EFFECTS OF PRIMING SOCIAL VALUES ON BEHAVIOURS RELATED TO OBSESSIONALITY

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Abstract

Introduction: Values have been widely researched within social psychology, particularly with regards to their effects on behaviour, but their application to mental health has been largely neglected. Some psychological therapies acknowledge the importance of values (e.g. Acceptance and Commitment Therapy) but their approaches to using values within therapies has not been empirically tested. The Schwartz model of values (Schwartz, 1992; Schwartz et al, 2012) has been demonstrated to be related to some mental health constructs and offers a potentially systematic way of understanding the dynamic relationships between values and mental health.

Aims: The current research aimed to investigate the relationship between obsessionality and values within a non-clinical sample, and to demonstrate the relationship between priming values and behaviours related to obsessionality. In doing so it draws upon the Schwartz model of values and the social psychology literature on the effects of priming values on value congruent behaviour. More specifically, it investigated whether individuals primed with obsessionality related values (conservation values) performed more obsessionality related behaviours and whether obsessionality related behaviours occurred more in those with high pre-dispositions of obsessionality. The role of responsibility beliefs and the importance of value centrality were also investigated.

Methods: A between-subjects experimental design was employed, with 90 participants (an obsessionality/conservation values prime group, n=30; a non-obsessionality/openness values prime group, n=30; and a control group, n=30). Univariate statistics, correlations and chi-square analyses were used to test the hypotheses. All participants completed a measure of values (PVQ-21), as well as measures of obsessionality (VOCI, SOAQ) and responsibility beliefs (RAS). All participants also completed two further tasks which incorporated obsessionality behaviours of checking, ordering and cleaning.

Results: The obsessionality values primed group demonstrated more cleaning behaviour than the controls and non-obsessionality primed group. Relationships between the priming tasks and other behaviours were not significant. Levels of obsessionality related behaviours were found to not significantly differ between those with high and low obsessionality or responsibility pre-dispositions. High levels of responsibility beliefs were found to be related to self-transcendence value priorities as expected but high obsessionality beliefs were not found to be significantly related to conservation value priorities.

Conclusions: This study provides empirical support for considering the values that individuals with obsessionality related difficulties hold, through demonstrating that bringing to mind obsessionality related values can lead to obsessionality related behaviour in a non-clinical sample. It also highlights the motivational underpinnings of obsessionality with regards to individuals needing substantial motivations to engage in obsessionality related behaviours in line with current conceptualisations of obsessionality related mental health difficulties. The results are discussed with reference to the existing literature and the clinical implications are outlined. The strengths and limitations of the research and ideas for future research are also presented.

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Chapter 1 - Introduction

1.1 THESIS OVERVIEW

The current study investigated the links between values and the construct of obsessionality. Chapter one introduces the concept of values and how they can motivate behaviour. It goes on to introduce values in relation to mental health problems, and focuses in on the construct of obsessionality. It also introduces the Schwartz model of basic values (Schwartz, 1992; Schwartz, 1994; Schwartz, Cieciuch, Vecchione, Davidov, Fischer *et al*, 2012) as a way to investigate values in relation to mental health constructs. This is followed by a systematic review which aims to investigate the evidence base for how priming values cognitively can lead to value congruent behaviour to demonstrate the utility of this methodology for the current study. It concludes with the outline for the current study and the hypotheses. Chapter two focuses on the methodology of the current study giving details of the procedures and measures used throughout. Chapter three presents the results of the study providing descriptive results first, followed by statistical analysis in relation to the hypotheses. Chapter four critically discusses the results of the study and considers the implications, the relationship to existing literature and clinical practice, directions for future research and the limitations.

1.2 INTRODUCTION TO STUDY

Values are relevant to many different psychological theories and therapies (i.e. Acceptance and Commitment Therapy, Hayes, 1994; Positive Psychology, Seligman & Csikszentmihalyi, 2000; Narrative Therapy, White & Epston, 1990; Person Centred/Client Centred Counselling, e.g. Rogers, 1951. However, while the topic of values has been a prominent area of research within social psychology, there is a relative lack of research in the area of values related to mental health.

This research aims to investigate how values are linked to the construct of obsessionality, in a non-clinical sample, by drawing on the Schwartz (1992, 2004; Schwartz *et al*, 2012) model of basic human values and existing research concerning the impact of activating values to motivate behaviour (e.g. Maio, Pakizeh, Cheung & Rees, 2009a; Verplanken & Holland, 2002; Karremans, 2007; Bargh, Gollwitzer, Lee-Chai, Barndollar & Trotschel, 2001; Hart & Albarracin, 2009).

The chapter will introduce the concept of social values and how they are defined. It will go on to introduce the Schwartz (1992, 1994; Schwartz *et al,* 2012) model of basic values, give details of how values can be measured and also how they can be activated to motivate behaviour. It will then focus on the relationship between values and mental health and the role of values in a range of therapies for mental health difficulties. An overview of obsessionality will then be provided including the definition and measurement of obsessionality and the relationship of obsessionality to values and other mental health variables.

The process of activating values will be put forward as a methodology for studying the link between values and behaviours in relation to obsessionality. A systematic review on the evidence base in relation to the role that activating values has on motivating behaviour will be presented. The chapter will then conclude with outlining the research questions and hypotheses of the current study.

1.3 CONCEPTUALISING AND DIFFERENTIATING VALUES

1.3.1 Defining values

There is generally common agreement among researchers that values represent desirable, trans-situational goals that serve as guiding principles in peoples' lives (e.g. Schwartz, 1994; Seligman, Olson & Zanna, 1996). There are several components that are believed to make up the concept of human values and which are implicit in the writings of many theorists (e.g. Feather, 1995; Inglehart, 1997; Rokeach,1973; Schwartz & Bilsky, 1987). Schwartz (1992) outlined these components as: 1) values are beliefs which are linked inextricably to affect, 2) values refer to desirable goals that motivate action, 3) values transcend specific actions and situations, 4) values serve as standards or criteria, and 5) values are ordered by importance.

In the early 1950s Allport, Vernon & Lindzey (1951) designed a typology of values in which peoples' 'stable preferences' for all kinds of private and societal behaviours were categorised. This early values structure relied on a conceptualisation of values

as fixed and stable elements which is far removed from the understanding of values today (e.g. Bardi & Schwartz, 2003).

Rokeach (1973; 1979) moved the focus towards the notion that each individual creates a very personal and flexible hierarchy out of the values available in their culture. He used the idea of terminal values which refer to desirable end-states of existence (goals we would like to achieve during our lifetime) and instrumental values which refer to preferable modes of behaviour (i.e. means of achieving the terminal values) to understand the individual's value structure. He postulated that the values individuals learn develop into a value structure over time through experiences in which two values are placed in conflict, forcing the individual to choose one value over the other (Rokeach, 1973).

There is evidence that the initial development of values is thought to occur through social interactions with role models such as parents and teachers (e.g. Parks & Guay, 2009). However, there are many factors that can contribute to the values an individual will develop with the individual's needs (e.g. Maslow, 1954), traits, temperament, culture (e.g. Meglino & Ravlin, 1998), socialisation (e.g. Schwartz & Bardi, 1997), and personal experiences (e.g. Rokeach, 1973; Schwartz, 1992; Inglehart, 1997) all playing a part (Bardi & Goodwin, 2011).

Building on the work of Rokeach, Schwartz (Schwartz, 1992; Schwartz *et al*, 2012) has moved values research into new territory with the development of his circular model of values which provides a framework for how values are related to each other in terms of their underlying motivations. Various researchers have commented on the theoretical and empirical grounding of the Schwartz model (e.g. Silfver, Helkama, Lonnqvist & Verkasalo, 2008; Parks & Guay, 2009; Maio *et al*, 2009a). To develop it, Schwartz chose values and value items based on a large quantity of empirical data from different cultures around the world. Schwartz then performed multidimensional scaling of these data and identified a set of values that are understood similarly across various cultures (Schwartz, 1992; 1994; Schwartz & Savig, 1995). This means that there is a cross cultural consensus on which of these values are compatible and which are in conflict. The Schwartz model is described in further detail below.

1.3.2 Schwartz model of values

The original theory of basic human values developed by Schwartz (1992) included ten motivationally distinct, broad and basic values that were seen to be derived from three universal requirements of the human condition: needs of individuals as biological organisms, requisites of coordinated social interaction, and survival and welfare needs of groups (Schwartz, 1992; 1994; Schwartz *et al*, 2012). These ten values are intended to include all the core values recognised in cultures around the world. Each of the ten values can be characterised by describing its central motivational goal which are outlined in Table 1.1 below. There are also individual values that fit within the ten broad basic values and examples of these are also included in Table 1.1.

The unique characteristic of the Schwartz values theory is that it offers a way of understanding the relationships between different values rather than looking at each value in isolation. As noted by previous values theorists (i.e. Rokeach, 1973) individuals potentially develop their own values system through choosing certain values over others in different situational contexts. Schwartz attempts to give evidence for this theory by developing it further and proposing a coherent system of dynamic relations underlying the 10 basic values which can help to explain individual decision making, attitudes and behaviour (Schwartz, 1992; 1994; Schwartz *et al*, 2012). This extended theory postulates that some values are more closely linked with regards to their motivational goals than others. For example, pursuing conformity values may be compatible with the pursuit of security values as seeking to fit in and conform to one's social group is likely to be closely related to maintaining the stability of the social group and feeling safe (Schwartz, 1992). In contrast, the pursuit of self-direction values may conflict with the pursuit of conformity values as seeking to be creative and pursuing independence may obstruct actions aimed at following social expectations and norms (Schwartz, 1992; Maio *et al*, 2009a).

Table 1.1 – motivational goals of the ten basic values (and examples of individual values incorporated within the broad basic values) (Schwartz, 1994, pp 22; Schwartz, Sagiv & Boehnke, 2000, pp316).

Basic Value	**Motivational goal *(individual values)***
Self-Direction	Independent thought and action - choosing, creating, exploring *(creativity, freedom, curious, independent, choosing own goals)*
Stimulation	Excitement, novelty and challenge in life *(daring, a varied life, an exciting life)*
Hedonism	Pleasure and sensuous gratification for oneself *(pleasure, enjoying life, self-indulgent)*
Achievement	Personal success through demonstrating competence according to social standards *(successful, capable, ambitious, influential)*
Power	Social status and prestige, control or dominance over people and resources *(social power, wealth, authority, preserving public image)*
Security	Safety, harmony, and stability of society, of relationships and of self *(family security, national security, social order, clean, reciprocation of favours, sense of belonging)*
Conformity	Restraint of actions, inclinations and impulses likely to upset or harm others and violate social expectations or norms *(obedient, self-discipline, politeness, honouring parents and elders)*
Tradition	Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provide the self *(accepting my portion in life, devout, respect for tradition, humble, moderate)*
Benevolence	Preserving and enhancing the welfare of those with whom one is in frequent personal contact *(helpful, forgiving, honest, loyal, responsible)*
Universalism	Understanding, appreciation, tolerance and protection for the welfare of all people and for nature *(social justice, broadminded, world at peace, wisdom, a world of beauty, unity with nature, protecting the environment, equality)*

Schwartz (1992) used data from 67 countries to investigate the overall structure of values across cultures and Figure 1.1 below displays the circular structure that was subsequently described. The circular arrangement is a continuum of motivations rather than each value being a discreet entity (Schwartz, 1992; Davidov, Schmidt & Schwartz, 2008). The closer two values are in either direction around the circle, the more similar their underlying motivations and the more distant from each other the values are, the more conflicting their underlying motivations.

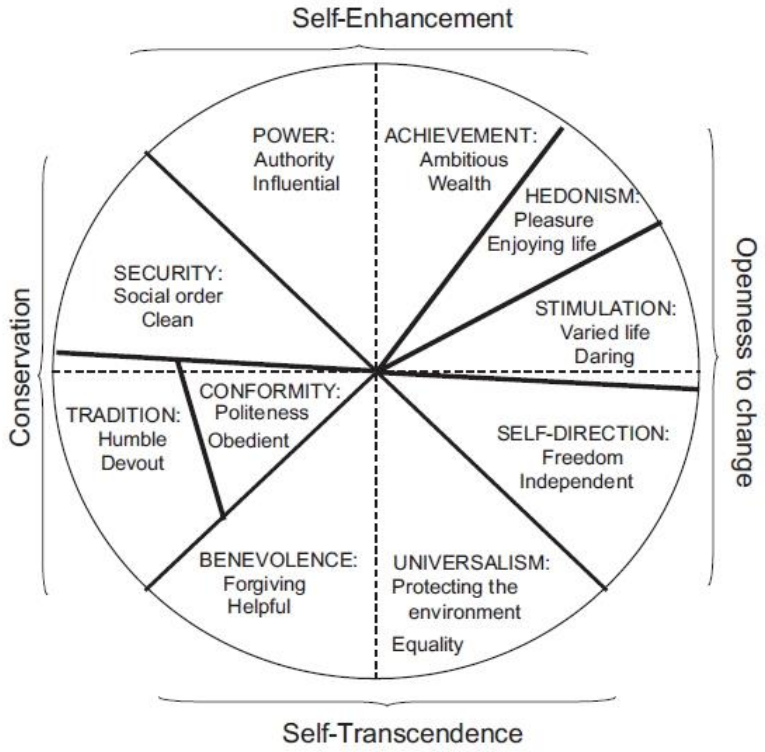

Figure 1.1 – Circular structure of the Schwartz values theory (Schwartz, 1992)

The structure shown in Figure 1.1 can also be described with reference to two orthogonal dimensions. The self-enhancement versus self-transcendence dimension places power and achievement values as opposed to universalism and benevolence values. Both of the former emphasise the pursuit of self-interests, whereas both of the latter involve concern for the welfare and interests of others. The conservation versus openness to change dimension places security, conformity and tradition values as opposed to self-direction and stimulation values. All of the former emphasise self-restriction, order and resistance to change whereas both of the latter emphasise independent action, thought and feeling and readiness for new experience. Hedonism is thought to share elements with both openness and self-enhancement (Schwartz, 1992; 1994; Schwartz *et al*, 2012).

Supporting evidence for this motivational structure has been found in multiple studies (e.g. Schwartz, 1992, 1994; Schwartz & Boehnke, 2004; Vecchione, Casconi & Barbaranelli, 2009; Bilsky, Janik & Schwartz, 2011; Cieciuch & Schwartz, 2012). This research points to broad underlying motivations that may constitute a universal principle that organises value systems. This makes the model applicable across cultures and research has indicated that while there can be differences in value

priorities across cultures the structure beneath the values systems is still the same (e.g. Schwartz, 1992, 1994, 1999). The same also holds true for there being individual differences in value structures (e.g. Fischer & Schwartz, 2011) as well as possible gender differences (e.g. Schwartz & Rubel, 2005). Generally, it has been found that people may differ substantially in the importance they attribute to the different values that comprise the ten basic values (see Table 1.1), but the same structure of motivational oppositions and compatibilities apparently organises their values (Schwartz, 1992; 1994).

This integrated motivational structure of relations among values makes it possible to study how whole systems of values, rather than single values, relate to other variables which has been an area of interest for much research. For example, Pakizeh, Gebauer & Maio (2007) have shown that the circular nature of the model reflects not just conscious decisions but also the way that values are represented in memory i.e., people rate a second value in terms of importance quicker when the two values are directly related or directly opposing rather than intermediate. Other research has demonstrated that the structure of intra-individual value change occurs in line with the circular structure of motivations such that when one value changes in importance the ones closest to it in the Schwartz (Schwartz, 1992; 1994; Schwartz *et al*, 2012) values structure will also change (Bardi, Lee, Hofmann-Towfigh & Soutar, 2009).

More recently Schwartz has refined his values theory to include further basic values and further overarching motivational dimensions to the circular structure (Schwartz, 2006, 2009; Schwartz *et al*, 2012). This followed on from evidence that some of the existing values had more than one conceptually distinct component which might be better represented by being separate values (e.g. Caprara, Schwartz, Capanna, Vecchione & Barbaranelli, 2006; Vecchione, Caprara, Schoen, Gonzalez-Castro & Schwartz, 2012) and recently Schwartz *et al* (2012) demonstrated that there is evidence for 19 distinct values within the revised model. Figure 1.2 illustrates these 19 values and also shows the overarching motivational dimensions. It can be seen that the conservation and self-enhancement quadrants together form an anxiety related motivation. That is, a motivation to perform actions and pursue goals that are related to pursuing self-protection and avoiding anxiety. In contrast the openness to

change and self-transcendence quadrants form an anxiety free motivation related to self-expansion and growth rather than protection (Bilsky, Janik & Schwartz, 2011). The other dimension that Schwartz suggests in his revised model is that conservation and self-transcendence quadrants form a society based motivation whilst openness to change and self-enhancement quadrants form an individual based motivation. Within this motivational dimension the motivation to develop as an individual versus a motivation to fit in with society and look after others is at play.

Figure 1.2 – Revised model of basic human values (Schwartz *et al*, 2012, pp 669)

Evidence for these over-arching motivations has been demonstrated. For example, Schwartz, Sagiv & Boehnke (2000) investigated value priorities and the correlations with worry about societal problems by asking participants across five nations to complete questionnaire measures of their value priorities and worries related to seven life domains. They found that the extent to which respondents worried about issues such as poverty, hunger and destruction of the environment was strongly positively correlated to universalism values with other positive correlations with the other socially oriented values (see left side of Figure 1.2). The personal focus values in contrast (see right side of Figure 1.2) were all negatively correlated with the same worries (Schwartz *et al*, 2000).

In terms of the anxiety dimension, Schwartz *et al*, (2012) suggest that pursuit of conservation and self-enhancement values (bottom section of Figure 1.2) is generally intended to serve the motivation of coping with anxiety due to uncertainty in the social and physical world. For example, people may seek to maintain social order (security values - conservation) and control threat (power values – self-enhancement). With reference to this, Schwartz, Sagiv & Boenke (2004) found significant positive correlations between personal worries (such as concern about own personal health, safety, success and finances) and self-enhancement values and negative correlations with self-transcendence values and some openness values which offers some support for this anxiety dimension.

Indeed, further evidence from the European Social Survey (ESS) adds support to the assumption that conservation and self-enhancement values reflect greater personal anxiety than self-transcendence and openness values (top section of Figure 1.2) (Bilsky, Janik & Schwartz, 2011). The ESS is carried out with representative national samples from at least 24 countries throughout Europe and incorporates a measure of the Schwartz basic values. Analysing this data, Bilsky *et al* (2011) pointed to patterns of correlations between values and certain questions from the ESS to support the anxiety dimension. For example, questions such as “how happy are you?”, “how satisfied are you with life as a whole?” and “how often have you felt cheerful and in good spirits in the last two weeks?” were correlated positively with all self-transcendence and openness values and negatively with all conservation and self-enhancement values. This indicates that those individuals pursuing conservation and self-enhancement values may be putting their available resources in directions associated with generally trying to cope with life rather the pursuing wider well-being.

In support of this, Schwartz (2008) also relates the structural opposition between conservation and openness values to Higgins’ (1997) two basic regulation systems. Conservation values are proposed to motivate self-regulation of the avoidance of punishment and prevention of loss in line with one of Higgins’ (1997) systems. Security needs, obligations and the threat of loss trigger this system which is in line with the underlying motivations of the conservation quadrant as these values guide attention and action to avoid or overcome actual or potential danger (Schwartz *et al*,

2012). Openness values in contrast are believed to motivate self-regulation of the pursuit of rewards and promoting gain in line with the second of Higgins' (1997) systems. Nurturance needs, ideals and opportunities to gain trigger this system which is in line with openness values as these guide attention and action to rewarding social, intellectual and emotional opportunities (Schwartz *et al*, 2012).

To support this, Van-Dijk & Kluger (2004) found that manipulations of promotion and prevention had the same effects as manipulations of openness and conservation values respectively. In the first part of their experiment they manipulated the context of a scenario based measure such that participants were focused on a promotion (attainment) goal or a prevention goal and then gave them either positive or negative feedback on their performance to see what effects this had on subsequent ratings of effort. It was found that those in the promotion condition who received positive feedback were likely to exhibit more effort as were those in the prevention condition who received negative feedback (Van-Dijk & Kluger, 2004). In their second study, Van-Dijk & Kluger (2004) found that those who had openness value priorities responded more strongly to positive feedback in terms of effort while those with conservation value priorities responded more strongly to negative feedback in line with the postulated link between Higgins' (1997) self-regulation systems and the conservation and openness values motivational underpinnings (Schwartz *et al*, 2012).

Schwartz *et al* (2012) argue that the recent model provides greater precision of prediction and explanation for a diverse set of attitudes and beliefs than the original theory. They also provide evidence that the 19 values model can still be collapsed into the original 10 values model and the four quadrants (Schwartz *et al*, 2012) and as such can add to the original model without invalidating it. Likewise, whilst the overarching dimensions were not explicitly identified in the original model, they can still be related to the motivations underlying the 10 values as well as the 19 values due to the expanded model being based on the pre-existing model (Schwartz *et al*, 2012). As yet, there is no empirical evidence to support the assumption that the 19 values model can better predict or explain behaviours than the original model, and as such the original values model is focused on within this research whilst taking account of the overarching categories that have more recently been identified.

1.3.3 Measuring Values

There are several measures available for determining an individual's values. These include the Rokeach Values Survey (RVS, 1968) which is based on the values identified by Rokeach (1968; 1973), and more recently measures based on the Schwartz (1992) basic values theory; the Schwartz Values Survey (SVS; Schwartz, 1992) and the Portrait Values Questionnaire (PVQ; Schwartz, 1994).

Generally, one of the main difficulties when considering the measurement of values is the social desirability of responses and the issue that all values can be deemed by the majority of participants as being important to them. This is related to the values as 'truisms' hypothesis work of Maio & Olsen (1998) which has shown that individuals will usually strongly support any given value as being important without necessarily having coherent arguments or evidence for why those values are important (Maio & Olsen, 1998; Karremans, 2007). Indeed, Schwartz (1992) found in pre-tests of the SVS that respondents rated most values as being from mildly to very important to them which has important implications for developing measures that are meaningful and prompted Schwartz to account for this in the response format of the final version of the SVS as described further below.

Main measurement approaches are based on either a ranking procedure (as used in the RVS) or a Likert response scale (used for the SVS and PVQ). The ranking system has ecological validity in the sense that individuals are asked to place one value as being more important than another in much the same way as someone would choose one value over another in everyday situations (Parks & Guay, 2009). However, a ranking system limits the statistical analyses that can be carried out and is potentially more difficult to administer to respondents, particularly outside of the laboratory context.

There are also difficulties with a Likert response as the social desirability of the values being measured can lead to a positive bias in value responses (Schwartz, 1992) and there are more general difficulties in that one individual may use a Likert scale very differently from another individual (e.g. Schwartz, 2005). However,

Schwartz (2005) suggests methods for overcoming biased responding such as by standardising the scores for each individual (see methods section 2.6.3.2).

Utilising a values measurement tool that is based on the Schwartz model (Schwartz 1992, Schwartz *et al* , 2012) allows for outcome data to be interpreted in line with the theoretical underpinnings of this. Both the SVS and the PVQ have been investigated in terms of their psychometric properties, especially in relation to how well they fit with the Schwartz model (e.g. Schwartz & Boehnke, 2004; Hinz, Brahler, Schmidt & Albani, 2005; Vecchione, Casconi & Barbaranelli, 2009).

The SVS includes items that express an aspect of the motivational goal of one value from the original model, for example in item 1, equality (equal opportunity for all) would be expressing the value of universalism (See Figure 1.1 and Table 1.1). Respondents are asked to rate the importance of each value item as a guiding principle in their life on a 9 point scale from 'of extreme importance' through to 'opposed to my values.' The scale is non-symmetrical to allow more answer options around the 'important' end of the scale on account of the positive response bias seen when developing the measure (Schwartz, 1992). The score for the importance of each value is the average rating given to items related to each value. The number of items related to each value differs from three (hedonism) to eight (universalism) reflecting the conceptual breadth of the values as can be seen in Table 1.1. Using both multi-dimensional scaling and confirmatory factor analysis methods, the SVS has been found to be a valid measure in terms of its convergent and discriminant validity as well as in terms of its relationship to the proposed model of underlying motivations (e.g. Schwartz & Boehnke, 2004; Fontaine, Poortinga, Delbeke & Schwartz, 2008; Schwartz, 1994, 2006).

The Portrait Values Questionnaire (Schwartz, 1994) is an alternative to the SVS developed to be less cognitively demanding (as the SVS is considered to be a very abstract measure of values) in order to measure the ten basic values (Figure 1.1) in samples of children, the elderly and those not educated in Western schools (Schwartz, 1994; Schwartz, 2006; Schwartz *et al,* 2001). This questionnaire was also developed in order to assess whether the values theory is valid independent of the SVS method of data gathering and to provide a more implicit way of measuring

values. The measure includes short verbal 'portraits', gender-matched with the respondent. Each portrait describes a person's goals, aspirations or wishes that point implicitly to the importance of a value (e.g. Item 3 – *It is important to her that every person in the world be treated equally. She believes that everyone should have equal opportunities in life*). Respondents answer 'how much like you is this person?' and respond from 'very much like me' through to 'not like me at all'. Respondents' own values are inferred from their self-reported similarity to people described implicitly in terms of particular values. This measure therefore captures the person's values without explicitly identifying values as the topic of investigation. The number of portraits corresponding to each value varies from three to six, again reflecting the conceptual breadth of the values as with the SVS. Evidence from multi-dimensional scaling and confirmatory factor analysis studies gives support for the PVQs convergent and discriminant validity (e.g. Schwartz, 2005; Schwartz *et al*, 2001) and its proposed underlying structure (e.g. Vecchione *et al*, 2009; Cieciuch & Schwartz, 2012; Cieciuch & Davidov, 2012) although there is some evidence that the structure of the four quadrants is more strongly supported than that of the individual values (Hinz, Brahler, Schmidt & Albani, 2005).

The PVQ was also adapted for use in the European Social Survey (ESS). The ESS version includes 21 PVQ items some of which have been revised in order to better cover the content of the ten basic values (Schwartz, 2003). The 21 item ESS version was developed in order to capture the conceptual breadth of the ten basic Schwartz values rather than to gain homogeneity in distinguishing between the ten values. This has led to some concerns about its discriminant validity (e.g. Davidov, 2010; Davidov, Schmidt & Schwartz, 2008) although Bilsky, Janik & Schwartz (2011) analysed data from three rounds of the ESS and concluded that the vast majority of their analyses support the Schwartz (1992) circular model of human values. However, it has been recommended by some researchers (e.g. Hinz *et al*, 2005; Verkasalo, Lonnqvist, Lipsanen & Helkama, 2009) that individual value scores from the PVQ-21 should be collapsed into a more general 'quadrant' score rather than being used as individual scores. This method has been shown by Verkasalo *et al* (2009) to provide an extremely robust two-dimensional structure which heightens the reliability of the 10 basic values being presented on their own. They note the difficulty with reliability of the short PVQ in being able to measure all ten basic values

and instead advocate for investigating the two value dimensions. The difficulties with the discriminant validity have been found to be within the separate quadrants rather than across quadrants (i.e. there is weak discriminant validity between conformity and tradition value items on the questionnaires but both of these values fall within the quadrant of 'conservation' rather than being values within two separate quadrants – see Figure 1.1).

It is important to have effective and valid instruments available for measuring values in order to be able to investigate links between values and other concepts (e.g., personality, attitudes and emotions) and behaviour, and to be able to interpret relationships between these variables. The Schwartz theory (Schwartz 1992; and Schwartz *et al* 2012) provides a useful framework for understanding the relationship between values and behaviours in terms of the underlying motivational conflicts. As such the PVQ and SVS are both useful measures of values when utilising this theory and have been considerably researched in terms of their validity (e.g. Schwartz & Boehnke, 2004; Schwartz, 1994, 2006; Vecchione *et al*, 2009; Cieciuch & Schwartz, 2012; Bilsky *et al*, 2011). However, the PVQ has advantages over the SVS as it is a more implicit measure of an individual's values which is less abstract to complete (Schwartz, 2003) and it also offers a short form version that has evidence for its utility (e.g. Bilsky *et al*, 2011; Verkasalo *et al*, 2012).

1.3.4 The purpose of values

Evidence suggests that people attach great importance to their values as behavioural guides and see them as central to their self-identity (e.g. Feather, 1990; Maio & Olsen, 1998; Schwartz, 1992; Seligman & Katz, 1996; Verplanken & Holland, 2002).

As such, our value priorities can affect choices about ordinary activities such as which newspapers we read and which films we watch (Allport, Vernon and Lindzey, 1951), which university course we apply for (Feather, 1988), which political parties we vote for (Helkama, Uutela & Schwartz, 1991; Schwartz, 1996) and which career choices we make (Feather & O'Brien, 1987; Dawis, 1991). These value-based choices, in turn, can create life circumstances to which we may also then adapt our values. For example, Schwartz & Bardi (1997) show that people upgrade the

importance of values that they can readily attain while downgrading the importance of values, the pursuit of which, are blocked. This also supports the view that unlike concepts such as needs or traits there is an element of choice in our values (Roccas, Sagiv, Schwartz & Knafo, 2002) and that our individual values systems can be flexible depending upon our circumstances at any given time such that we will prioritise different values relative to the situation we find ourselves in (Rokeach, 1973; Schwartz, 1992; Schwartz *et al*, 2012).

There is also evidence from work by Feather (1982a, 1982b & 1995) that the values people hold affect their initiation of new goal-directed activities, the degree of effort that they put into an activity, how long they persist at an activity in the face of alternative activities, the choices they make between alternative activities, and how they feel when an activity is undertaken (Feather, 1982a, 1982b, 1995).

However, there is conflicting evidence around whether values predict intentional behaviours. Some studies provide strong correlations between values and value congruent behaviours (e.g. Bardi & Schwartz, 2003; Savig & Schwartz, 1995; Schwartz, 1996) indicating that there is a link, while others find values to be poor predictors of behaviours (e.g. Kristiansen & Hotte, 1996). Subsequently, there has been much research attempting to identify which factors can mediate the relationship between values and behaviours (e.g. Karremans, 2007; Maio, Olsen, Allen & Bernard, 2001; Maio & Olson, 1995; Eyal, Sagristano, Trope, Liberman & Chaiken, 2009; Pozzebon & Ashton, 2009). Generally the evidence suggests that values only affect behaviour when they are activated in some way, such as through a priming procedure where the value is bought into the individual's mind via an experimental task (e.g. Verplanken & Holland, 2002; Maio *et al*, 2009a; Parzuchowki & Wojciszke, 2014).

1.3.5 Activating Values

Activation refers to a process whereby the value and its related concepts are 'primed' or 'readied for action' cognitively. Maio (2010) views values as mental representations that are available to us under certain circumstances (i.e. when we think about our values or when they are activated) while Schwartz & Bilsky (1987) defined them as cognitive structures (beliefs) that can be retrieved from memory

when needed. These conceptualisations of values as cognitive structures are congruent with the theory of 'spreading activation' which suggests that activating one concept cognitively spreads to activate other related concepts as well (e.g. Quillian, 1962, 1967; Collins & Loftus, 1975; Bargh, 1996; Shroder & Thagard, 2012).

There has been research to suggest that typical instantiations of values (i.e. more widely recognised examples) are more likely to lead to value congruent behaviour than atypical instantiations. For example, Maio, Hahn, Frost & Cheung (2009) primed participants with a typical instantiation of the value equality (a black person) or an atypical instantiation of the value equality (a left-handed person) and found that those primed with the typical instantiation were more likely to engage in egalitarian behaviour (allocating points more fairly between groups) than those primed with atypical instantiations. This suggests that priming the typical instantiation led to higher levels of activation because the concept was more recognisable as an example of a discriminated against population and so activation was more likely to spread to other related concepts of equality and fairness. The atypical instantiation in contrast may not be a concept that the participant had considered before in relation to equality meaning that spreading activation to other related concepts was less likely to occur (Maio *et al*, 2009b). There is also evidence to suggest that values that are most important to us are more accessible (e.g. Bardi, 2000), hence the effects of value centrality seen in many studies (eg. Verplanken & Holland, 2002).

There are several levels of priming that have been put forward by researchers as being capable of activating values in this way (e.g. Bardi & Goodwin, 2011; Petty & Cacioppo, 1986; Maio & Thomas, 2007). Generally there are conscious (effortful) methods, such as using persuasion or asking people to give arguments as to why certain values are important to them (e.g. Maio *et al*, 2009a; Karremans, 2007), and unconscious (non-effortful) methods, such as implicit priming tasks where an individual is asked to complete puzzles or word tasks themed around a specific value (e.g. Bargh, 2001; Hart & Albarracin, 2009; Verplanken, 2002; Maio *et al*, 2009a). There are also subliminal (non-effortful) methods where participants are asked to complete a task on a computer with subliminal primes flashed onto the screen (e.g. Neuberg, 1988; Smeesters, Wheeler & Kay, 2009). Generally all of these

techniques have shown that they can be used successfully not only to prime values but to lead to value congruent behaviours.

1.3.6 Summary of values section(s)

Values have been defined as trans-situational, motivational concepts (Schwartz, 1994) that can be linked to behaviour via mechanisms such as mental activation i.e. through priming tasks (e.g. Verplanken & Holland, 2002; Maio *et al*, 2009a,b). The Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) has been empirically investigated by multiple researchers (e.g. Schwartz & Boehnke, 2004; Fontaine *et al*, 2008; Vecchione *et al*, 2009; Cieciuch & Schwartz, 2012; Cieciuch & Davidov, 2012) and has been used successfully in studies to understand the motivational conflicts underlying values and the subsequent effects of this on behaviour (e.g. Maio *et al*, 2009a, Karremans, 2007).

The Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) has also been explicitly linked to affect in terms of an underlying anxiety motivation dimension (Schwartz 2006, 2009; Schwartz *et al*, 2012). Evidence for this dimension suggests that there are certain values (i.e. conservation quadrant values) that are linked to a motivational need to protect against or avoid anxiety (e.g. Van-Dijk & Kluger, 2004). There are also links between the anxiety dimension of the Schwartz model and general well-being (Bilsky *et al*, 2011) as well as relationships to more specific worries (Schwartz, Sagiv & Boenke, 2004).

As we know that values can affect behaviour (e.g. Maio *et al*, 2009a, Karremans, 2007) and that certain values are related to anxiety (Schwartz *et al*, 2012; Schwartz, Savig & Boenke, 2004) it is also possible that values can affect behaviours related to our mental health and well-being. Indeed, several therapies for mental health difficulties utilise values as part of therapy (e.g. Acceptance and Commitment Therapy; Hayes, 1994; Positive Psychology; Seligman & Csikszentmihalyi, 2000). This will be explored further in the following section.

1.4 VALUES AND MENTAL HEALTH

1.4.1 Overview

This section demonstrates that values have a role to play within a mental health context by evidencing that the use of values in a therapeutic context is widespread and potentially extremely useful. It also shows that at present there is a discrepancy between the ways that values are conceptualised within therapeutic contexts especially when compared with the general psychological literature around values and mental health and that current measures of values utilised within therapies are not empirically grounded. This section also demonstrates that values have an important role to play in mental health by presenting evidence for links between values and mental health concepts.

1.4.2 Role of values in therapies for mental health difficulties

Many different therapies incorporate values as part of their approach to working with individuals with mental health difficulties. For example, Acceptance and Commitment Therapy (ACT; Hayes, 2004; Hayes, Strosahl & Wilson, 1999); Narrative Therapy (White & Epston, 1990) ; Person-Centred/Client Centred Counselling (e.g. Rogers, 1951) and Positive Psychology Approaches (Seligman & Csikszentmihalyi, 2000) all use values in some way within their frameworks as do many others. The common factor between all these therapies is that they seek to connect the individual with their value priorities in order for the individual to use these values to promote their well-being. The method that the therapies utilise to do this as well as the extent to which this values work is the focus of the therapy varies.

For instance, ACT (Hayes, 2004; Hayes, Strosahl & Wilson, 1999) focuses on moving an individual in a valued direction by helping them to build larger patterns of effective behaviour and helping them to experience what they feel and think 'as it is' and not 'as it says it is.' Hayes (1994) views values as qualities of action that can be instantiated in behaviour but not possessed like an object (i.e. values direct us towards goals and goal directed behaviour but are not the goals themselves). ACT encourages clients to list values in different domains which then become the basis for setting achievable goals, performing concrete actions and living a 'valued life'. Wilson & Murrell (2004) note that "… there is no good science that tells us precisely

how, in behaviour therapy, we can access the relative importance of these valued domains and harness them fully to our treatments" (pp 135; Wilson & Murrell, 2004). Generally values are derived within ACT through conversations between the therapist and client although there are several value clarification tools that have been designed to support this process. For example, Hayes, Strosahl & Wilson (1999) developed a values assessment tool which asks clients to define values from nine domains; intimate relationships, family relations, friendships, career, education, recreation, spirituality, citizenship and health. Other measures have since been designed which tend to focus on the same domains generally such as the Valued-Living Questionnaire (VLQ; Wilson, Sandoz, Kitchens & Roberts, 2010) which looks at 10 domains, Hayes *et al*'s (1999) original nine domains and a parenting domain, and the Values Compass (Dahl, Plumb, Stewart & Lundgren, 2009) which provides the client with a visual summary of their values and current ratings with regards to how consistently they are living their lives in line with their values. Tools such as the VLQ (Wilson *et al*, 2010) give a more standardised method to identifying values that could assist with further research in this area. However, these measures were not empirically derived but have rather been developed by practitioners as tools to support their work with clients in therapy (Hayes, 2004). Therefore, it is unclear whether these tools are valid measures beyond the fact that they appear to have ecological validity and make sense for clients.

Positive Psychology (e.g. Seligman & Csikszentmihalyi, 2000) utilises the Values In Action Inventory of Strengths (VIA-IS; Seligman, 2001) which is conceptualised as identifying character strengths or virtues that the individual person may value. These 'character strengths' are then utilised in a similar way to ACT by giving valued direction to behaviours to increase positive affect and meaning in an individual's life. Whilst Peterson & Seligman (2004) do not conceptualise these 'character strengths' as values explicitly, there are considerable overlaps between the 24 character strengths and the value domains identified by Schwartz (1992, 1994; Schwartz *et al*, 2000). For example, character strengths measured by the VIA-IS include 'fair, kind, modest, leadership, learning, perseverance' and so on. Many of these can be seen in Table 1.1 (section 1.3.2) which outlined the individual items that underlie the 10 Schwartz (1992, 1994; Schwartz *et al*, 2000) basic values.

Also, within the area of positive psychology, there has been some research into the links between character strengths and concepts such as life satisfaction which suggests reliable and robust links between the character strengths of hope, vitality, gratitude, love and curiosity with higher life satisfaction (Park, Peterson & Seligman, 2004). More widely, there has also been research into whether the VIA-IS can be used to determine a universal human nature in terms of commonalities across cultures. This has stemmed from similar responses on the VIA-IS being found among large samples of US respondents (Park *et al*, 2004; Peterson *et al*, 2006) and UK respondents (Linley, Maltby, Wood, Joseph, Harrington, *et al*, 2007). However, this research appears to be in its infancy and the possible links with theories of human values appears to have been largely ignored although Peterson & Seligman (2004) acknowledge that this is a useful direction to consider.

Within narrative therapy (White & Epston, 1990) values, along with intentions, hopes and commitments, are used to 'thicken' life stories meaning that they are used to give more meaning to the stories that the client tells about themselves and their lives. This is used to give alternative directions in life that have meanings that are removed from whatever the 'problem' was that they were seeking therapy for. In the narrative therapy context there is a general lack of empirical evidence (Etchison & Kleist, 2000) and there is no conceptualisation of values beyond however values are understood by the individual as the therapist does not exert their own understanding of concepts such as values onto the client (White & Epston, 1990). This is a similar approach to that which might be taken in person-centred Counselling (e.g. Rogers, 1951) with regards to the use of values in therapy. As such, there appears to be little empirical evidence with regards to the approach these therapies take to utilising values.

There do appear to be conceptual links between values within ACT (Hayes, 1994) and positive psychology (Seligman & Csikszentmihalyi, 2000) and values within the Schwartz model (Schwartz, 1992, 1994, Schwartz *et al*, 2012). Particularly, Hayes (1994) considers values to be trans-situational in much the same way as Schwartz (1992, Schwartz *et al*, 2012) conceptualises values. It is also of interest that both ACT and positive psychology use values as a way of setting behavioural goals in terms of clients living their lives in meaningful value directed ways (Hayes, 1994;

Hayes *et al*, 1999; Seligman & Csikszentmihalyi, 2000). This suggests that values are considered to have motivational underpinnings within these therapies that can affect behaviour consistent with the Schwartz theory (Schwartz, 1992, 1994; Schwartz *et al*, 2012) and evidence of the effects of priming values on behaviour (e.g. Maio *et al*, 2009a,b; Verplanken & Holland, 2002; Karremans, 2007). Due to these potentially converging conceptual understandings of values it would be useful to consider the utility of the Schwartz model (1992; Schwartz *et al*, 2012) within the domain of mental health. This could provide the ACT and positive psychology approaches with the empirical grounding with regards to their understanding of values that currently appears to be lacking (e.g. Wilson & Murrell, 2004).

1.4.3 Relationship between values and mental health

There has been research into the relationship between values and several constructs relevant for mental health such as general wellbeing (e.g., Bilsky & Schwartz, 1994; Schwartz, 2011; Joshanloo & Ghaedi, 2009), self-esteem (e.g., Lonnqvist, Verkasalo, Helkama, Andreyeva, Benzmenova *et al*, 2009), worry (e.g., Schwartz, Sagiv & Boehnke, 2000) and emotions (Sortheix, Olakivi & Helkama, 2013; Silfver *et al*, 2008).

There are several avenues of research into how values affect well-being. The first takes the perspective that there are healthy values and unhealthy values, in that some values are more positively related to well-being while others are negatively related (Deci & Ryan, 2000). There is indeed evidence that having strong self-direction values, which emphasise independent thought and action, generally predicts higher well-being while other values such as power, which emphasise the need for control over others and social prestige, predicts lower well-being (Bilsky & Schwartz, 1994; Schwartz, 2011). Considered in a slightly different way there is evidence that intrinsic values (those that promote acceptance and affiliation, such as self-transcendence values) benefit well-being while extrinsic values (focused on material success and fame, such as self-enhancement values) tend to harm well-being (e.g. Kasser & Ahuvia, 2002; Kasser & Ryan, 1996; Vansteenkiste, Durietz, Simons & Soenens, 2006).

However, there is conflicting evidence as to which values are related to positive well-being and this is further complicated by different definitions of well-being used in different research. For example, Joshanloo & Ghaedi (2009) investigated hedonic (happiness/pleasure) and eudaimonic (living well and actualising potential) aspects of well-being in relation to values within a sample of university students. They found that there were more significant relationships between values and the social aspect of eudaimonic well-being than for the psychological aspect of eudaimonic or hedonic well-being. They also found results that were generally inconsistent with their predictions based upon the Schwartz model and they concluded that future research should be clear on which aspects of well-being they are attempting to measure.

Another area of research into values and well-being is around value discrepancies (e.g. Savig & Schwartz, 2000). This approach suggests that when the individual's values do not adhere to the values they perceive as being dominant in the environment it can cause affective responses (such as anxiety and low mood) which have a negative effect on well-being (Savig & Schwartz, 2000; Lonnqvist *et al*, 2009). Consistent with this, individual value structures have been theorised to be flexible, such that we are capable of changing our value priorities to enable us to pursue values which are open to us while downgrading the importance of values of which our pursuit is blocked (Schwartz & Bardi, 1997). This has been postulated to be due to the fact that experiencing value discrepancies is uncomfortable to experience as it causes adverse affective responses (e.g. Rees & Maio, 2009; cited in Maio, 2010).

Many researchers and theorists have highlighted the strong emotional component of values (e.g. Maio & Olsen, 1998; Schwartz, 1992; Schwartz *et al*, 2012). There is evidence that individuals can experience dejection or agitation when beliefs about their values are manipulated so that they believe there are discrepancies between which values they think are important to them and which values the researchers report are important to them from questionnaire measures (Rees & Maio, 2009; cited in Maio, 2010). Maio *et al* (2009b) have also demonstrated using a computer based task that participants are quicker to link emotions to values than they are to link cognitions or behaviours to values. The authors suggest that this demonstrates that we have stronger emotional links to our values than cognitive or behavioural links as our emotional links appear to be activated faster.

In terms of the Schwartz theory of values (Schwartz, 1992, 1994; Schwartz *et al*, 2012) there is evidence that certain emotional concepts, such as guilt and empathy, are strongly related to certain values and more weakly related to others in patterns consistent with the circular values model (Silfver *et al*, 2008). In their research, Silfver *et al* (2008) asked participants to complete the SVS along with measures of guilt, shame and empathy (which included a measure of personal distress) and then investigated the correlations between values and the emotional measures. They found that guilt and empathy were positively related to universalism, benevolence, tradition and conformity values and negatively related to power, hedonism, stimulation and self-direction values. Other concepts such as shame and personal distress were only weakly related to values of any kind which the researchers suggest reflects the fact that voluntary control is less important for these concepts compared to the others (Silfver *et al*, 2008). They conclude that generally self-transcendence and conservation values appear to be compatible with pro-social emotional tendencies such as guilt and empathy while self-enhancement and openness do not. This would support the Schwartz model's (Schwartz *et al*, 2012) overarching dimension of social focus versus personal focus (see Figure 1.2) by suggesting that there are certain emotional responses which occur in relation to other people and that individuals who more strongly endorse pro-social values will experience these emotions to a stronger degree than those who endorse pro-individual values.

In relation to anxiety, Schwartz, Sagiv & Boehnke (2000) investigated the relationships between values and worry particularly with regards to the perceived discrepancy from the desired state of an object and personal values. In the context of their research they defined worry as "an emotionally disturbing cognition that a state of an object (micro or macro) in some domain of life (health, safety etc.) will become (or become more, or remain) discrepant from its desired state" (Schwartz *et al*, 2000, pp311). They suggest that this definition can apply to everyday worries that apply to all individuals, up to intense and uncontrollable worries associated with severe anxiety (Borkovec, Robinson, Pruzinsky & Dupree, 1983). Schwartz *et al* (2000) also found expected relationships between macro worries (societal level concerns) being positively related to self-transcendence value priorities, especially

universalism, and suggest this is because these individuals are more likely to be focused on others. They also found that micro worries (personal level concerns) were positively related to self-enhancement value priorities, especially power, as these individuals are more likely to be focused on the self. There were negative correlations of micro worries and openness as people who value new, challenging and uncertain outcomes are less concerned about uncertain personal consequences. Security values failed to correlate with overall micro worries although they correlated positively and consistently across samples with the more specific micro and macro safety/health worries. Thus, security values may sensitise people only to narrow security related concerns with regard to both self and others. Generally the authors conclude that worries as an aspect of subjective well-being, are related to negative emotional responses to perceived discrepancies that may motivate action to reduce those discrepancies (Schwartz *et al*, 2000).

In relation to this, Sortheix, Olakivi & Helkama (2013) investigated values related to life events and subjective well-being within a general population sample over a fourteen year timespan. They initially investigated whether individual value priorities would predict the number of life events and found that openness values were positively correlated to life events and conservation values were negatively correlated. Importantly this was only the case for controllable life events meaning that the value priorities had an effect on the decisions and behaviours of the participants over time. This is in line with the Schwartz model (1992; Schwartz *et al*, 2012) as it would predict that those who endorse openness values would be more open to seeking out new experiences and might hence have more life events generally when compared to those who endorse conservation values who might avoid uncertain experiences in favour of the safety of known experiences (Schwartz, 1992; Schwartz *et al*, 2012).

Sortheix *et al* (2013) also found that over time there was an increase in conservation values within the community which correlated with a decrease in life events generally. On a measure of psychological strain including questions about nervousness, anxiety, depression and feeling fearful they found that psychological symptoms were negatively related to security, conformity and benevolence (i.e. the stronger these values the less psychological symptoms) and that psychological

symptoms were positively related to hedonism and stimulation. They suggest that this was related to the increased life events seen in the openness values leading to more impact on emotional resources. There were mediating factors in this study to suggest that when personal values match the prevailing values in the environment, people enjoy higher well-being. This study therefore gives support to the value discrepancies hypothesis with regards to the relationship between values and well-being but also gives evidence in support of the opposing motivations of the conservation and openness value dimensions within the Schwartz model (Sortheix *et al*, 2013).

Finally, Lonnqvist *et al* (2009) carried out an investigation into the relationships between the Schwartz (1992; Schwartz *et al*, 2012) values model and self-esteem in samples from five different nations. They discovered overall that openness values (self-direction and stimulation) were positively related to self-esteem as were self-enhancement values (achievement and power). In contrast, conservation values (tradition) were negatively related to self-esteem as were self-transcendence values (universalism and benevolence). There were, however some important differences seen between the samples such that those samples which showed that achievement and universalism values were important at a group level were more likely to show positive relationships between these values and higher self-esteem. In contrast, self-direction and hedonism values were more positively related to self-esteem in samples where these values were less important at the group level (Lonnqvist *et al*, 2009). This suggests that the pursuit of some values is more likely to occur when there is already high self-esteem as would be expected in openness values where the focus is on the individual being independent and seeking out new experiences (Schwartz, 1992; Schwartz *et al*, 2012).

1.4.4 Summary of values section(s)

Generally, there is evidence that values are related to certain mental health constructs such as general wellbeing (e.g. Bilsky & Schwartz, 1994; Joshanloo & Ghaedi, 2009) and that the Schwartz model (Schwartz, 1992, 1994; Schwartz *et al*, 2012) can be particularly related to emotions such as guilt and empathy (Silfver *et al*, 2008) as well as different aspects of worry (Schwartz, Sagiv & Boehnke, 2000). In

addition to this, values have a potential role to play in the experience of high self-esteem (e.g., Lonnqvist, Verkasalo, Helkama, Andreyeva, Benzmenova *et al*, 2009).

There are also clear conceptual overlaps between the ways that values are conceptualised within some therapies for mental health conditions such as ACT (Hayes, 1994) and Positive Psychology (Seligman & Csikszentmihalyi, 2000) and the ways that values are conceptualised in the social psychology literature (e.g. Schwartz *et al*, 1992; Schwartz *et al*, 2012).

1.5 OBSESSIONALITY AND MENTAL HEALTH

1.5.1 Overview

This section demonstrates the relevance of obsessionality related to mental health and provides a rationale for researching this concept. It also describes how obsessionality is related to values and how obsessionality can be measured.

1.5.2 Defining obsessionality

Obsessionality refers to tendencies towards thinking or behaving in certain ways in certain situational contexts and it tends to connote a repetitive or persistent thought or impulse (Turner, Beidel & Stanley, 1992; Rachman, 1985). The presence of these unwanted and uncontrollable mental events typically is viewed as outside of the person's control. Obsessions can also be stimulated by external stimuli (Parkinson & Rachman, 1981) with stimuli in the environment such as sharp objects, certain words or persons cuing the onset of obsessional ideation. Although obsessionality can also be considered as an adaptive skill within our culture in terms of allowing for a sharp but narrow focus on things that are important or need to be done it is most often considered in relation to mental health difficulties such as Obsessive Compulsive Disorder (OCD). In fact, there is evidence that obsessionality and OCD can be considered as existing along a continuum (e.g. Mathews *et al*, 2004; Clark & Rhyno, 2005).

In terms of OCD there are usually 'obsessions' present in terms of consistent, repetitive thoughts or images which tend to be based around one of several themes(e.g. Rachman, 1985). Common themes are fears of contamination, safety,

doubting of memory or perception, fears of transgressions (often related to religion), need for order or symmetry and unwanted intrusive thoughts of an aggressive or sexual nature (e.g. Calamari, Wiegartz & Janeck, 1999). Commonly these obsessions are accompanied by behaviours that the individual performs in order to counteract the thoughts although this is not always the case. Common compulsions are cleaning/washing, checking (i.e. locks, stove, plugs etc.), counting/repeating actions a certain number of times of until it feels right, arranging objects, touching or tapping objects, hoarding, seeking reassurance and list making (e.g. Thordarson, Radomsky & Rachman, 2004).

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) includes the following definition for OCD: the presence of obsessions, compulsions, or both with obsessions defined as recurrent and persistent thought, urges, or images that are experienced as unwanted and that cause marked anxiety or distress. The definition also includes that the person attempts to supress or ignore the thoughts, impulses or images or attempts to neutralise them with some other thought or action. Compulsions are defined as repetitive behaviours (e.g. hand washing, ordering, checking) or mental acts (e.g. counting, repeating words silently) in response to an obsession or according to rules that must be applied rigidly. This also includes the behaviours or mental acts being aimed at preventing or reducing distress or preventing some dreaded event or situation but that the behaviours are either not connected in a way that could realistically neutralise or prevent whatever they are designed to address or they are clearly excessive. Along with this is the need for the obsessions or compulsions to be time-consuming and to cause clinically significant distress or impairment in social, occupational or other important areas of functioning (DSM-V, American Psychiatric Association, 2013).

The definition for obsessionality to reach clinical levels therefore, clearly incorporates a behaviour symptomatology alongside any purely cognitive obsessionality as well as high levels of distress or anxiety (Salkovskis, Wroe, Gledhill, Morrison, Forrester *et al*, 2000). There have also been shown within the clinical OCD population to be at least five subgroups of obsessionality (e.g. Calamari *et al*, 1999). Within their study Calamari *et al* (1999) used a well-established clinical symptoms checklist to assess over 100 patients with OCD. They used cluster analysis and identified five

subgroups of symptoms which they labelled; harming, hoarding, contamination, certainty and obsessionals (Calamari *et al*, 1999). Previous attempts to identify subgroups using factor analysis techniques have shown similar results. For example, Van Oppen, Hoeakstra & Emmelkamp (1995) found factors of; impulses, washing, checking, rumination and precision while Leckman, Grice, Boardman, Zhang, Vitale *et al* (1997) found four factors of; obsessions and checking, symmetry and ordering, cleanliness and washing and hoarding. There appear to be common obsessional difficulties around contamination/cleaning and checking as evidenced from these symptom clusters appearing across a range of studies (e.g. Calamari *et al*, 1999 Van Oppen *et al*, 1995 & Leckman *et al*, 1997). There is evidently a wide range of symptomatology that falls within the concept of obsessionality within clinical populations and which could also apply to non-clinical populations as explored below.

1.5.3 Obsessionality and the Obsessive Compulsive Disorder (OCD) continuum

Obsessionality appears to exist on a continuum from normal experiences of obsessionality in the general population up to the experience of severe OCD in clinical populations which has an effect on general functioning in everyday life (e.g. Clark & Rhyno, 2005). In support of this idea there is evidence that obsessionality in terms of obsessions and intrusive thoughts occurs in the general population to a significant degree without the presence of OCD (e.g. Rachman & DeSilver, 1978; Salkovskis & Harrison, 1984; Belloch, Morillo, Lucero, Cabedo & Carrio, 2004). For example Rachman & DeSilver (1978) discovered that 80% of a non-clinical sample commonly experience intrusive thoughts. These studies indicate that it is not unusual for individuals to experience obsessional thoughts and that it is not the occurrence of obsessive thoughts themselves that constitutes the presence of difficulties. Rather it is the frequency, duration and intensity of intrusive thoughts and the appraisal of the thoughts that is different between clinical and non-clinical populations (Rachman & DeSilver, 1978; Salkovskis, Richard & Forrester, 1995; Rassin & Muris, 2006).

However, a recent review of the evidence suggests that there are also differences between clinical and non-clinical samples in the content of intrusive thoughts as well

as the appraisals and responses leading from them and concludes that the continuum hypothesis cannot rest on the frequency of intrusive thoughts alone (Berry & Laskey, 2012).

Further evidence for a continuum comes from studies which have investigated the structure of obsessionality, as it relates to OCD, in non-clinical samples which have found that the structure is similar within both populations (e.g. Mathews *et al*, 2004; Coles *et al*, 2003). Mathews *et al* (2004) used the Leyton Obsessional Inventory short form in an undergraduate sample and found four factors within the data. This suggested that the structure of obsessional symptoms were similar in their undergraduate student sample to previous findings among samples of young people with OCD. Generally, the prevalence, symptom structure and patterns of comorbidity with anxiety and ADHD were similar to the patterns seen in adolescents with OCD. They also found that 90% of their participants endorsed two or more OCD symptoms, 65% endorsed five or more and 10% endorsed fifteen or more. Similarly, Coles *et al* (2003) investigated 'not just right' experiences in undergraduate samples using the Padua Inventory. They found that the large majority of their student sample (95%) endorsed having experienced at least one 'not just right' experience over the past week and almost all of them (99%) reported having experienced one at some time in their lives. Intensity and importance ratings of 'not just right' experiences rather than frequency was found to be related to the level of OCD features present consistent with previous research (e.g. Salkovskis, *et al*, 1995; Rassin & Muris, 2006).

The continuum hypothesis (Clark & Rhyno, 1995) forms the basis for current cognitive models of OCD, which suggest that the individual's understanding of 'normal' obsessions is central to the development and maintenance of OCD. Cognitive theories emphasise the role of beliefs that 'fuse' the intrusive thought to the event or action (Rachman, 1997, 1998), that one is responsible for harm coming to oneself or others (Salkovskis, 1985, 1999) and meta-cognitive beliefs about the significance of intrusive thoughts (Wells & Matthews, 1994; Wells, 1997). Such beliefs determine the individual's appraisal of the intrusive thoughts, which in turn determines subsequent cognitive and behavioural responses. As such there are significant mediating factors in the relationship between obsessionality in the clinical

and non-clinical populations (e.g. Salkovskis, 1985, 1999; Rachman, 1997, 1998, 2002; Rheaume, Ladouceur, Freeston & Letarte, 1995)

1.5.4 Obsessionality and Responsibility

The cognitive model of OCD (Salkovskis *et al*, 1999, 2000) defines responsibility as the belief of possessing a pivotal role for leading or preventing negative and crucial outcomes, and highlights the central role of dysfunctional responsibility schema or inflated sense of responsibility for both the development and the maintenance of OCD (Rheaume *et al*, 1995). Perceived sense of responsibility has most likely attracted the most attention in the literature with regards to mediating factors of OCD (e.g. Rachman, 1998, 2002; Salkovskis, 1985, 1989, 1993; Salkovskis, Wroe, Gledhill, Morrison & Forrester *et al*, 2000; Freeston, Ladouceur, Gagnon & Thibodeau, 1993). Many of these studies have found that there are increased levels of responsibility beliefs present in clinical OCD samples of the population when compared to other populations. For example, Freeston *et al* (1993) used self report questionnaires of responsibility beliefs and found that patients with OCD endorsed more beliefs related to responsibility than a group of matched controls. Arntz, Voncken & Goosen (2007) demonstrated that when responsibility was experimentally manipulated so that there was either a high or a low responsibility condition, subjective OCD like experiences and checking behaviour were higher in OCD patients in the high responsibility condition than all other groups.

The relationship between excessive sense of responsibility and Obsessive-Compulsive Symptoms (OCS) has also been supported in both clinical and non-clinical samples by clinical observations (Rachman, 1993; Tallis, 1994), by questionnaires (e.g. Foa *et al*, 2002; Salkovskis *et al*, 2000), by experimental manipulations (e.g. Ladouceur *et al*, 1995; Lopatka & Rachman, 1995) and by treatment efficacy studies which showed that therapies focusing on inflated sense of personal responsibility (Freeston, Rheaume & Ladouceur, 1996; Ladouceur *et al*, 1996) induced significant changes in the OCS.

Rachman (2002) suggested that in checking behaviour the focus of inflated sense of responsibility is on mainly protecting others rather than self from coming to harm, whereas in cleaning behaviour self-focused responsibility operates. Moreover,

empirical studies suggest that inflated responsibility has a more identifiable and salient role in checking symptoms as compared to cleaning symptoms (e.g. Foe *et al*, 2002; Lopatka & Rachman, 1995; Rachman, 1998; Rheaume, Freeston, Dugas, Letarte & Ladouceur, 1995; Smari, Glyfadottir & Halldorsdottir, 2003, Yorulmaz *et al*, 2006).

In terms of the measurement of responsibility there have been several measures devised including the Responsibility Appraisal Questionnaire (RAQ; Rachman, Thordarson, Shafran & Woody, 1995) and the Responsibility Attitudes Scale (RAS; Salkovskis *et al*, 1999) among others. Generally these measures are used within the context of determining the level of disproportionate responsibility beliefs that an individual holds with regards to feeling responsible for harm. The RAQ consists of four potentially different factors; responsibility for harm, responsibility in social contexts, positive outlook towards responsibility and thought-action fusion (Rachman *et al*, 1995). Rachman *et al* (1995) suggest that the thought-action fusion subscale is particularly significant within a clinical sample of participants with OCD. The RAS (Salkovskis *et al*, 1999) is a measure designed using items initially generated by clinicians with expertise in using the cognitive theory of OCD within their clinical practice and validated using clinical and non-clinical samples (Salkovskis *et al*, 2000). As such, it is a strong measure with regards to its relevance to clinical practice and has been shown to have high internal consistency and test-retest reliability (Salkovskis *et al*, 2000).

1.5.5 Measuring Obsessionality

Many different measures have been developed to assess OCD symptoms and obsessionality over the years. These generally take the form of self-report measures and are used to assess symptom severity and/or to monitor treatment progress (Overduin & Furnham, 2012).

Some of the most widely used measures are the The Padua Inventory – Revised (PI-R; van Oppen, Hoekstra & Emmelkamp, 1995), the Obsessive-Compulsive Inventory - Revised (OCI-R; Foa *et al*, 2002), the Vancouver Obsessional Compulsive Inventory (VOCI; Thordarson, Radomsky & Rachman, 2004), the Clark-Beck Obsessive-Compulsive Inventory (CBOCI; Clark, Antony, Beck, Swinson & Steer,

2005) and the Dimensional Obsessive-Compulsive Scale (DOCS; Abramowitz *et al*, 2010). The large number of measures and the revisions made to them over time reflects the difficulties with conceptualisations of obsessionality in the clinical population and the wide range of different symptom subscales that measures attempt to address. For example, almost all measures include subscales for checking and contamination but there are differences in the inclusion (or not) of other subscales such as ordering, hoarding, obsessions, rumination, precision, impulses to harm and numbers (Overduin & Furnham, 2012). There are also some differences in the scales that are used to complete the measures with some taking a rating scale approach for symptom severity (e.g. the VOCI) or distress caused by symptoms (e.g. OCI-R, PI-R) while others ask respondents to choose one of a series of statements (e.g. CBOCI) and some measure levels of distress created by symptoms as well as other factors such as effects on life (e.g. DOCS). All of the measures above have been developed and validated utilising samples of clinical and non-clinical populations and have generally been found to have good internal consistency (Overduin & Furnham, 2012).

The Vancouver Obsessive Compulsive Inventory is a 55 item self-report questionnaire used to measure six different subscales of symptoms related to Obsessive Compulsive Disorder. Thordarson *et al* (2004) developed the tool to eliminate several limitations of the Maudsley Obsessive Compulsive Inventory (MOCI; Hodgson & Rachman, 1977). Thordarson *et al* (2004) note that the MOCI was developed in the 'pre-cognitive' era and as such misses some important aspects of assessing OCD as well as being limited in its measurement of the range of obsessive compulsive phenomena (the MOCI is biased towards washing and checking but is limited on obsessions, hoarding and covert rituals for example). They also note that the negatively worded items on the MOCI were confusing and difficult for respondents to answer. The VOCI may be more useful when considering measuring obsessionality symptoms in non-clinical populations due to its simple response format which relies on experience of symptoms rather than distress caused by symptoms which might show less variability among non-clinical samples. There is evidence for excellent internal consistency and test-retest reliability of the VOCI (Thordarson *et al*, 2004; Radomsky *et al*, 2006) and there are good correlations

between overall scores on the VOCI and other measures of OCD in clinical and non-clinical samples (Thordarson *et al*, 2004).

One of the disadvantages of the VOCI is that it lacks items which assess the ordering aspects of obsessionality. As such the Symmetry, Ordering and Arranging Questionnaire (Radomsky & Rachman, 2004) is a useful tool as it was developed as a specific measure for ordering/arranging symptoms of OCD. The authors argue that this aspect of OCD has often been overlooked even though it appears to be a common aspect in many OCD presentations. They therefore set out to develop a measure to capture these phenomena in particular, that could then be used alongside other measures, particularly the VOCI. Several previous reviews recommend that the SOAQ is used alongside the VOCI in order to provide a more rounded measure of OCD symptoms (e.g. Overduin & Furnham, 2012; Gonner *et al*, 2010).

1.5.6 Values related to obsessionality

Considering the links between values and obsessionality we should first consider the links between the widest related concepts i.e. the anxiety dimension of the Schwartz model and the anxiety function of obsessionality. Obsessionality is commonly conceptualised as being related to anxiety and this is almost certainly the case when considering obsessionality within clinical populations with regards to cognitive models of OCD (e.g. Salkovskis *et al*, 2000). The Schwartz (1992, 1996; Schwartz *et al*, 2012) model conceptualises one of the outlying motivational dimensions as being between anxiety (conservation and self-enhancement values) versus anxiety-free values (openness and self-transcendence values). Schwartz *et al* (2012) postulate that this dimension represents a motivation of coping with anxiety due to uncertainly in the social and physical world (i.e. protecting self and others from harm, maintaining the status quo and avoiding unpleasant situations) versus a motivation of seeking to grow and expand where new opportunities are actively sought. As previously highlighted there is evidence to support this anxiety dimension of the values model (e.g. Schwartz *et al*, 2000; Sortheix *et al*, 2013).

Within obsessionality, the relationship to anxiety can be understood in similar terms with the individual seeking to reduce threat to self and others, wanting to protect and

maintain normality and trying to avoid unpleasant feelings. This is supported by the literature around obsessionality within non-clinical populations which have highlighted that the experience of obsessionality often occurs alongside anxiety (e.g., Coles *et al*, 2003). It is also consistent with the cognitive theory of obsessionality (e.g. Salkovskis *et al*, 2000) which highlights that it is the misinterpretation of obsessional thoughts that creates anxiety and makes obsessional difficulties increase and that disproportionate responsibility beliefs around needing to prevent harm to the self and others also contributes to this anxiety (e.g. Foa *et al*, 2002; Salkovskis *et al*, 2000; Ladouceur *et al*, 1995; Lopatka & Rachman, 1995). As previously highlighted, there is evidence for the anxiety dimensions of the Schwartz model but most specifically linked to obsessionality, Schwartz *et al* (2000) found significant positive correlations between personal worries and values on the anxiety dimension and negative correlations between the same worries and values on the anxiety-free dimension and Schwartz (2011) also shows that the anxiety dimension is related to lower well-being than the anxiety-free dimension.

Considering this a step further there is also evidence that the conservation quadrant versus the openness quadrant in particular is linked to mental health in terms of links to Higgins' (1997) two basic regulation systems as well as links to personality factors such as openness, extraversion, conscientiousness and more tentatively to neuroticism (Roccas, Sagiv, Schwartz & Knafo, 2002). Roccas *et al* (2002) measured the big five personality factors (extraversion, agreeableness, openness, neuroticism and conscientiousness) alongside a measure of the Schwartz (1992) values. They discovered that conscientiousness is linked to conservation values (conformity in particular) while openness and extraversion were both related to openness values (self-direction and stimulation respectively). They also found that two facets of neuroticism were related to the Schwartz values model in opposite directions. An angry/hostile and impulsive facet of neuroticism was correlated positively with openness values (particularly stimulation) and negatively with conservation values (especially conformity). An anxious, depressed, self-conscious and vulnerable facet of neuroticism was correlated positively with conservation values (particularly tradition) and negatively with openness values (such as stimulation). However, the authors note that the correlations for the neuroticism findings were smaller than those for openness, extraversion and conscientiousness.

Taken together these findings, along with the commonalities between the motivations underlying the conservation quadrant and the first Higgins' (1997) self-regulation system add support to the conservation quadrant being related to anxiety as conscientiousness is related to taking care over actions and wanting to get things right while neuroticism is often linked to mental health difficulties such as anxiety (Roccas *et al*, 2002). The findings of Roccas *et al* (2002) also add to the evidence for the openness quadrant being related to an anxiety-free dimension as those who are open and extrovert tend to be outgoing and seeking of new experiences in line with the second of Higgins' (1997) self-regulation systems and the Schwartz model (Schwartz, 1992, 1994; Schwartz *et al*, 2012).

Evidence also suggests that, related to anxiety to some extent, higher self-reported levels of guilt and empathy are positively related to conservation quadrant values and negatively related to openness values (Silfver *et al*, 2008) which could be related to the pro-social and pro-self dimension of the Schwartz model (Schwartz *et al*, 2012). This would also fit with the theory around obsessionality as the responsibility element of clinical obsessionality is often in relation to preventing harm to others as well as the self (e.g. Foa *et al*, 2002; Salkovskis *et al*, 2000). In support of the anxiety motivation of the Schwartz model (Schwartz *et al*, 2012) as well as the links to the conservation quadrant, Sortheix *et al* (2013) found that psychological symptoms were negatively related to security and conformity values, which in the context of their study was related to the fact that people who gave importance to these values were more likely to avoid new potentially threatening experiences and were more likely to attempt to maintain the status quo. This adheres with the motivations proposed to underlie the anxiety dimension as well as the motivations underlying the proposed mechanism of anxiety within clinical obsessionality (e.g. Salkovskis *et al*, 2000).

There is also some experimental evidence that priming conservation values led to participants prioritising the use of cleaning wipes to clean their hands sooner while priming the opposing openness value led to this same cleaning behaviour being delayed (Maio *et al*, 2009a). In their experiment Maio *et al* (2009a) primed participants with either conservation values or openness values in order to activate these values cognitively. They then asked participants to complete some consumer

surveys with a leaky pen followed by the participants completing a colouring task with sticky crayons. They measured the interval at which the participant asked for a non-leaky pen or used a cleaning wipe and found that the conservation primes asked sooner or used a wipe sooner compared to the openness primed participants who tended to delay the same behaviours (Maio *et al*, 2009a). The researchers suggest that this is related to the underlying motivational conflicts between the conservation and openness quadrants in regards for the needs for security and sense of order. This study could also be particularly related to proposed links between conservation values and obsessionality, as cleaning is a behaviour often linked with the concept of obsessionality in a clinical obsessionality based context (e.g. Calamari *et al*, 1999 Van Oppen *et al*, 1995 & Leckman *et al*, 1997).

In terms of individual basic values and their links to mental health and obsessionality it has been demonstrated that although security values were not related generally to micro worries they were correlated positively and consistently across samples with safety and health worries specifically (Schwartz *et al*, 2000). Tradition values have also been negatively related to self-esteem (Lonnqvist *et al*, 2009) to macro worries generally (Schwartz *et al*, 2000) and to guilt-proneness along with conformity values (Silfver *et al*, 2008). The Schwartz *et al* (2000) finding in particular is relevant to obsessionality as research has highlighted that contamination and worries about harm are common in presentations of obsessionality (e.g. Calamari *et al*, 1999 Van Oppen *et al*, 1995 & Leckman *et al*, 1997). However, the findings with regards to the tradition and conformity values are also of interest as taken together these results suggest that there are significant links between these values and different constructs relevant to mental health.

Going a step further there are individual values within the broader basic values (Schwartz, 1992, 1994; Schwartz *et al*, 2000) which could be more linked to our understanding of obsessionality. Considering the subtypes of obsessionality commonly found within clinical populations e.g. checking, ordering and fears of contamination (e.g. Calamari *et al*, 1999 Van Oppen *et al*, 1995 & Leckman *et al*, 1997) there are links with values within the security basic value as well as the conservation quadrant more generally (e.g. Schwartz, 1994; Schwartz *et al*, 2000). Specifically, as shown in Table 1.1 (section 1.3.2), the security basic value

incorporates values of being clean and healthy which on the basis of the evidence above could be individual values that are most closely related to concepts of obsessionality (e.g. Schwartz *et al*, 2000; Calamari *et al*, 1999).

1.5.7 Summary of obsessionality section(s)

Obsessionality as a concept is clearly related to mental health particularly when considering difficulties such as Obsessive Compulsive Disorder (OCD; APA, 2013). There is also substantial evidence that obsessionality in relation to OCD can be seen as a continuum that is present to some extent within the non-clinical population (e.g. Clark & Rhyno, 1995; Mathews *et al,* 2004; Coles *et al*, 2003). This suggests that the study of obsessionality within non-clinical populations is useful and valid for application to our understanding of clinical obsessionality. Responsibility has also been indicated as a significant factor that appears to mediate the relationship between the experience of obsessionality as being non-clinical or clinical (e.g. Salkovskis *et al*, 2000). Of particular importance, considering the links generally between values and mental health and the use of values in therapies, there are also the foundations for clear links between obsessionality and values within the Schwartz model (e.g. Schwartz *et al*, 2000; Sortheix *et al*, 2013; Maio *et al*, 2009a). This suggests that investigating these links could be useful in terms of better understanding how obsessionality is linked to values and how these links can be utilised in a clinical context.

1.6 PRIMING VALUES AND THE EFFECTS ON BEHAVIOUR: THE EVIDENCE

1.6.1 Aim and scope of current literature review

This literature review aimed to identify research in the area of priming social values that adds to our understanding of how priming values relates to behaviour. As such it aimed to highlight the relevant research findings in relation to this and offer a critique of the work in this area. Bringing the relevant research together in this way will enable a comprehensive understanding of the factors that contribute to the effects seen on behaviours when priming values.

1.6.2 Systematic review question

What evidence is there for the effect of priming social values on behaviour?

1.6.3 Method

1.6.3.1. Literature Review Strategy

The following databases were searched for articles relevant to the systematic review question: PsycINFO, PsycArticles, SCOPUS and Web of Science. For SCOPUS the search was limited to subject areas 'Psychology' and 'Social Sciences' in two separate searches. The Web of Science search was limited to research area 'Psychology.'

1.6.3.2 Search terms

The following search terms were used to search each of the above databases individually:

Prim* value* (PsycINFO & PsycArticles only, see below)
Prim* value* and behav* (PsycINFO & PsycArticles only, see below)
Priming value*
Priming value* and behav*
Primed value*
Primed value* and behav*
Activating value*
Activating value* and behav*
Manipulating value*
Manipulating value* and behav*

It was found that searching for prim* in combination with the terms value* and behav* returned over 10,000 results in the majority of the databases searched (aside from PsycINFO and PsycArticles which combined returned 754 results for these two searches). This led to the full search terms 'priming' and 'primed' being used instead in the other databases.

1.6.3.3 Inclusion criteria

The following inclusion criteria were used to choose articles relevant to the systematic review question. If a study did not meet the inclusion criteria it was excluded from the review. Definitions of social values, priming and behaviour used for the inclusion criteria are included below.

- Articles must be empirical studies
- Study must have human participants

- Participants must be adults (age 18 and over)
- Articles must be in English
- Studies after 1980 until 2014
- Published in peer reviewed journal
- Study must include a priming task
- Study must include at least one social value as the primed variable
- Study must include a measure of behaviour that follows the priming task

1.6.3.4 Defining social values

For the purposes of this systematic review an operationalised definition of social values was necessary to determine those values that were relevant to the research question. It was decided that the values being primed in the studies must be trans-situational in nature to be in line with common definitions of social values in the existing values literature (i.e. Schwartz, 1992; Schwartz *et al*, 2012). That is, they must not be goals but rather concepts that can lead to a variety of goals around the concept. It was also felt that wider concepts such as religion, morality, politics, culture, etc. should not be the priming focus as these are all concepts that include values as a part of them but are not exclusively related to values. For example morality includes values but also incorporates virtues, norms, practices and identities to name only a few (e.g. Parzuchowski & Wojciszke, 2014). If studies were priming concepts, such as religion, rather than the individual values then it would be difficult to gauge the extent to which these studies were actually priming values rather than one of the other underlying variables.

1.6.3.5 Defining behaviour

A working definition of behaviour was also required to be able to complete the systematic review. It was decided that any studies that measured observable behaviour should be included as should those that measured intentions to behave in certain ways (i.e. providing contact details to be passed on to a charity to be contacted about volunteering, e.g. Arieli, Grant & Sagiv, 2013). Studies which included choices/decisions were also included. A review of the behaviours seen in the included studies is incorporated into the write up of the literature review below.

1.6.3.6 Defining Priming

For the purposes of this systematic review priming was defined as any task that was used intentionally by a researcher to bring to mind (consciously or unconsciously) a

desired value or values in a participant. A review of the priming tasks that were used in the included studies is incorporated into the systematic review narrative that follows.

1.6.3.7.Review process

A total of 3498 articles were identified using the search terms and databases outlined above. These articles were then reviewed by title and abstract for relevance to the topic of priming values and the effects on behaviour. Articles that clearly did not meet all of the inclusion criteria were eliminated at this point. This process left 293 abstracts which were then examined by the researcher in more detail to ensure that they were eligible for inclusion in the review. Following this process 218 of the articles identified via the original database searches were eliminated from the review for either being duplicates (142) or clearly not meeting criteria (80) leaving a total of 71 articles. The references for these remaining articles were then searched to identify any further relevant articles. A further 8 articles were identified from the references and the abstracts of these articles were reviewed to ascertain whether they were likely to meet the inclusion criteria. This process yielded a further 4 articles to include in the review taking the total number of articles up to 79. These 79 articles were then retrieved as full text articles and were examined in closer detail. At this stage several of these articles were reviewed by the researcher and her supervisor together in order to clarify if they met the criteria. Each article was considered in relation to the inclusion criteria and any discrepancies between researcher and supervisor opinions were discussed with consensual decisions made. Of the articles being considered at this stage of the review 46 included multiple experiments within the same paper and as such each individual experiment was reviewed with regards to whether it met the inclusion criteria. If no experiments reported within the article met the inclusion criteria the article was discarded from the review. If at least one experiment within an article met the inclusion criteria then the individual experiments were retained for inclusion in the review. In total a further 54 articles were excluded leaving a total of 25 articles which were eligible to be included in the systematic review which incorporated 54 separate experiments in total. The process of article extraction is detailed in Appendix 1.

1.6.4 Results

This section reviews the individual experiments based on aspects of the participant samples included in the studies, the values focused on, the priming tasks used, the behavioural measures used, the main effects seen and the mediating factors. The table seen in Appendix 2 provides details of all the experiments included in the review and should be used alongside the narrative below.

1.6.4.1 Samples

1.6.4.1.1 Participant Samples

The vast majority of studies used an undergraduate student sample. There were only three exceptions to this. Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013, Ex1) used a convenience sample of market vendors for their first study while they also did not provide details of their participant sample in Experiment 4 rendering the sample unknown. Shafran, Lee, Payne & Fairburn (2006) were the other exception as they used a sample of undergraduate students and community volunteers and it is unclear how many of the participants were drawn from which subject pools.

1.6.4.1.2 Number of participants

The numbers of participants in the studies varied greatly from 16 (Yang *et al*, 2013 Ex1) up to 288 (Bargh, Gollwittzer, Chai, Barndollar & Trotschel, 2001 Ex3).

1.6.4.1.3 Ages of participants

Only 7 studies provided details of the ages of their participants. This may have been due to the vast majority (all bar three) of the studies using undergraduate student samples thereby leading the reader to assume that the participants would be aged from 18 into their early 20's. Indeed those studies that did include a mean age of participants indicated that the mean ages were ranged from 20.0 (Karremans , 2007 Ex2) and 24.1 (Bargh *et al*, 2001 Ex2).

1.6.4.1.4 Gender of participants

Fourteen of the Experiments did not include any indication of the number of male or female participants (Verplanken, Trafimow, Khusid, Holand & Steentjes,2009 Ex2; Verplanken & Holland, 2002 Ex1,2 & 3; Yang *et al*, 2013 Ex1; Smeesters, Wheeler &

Kay, 2009 Ex3; Smeesters, Warlop, Van Avermaet, Corneille & Yzerbyt, 2003 Ex1,2,3 & 4; Rasinsky, Visser, Zagatsky & Rickett, 2005; Bargh, Chen & Burrows, 2006 Ex1; Epley & Gilovich, 1999 Ex1 & 2). Those that did offer this information showed that the majority of participants were female. For example, Shafran *et al* (2006) used a female only sample for their experiment while Maio, Pakizeh, Cheung & Rees (2009a) Ex2 had 72% female, Ex3 90% female, Ex4 82% female and Ex 5 60% female. Maio, Olsen, Allen & Bernard (2001) Ex 1 had 55% female and Ex2 had 86% female. Karremans (2007) Ex1 had 63% females, Ex2 76% female participants. These are representative examples of the general data.

There were two exceptions to this with Bargh *et al*, (2001 Ex 1) and Neuberg (1988) using male only samples. This could again be a factor of the samples used in the vast majority of the studies – undergraduate students. While there are potentially equal numbers of males and females that go on to university if samples are drawn from undergraduate psychology courses it is likely that the majority of participants will be female based on the ratios of male to female present on these courses.

1.6.4.2 Values focus of the studies

There were a range of values focused on across studies and these are broken into sections arranged by general value types.

1.6.4.2.1 Pro-social values

The majority of studies, twenty in total, investigated what could be considered pro-social values such as cooperation (Hertel & Fielder 1998 Ex1 & 2; Bargh *et al*, 2001 Ex 1&2), equality (Maio *et al*, 2009a Ex 1,3 & 4; Maio *et al*, 2001, Ex1), helpfulness (Karremans, 2007,Ex2; Maio *et al*, 2001, Ex2), care for the environment (Verplanken & Holland, 2002, Ex 1,2 &3), honesty (Parzuchowski & Wojciszki, 2014, Ex 1 &2, Rasinsky *et al*, 2005), fairness (Jonas, Sullivan & Greenberg, 2013, Ex3), generosity (Jonas, *et al*, 2013, Ex2) and loyalty (Hertel & Kerr, 2001). One study looked at pro-social values more generally using the term 'benevolence' to encompass a wider category of pro-social value instantiations (e.g. Arieli *et al*, 2013 Ex2) and two others used the term 'collectivist' to refer to a pro-social orientation (Bechtoldt, Choi & Nijstad, 2012; Verplanken *et al*, 2009 Ex2).

1.6.4.2.2 Social order values

There were fourteen studies which included values which could be considered to serve a function of maintaining society and social values such as, cleanliness (Yang *et al*, 2013, Ex 1-7), conformity (Epley & Gilovich, 1999 Ex1&2), politeness (Bargh *et al*, 1996 Ex1), tradition (Maio *et al*, 2009a Ex1; Maio *et al*, 2001 Ex2) and security (Maio *et al*, 2009a Ex 3&4). These values all have a common motivation of maintaining certain societal standards although they can also be considered within the pro-social frame.

1.6.4.2.3 Pro-Individual values

Sixteen other studies investigated what could be considered more pro-individual values such as high personal standards (Shafran *et al*, 2006), competitiveness (Neuberg, 1988), competence (Utz, Ouwerkerk & van Lange, 2004 Ex1&2) and achievement (Hart & Albarracin, 2009; Harris, Coburn, Rohrer & Pashler, 2013 Ex1&2; Bargh *et al*, 2001 Ex1, 3, 4&5). Other pro-individual values that are more focused on personal needs include stimulation (Maio *et al*, 2009a Ex2), self-direction (Maio *et al*, 2009a Ex2&3) and living a varied life (Karremans, 2007 Ex2). The Bechtoldt *et al* (2012) and Verplanken *et al* (2009 Ex2) studies also used the terms 'individualist' and 'private-self' respectively to refer to these more pro-self values in their studies.

1.6.4.2.4 Multiple competing values

Several studies focused on priming more than one value. In some cases this was done to investigate the effects of priming two opposing values (i.e. values with different underlying motivations) on behaviour relating to one or both of the values. For example Hertel & Fielder (1998, Ex 1&2) and Smeesters *et al* (2009a, Ex3) both primed cooperation and competition values in different groups of participants to see the effects on sharing behaviour while Karremans (2007, Ex1) primed honesty/loyalty and successfulness/ambition in different groups to investigate effects on helping behaviour. Maio *et al* (2009a) carried out a series of experiments with a focus on the effects of priming motivationally opposing values on behaviours. These experiments included a focus on tradition values versus stimulation values to look at modesty (Ex2), security versus self-direction to look at cleanliness (Ex 3) and

curiosity (Ex 4) and achievement versus benevolence to investigate willingness to volunteer and achievement related behaviours (Ex 5).

Bechtoldt *et al* (2012) primed individual and collectivist self-construals, and therefore more individual vs pro-social values, in their participants to investigate the effects on creativity while Verplanken *et al* (2009 Ex2) also primed the private versus collective self to determine how this affected use of the value of loyalty when making a decision.

Two further studies (Neuberg, 1988 & Wheeler, Morrison, DeMaree & Petty, 2008) both primed opposing politeness and rudeness in order to see the effects on how long it would take participants to interrupt the experimenter. Similarly, Epley & Gilovich (1999 Ex1&2) primed conformity and non-conformity in their participants to determine the effects on conforming to group pressure. This study is a little different from the others that prime different values in opposition to each other as conformity will always come to mind when priming non-conformity (unlike helping vs achievement for example). Using the Schwartz model to consider conformity it would be expected that values related to stimulation would be best used to counter conformity rather than non-conformity per se.

One study primed different groups with the varied values of helpfulness, equality, successfulness and a varied life in order to investigate the effects of all of these primes on egalitarian behaviour (Karremans, 2007 Ex2).

1.6.4.3 Priming tasks utilised

All studies primed participants without them being told that this was the nature of the study and they utilised a range of priming techniques.

1.6.4.3.1 Subliminal Priming Tasks

Five studies used unconscious subliminal primes such as participants being primed during a computer based lexical decision task (Smeesters *et al*, 2009 Ex3; Smeesters *et al*, 2003 Ex3; Neuberg, 1988; Hart & Albarracin, 2009 Ex3 & Wheeler *et al*, 2008). Participants would be presented with the prime words for very short (i.e. one tenth of a second) periods before a string of x's would appear (or a string of

random letters) followed by a target letter string. Participants would then have to decide whether the target letter string was a real word or not and press the corresponding key on the keyboard before the next trial would begin. Smeesters *et al* (2009a, Ex3) used this methodology as did Smeesters *et al* (2003, Ex3). Neuberg (1988), Hart & Albarracin (2009 Ex3) and Wheeler *et al* (2008) all used similar methodologies. The only notable difference was that Neuberg (1988) asked participants to decide which side of the screen the 'flash of light' appeared rather than decide on letter strings but the flashing up and masking of the prime words was similar in design.

1.6.4.3.2 Conscious (Explicit) Priming Tasks

Some priming tasks focused on more explicit ways of priming values. These are outlined in more detail below.

Writing tasks

There were three studies that utilised a writing based priming task, Arieli *et al* (2013 Ex2), Bechtoldt *et al* (2012) and Verplanken *et al* (2009 Ex2). These tasks all differed in terms of what the participant was asked to write about but all aimed to bring values to mind. Arieli *et al* (2013 Ex2) asked participants to write stories about their own benevolent experiences of being kind to others as well as asking them to write persuasive essays about the benefits of being kind. Bechtoldt *et al* (2012) wrote statements about the ways that the participants were similar or different to others depending upon whether they were being primed for the collectivist or individual self-construal. Verplanken *et al* (2009 Ex2) asked participants to write what they had in common with or how they differed from people they felt close to in order to prime the collective-self or private-self.

Impression Formation

Two experiments used an impression formation task to prime participants, Verplanken *et al* (2002, Ex1&3). Participants were provided with a list of attributes about a target person and were asked to form an impression of the person, including the attributes related to them and to write about the person (Verplanken *et al*, 2002).

Providing reasons for values

There were five experiments that asked participants to provide reasons for values as a priming task, Maio *et al* (2009b, Ex1); Karremans (2007, Ex1&2); Maio *et al* (2001, Ex1&2). This methodology of priming is less implicit but all studies that use this method take careful measures to ensure that participants do not link this task with what they are asked to do during the rest of the session. Maio *et al* (2001, Ex1) investigated the use of this method of priming versus a more implicit method of simply making the values salient via a scrambled words task and they found that the priming effects were greater for the group that provided reasons for the values when compared to the values salient group and that this effect was not due to awareness of the prime. Likewise, Karremans (2007, Ex2) found that the helpfulness reasons group were more likely to be egalitarian than the helpfulness salient group who had completed a word puzzle around the theme of helpfulness.

1.6.4.3.3 Sub-conscious (Implicit) Priming Tasks

Some priming tasks focused on priming values in more implicit ways as described below.

Reading Stories

In total, six experiments primed participants via a reading task, Maio *et al* (2009a, Ex3&4), Yang *et al* (2013, Ex, 6&7), Jonas *et al* (2013, Ex2) and Arieli *et al* (2013, Ex2). Typically, participants were asked to read a passage of text (e.g. Maio *et al*, 2009a, Ex3&4) or an article (Yang *et al*, 2013, Ex 6&7; Jonas *et al*, 2013, Ex2; Arieli *et al*, 2013, Ex2) that is manipulated to include elements of the target value within it.

Physical primes

There were seven experimental in total that used a physical prime, Yang *et al* (2013, Ex 1-5) and Parzuchowski & Wojciszki (2014, Ex 1&2). In the case of Yang *et al* (2013, Ex 1-5) participants were asked to count dirty or clean money or dirty or clean paper to prime them to the value of cleanliness (Ex 2-5). In Yang *et al* (2013) Ex1 market vendors were given dirty or clean money to pay for goods as a prime to the cleanliness value. Parzuchowski and Wojciszki (2014) took a different approach in which they asked participants to either place their hand on their heart or on their hip

(Ex1) or shoulder (Ex2) when doing different tasks in order to prime participants to the value of honesty.

Word Search

In total seven experiments used a word search task to prime participants, Harris *et al* (2013, Ex1&2); Bargh *et al* (2001 Ex1,3,4&5) and Hart & Albarracin (2009 Ex4). As with the scrambled sentences task (below), participants were asked to complete a word search task that incorporates words related to the prime value target. Participants are given a list of words to find within the word search and are generally given as long as necessary to find the target words.

Memory task

There were five experiments that used a memory based task, Hertel & Fielder (1998, Ex1&2); Hertel & Kerr (2001) and Maio *et al* (2009a, Ex3&4). Both Hertel & Fielder (1998) and Hertel & Kerr (2001) studies asked participants to memorise words displayed on a sheet of paper and then informed the participants that the words could be put into groups to aid with the task. Hertel & Fielder (1998) also included an element of priming positive and negative evaluative words related to the target values. In the case of Maio *et al* (2009a, Ex3&4) participants were provided with a sheet presented as a memory task that contained words related to the prime value and other words unrelated to the prime. Similarly to the Hertel & Fielder (1998) and Hertel & Kerr (2001) studies, participants were afterwards told that the words could be divided into different groups and were asked to do the task again in order to see if they could now remember more of the words after thinking about them in groups.

Unscrambling sentences

Overall, thirteen experiments used an unscrambling sentences priming task, Maio *et al* (2009a, Ex2&3); Verplanken *et al* (2002, Ex2); Smeesters *et al* (2003, Ex 1,2&4); Jonas *et al* (2013, Ex3); Bargh *et al* (2001 Ex2); Bargh *et al* (1996 Ex1); Epley & Gilovich (1999 Ex1&2) and Utz *et al* (2004 Ex1&2). This task usually incorporates five words in a scrambled order, four of which when unscrambled will make a sentence. It is usually the case that a majority of the sentences will include a target word that is related to the prime value. Usually the prime value itself is not

presented as one of the words but rather semantically related words are presented in order to bring the target prime unconsciously to mind.

1.6.4.4 Behavioural measures used in the studies

The studies within the review utilised a range of behavioural measures. Some studies focused on asking participants to make decisions or choices (Verplanken *et al*, 2002 Ex1,2&3; Yang *et al*, 2013 Ex5; Bargh *et al*, 2001 Ex5; Hart & Albarracin, 2009 Ex3; Verplanken *et al*, 2009 Ex2), others asked them to complete self-reports of some form (Maio *et al*, 2009a Ex2; Yang, 2013 Ex3; Parzuchowski & Wojciszke, 2014 Ex3&4; Rasinsky *et al*, 2005).

The most commonly used behavioural measure was related to sharing money or points usually through the use of economic games such as the prisoners dilemma game or the minimal group paradigm (Hertel & Fielder, 1998 Ex1&2; Yang *et al*, 2013 Ex2,4,6&7; Smeesters *et al*, 2009a Ex3; Smeesters *et al*, 2003 Ex1,2,3,&4; Jonas *et al*, 2013 Ex3; Neuberg, 1988; Utz *et al*, 2004 Ex1&2). Other experiments focused on other forms of sharing behaviour (Maio *et al*, 2009a Ex1,2&3; Karremans, 2007 Ex2; Maio *et al*, 2001 Ex1; Hertel & Kerr, 2001; Bargh *et al*, 2001 Ex2).

There were also studies that included observable behavioural measures such as studies that investigated volunteering behaviour (Arieli *et al*, 2013 Ex2; Maio *et al*, 2009a Ex5; Maio *et al*, 2001 Ex2), helping behaviour (Karremans, 2007 Ex1), donating behaviour (Jonas *et al*, 2013 Ex2) and others which are described below (Maio *et al*, 2009a Ex3&4; Yang *et al*, 2013 Ex1; Shafran *et al*, 2006; Bargh *et al*, 2001 Ex4; Bargh *et al*, 2006 Ex1; Epley & Gilovich, 1999 Ex1&2; Bechtoldt *et al*, 2012; Wheeler *et al*, 2008). Further studies included performance based behaviours such as performance on word searches (Harris *et al*, 2013 Ex1&2; Bargh *et al*, 2001 Ex1&3; Hart & Albarracin, 2009 Ex4).

1.6.4.4.1 Making decisions

Seven experiments focused on making choices (Verplanken *et al*, 2002 Ex1,2&3; Yang *et al*, 2013 Ex5; Bargh *et al*, 2001 Ex5; Hart & Albarracin, 2009 Ex3; Verplanken *et al*, 2009 Ex2). In the Verplanken *et al* (2002) experiments the

participants were asked to make a decision on which one out of 20 television sets they would choose to buy based on the information they were presented with. The information that the participants used to guide their decision was based on seven different attributes one of which was the target attribute of environmental friendliness. As such the decision that the individual made was considered by the experimenters in relation to how environmentally friendly it was (Ex 1 & 2) or in relation to how many environmentally related pieces of information the individual requested to view in order to inform their decision (Ex 3). In the Verplanken *et al* (2009) experiment a similar paradigm was utilised in which participants were asked to decide which apartment they would choose to move into based upon the information available. Again the information available was based on seven different attributes with the target attribute of loyalty being among them. The decision the participant made was investigated in relation to the rating of loyalty their chosen apartment had been given (Verplanken *et al*, 2009 Ex2). In the Bargh *et al* (2001, Ex5) and Hart & Albarracin (2009, Ex4) studies, participants were asked to choose whether they wanted to continue working on a word based puzzle task that they had already started or whether they would like to move onto a fun cartoon based task and this was used as a measure of perseverance behaviour. The Yang (2013, Ex5) study investigated the decisions of participants of whether to accept the fair or unfair offers made to them on a money sharing game.

1.6.4.4.2 Self-report measures

Another five studies included self-report type measures as measures of behaviours (Maio *et al*, 2009a Ex2; Yang *et al*, 2013 Ex3; Parzuchowski & Wojciszke, 2014 Ex3&4; Rasinsky *et al*, 2005; Shafran *et al*, 2006). In the Parzuchowski & Wojciszke (2014 Ex3 & 4) studies the participants rated the attractiveness of faces (Ex3) or told the researchers how many correct answers they had scored on a maths test (Ex4) as measures of honesty. The Rasinsky *et al* (2005) study likewise used a self-report measure of undesirable drinking behaviours as a measure of honesty. In the Maio *et al* (2009a Ex2) study the participants completed a measure rating themselves in relation to others on positive and negative traits as a measure of modesty behaviour. While Shafran (2006), looked at the amount of food actually eaten by participants (as recorded in a food diary) over a 24 hour period in relation to amount of high calorie foods eaten.

1.6.4.4.3 Economic games

There was a total number of 15 experiments that focused on behaviours around sharing money fairly or showing cooperative behaviour around sharing money (Hertel & Fielder, 1998 Ex1&2; Yang *et al*, 2013 Ex2,4,6&7; Smeesters *et al*, 2009a Ex3; Smeesters *et al*, 2003 Ex1,2,3,&4; Jonas *et al*, 2013 Ex3; Neuberg, 1988; Utz *et al*, 2004 Ex1&2).

Hertel & Fielder (1998 Ex 1&2) were interested in how fairly participants shared money between themselves and another in an economic game and Yang *et al* (2013) likewise utilised a variety of different economic games in order to investigate sharing behaviour including a trust game (Ex2), a game involving cooperation (Ex4) and the dictator game (Ex 6&7) where the participant allocates money to themselves and a supposed other. In the same vein, Smeesters *et al* (2009a, Ex3) also used a non-reciprocal dictator game to measure sharing behaviour and Smeesters *et al* (2003, Ex1,2 &3) looked at cooperative behaviour in a prisoners dilemma game where the participant is led to believe that they are playing with another participant and that they have the option to make cooperative choices (which will result in money being shared if the partner also chooses to cooperate) or non-cooperative choices (which will result in them keeping all the money if the partner chooses to cooperate but will result in them losing all the money if the partner also chooses not to cooperate). In Ex4, Smeesters *et al* (2003) used a give some game where participants were asked to decide how much money to give to others to measure sharing behaviour. Jonas *et al* (2013 Ex3) also utilised the dictator game to measure sharing behaviour, while Neuberg (1988) and Utz *et al* (2004, Ex1 &2) also used versions of the prisoners dilemma game to measure cooperative behaviour.

A further seven experiments focused on sharing behaviour in other contexts (Maio *et al*, 2009b Ex1,2&3; Karremans, 2007 Ex2; Maio *et al*, 2001 Ex1; Hertel & Kerr, 2001; Bargh *et al*, 2001 Ex2). Of these experiments six utilised a point allocation task, commonly known as the minimal group paradigm, whereby participants are asked to allocate points between members of their own group (the in-group) and members of another group (the out-group) by choosing one formation of allocations from a number of grids made available to them (Maio, 2009b Ex1,2&3; Karremans, 2007

Ex2; Maio, 2001 Ex1; Hertel & Kerr, 2001). The grids generally allow participants options to allocate points fairly across the two groups or to favour their own group when allocating points and hence the task is seen to be a measure of egalitarian behaviour. Similarly, Bargh *et al* (2001, Ex2) used a fishing game to measure the sharing of resources between self and community such that participants had to decide how many of the fish they had caught they should keep and how many they should return in order to allow the fishing stocks to replenish and benefit the general community.

1.6.4.4.4 Observable behaviours

A total of three experiments focused on volunteering behaviours (Arieli *et al*, 2013 Ex2; Maio *et al*, 2009a Ex5; Maio *et al* 2001 Ex2). All three of these experiments focused on whether participants were willing to volunteer either for a charity (Arieli *et al*, 2013, Ex2) or to complete further research studies for no payment (Maio *et al*, 2009a Ex5; Maio *et al*, 2001 Ex2) and in the case of the latter two studies measured how much time participants were willing to volunteer as well. There was one study which focused on helping behaviour (Karremans, 2007 Ex1) in terms of whether participants helped the experimenter pick up pencils that had been knocked over and another one which focused on donating behaviour (Jonas *et al*, 2013 Ex2) related to how much money participants donated to a charity when prompted at the end of the experiment.

A further five experiments investigated performance on word searches as a measure of behaviour (Harris *et al*, 2013 Ex1&2; Bargh *et al*, 2001 Ex1&3; Hart & Albarracin, 2009 Ex4). All of these studies utilised similar methodologies in that participants were provided with several word searches and were scored depending upon how many words they were able to find in the allocated timespan.

There were ten experiments which focused on other observable behaviours (Maio *et al*, 2009a Ex3&4; Yang *et al*, 2013 Ex1; Shafran *et al*, 2006; Bargh *et al*, 2001 Ex4; Bargh *et al*, 2006 Ex1; Epley & Gilovich, 1999 Ex1&2; Bechtoldt *et al*, 2012; Wheeler *et al*, 2008). Among these experiments, Maio *et al* (2009a Ex3&4) measured how long it took for participants to request a new pen or to use a cleaning wipe when asked to complete tasks with a leaky pen and sticky crayons (Ex3) and measured

how curious participants were to find out more information about the answers on a quiz task as indicated by the participants ticking a box to request further information (Ex4). Yang (2013, Ex1) measured how fair market vendors were in providing the weight of vegetable asked for by weighing the vegetables. Bargh *et al* (2001 Ex4) looked at whether participants persevered at a scrabble based work task past the allotted time limit as a measure of perseverance. Two studies measured polite behaviour by investigating how long it took for participants to interrupt the experimenter (Bargh *et al*, 2006 Ex1; Wheeler *et al*, 2008). As a measure of conformity behaviour, Epley & Gilovich (1999, Ex1&2) measured how strongly participants agreed with confederates about the interestingness of a task that had been performed. Finally, Bechtoldt *et al* (2012) included a measure of creativity based upon two dimensions of the number of ideas and the originality of ideas that participants were able to think of when asked about ways to improve teaching at a university.

1.6.4.5 Main results – direct effects of prime on behaviour

The majority of studies, 42 experiments in total, found main effects of priming values on behaviour in the directions predicted. However, for twenty seven of these studies there were also mediating factors that contributed to these main effects. In the case of the twelve studies where there were no main effects found for the primed values on behaviour, ten of them found significant interactions between the prime and another variable included in the study or found a significant effect between other variables in the study and behaviour. There were only two exceptions to this (Harris *et al*, 2013 Ex 1&2) which did not find any effects of the primed values on behaviour at all. The direct effects of the primes on behaviour are outlined further below with the mediating effects highlighted in the section that follows.

1.6.4.5.1 Priming pro-social values

Generally, priming pro-social values increased the likelihood of participants behaving in pro-social ways. For example, Arieli *et al* (2013) found that priming benevolence increased the likelihood of participants being willing to volunteer for a charity when compared to controls while Jonas *et al* (2013 Ex2) found that being primed for kindness led to more generosity in donating money to charity. Priming equality led to a decrease in in-group favouritism and more equal sharing in a points allocation task

(Maio *et al* 2009b, Ex1,3&4; Maio *et al*, 2001 Ex1) and similarly priming fairness led to sharing more money on a money allocation task (Jonas *et al*, 2013 Ex3).

In terms of priming other pro-social values, Maio *et al* (2001, Ex2) found priming helpfulness led to more time being volunteered to take part in further research studies while priming cooperation also led to more cooperative behaviour in an environmental resources game (Bargh *et al*, 2001 Ex2). It was also found that priming honesty led to more honest ratings of attractiveness for unattractive faces (Parzuchowski and Wojciszke, 2014 Ex3), more honest self-reports of maths performance (Parzuchowski and Wojciszke, 2014 Ex4) and more honest self reports of undesirable drinking behaviours (Raskinsky *et al*, 2005). In terms of caring about the environment Verplanken & Holland (2002 Ex1&2) found the expected effects of those being primed with environmental values being more inclined to make more environmentally friendly choices.

There were two studies which primed pro-social values and did not find direct effects of the prime on behaviour (Hertel & Kerr, 2001; Verplanken & Holland, 2002 Ex3), although both reported mediating effects which are highlighted further below.

1.6.4.5.2 Priming social order values

Priming social order values generally increased the pro-social and social order behaviours that were the focus of the experiments. It was found that priming cleanliness via handling clean or dirty money had direct effects on how fair market vendors were in providing the weight of vegetable asked for (Yang *et al*, 2013 Ex1) with those given clean money providing a fair weight while those given dirty money were less fair. It was also found that clean money primes led to participants being more willing to cooperate in sharing money when compared to those primed with dirty money and controls (Yang *et al*, 2013 Ex2, 4 & 5), and that this effect was also found when reading about clean or dirty money as the prime rather than handling actual money (Yang *et al*, 2013 Ex 6&7).

It was also found that priming conformity values led to more agreement with others ratings on the interestingness of a task when compared to those primed with non-conformity and controls (Epley & Gilovich, 1999 Ex1&2). Bargh *et al* (1996 Ex1)

found a direct effect of primes such that priming rudeness led to participants interrupting the experimenter significantly faster than those in the neutral or polite prime conditions.

Wheeler *et al* (2008) did not find direct effects of the prime of rudeness on subsequent interrupting behaviour but they did find effects that mediated the relationship which are highlighted in the mediating effects section below.

1.6.4.5.3 Priming pro-individual values

Priming pro-individual values appeared to have expected effects on behaviour measures of performance i.e. increases in perseverance and self-restraint, while they decreased pro-social cooperation. There was however one study which found no effects of the priming task on performance behaviour (Harris, 2013 Ex 1&2).

Priming high personal standards was shown to have an effect on certain behaviours related to eating such as eating less high calorie foods, feeling more guilt after eating and showing increased restraint (Shafran *et al*, 2006). It was also found that priming achievement related values enhanced performance on a word search task (Bargh *et al*, 2001 Ex1&3), predicted whether participants persevered with a task beyond the time limit set (i.e. heightened the participants' need to achieve; Bargh *et al*, 2001 Ex4) and determined whether participants chose to persevere with a less fun task already started rather than switch to a fun cartoon based task (Bargh *et al*, 2001 Ex5) all when compared to control participants.

Hart & Albarracin (2009 Ex 3&4) and Utz *et al* (2004 Ex 1&2) did not find direct effects of the primes of achievement or competence on their behavioural measures but both found mediating factors which are included in the section that follows.

One notable exception to all the experiments noted above was the paper by Harris *et al* (2013 Ex1&2) in which two experiments are reported which were carried out as direct replication attempts of the Bargh *et al* (2001 Ex1&3) studies. Harris *et al* (2013) did not find any effects of the achievement prime on subsequent word search performance unlike the initial Bargh *et al* (2001 Ex1&3) studies which found that the

achievement prime enhanced performance on word searches when compared to controls and did not find any mediating factors.

1.6.4.5.4 Priming opposing values (pro-social vs pro self)

Generally priming opposing values showed opposite effects on the same behaviours as predicted, such that priming pro-social values increased pro-social behaviours while priming pro-individual values decreased pro-social behaviours.

For example, Maio *et al* (2009a Ex5) found the expected effects of priming two opposing values (achievement and benevolence) on an achievement based task (a word search) and a benevolence task (willingness to volunteer for research). It was shown that those participants primed with achievement performed better on the achievement based task than the benevolence primed group or controls while those primed for benevolence values were more likely to volunteer more time than the achievement group or controls. Similarly, Karremans (2007, Ex1) also primed benevolence or achievement values in participants and found that the benevolence group were more likely to help pick up dropped pencils than the achievement primed group or controls.

Further to this, Karremans (2007 Ex2) also found that those participants primed with helpfulness or equality (via a providing reasons for values priming task) were more likely to allocated points fairly among the in-group and out-group than those primed with successfulness or a varied life (via the same priming task) or helpfulness (primed via a different task – without reasons for the value given) and controls. Similarly Smeesters *et al* (2009a Ex3) found that priming cooperation led to more equal sharing of money than did priming competition. Smeesters *et al* (2003 Ex1,2,3&4) also found that priming morality (as opposed to might) led to more cooperation and sharing in games involving decisions about allocating money to self or other.

Priming the collective self, as opposed to the private self, influenced participants to use the value of loyalty more when making a decision about which apartment they would choose from a list (loyalty was one attribute of seven that were rated for each apartment; Verplanken *et al*, 2009 Ex2). It was also the case that priming collectivist

values as opposed to individual values led to more creativity on a dimension of fluency (i.e. individual participants came up with more ideas when working in a small group primed with collectivist values; Bechtoldt *et al*, 2012).

Hertel & Fielder (1998 Ex 1&2) and Neuberg(1988) did not find any direct effects of priming cooperation versus achievement on subsequent measures of pro-sociality and cooperation but they did both find mediating factors which are outlined in the mediating factors section below.

1.6.4.5.5 Priming opposing values (social order vs personal development)

Similar effects were seen when priming social order versus personal development such that there were opposite effects of the value primes on the same behaviour. Priming rudeness in participants, as opposed to politeness, led to participants being more likely to interrupt the experimenter (Bargh *et al*, 1996 Ex1; Wheeler *et al*, 2008). When Maio *et al* (2009a Ex2) primed tradition values or stimulation values in their participants they found that those primed with tradition were more likely to be modest when comparing themselves on positive and negative traits to other students whereas those primed with stimulation values decreased in modesty compared to the control participants.

Investigating security and self-direction values, Maio *et al* (2009a Ex 3&4) found that those primed with security values asked for a clean pen or used a cleaning wipe quicker than controls, whereas those primed with self-direction values were more likely to delay asking for a new pen or using a cleaning wipe compared to controls (Maio *et al*, 2009a Ex3). They also found that those primed with self-direction values were subsequently more curious about finding out new knowledge than control participants while those primed with security values were less curious than controls (Maio *et al*, 2009 Ex4).

1.6.4.6 Mediating effects on the prime to behaviour relationship

There were twelve studies which did not find direct effects of the prime on behaviour (Hertel & Kerr, 2001; Verplanken & Holland, 2002 Ex3; Wheeler *et al*, 2008; Hart & Albarracin, 2009 Ex3&4; Utz *et al*, 2004 Ex 1&2; Hertel & Fielder, 1998 Ex 1&2;

Neuberg, 1988; Harris *et al*, 2013 Ex1&2). Of these studies the first ten found that there were other factors that mediated the relationship of the prime to the behaviours measured or that significantly interacted with the primes. The only exceptions to this were the Harris (2013 Ex 1& 2) experiments which did not show any effects of the primes on behaviour. There were also significant mediating effects found in twenty seven of the studies which had shown direct prime to behaviour effects. The mediating factors from all of these studies are outlined further below arranged by the type of mediating factors.

1.6.4.6.1 Value Centrality

Value centrality was shown to have a mediating effect in twelve studies (Verplanken *et al*, 2002 Ex1,2 &3; Utz *et al*, 2004 Ex1&2; Bechtoldt *et al*, 2012; Smeesters *et al*, 2003 Ex 1,2,3&4 and Arieli *et al*, 2013; Hertel & Fielder, 1998 Ex 1&2). Generally within these twelve studies the fact that the participants identified the values in question as values that were of high priority to them mediated the effect between priming and value congruent behaviours.

For example, Verplanken & Holland (2002 Ex1,2&3) found in their study of priming environmental values on the use of environmental information to make consumer choices (choosing a TV) that reliable priming effects were only seen if caring about the environment was a value that was considered to be central to the participants i.e. was already an important value for them. In Ex2, Verplanken *et al* (2002) found direct effects of the primes on behaviour but also that value centrality mediated this effect. In Ex3 they did not find main effects of the prime on behaviour but did find significant interactions between value centrality and primes (Verplanken *et al*, 2002 Ex3). The mechanism for this could be that the prime increased the importance (or the salience) of the value for the participants for whom the value was already important which then mediated the effect by making these individuals more likely to use environmental information at their disposal to make their decisions. In support of this Verplanken *et al* (2002 Ex1) also found that the effect of the priming manipulation was due to the perceptions of the environmental attribute as being important, such that those participants who gave high importance to the environmental information available were more likely to choose a TV that was better for the environment.

Utz *et al* (2004 Ex1&2) also found an interaction between the value prime and value centrality. They found that priming competence affected those who were considered to be competitors on a ring measure of value centrality but that the prime did not affect those classified as pro-socials or individualists (Utz *et al*, 2004 Ex1). It was also found that the competence prime reduced cooperation for competitors, increased cooperation for pro-socials, and had no effect for individualists (Utz *et al*, 2004 Ex2). Utz *et al* (2004 Ex 1&2) also found that having a cooperative partner led to greater cooperation among pro-socials and that there was a main effect of strategy such that a cooperative partner elicited more cooperation than a non-cooperative partner. The effect of strategy was stronger for pro-socials and individualists than it was for competitive participants (Utz *et al*, 2004).

In the study carried out by Arieli *et al* (2013 Ex2) it was found that the change in benevolence values following the priming intervention mediated the relationship to volunteering behaviour. In essence, the priming tasks only had an effect on volunteering behaviour for those participants for whom benevolence values became high priority values.

There were significant interactions between the priming task and social value orientation found in the studies carried out by Smeesters *et al* (2003 Ex1,2,3&4). Participants were measured with regards to whether they had a pro-social or pro-individual value orientation which was found to have an effect on cooperative behaviour such that those who had pro-social orientations were generally more likely to be cooperative than those who had pro-individual social value orientations (Smeesters *et al*, 2003 Ex1,2,3&4). They also found an interaction effect which demonstrated that those who were low in consistency with regards to their social value orientation were more likely to be affected by the primes. This meant that individuals who were low-consistent pro-individuals were as likely as low and high consistency pro-socials to show effects of the morality (pro-social) primes on cooperative behaviour (Smeesters, 2003 Ex 1,2,3&4). In a later study, Smeesters *et al* (2009, Ex3) also found that the effects of cooperation and competition primes on cooperative behaviour were related to perceptions of the supposed 'other' taking part in the cooperative game and that this relationship was also mediated by having a

communal value orientation. This meant that those who had communal value orientations, as opposed to individual focused value orientations, were more likely to perceive others as being cooperative and were more likely to behave in a cooperative way regardless of primes.

Similarly to the above, Hertel & Fielder (1998 Ex1&2) found that pre-dispositions to values was the only strong predictor of cooperative behaviour in their studies such that those with cooperative pre-dispositions were likely to behave cooperatively while those with individualist pre-dispositions were less likely to be cooperative. There was also a consistency main effect such that those who were low in consistency on their pre-dispositions were more likely to be cooperative following the cooperation prime, meaning that the primes were more likely to have an effect on those individuals who did not have strong dispositional tendencies (Hertel & Fielder, 1998 Ex1&2).

Finally, Bechtoldt *et al* (2012) found that creativity, as measured by originality of ideas, was mediated by an interaction between value orientation and self-construal prime as either collective versus individual. They found that there were more original ideas when those who were in the collective value orientation groups had been primed with the individual self-construal rather than being in the collective value orientation group and being primed for collectivist self-construal. They argue that this is related to the collective group working better as a team when each member within it is working to individual motivations and strengths.

1.6.4.6.2 Expectations of others

There were seven experiments that showed that expectations of others had a mediating effect on the prime to behaviour interactions (Parzuchowski & Wojcizke, 2014 Ex3; Epley & Gilovich, 1999 Ex 1&2; Hertel & Kerr, 2001; Smeesters, 2003 Ex 2,3&4; Smeesters *et al*, 2009 Ex3).

For example, Parzuchowski & Wojciszke (2014 Ex3) found an interaction between attractiveness and prime such that the honesty prime only affected ratings of attractiveness for unattractive faces (as had been determined via a pilot study) and not for attractive faces. The interpretation of this is that there is no need to be

dishonest when someone is attractive whereas there is a social expectation that we will exaggerate someone's attractiveness when they are unattractive rather than be honest. The honesty prime was thought to reduce this social expectation by promoting the concept of honesty.

In their studies on priming conformity, Epley & Gilovich (1999 Ex1&2) found that conformity primes increased adherence to the answers given by confederates but they also found that priming non-conformity led to more adherence than those in the control group. They suggest that priming non-conformity also primes conformity by the fact that non-conformity is understood within the context of being the opposite of conformity (Epley & Gilovich, 1999 Ex1). They also found that there were no priming effects seen in the absence of pressure from others for either conformity or non-conformity primes. That is, when control participants were given the same priming task and were then asked the same questions about the interestingness of the task without others being present there were no differences in the ratings across the priming tasks (Epley & Gilovich, 1999 Ex2). They suggest that this means conformity is a concept that can only be seen in relation to other people as it serves a societal function of group cohesiveness.

Hertel & Kerr (2001) noted that perceived expectations and norms mediated the relationship between priming loyalty and equality values on egalitarian behaviour. Specifically when participants were primed for loyalty they had stronger expectations of in-group favouritism as the in-group norm but when they were primed for equality there were lower expectations of in-group favouritism being the in-group norm. As such the loyalty prime led to higher in-group favouritism compared to the equality group due to this interaction between primes and subsequent expectations of group norms. They also found a significant effect of the type of matrices that they used within the minimal group paradigm such that priming loyalty led to higher in group favouritism when using intergroup matrices but not when using intragroup matrices.

With regards to cooperative behaviour Smeesters (2003 Ex2, 3 &4) found that participants' expectations of their supposed 'partners' cooperation had an effect on subsequent cooperative behaviour. It was found in Experiment 2 that those primed with morality (pro-social) compared to might (pro-individual) primes had higher

expectations of cooperation (Smeesters, 2003 Ex 2&4). In further studies they found that pro-socials expected more cooperation than pro-individuals (Smeesters *et al*, 2003 Ex3&4) and that correlations of these expectations and actual cooperative behaviour were also significant (Smeesters *et al*, 2003 Ex3&4).

1.6.4.6.3 Personality factors

A total of five studies indicated that there were personality factors that mediated the prime to behaviour effects in their participants (e.g. Hart & Albarracin, 2009 Ex 3&4 and Wheeler *et al*, 2008; Neuberg, 1998; Shafran *et al*, 2006).

Chronic achievement motivation was one of the factors investigated in relation to personality. Hart & Albarracin (2009 Ex3&4) measured chronic achievement motivation in their participants prior to priming achievement values (Ex 3&4) and also manipulated the frames given to the behavioural task (i.e. giving a fun context, achievement context or generic/neutral context for a word-search task) in Ex4. They found that the achievement prime increased the probability that the people with chronically high achievement motivation would choose to resume an interrupted achievement focused task and that people with low chronic achievement motivation would choose to switch to a fun task that was offered as an alternative (Hart & Albarracin,2009 Ex3). Hart & Albarracin (2009 Ex4) also found that there was an interaction between the chronic achievement motivation and achievement prime that was dependent upon the task frame. In the fun frame condition the achievement prime increased performance for chronically low achievement motivators but decreased performance for chronically high achievement motivators. In the achievement frame condition the achievement prime reduced performance for chronically low achievement motivators but improved performance for high achievement motivators.

Related to the Hart and Albarracin (2009 Ex3&4) findings, Neuberg (1988) found that there was a significant interaction between prime type and behavioural predisposition such that participants with a competitive behaviour disposition displayed more competitive behaviour when exposed to competitive primes than those with cooperative behavioural dispositions exposed to competitive primes. There was also a main effect of behavioural tendency such that those who were

more competitive on their first move of the prisoners' dilemma game played more competitively afterwards. They also found a main effect for partners initial move such that if the partner was competitive on the first move the participant played more competitively themselves compared to when their partners first move was cooperative.

In their study of the effects of priming rudeness on interrupting behaviour, Wheeler *et al* (2008) found that self-monitoring, internal state awareness and self-reflectiveness were all related to the pattern of results seen in their study. They found that assimilation to rudeness or politeness primes, that is displaying behaviour in accordance with the primed concept, only occurred in those who were low self-monitors, those who had low internal state awareness, and those who were high in self-reflectiveness. Further personality factors seen in the studies included the finding by Shafran *et al* (2006) that there were significant differences between the high standards primed group and the low standards primed group on measures of perfectionism following the prime. They suggest that differences in perfectionism could have mediated the effects of the prime on behaviour and link this to the evidence for a relationship between perfectionism and eating disorders within clinical populations.

1.6.4.6.4 Having goals consistent with behaviours

Five studies suggested that having a more conscious reason for engaging in the primed behaviours mediated the prime to behaviour effects. For example, Maio *et al* (2001 Ex1&2) and Karremans (2007 Ex1&2) both utilised a priming technique which asked the participants to provide reasons in support of the target values while Bargh *et al* (2001 Ex2) provided participants with an explicit aim of being cooperative during the behavioural task as using a priming task. These studies are outlined below.

In the studies carried out by Maio *et al* (2001 Ex1&2) the priming task used involved asking participants to provide reasons for and against the target values. It was found that the nature of the reasons given were related to subsequent effects on behaviour. For example, Maio *et al* (2001 Ex1) analysed the reasons that participants gave in support of or against the value of equality and found that the more clear and concrete the reasons given were the less in-group favouritism the

participant exhibited on the behaviour measure i.e. the more egalitarian they were. Similarly, when they analysed the reasons given for and against helpfulness they found that participants who gave more clear and concrete reasons volunteered significantly more time than those who gave less clear reasons (Maio *et al*, 2001 Ex 2). In line with these findings Karremans (2007, Ex1&2) also found that higher favourability of the reasons given in support of benevolence of or helpfulness values was correlated with subsequent behaviours. In Experiment 1 Karremans (2007) found that favourability of benevolence reasons was significantly positively correlated with helping behaviour while in Experiment 2 they found that favourability of reasons for helpfulness and equality were significantly correlated with choosing to share points equally among the in-group and out-group.

In a similar fashion, Bargh *et al* (2001 Ex2) found that were was a main effect of giving the participant a conscious goal on subsequent behaviour. Although there was a main effect of priming cooperation on the behaviour measure, it appeared that those participants who were given the aim of completing the task in a cooperative way were also more likely to behave more cooperatively. The intentions between all participants to behave cooperatively were measured as being the same so it was concluded that the conscious goal that was given interacted with the priming task to effect subsequent cooperative behaviour (Bargh *et al*, 2001 Ex2).

1.6.4.6.5 Attitudes

Three studies suggested that there were relationships between certain attitudes and the effects seen within the experiments (e.g. Yang *et al*, 2013 Ex 5,6 &7). For example, Yang *et al* (2013 Ex5) found that when participants were primed with clean or dirty money the relationship between whether they accepted the money offers made in a sharing game were shaped by their subsequent attitudes to low and unfair offers. As such, those primed with clean money were less likely to accept low offers from the supposed 'partner' they were playing with but were especially unlikely to accept low and unfair offers. Those primed with dirty money were less likely to be discriminate in this way. Similarly, Yang *et al* (2013, Ex6) found that favourable evaluation and attitude towards trade-related words mediated the effect of the participants primed with clean money giving more generously than those primed with

dirty money. The effects of the prime were rendered non-significant when the evaluations of the trade-related words were entered into the analysis.

In another experiment, Yang *et al* (2013 Ex7) found that fairness and greed attitudes had mediating effects. They primed participants with articles about how clean or dirty the money in circulation in their country was and then asked participants to take part in a money sharing game to measure fairness. They found that those primed with the clean money were fairer than those primed with dirty money. A mediating factor within this was individual ratings of favourability towards fairness or greed such that those who were primed with clean money were more likely to endorse fairness and allocate money fairly while those who were primed with dirty money were more likely to endorse greed and to keep more of the money for themselves.

1.6.4.6.6 Other Mediating Factors

There were several other studies which had mediating effects which did not fit into the categories above. For example Bargh *et al* (2001 Ex5) found that gender had an effect such that more women than men chose to persevere with an achievement based task rather than choosing to change to a fun task. This effect was not explored further within the Bargh *et al* (2001) paper. In the same paper, Bargh *et al* (2001 Ex3) also found that there was a significant effect of a time delay on achievement based behaviour following an achievement prime. They utilised two different tasks to measure the effects of achievement based primes and they found that achievement based attitudes tended to extinguish over the time delay so that on a subsequent impression formation task the participants were less likely to develop impressions of the individual as being achievement focused but that in terms of the achievement behaviour the performance was better after a time delay than immediately following the prime.

In a different study but also related to time delay, Rasinski *et al* (2005) found that there was an effect of task order. When they primed their participants for honesty they found that when the target questions about undesirable drinking behaviours immediately followed the prime, participants were more likely to answer them honestly compared to when the questions came later in the questionnaire.

In their experiments investigating priming kindness on generosity and fairness Jonas *et al* (2013 Ex2&3) were also interested in the effects of mortality salience on the behaviours that followed the primes. In Experiment 2 Jones *et al* (2013) allocated participants to a mortality salience or dental pain group with tasks to bring these two different situations to mind and then within each of these groups, participants were either primed for generosity and kindness or a neutral non-value based prime. They found that in the mortality salience group the generosity/kindness prime led to more money being donated to charity compared to the neutrally primed participants who were found to give less money. In the dental pain condition there was no influence of prime on donating. These results were in line with the expectations of the researchers such that bringing to mind the possibility of a participant's own death should reduce the likelihood of them focusing on others and being willing to be charitable, as seen in the neutral prime condition, but that introducing the prime increased focus on others and overcame this commonly seen effect of mortality salience. They also found that there were significant correlations and a significant interaction between mortality salience and money importance. In a further experiment, Jonas *et al* (2013 Ex3) showed that there was a significant effect of a fairness prime on donating money across the mortality salience and dental pain groups. They also found that there was a significant interaction between the fairness prime and whether participants were in the mortality salience or dental pain groups such that they found that the participants primed with fairness gave more money in the mortality salience condition than in the dental pain condition.

1.6.4.7 Limitations

There are several common limitations apparent in the studies included in this review and these are explored further below. For example, there is an obvious bias towards undergraduate student samples of participants which limits the generalisability of this area of research. There are also occasionally small sample sizes which can lead to questions about the power and validity of the results. Other methodological weaknesses and limitations within individual studies are explored further below.

1.6.4.7.1 Small sample sizes

There were 14 experiments from the 54 reviewed which had less than 20 participants per condition (Arieli *et al*, 2013 Ex2; Maio *et al* (2001) Ex2; Maio *et al*

(2009b) Ex3; Parzuchowski & Wojciszke, 2014 Ex4; Bargh *et al*, 2001 Ex2; Verplanken & Holland, 2002 Ex1; Yang *et al*, 2013 Ex1&2; Bargh *et al*, 1996 Ex1; Epley & Gilovich, 1999 Ex1; Hertel & Fielder, 1998 Ex1; Karremans, 2007 Ex2; Maio *et al*, 2009 Ex3&4). This makes it difficult to interpret the results from these experiments with confidence as the results may lack good effect sizes. In contrast to this however, many of the studies reviewed have large sample sizes which means that the majority of the results within this review can be considered to have power. Many of the effects seen in the experiments noted above have also been replicated or explored within further experiments with larger participant samples which means that more generally the effects seen within the literature as a whole have good effect sizes.

1.6.4.7.2 Lack of control group

In total 18 of the studies do not report having a control group as part of their design (Jonas *et al*, 2013 Ex2&3; Parzuchowski & Wojciszke, 2014 Ex3; Hertel & Kerr, 2001; Yang *et al*, 2013 Ex2,3,4&5; Shafran *et al*, 2006; Wheeler *et al*, 2008; Epley & Gilovich, 1999 Ex1; Bargh *et al*, 2001 Ex3; Utz *et al*, 2004 Ex1&2; Smeesters *et al*, 2009 Ex3; Hertel & Fielder, 1998 Ex2; Verplanken *et al*, 2009 Ex2; Bechtoldt *et al*, 2012). In some cases this is due to the researchers using a control group from a previous study where they were intending to replicate the same procedures and measures (e.g. Hertel & Fielder, 1998 Ex2). However, this methodology does not take account of other factors such as the potential for a different environment being used for the new study or other such confounding variables which would mean that the control group from the previous research may have been tested under different conditions to the current experimental participants. Other studies utilised participants from other conditions within the study as their control groups. For example, Yang *et al* (2013 Ex2,3,4&5) used four groups of participants in their studies, with two groups being primed with the clean or dirty money conditions, while other participants were asked to count clean or dirty paper. However, there were significant interactions between the dirty and clean paper and dirty and clean money conditions in all of their studies which makes it difficult to judge how participants would have responded to the behavioural measures if they had not been exposed to money or paper primes at all.

1.6.4.7.3 Experimenter not blind to conditions

It is not clear in the reporting of some of the studies as to whether the experimenters were blind to conditions (e.g. Verplanken & Holland, 2002 Ex1,2&3; Smeesters *et al*, 2003 Ex 1-4) while in at least one study it was clear that they were not (Arieli *et al*, 2013 Ex2). This is one of the strengths of the methodologies around priming values; that experimenters take lengths to ensure that they are not biasing their own behaviour when carrying out their research in order to get results in favour of their hypotheses. Generally, the experiments reviewed carefully considered their methodology so that the individual experimenters did not know which conditions the participants were allocated to in order to avoid any conscious or unconscious changes in experimenter behaviour. The procedures for this were clearly highlighted within several studies (e.g. Harris *et al*, 2013 Ex1&2; Neuberg, 1988; Karremans, 2007 Ex1&2) with almost all (excepting those initially highlighted above) outlining some details of these procedures within their methods sections.

1.6.4.7.4 Participants not probed for suspicion

There were six studies that did not report whether they probed the participants for suspicion at the conclusion of the study (e.g. Arieli *et al*, 2013 Ex2; Yang *et al*, 2013 Ex1,2&4, Shafran *et al*, 2006; Karremans, 2007 Ex2). The importance of this is that these studies are investigating the activation of values at an unconscious cognitive level. In order to understand how priming values affects behaviours we need to see participants responding to tasks in as natural a way as possible. If participants suspect links between tasks that are administered then there is a chance that they will change their behaviour accordingly. By probing participants for suspicion at the conclusion of the study the experimenter is able to ascertain whether the effects that they have seen in the experiment are genuinely due to the manipulations that they have made in the study rather than due to the participant changing their behaviour consciously to attempt to meet the experimenter's expectations. As such, we cannot be certain within these studies whether the participants were aware of the priming task or not and whether this awareness affected their behaviour.

Due to the nature of the Shafran *et al* (2006) paper being related to keeping a food diary over the course of a week following the signing of an explicit contract we can

ascertain that these participants would have been aware of the nature of the study and may have guessed its purpose. In the case of Arieli *et al* (2013 Ex2) we know that they carried out this study as a direct attempt to increase individuals' benevolence values and they utilised a range of persuasive priming procedures in order to do this. As such, participants may have been explicitly aware of the attempts of the researchers and part of the behaviour that the researchers then saw in terms of volunteering with a charity may have been related to demand effects. Yang *et al* (2013 Ex1) did not debrief their participants due to this being a field research study but a debrief procedure could have given the researcher an idea of any confounding variables such as individual differences in whether their market vendor participants had felt angry or rushed which led to less fair behaviour rather than unfair behaviour being related to the dirty money prime.

In several studies the researchers report that there was some participant awareness of the primes which was acknowledged during the debriefing procedure (e.g. Neuberg, 1988; Maio *et al*, 2009a) and these participants were then removed from further analysis so as not to bias the rest of the sample. As such, these are important procedures to include within priming studies to ensure unbiased data.

1.6.4.7.5 Random allocation to conditions

The majority of studies noted that the participants were randomly allocated to conditions but at least three studies did not specify this (e.g. Verplanken & Holland, 2002 Ex1,2&3). This is important because random allocation to conditions is another aspect of reducing bias in experiments through ensuring that all the participants are allocated without the experimenter choosing which participant goes into which condition based upon some other pre-determined criteria which might favour their hypotheses.

1.6.4.7.6 Mediating effects not considered

Given the range of mediating effects that have been noted in the previous section of this review, it is perhaps surprising that some studies have not considered any mediating factors within their research. For example, Maio *et al* (2009a Ex2,3&4) do not consider any other factors which could have affected their results beyond their interpretation in line with the Schwartz values model although they do acknowledge

that there could be other values impacting on the behaviour measure and that we cannot be certain which values are having the effect. Bargh *et al* (2001 Ex1) also do not consider any mediating factors in their study. This could be a limitation as the actual priming effects in many of the studies included in the review appear to be mediated by other factors and as such studies which do not consider the inclusion of mediating factors may overestimate the direct effects of the priming tasks on behaviour.

1.6.4.7.7 Validity of behaviour measures

There are several limitations in the literature with regards to measures of behaviour as related to values. Of note is the fact that we cannot be certain which values are having an effect on many behaviours because values themselves are considered as 'trans-situational' and as such are related to many different behaviours. Likewise, behaviours can be related to many different values (Maio *et al*, 2009a Ex2,3&4; Bargh *et al*, 2001 Ex2). In the Bargh *et al* (2001 Ex2) study participants complete a resources allocation game as a measure of cooperation between the self and the wider community. However, this game is ambiguous in relation to the values it is actually measuring as it could also be related to caring about the environment as well as being related to values concerned with social order and survival in terms of maintaining social order and following group rules.

Another important issue is the general validity of the measures being utilised. For example, Maio *et al* (2009a Ex3&4) use novel behavioural tasks as measures of curiosity and cleanliness in relation to openness and security values respectively. As these are novel behavioural measures it is unclear how valid they are in terms of how well they actually measure the values that they are proposed to measure and how standardised they are in terms of how participants will respond to the behaviours to give an idea that they are actually measuring differences due to the primes rather than individual differences.

Another example of a measure that may not be valid is the measure of rudeness behaviour seen in the Bargh *et al* (2006 Ex1) experiment. A number of participants within this experiment did not interrupt the experimenter at all during the allocated time suggesting that the measure was not entirely valid. This was similar to that

seen by Wheeler *et al* (2008) when they attempted to use the same measure of behaviour. In this case there could be other factors to take into account, such as the motivation for the participant to interrupt the experimenter. For example, there may have been reasons why some participant needed to finish the study more quickly than others. There was also the confounding factor that the person the rudeness was aimed at was someone in a position of authority which adds a further dimension to the requirement to be rude or polite.

In another study Hertel & Fielder (1998 Ex1&2) use the ring measure of social values as a way of measuring participants' behaviour in terms of whether they are altruistic, cooperative, individualistic, competitive or aggressive. One of their main findings is that the cooperative behaviour of participants, as measured by the ring measure, is not related to cooperation primes but is instead qualified by an interaction between primes and pre-dispositions indicating the pro-social predispositions (altruistic and cooperative) are more likely to display cooperative behaviour. Smeesters *et al* (2003 Ex1-4) used the same measure to determine their participants' pre-dispositions prior to priming and measuring behaviours using an economic game and they concluded that the participants' pre-dispositions interact with the primes to affect behaviour. This raises questions as to what exactly the ring measure of social values is measuring and whether it can be considered a measure of cooperative behaviour or rather a measure of pre-dispositions.

There is a general difficulty with the economic games utilised in many of the studies included in this review in that they tend to rely on hypothetical monetary payoffs and even those studies where the participants are given monetary rewards they are a fraction of the actual money used in the games. As such there is a question over how well these games actually apply to real-life behaviour in relation to cooperation, sharing and equality (Smeesters *et al*, 2003). Many of the studies also incorporate a single trial of one of these games (e.g. Smeesters *et al*, 2003 Ex1-4) which assumes that the participant is making that one choice based upon the primed value and that this is enough to constitute behaviour. However, many other studies also utilise behaviour measures that are based on one decision only (e.g. Verplanken *et al*, 2002) and the argument for this is that the primes are potentially having an effect on the participants' decision making process in terms of the information that they use to

make their decision as well as other factors such as considering the social context. As such, these experiments may be more applicable to real life settings than they first appear to be.

There are some examples where the behaviour measures are biased in favour of seeing certain behaviour. For example, Maio *et al* (2009b Ex1, 3&4) gave participants options for allocating points between two groups which substantially favoured the in-group over the out-group with the rationale that if participants chose to allocate points equally this indicated a conscious effort. However, they do not consider that the matrices being biased towards the in-group may have inadvertently primed their other participants towards the in-group which would have biased their results. It would have been helpful for the researchers to have demonstrated that the control group would favour the in-group when they had options favouring the out-group and the in-group available to them in order to then compare the choices made by the equality primed participants.

Other general concerns with the measures used include the Jonas (2013 Ex2) study in which they measure the amount of money participants are willing to donate to charity. The researchers themselves acknowledge that this measure relies on the amount of money the participants had available to them at the time. Jonas *et al* (2013) attempted to overcome this by paying the participants in cash at the start of the study so that they at least had a small amount of money available to donate but other measures of volunteering of donating would have been useful to consider.

1.7.4.7.8 Conceptualisation of values

Some studies such as Maio *et al* (2001); Maio *et al* (2009ab); Karremans (2007); Verplanken *et al* (2009); Verplanken & Holland (2002) and Arieli *et al* (2013) clearly conceptualise the values under investigation in relation to available models within the values literature (e.g. Schwartz model of basic human values; Schwartz 1992, 1994).

However, within many of the studies there are unclear conceptualisations of values with regards to the concepts being primed. Many of the studies used in this review do not offer a framework for understanding values and do not acknowledge that their experiments are related to the values literature at all (e.g. Neuberg, 1988; Hertel &

Kerr, 2001; Epley & Gilovich, 1999; Utz *et al*, 2004; Wheeler *et al*, 2008; Bargh *et al*, 2001; Shafran *et al*, 2006; Jonas *et al*, 2013; Hart & Albarracin, 2009; Smeesters *et al*, 2003 Ex1-4; Smeesters *et al*, 2009a Ex3; Parzuchowski & Wojciszke, 2014). Despite this all of these studies are priming concepts which fit with current conceptualisations of social values. For example, Smeesters *et al* (2003 Ex1-4) use the terms 'morality' and 'might' as concepts that are being primed to investigate the effects on cooperative behaviours. When studying the actual target primes that are being used within the priming procedure it is apparent that the term 'morality' refers to pro-social values including; cooperative, helpful, fair, caring and so on, while the term 'might' refers to pro-individual values including; powerful, striving, smart and persistent (Smeesters *et al*, 2003). However, the fact that these studies do not conceptualise their research in terms of social values but rather in relation to other concepts such as social norms, stereotypes, morality, goals and traits suggests that there are large overlaps in the conceptualisations of these concepts within the field of social psychology. As such, it may be difficult to interpret results in the area of priming values without reference to a consistent framework such as the Schwartz model (Schwartz, 1992; 1994).

One further factor related to this is that it is unclear what concepts some studies are priming. For example, Epley & Gilovich (1999 1&2) prime conformity and non-conformity in different groups of participants to see the effects on behaviours related to conforming with the opinions of others which are unlikely to be accurate reflections of the participants' actual experience. They found that priming conformity made the participants more likely to agree with the confederates opinions but they also found that priming non-conformity had the same effect to a slightly letter degree. They suggest that this indicates that priming the opposing motivation (non-conformity) had the same effect as priming conformity. Another viewpoint is that rather than non-conformity representing the opposing motivation to conformity it actually represents another aspect of conformity. This means that because words used to bring to mind non-conformity such as 'oppose, rebel, confront and defy' are still semantically linked to those used to bring to mind conformity e.g. 'comply, respect, obey and uphold,' either of these priming groups is likely to prime conformity to some extent. This was also supported by the Hertel & Fielder (1998 Ex1&2) studies which used prime

words semantically related to cooperation that were both positive and negative in nature to successfully prime the value.

1.7.4.7.9 Confounding factors

There are further instances of confounding factors, not covered in the sections above, within some of the studies. For example Bargh *et al* (2001 Ex1) instructed their participants to 'find as many words as possible' within a word search task which could have added an extra element of priming which they do not account for in their interpretation of results. This is especially pertinent in relation to the fact that Bargh *et al* (2001 Ex2) subsequently found that providing participants with the conscious goal to cooperate (i.e. instructing participants to cooperate as much as possible while completing a resource allocation game) had an effect on behaviour and interacted with the prime in accounting for the effects seen.

In another Bargh *et al* (2006 Ex1) study the perceptions of the participants in relation to their feelings about the researcher were measured to investigate whether this had any mediating effect on whether the participant interrupted the experimenter of not (i.e. did the participant perceive the experimenter as being rude or not). They found that ratings did not change across participants primed for rudeness or those primed for politeness and concluded that there were no differences in perceptions. However, they do not take account of the fact that there may be other factors at play such that the participants may not have wanted to get the experimenter into any trouble by saying that they were rude and priming rudeness may not have overcome such strong social norms as these.

In terms of other examples, Harris *et al* (2013 Ex1&2) included procedures which could have made it explicit to participants that the experimenter was not aware which condition the participant was taking part in (i.e. asking the participant to keep materials face down) which could inherently raise suspicion within the participant as to the nature of the conditions. Harris *et al* (2013) also note that they added measures to ensure experimenter impartiality in their replication attempt of Bargh *et al* (2001) but they do not consider whether there were other differences between their experiments such as the impact of samples from different universities which could have explained the fact that they found no effects of the prime on behaviour.

In relation to the priming tasks themselves there are examples where it is unclear which priming task had an effect and for what reason the effects occurred. For example, Arieli *et al* (2013 Ex2) used four different priming tasks with the same group of participants as an 'intervention' for increasing benevolence values (pro-social) values. It is therefore difficult to interpret which of the priming tasks had an effect on the behaviour or whether all priming tasks contributed to the effects seen. In another study Maio *et al* (2001 Ex2) used two priming tasks, one that focused on providing reasons for values and another that focused on rating feelings in relation to a value. They found that the priming task asking for reasons for the values had more of an effect on subsequent behaviour than that asking for ratings of feelings about the value but they do not account for the fact that the reasons prime group were given more time to complete the priming task than the other group. It is possible that the more time spent thinking about the value had an effect more than the actual nature of the priming task itself.

1.6.4.7.10 Generalisability

As highlighted in the results section above 52 out of the 54 studies included in the review use undergraduate samples of participants which means that the results are difficult to generalise to other populations and one of the remaining 2 studies does not specify its participant sample (Yang *et al*, 2013 Ex4). The only exception to the undergraduate student samples was Yang *et al* (2013; Ex1) who utilised an opportunistic sample of market vendors. It is also noted that Shafran *et al* (2006) used a mixed undergraduate and community sample of volunteers for their study although they do not state the proportions of each in their final sample. The ages of participants, where these were provided, appeared to be similar as mean ages ranged from 20 years (Karremans, 2007 Ex2) up to 24.1 years (Bargh *et al*, 2001 Ex2). This is in line with general undergraduate student samples but also limits the generalisability of the priming effects seen within the literature reviewed to wider age ranges. It was also noted that 33 out of the 40 studies that provided information on the gender of participants utilised samples that were predominantly female. This again highlights potential difficulties with being able to generalise to a wider sample.

The biggest difficulty with generalisability of the priming literature results, however, comes from the predominantly laboratory based research paradigms that are commonly used. Although one of the strengths of many of the studies reviewed here is that they tend to adhere to stringent procedures in order to reduce bias, there has to be a question asked about how these findings are applicable to the real world. The use of subliminal computer based priming techniques and economic games are highly controllable paradigms that are replicable in further experiments but in relation to decisions and behaviours in everyday life there are more applicable methods such as attempting to measure observable behaviours (e.g. Maio *et al*, 2009a; Maio *et al*, 2001; Wheeler *et al*, 2008; Bargh *et al* 1996; Epley & Gilovich, 1999; Bargh *et al*, 2001; Karremans, 2007) and using priming paradigms that rely on materials readily available such as asking participants to think about values or reading values related materials (e.g. Maio *et al*, 2001; Arieli *et al*, 2013; Maio *et al*, 2009b; Karremans, 2007; Jonas *et al*, 2013 Ex2; Yang *et al*, 2013 Ex6&7).

1.6.4.8 Summary of Review Results

The majority of studies investigating the effects of priming values on behaviour appear to be related to priming pro-social values (e.g. Maio *et al*, 2001 Ex 1&2; Arieli *et al*, 2013; Maio *et al*, 2009b Ex1,3&4) although there has also been considerable research into other areas of values such as pro-individual values (e.g. Bargh *et al*, 2001 Ex 1,3,4&5; Hart & Albarracin, 2009 Ex 3&4) and pro-societal standards values (e.g. Yang *et al*, 2013 Ex1-7; Epley & Gilovich, 1999 Ex1&2). Importantly, there have also been studies investigating the effects of priming values with opposing motivation on behaviours (e.g. Maio *et al*, 2009a Ex2-5; Smeesters *et al*, 2009a Ex3; Hertel & Fielder, 1998 Ex1&2)

There has been a wide range of priming tasks used to prime values including subliminal computer based priming tasks (e.g. Neuberg, 1998; Wheeler *et al*, 2008), implicit tasks (e.g. Jonas *et al*, 2013 Ex2&3; Parzuchowski & Wojciszke, 2014 Ex 3&4) and more explicit priming tasks (e.g. Maio *et al*, 2001 Ex1&2; Karremans, 2007 Ex1&2) which have all shown success in leading to value congruent behaviours. A number of different behaviours have also been investigated in relation to values and the behavioural measures used varies greatly across studies from behaviours around making decisions and choices (e.g. Verplanken & Holland, 2002 Ex 1,2&3;

Smeesters *et al*, 2003 Ex1-4) through to behaviours directly observed by the experimenter (e.g. Bargh *et al*, 2001 Ex1; Karremans, 2007 Ex1).

In terms of the results of the experiments there is evidence from the majority of studies reviewed that priming values has direct effects on value congruent behaviours in the predicted directions (e.g.Arieli *et al*, 2013 Ex2; Maio *et al*, 2009 Ex 1,3&4; Parzuchowski & Wojciszke, 2014 Ex3&4; Rasinsky *et al*, 2005; Epley & Gilovich, 1999 Ex1&2). There were also a large number of studies that indicated that there are important mediating factors that can influence the relationship between priming values and value congruent behaviours such as value centrality (e.g. Verplanken & Holland, 2002 Ex2&3) and certain personality factors (e.g. Hart & Albarracin, 2009 Ex3&4).

In terms of limitations, there are some common factors between studies such as a general bias towards undergraduate student samples of predominantly female participants of similar ages. This limits the applicability of most results within this area to wider samples. However, one of the strengths of the experiments reported is that there are generally strong methodological procedures in place to reduce experimenter bias, such as the experimenters being blind to conditions, randomising participants to experimental groups, using control groups and probing the participants for suspicion during a de-briefing procedure although occasionally studies do not report whether they have considered these factors.

Other more specific limitations refer to the nature of the behavioural measures used in individual studies and how valid these are as measures of values and behaviour. For example, some studies rely on observable behaviours which can be difficult to measure (e.g. Maio *et al*, 2009a; Karremans, 2007 Ex1; Wheeler *et al*, 2008; Bargh *et al*, 2006 Ex1) while others rely on economic games which can be argued to have little practical relationship to real world decisions (e.g. Smeesters *et al*, 2003; Yang *et al*, 2013 Ex 2,4-7; Utz *et al*, 2004).

There are also clearly differences in how values are conceptualised within different studies with many using the concepts of traits, stereotypes, social norms and goals to discuss their research (e.g. Neuberg, 1988; Hertel & Kerr, 2001; Epley & Gilovich,

1999; Utz *et al*, 2004; Wheeler *et al*, 2008; Bargh *et al*, 2001; Shafran *et al*, 2006; Jonas *et al*, 2013; Hart & Albarracin, 2009; Smeesters *et al*, 2003 Ex1-4; Smeesters *et al*, 2009a Ex3; Parzuchowski & Wojciszke, 2014) when there are clear overlapping factors in common between these concepts.

1.7 SUMMARY OF CHAPTER

This chapter has introduced the concept of social values and has defined them in terms of the Schwartz (1992, 1994; Schwartz *et al*, 2012) model of human values. The Schwartz model has been demonstrated to have been extensively researched in terms of its structural validity (e.g.Vecchione *et al,*2009; Bilsky *et al*, 2011) and it has been used in multiple studies which give supporting evidence for its underlying motivation structure as it relates to behaviour (e.g. Maio *et al*, 2009a; Karremans, 2007).

The process of activating values via a priming mechanism has been demonstrated to be a robust methodology for investigating how values can affect behaviour (e.g. Maio et al, 2009ab; Arieli *et al,* 2013; Karremans, 2007). A variety of different values have been used within these priming studies with generally consistent effects although mediating factors have also been identified in the priming to behaviour pathway (e.g. Smeesters *et al*, 2003). For example, value centrality has been shown to be a significant factor (e.g. Verplanken & Holland, 2002).

The chapter has also described how values are conceptualised in a therapeutic context and provided evidence for the relationship between values and mental health generally (e.g. Savig *et al*, 2000; Bilsky & Schwartz, 1994; Silfver *et al*, 2008). Generally it has been highlighted that there is a lack of consistency in how values are utilised in therapies and that a more coherent structure of values within a therapy context would be useful.

An overview of obsessionality has been provided including how obsessionality can be understood to be a continuum within the population (e.g. Clark & Rhyno, 1995; Mathews *et al*, 2004). As such, obsessionality has been researched within clinical and non-clinical populations with relation to obsessionality symptoms (e.g. Coles *et al*, 2003; Thordarson *et al*, 2004). Responsibility has also been highlighted as an

important aspect of obsessionality within cognitive theories of obsessionality (e.g. Salkovskis *et al, 2000*) and has been extensively researched in the literature (e.g. Rachman, 1998, 2002; Salkovskis *et al*, 2000; Freeston *et al*, 1993).

Obsessionality has also been related to values within the Schwartz model at varying levels and links have more specifically been demonstrated between the conservation quadrant and obsessionality (e.g. Sortheix *et al*, 2013; Schwartz *et al*, 2000).

1.8 INTRODUCTION TO CURRENT STUDY

The current study was designed to investigate the relationship between the Schwartz structure of social values (Schwartz, 1992; Schwartz *et al*, 2012) and obsessionality. Values have been shown to be trans-situational concepts that can have far-reaching implications for our behaviour and the choices that we make in our lives. As such values have been readily incorporated into different forms of therapeutic interventions for mental health difficulties (e.g. Hayes, 2004; Seligman & Csikszentmihalyi, 2000) with little investigation into how values can be structured in relation to mental health concepts (e.g. Wilson & Murrell, 2004). The Schwartz model has been shown to be empirically supported (e.g. Bilsky *et al*, 2011) and has been systematically related to a variety of different concepts including some related to mental health (e.g. Silfver *et al*, 2008). As such, it provides a useful way of understanding how values can be related to mental health. As the strength of the Schwartz model is its dynamic structure of motivational influences underlying the social values it can readily be related to motivations to behave in different ways (e.g. Maio *et al*, 2009a). This has potentially important implications for therapeutic interventions specifically related to behavioural therapies.

The evidence from the literature review undertaken also suggests that priming values can have a large effect on behaviour (e.g. Maio *et al*, 2009ab; Karremans, 2007, Arieli *et al*, 2013; Verplanken & Holland, 2002). This is important, as therapies such as Acceptance and Commitment Therapy (ACT; Hayes, 2004) focus on the use of values to direct client behaviour in value congruent directions. As such it would be important to know whether priming obsessionality related values could have effects on behaviours related to obsessionality as value congruent behaviours are seen to follow value primes.

Specifically the current study aims to primarily investigate the impact of priming values from the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) that are theoretically related to obsessionality (e.g. Schwartz *et al*, 2000) on obsessionality congruent behaviours. As such measures of checking, ordering and cleaning behaviours are included in the experimental design as these appear to be common subtypes of obsessionality symptoms (e.g. Calamari *et al*, 1999; Lechman *et al*, 1997). As responsibility has been shown to be such as strong factor within cognitive models of obsessionality (e.g. Salkovskis *et al*, 2000) it will also be investigated as a potential mediating variable. Responsibility also appears as a value within the benevolence basic value of the Schwartz model and as such there may be specific reasons to suggest that a responsibility measure may be related to values outside of the conservation quadrant (Schwartz, 1992). Further background information for each of the hypotheses is outlined below.

1.9 HYPOTHESES

Hypothesis 1 - Taking into account the values priming literature and the proposed links between obsessionality and conservation values of the Schwartz model we predict that priming conservation values (clean, healthy and self-discipline) will lead to more obsessionality related behaviours while priming non-obsessionality related openness values (freedom, curiosity and variation in life) would lead to less of the obsessionality related behaviours. More specifically:

H1a. Priming obsessionality related conservation values (i.e. clean, healthy and self-discipline) will lead to more time spent completing a letter checking task compared to controls.

H1b. Priming non-obsessionality related openness values (i.e. freedom, curiosity and variation in life) will lead to less time spent completing a letter checking task compared to controls.

H1c. Priming obsessionality related conservation values will lead to increased scores of orderliness when putting colouring pens away compared to controls.

H1d. Priming non-obsessionality related openness values will lead to decreased scores of orderliness when putting pens away compared to controls.

H1e. Priming obsessionality related conservation values will lead to more use of cleaning wipes when completing a gluing task compared to controls.

H1f. Priming non-obsessionality related openness values will lead to less use of cleaning wipes when completing a gluing task compared to controls.

Hypothesis 2 – As control group participants are not going to be primed to any values we would expect to see general relationships between questionnaire measures of obsessionality and responsibility and the obsessionality related behaviours that are unaffected by the primes. As such we should see that the higher the self-report measure of obsessionality and responsibility the higher the levels of obsessionality related behaviours.

H2. Control group participants will show positive correlations for higher scores on obsessionality and responsibility questionnaire measures being related to higher scores on obsessionality behavioural measures and lower scores on the questionnaire measures being related to lower scores on the behavioural measures.

Hypothesis 3 – Based on the evidence for the strength of priming effects we predict that within the experimental groups the levels of obsessionality as measured on the questionnaire measures will interact with the quadrant being primed but that the effects of priming will also outweigh the effects of levels of obsessionality in terms of levels of obsessional behaviour seen. This basically means that although we expect that those who have high self-reported obsessionality will perform more obsessionality related behaviours we also expect that priming obsessionality related values will have stronger effects.

H3a. Participants who score high on self-reported obsessionality on questionnaire measures who are also primed for obsessionality related conservation values will show the highest scores on obsessionality related behavioural measures.

H3b. Participants who score low on self-reported obsessionality on questionnaire measures who are also primed for non-obsessionality related openness values will show the lowest scores on obsessionality related behavioural measures.

H3c. Participants who score low on self-reported obsessionality on questionnaire measures who are primed for obsessionality related conservation values will show higher subsequent scores on obsessionality related behavioural measures than those who are high on self-reported

obsessionality on questionnaire measures who are primed for the non-obsessionality related openness values.

Hypothesis 4 – In line with the role of responsibility as a potentially mediating factor in the nature of obsessionality we also predict that there will be similar relationships between self-reported responsibility on questionnaire measures and the obsessionality related behaviours. As such we predict that within the experimental groups the levels of responsibility as measured on the questionnaire measure will interact with the quadrant being primed but that the effects of priming will also outweigh the effects of levels of responsibility in terms of levels of obsessional behaviour seen.

H4a. Participants who score high on self-reported responsibility on questionnaire measures who are also primed for obsessionality related conservation values will show the highest scores on obsessionality related behavioural measures.

H4b. Participants who score low on self-reported responsibility on questionnaire measures who are also primed for non-obsessionality related openness values will show the lowest scores on obsessionality related behavioural measures.

H4c. Participants who score low on self-reported responsibility on questionnaire measures who are primed for obsessionality related conservation values will show higher subsequent scores on obsessionality related behavioural measures than those who are high on self-reported responsibility on questionnaire measures who are primed for the non-obsessionality related openness values.

Hypothesis 5 – In line with the research outlined in section 1.6.4.6.1 we expect that value centrality will have an impact on the measures of obsessionality. As such we would expect that those participants who rate obsessionality related conservation values as their value priorities will show higher self-reported ratings of obsessionality as well as more obsessionality related behaviours than participants with other value priorities. It is expected that the reverse pattern would be seen in those participants who rate non-obsessionality openness values as their value priorities. It is also expected that responsibility will show a similar relationship with relation to the self-transcendence value quadrant as responsibility is seen as a value within this quadrant of the Schwartz model. As value centrality has been shown to be a mediating factor on whether value congruent behaviour is seen following priming of

values within previous priming studies it is expected that value centrality will have effects beyond the presence of the priming of obsessionality versus non-obsessionality related values.

H5a. Participants who rate the obsessionality related conservation values as being of highest priority to them (relative to other values) will show higher self-reported obsessionality on questionnaire and behaviour measures of obsessionality compared to participants who rate non-obsessionality openness values as being of highest priority to them (relative to other values).

H5b. Participants who rate the self-transcendence values as being of highest priority to them (relative to other values) will show higher self-reported responsibility on questionnaire measures of responsibility compared to participants who rate self-enhancement values as being of highest priority to them (relative to other values).

Chapter two: Methods

2.1 INTRODUCTION

This chapter will describe the methods used for this research study. This will include details of the design, sample of participants, measures used, the procedure for gathering the data and details of clinical governance.

2.2 DESIGN

In line with the aims of the study, a quantitative methodology was employed and a cross-sectional (between subjects) design was used. The data was analysed using factorial design (ANOVA) techniques which are further described in the analysis section.

2.3 POWER ANALYSIS

A power analysis was carried out using G Power. As there was a wide variation in effect sizes when reviewing previous studies it was felt that a range of power calculations would be beneficial to give an indication of the range of potential sample sizes required to have adequate power. Effect sizes were obtained from similar studies reported by Maio *et al*, 2009a; Maio *et al,* 2009b and Verplanken *et al*, 2002. The effect sizes ranged from small to large (0.13 up to 0.73). ANOVA power analyses were carried out with the various effect sizes with the number of groups set to 3 and response variables at 3. A total sample size between 39 and 576 was identified using the effect sizes from the studies above (Maio *et al*, 2009a; Maio *et al,* 2009b and Verplanken *et al*, 2002).

The actual sample size for the current study was then calculated by taking an effect size from the middle of those seen in previous studies (i.e. 0.35) which yielded a sample size of 84. This was rounded up to 90 for the study to allow for any participant data being excluded based on suspicions around the purpose of the study.

2.4 INCLUSION AND EXCLUSION CRITERIA

There were no specific inclusion and exclusion criteria for the study aside from those noted below.

Inclusion:
Participants had to be adults, aged 18 or above and registered to access the Experimental Management System at Cardiff University.

It was assumed that all participants were capable of giving informed consent (see section 2.10 below).

2.5 SAMPLE

The study sample comprised of 90 participants containing three groups of adults over the age of 18. All of the participants were drawn from a student and community population and the three groups all had similar demographics as shown in Table 2.1 below (see Results section 3.3.1, Table 3.1). The three groups each comprised of 30 participants and included two experimental groups and one control group.

Table 2.1 – Participant Demographics across groups

	1 - Conservation	2 - Openness	3 – Control
Mean age (stD)	20.80(4.44)	21.07 (4.43)	22.63 (7.41)
Age Range	18-40	18-40	19-50
% Female	90%	90%	80%
% White British	90%	83%	70%

2.6 MEASURES

Participants in the two experimental groups (conservation and openness) were asked to complete a priming task which provided a measure of the strength of their cognitive support for the values to which they were primed. These participants were asked to consider reasons why conservation values (clean, healthy and self-disciplined) or openness values (freedom, curiosity and variation in life) were important and to write these reasons on the sheet provided (see section 2.8). Behavioural measures of obsessionality (checking, ordering and cleaning behaviours) were embedded within the next two tasks that participants were asked to complete. These tasks and behavioural measures are described further below

(see sections 2.6.1 & 2.6.2). Further variables under examination in this study were participant value priorities, self-reported levels of obsessionality and self-reported levels of responsibility beliefs. In addition to the demographic questionnaire, four established questionnaires were used to measure these variables and these five components together made up the questionnaire battery. Details of the questionnaire measures can be found in section 2.6.3 below.

2.6.1 Priming task – listing reasons for importance of values

Participants in both of the experimental groups were asked to complete a priming task (see Appendix 3 and 4) while participants in the control group were asked to complete a similar task which did not involve priming any values (see Appendix 5). This task was the manipulating variable in the study. The task involved the participant giving reasons for different values being important. Participants were asked to consider this from the perspective of why the values were important to them personally as well as why they felt the values would be important to society in general. Participants in the experimental conditions were primed to values on opposing sides of the Schwartz model. Conservation values are most closely associated with aspects that could be considered as being related to mental health difficulties such as OCD. For example values such as being clean, healthy and self-disciplined all fall within the conservation quadrant and more specifically within conformity and security values. These values are also hypothesised to be related to a wider anxiety-avoidance and self-protection based motivation as shown by the latest revised version of the Schwartz model (Schwartz *et al*, 2012) as well as being part of a more general community based (social) motivation. These wider motivations of the conservation values are in conflict with the opposing values within the openness to change quadrant i.e. self-direction and stimulation values which have motivations that are more about being anxiety free and personal growth.

In light of the above, participants in the conservation values condition were primed with the values ‘clean,’ ‘healthy’ and ‘self-discipline’ while participants in the openness to change values condition were primed with the values ‘freedom,’ ‘curiosity’ and ‘variation in life.’ In both conditions participants were given 9 minutes to list as many reasons as possible as to why the values were important to them and to society in general.

2.6.2 Behavioural measures

Participants' behaviours related to checking, ordering and cleaning were measured in the study. Most behavioural measures were carried out covertly with participants being de-briefed at the conclusion of the study (see section 2.8). All participants completed these three measures as they were related to Hypothesis 1 (see section 1.9) which required all three participant groups' responses to the tasks.

2.6.2.1 Checking behaviour

Checking behaviour was measured through recording the time interval at which a participant completed a task asking them to identify all the letters 't', 'g' and 'h' in a passage of text by putting a line through each letter and writing the total numbers of each letter found at the bottom of the page (see Appendix 6). Participants were also asked to use a different coloured pen for each of the three letters so as to legitimately introduce the colouring pens that were subsequently used for the ordering task (see section 2.6.2.2 below). When participants indicated that they had finished the task they were also then prompted with the question "you have some time left, would you like to check your answers before we move on." This gave the participants a motive and opportunity to spend time checking their answers. The total amount of time that participants spent on this task was recorded. Longer times spent on this task indicated more checking behaviour with less time spent on the task indicating less checking behaviour.

2.6.2.2 Ordering

Ordering was measured through the novel task of whether participants put away colouring pens at the end of a task according to the order indicated on the pack. That is, whether they arranged the colouring pens in an ordered way. Following the letter checking task participants were asked by the experimenter whether they could put the colouring pens away while the experimenter got the materials for the next task ready. The experimenter then made a note of the order in which the pens had been placed in the packet while the participant completed the next task. In order to gain a varied measure of ordering an overall score was calculated by adding together the total number of pens for each individual which were placed within 2 slots

of their correct position. This gave a score of 0-12 on the ordering measure for each participant with higher scores indicating closer adherence to the order prescribed.

2.6.2.3 Cleaning

Cleaning behaviour was measured through recording the time interval at which a participant used a cleaning wipe whilst completing a messy task. This measure has been previously used by Maio *et al* (2009b). In their study, it was found that those participants primed for security values were quicker to use a cleaning wipe than those who were primed for the opposing self-direction value. In the current study participants were asked to glue stars onto a piece of paper using a messy glue stick while a pack of cleaning wipes were provided in front of the participant during the task. Whether the participant used a cleaning wipe or not was recorded as the measure of cleaning behaviour and the time interval for the point at which the participant used a wipe was also recorded.

2.6.3 Questionnaire Measures

All participants were administered the questionnaire measures in the following order:

Demographic questionnaire
The Portrait Values Questionnaire 21 item version (PVQ - 21)
The Vancouver Obsessive Compulsive Inventory (VOCI)
The Symmetry, Ordering and Arranging Questionnaire (SOAQ)
The Responsibility Attitudes Scale (RAQ)

2.6.3.1 Demographic questionnaire

All participants were asked to complete a demographic information sheet. The information collected from this questionnaire included the participant's age, gender and ethnicity (see Appendix 7).

2.6.3.2 Portrait Values Questionnaire 21 item version (PVQ 21)

The PVQ 21 (see Appendix 8) was completed by all participants (n=90) as participant value orientations were used to test hypothesis five (see introduction, section 1.9). The PVQ 40 was developed by Schwartz, Melech, Lehmann, Burgess & Harris (2001) to measure the ten basic values of the Schwartz model. It is an

alternative to the Schwartz Value Survey (SVS) which has been found to be too abstract for use with some samples of individuals. The PVQ is considered a more implicit measure of an individual's value priorities than the SVS which uses more explicit methods to discover an individual's most strongly held values.

There are two versions of the PVQ at present, a 40 item version and a shorter 21 item version which was developed specifically for use in the European Social Survey (ESS). The ESS is a cross-national survey that has been conducted every two years since 2001 in order to measure the attitudes, beliefs and behaviour patterns of diverse populations. The shorter 21 item version was used in the current study to reduce the burden on participants due to the number of tasks and questionnaires they were being asked to complete.

The PVQ 21 includes short verbal portraits of 21 different people, gender-matched with the respondent (Schwartz, 2005; Schwartz *et al*, 2001). Each portrait describes a person's goals, aspirations or wishes that point implicitly to the importance of a value. For example: item 2 on the female version measures the value 'power' by stating 'It is important to her to be rich. She wants to have a lot of money and expensive things.' For each portrait the respondent answers: "how much like you is this person?" The respondent can choose from the options: very much like me, like me, somewhat like me, a little like me, not like me, and not like me at all. Respondents own values are therefore inferred from their self-reported similarity to other individuals being described implicitly in terms of their particular values. There are two items related to each value, with the exception of 'universalism', for which there are three items representing the wider conceptual breadth of the universalism value compared to other values.

As it is possible that some respondents might answer that all of the portraits are very much like them (or conversely not like them at all) the PVQ is scored by looking at each respondents respective value priorities. As such the PVQ is scored by subtracting each individual's mean response to all of the value items from their response to each item. This gives an indication of the individual's value priorities. In the case of the current research, which is interested in the individual's value quadrant priorities, the scores for values within each quadrant are then summed and

averaged for each individual participant. The four value quadrants are then ranked in terms of importance from the lowest score (indicating high priority) to the highest (indicating low priority) score for each participant. This method has been shown by Verkasalo *et al* (2012) to provide an extremely robust two-dimensional structure of an individual's value priorities across quadrants.

The internal consistency of the PVQ-40 version has been shown to be good (Schwartz, 2005; Schwartz *et al*, 2001) although there have been some concerns with regards to the internal consistency of the PVQ-21 (e.g. Davidov, 2010; Davidov *et al*, 2008). However, the construct validity of both has been strongly supported (PVQ-40 Vecchione *et al*, 2009; Cieciuch & Schwartz, 2012; PVQ-21 Bilsky *et al*, 2011) especially with regards to the quadrant level structure (PVQ-40 Hinz *et al*, 2005; PVQ-21 Verkalalo *et al*, 2012).

2.6.3.3 The Vancouver Obsessional Compulsive Inventory (VOCI)

The VOCI was completed by all participants as it was used to test hypothesis three (see section 1.9) which includes comparisons across all three groups. The VOCI (see Appendix 9) consists of 12 items related to contamination, 12 items related to obsessions, 12 items related to 'just right' feelings, 7 items related to hoarding, 6 items related to checking and 6 items related to indecisiveness. Each item on the questionnaire is scored on a five-point Likert-type scale of 0-4 with the respondent being asked to rate each statement based on 'how much is each of the following statements true of you' with possible responses being 'not at all,' 'a little,' 'some,' 'much' and 'very much.' This means that a person can score between 0 and 220 for OCD symptoms overall with scores obtainable for each of the various subscales. All the items are positively cued and are related to current concerns and behaviour.

The current study did not aim to use the VOCI as a diagnostic tool but was instead interested in looking at the relationship of human values to an overall measure of obsessionality as related to obsessive compulsive disorder in particular. The VOCI was chosen for the current study as it has a scoring system which is easier for a non-clinical student sample to respond to, compared to other measures of OCD symptomatology which often ask for a rating of the level of distress related to various

symptoms as well as frequency (e.g. the Obsessive Compulsive Inventory, Foa *et al* 1998). The main advantages of the VOCI is that it assesses a range of both cognitive and behavioural aspects of OCD. Overduin and Furnam (2012) point out that the VOCI lacks items for assessing ordering/arranging symptoms or doubts and mental neutralising. Therefore it is often suggested that the Symmetry, Ordering and Arranging Questionnaire (SOAQ) is used as a supplement to the VOCI.

There is evidence for excellent internal consistency and good test-retest reliability of the VOCI from the original development study (Thordarson *et al*, 2004) as well as more recently (Radomsky *et al*, 2006; Chiorri, Melli & Smurra, 2011). It has been noted that there are some difficulties with the factor structure within the VOCI (Thordarson *et al*, 2004; Chiorri *et al*, 2011) but there are good correlations between overall scores and other measures of OCD in clinical and non-clinical samples (Thordarson *et al*, 2004). It is also reported by Overduin & Furnham (2012) that the VOCI has good reliability and adequate validity overall and Chiorri *et al* (2011) conclude that the VOCI is a useful tool for use in non-clinical populations.

2.6.3.4 The Symmetry, Ordering and Arranging Questionnaire (SOAQ)

The SOAQ was completed by all participants as it was used to test hypothesis three (see section 1.9) which includes comparison across all three groups. The SOAQ (Radomsky & Rachman, 2004)(see Appendix 10) was developed as a specific measure for ordering/arranging symptoms of OCD. It was also developed using an undergraduate student sample as the ordering and arranging symptoms are thought to occur on a continuum throughout the population. The SOAQ is a self-report measure that consists of 20 items related to orderliness/arranging with each item scored on a scale of 0-4 with participants being asked to 'please circle the number from 0-4 to indicate how much you agree with each statement.' The response options include 'not at all (0),' 'slightly (1),' 'moderately (2),' 'very (3),' and 'extremely (4)'. This means that a person can score between 0 and 80 on the SOAQ giving a total score for an 'orderliness' subscale.

There is evidence for high internal reliability of the SOAQ and very high test-retest reliability (Radomsky & Rachman, 2004). There was also evidence found to support

the structure of the SOAQ as a measure of a single construct (Radomsky & Rachman, 2004).

2.6.3.5 The Responsibility Attitude Scale (RAS)

The RAS was completed by all participants as it was used to test hypothesis four (see section 1.9) which includes comparison across all three groups. The RAS (Salkovskis *et al*, 1999) (see Appendix 11) was developed as a measure of responsibility beliefs as these have been shown to be related to the development and maintenance of OCD.

The questionnaire consists of 26 items related to different responsibility beliefs. Each item is scored on a scale of 0-6 meaning that a person can score between 0 and 156 on this measure. Respondents are asked to read a list of different attitudes or beliefs which people sometimes hold and to show their answers by putting a circle around the words which best describe how they think. For example item one states: "I often feel responsible for things which go wrong" and the response options are "totally agree, agree very much, agree slightly, neutral, disagree slightly, disagree very much or totally disagree." The same response options are given for all 26 items. Responsibility beliefs are not used to diagnose mental health difficulties such as OCD but measures such as the RAS are sometimes used in clinical settings in order to gain an understanding of factors relevant to the individual's development and maintenance of their mental health difficulties.

There is evidence for the high internal consistency and high test-retest reliability of the RAS from a study conducted by Salkovskis *et al* (2000).

2.7 RECRUITMENT

Participants were recruited via the online Experimental Management System at Cardiff University, which is a system provided by the university psychology department which allows researchers to advertise their studies on the site and participants to sign up to available studies online. The current study was advertised with the name of the study, length of time required to participate, amount of payment

for participation, available timeslots for participation and details for contacting the researcher if required. As the current study paid participants £4 for their participation it was open to all potential participants with access to the online system. This included undergraduate and postgraduate students from any school within the university and individuals from the community who wish to participate in studies for payment. Participants were able to view the study information via the online system and volunteered to take part by booking themselves onto available time slots. Participants were then given a copy of the information sheet at the start of their session and could then decide whether to take part in the study or not.

2.8 PROCEDURE

Participants were randomly allocated to one of the three conditions. Randomisation of participants to condition was carried out via the 90 packs of participant materials (30 packs relating to each of the three conditions) being randomly ordered by an independent person unrelated with the experiment prior to any participants being recruited. The researcher then used the packs in the randomised order with the 90 participants in turn.

As stated in the recruitment section above, the participants were recruited via an online system that allowed them to volunteer for participation in the study. When participants arrived for their individual timeslot with the researcher they were given the information sheet for the study to read and be able to ask questions (see Appendix12). If participants were willing to continue with the study they were then asked to complete the consent form (see appendix 13).

Those in the experimental conditions were next asked to complete the priming task and were given 9 minutes to complete this (appendix 3 & 4) which was timed using a stop watch by the experimenter. Those in the control group were asked to complete a similar task asking for why they like or dislike different beverages (appendix 5) and they were also given 9 minutes to complete this task to ensure similar levels of effort across groups.

All participants then completed the other tasks and measures in the following order:

Checking behaviour measure – letter identification task

The researcher asked the participants to work through a brief passage of text crossing out all of the letter 't's', 'g's' and 'h's' in the text and recording the number of each letter at the bottom of the page (appendix 6). Participants were asked to assign a different coloured pen to each of three different letters. Participants were told to work as quickly as possible but to avoid making any mistakes. They were also told that the experimenter was going to be timing them. When participants indicated that they had finished the task the stop watch was halted and they were asked whether they wanted to check their answers. Their response to this statement was recorded and for those who did not want to check their answers the time was recorded. For those participants who did want to check their answers the stop watch was restarted and the participants were allowed to check their work for as long as they required. When participants indicated that they had finished checking the total time taken to complete the task was recorded. The work sheet was retrieved from the participants and the measure of ordering behaviour was instigated as below.

Ordering behaviour measure – putting away the colouring pens

At the end of the letter identification task the researcher asked whether the participant would mind putting the colouring pens away while the researcher got the next set of materials ready. The experimenter pointed towards the cardboard packet for the pens which was placed face up on the table so that the participant could see the colour order in the front of the pack (see Appendix 14). The experimenter then proceeded to retrieve the materials for the next task from a bag giving the participant time to put the pens away. Before the participant started the next task the packet of pens were removed from their desk, ostensibly to make room for the next set of materials, so that the order in which the pens were put away could be recorded. The participant then proceeded to the next task.

Cleaning behaviour measure – sticking stars task

For this task the researcher asked the participant to stick different sized stars onto a piece of paper with star templates printed on it (appendix 15). Participants were instructed that they should stick the stars as carefully as possible and that this was more important than the speed at which they completed the task. They were also informed that they had five minutes to work on the task and that they did not have to complete all of the stars in this time as it was more important to be neat and careful. The participants were given a stick of glue to use for the task and an open pack of cleaning wipes were placed on the table in front of the participant along with the other materials. They were then told that the experimenter would tell them when their 5 minutes had elapsed. Whether the participant used a cleaning wipe was recorded along with the interval at which the wipe was first used.

Questionnaire measures

Following the tasks above, the participant was then given a questionnaire pack which asked them to complete the questionnaire measures in the following order:

Demographics Questionnaire
Portrait Values Questionnaire (PVQ)
Vancouver Obsessive Compulsive Inventory (VOCI)
Symmetry, Ordering and Arranging Questionnaire (SOAQ)
Responsibility Attitude Scale (RAS)

Debriefing procedure

Once all of the measures were complete the participants were verbally debriefed as to the true nature of the study and were assessed for suspicion as to the nature of the experiment. The verbal debrief followed a funnel debriefing procedure previously used by Maio *et al* (2009) which initially involved asking participants about their ideas of what the study might be investigating before giving them further details and asking questions aimed at discovering any suspicions about the nature of the study. It was explained as part of this procedure that sometimes participants are not told the hypotheses beforehand as this could affect their responses to the tasks and questions being asked (appendix 16). Participants were told what the study was investigating and were told about what the different tasks were measuring, specifically in relation to the behaviours that were being recorded. Following the

verbal debrief, during which participants had the opportunity to ask questions and withdraw from the study if they wished to, participants were provided with a paper debrief sheet to keep. This debrief sheet also contained the information in the verbal debrief along with researcher contact details if the participant had any subsequent questions or concerns (appendix 17).

Following completion of the session all data was entered into the Statistical Package for Social Sciences Version 20 (SPSS 20; IBM Corp, 2011) for analysis.

2.9 DATA ANALYSIS

The current study employed quantitative methodology because the data was obtained using standardised questionnaires, as well as interval and ratio measures.

The data was inputted to SPSS 20 which was then used to store and analyse the data. Data was first explored in terms of meeting the assumptions for using univariate methods of analysis (ANOVA). There were difficulties with the data meeting assumptions specifically with some measures showing deviation from a normal distribution and non-linearity (see results section 3.2.5). As such, the data was analysed using non-parametric statistical methods. Specifically Kruskal-Wallis ANOVA tests were used to examine Hypothesis 1 with regards to analysing differences between the three groups with regards to checking and ordering behaviour and Chi-square was used with regards to cleaning behaviour. Kendall's Tau was used to measure correlations within the control group for Hypothesis 2. Mann-Whitney U tests (for checking and ordering) and chi-square (for cleaning) were used to analyse differences between those scoring high on obsessionality/responsibility questionnaire measures or scoring low in obsessionality/responsibility for hypotheses 3 (obsessionality) and 4 (responsibility). Kruskal-Wallis ANOVA was again used in order to analyse relationships between value orientation and the relationship with questionnaire measures for Hypothesis 5 (see hypotheses section 1.9).

2.10 ETHICAL APPROVAL

As the study was conducted using a university student and community sample ethical approval to conduct the research was sought from and granted by a University Ethics Board (see Appendix 18).

The following points were given particular ethical consideration in this study.

Informed consent

All potential participants were provided with participant information sheets (see appendix 12) explaining the purpose of the study and what they would be expected to do if they chose to take part. It was made clear to participants that participation was voluntary and that they could withdraw from the study at any point without giving a reason. All participants signed consent forms to indicate that they had read the information sheet, been able to ask questions, understood that they could withdraw at any time and that they were willing to participate.

Anonymity and confidentiality

Participants were not asked to provide any personal details whilst completing the questionnaires and other tasks, thus ensuring anonymity. The consent forms were stored separately from the other data in a locked filing cabinet in the school of psychology building. The online system used for recruitment showed the principle researcher the names of the participants who had signed up for the study but this information was password protected and available to no other individuals.

Participants' well-being

It was not anticipated that the research would cause participants to become distressed. However, there was the possibility that completing some of the questionnaires may have been distressing for a few participants. If this were to happen, the participants were advised via the information sheet and de-briefing sheet to discuss this with the principal researcher or that they could contact the researcher's Academic Supervisor, who was a Consultant Clinical Psychologist, to discuss the issues raised in more depth (see appendix 17).

Chapter 3 - Results

3.1 INTRODUCTION

The chapter begins by giving details of any excluded data from the analysis and how missing values were handled. It moves on to explain how outliers were dealt with and how assumptions for statistical testing were met. It then shows how the data was statistically analysed in order to test the main hypotheses of the study.

3.2 MANAGING THE DATA

3.2.1 Excluded Data

One participant from the conservation priming group was excluded from all analyses due to demonstrating suspicion as to the purpose of the priming task within the study. The majority of participants (49%) were able to identify that the study was concerned with aspects of OCD during the funnel debriefing when asked what they thought the questionnaires were measuring. None of these participants accurately related their suspicions about OCD to the other tasks being measured in the study. For example 21 participants identified the sticking stars task as a measure of precision/neatness related to OCD when the behaviour actually being measured during this task was the use of cleaning wipes which only the one excluded participant identified. No participants, other than the one excluded, demonstrated any awareness of the nature of the link between the priming task and the other tasks they were asked to complete. One other participant failed to follow through on the request to put the pens back in their pack so had no score available for this one behavioural measure, however their other data was retained for inclusion in the analysis.

3.2.2 Data handling

All statistical analysis was carried out using SPSS 20 (IBM Corp., 2011).

3.2.3 Missing Value Imputation

Four participants did not answer all of the questions in the questionnaires. Two participants missed one question on the Vancouver Obsessive Compulsive Inventory (VOCI; items 29 and 33 respectively), one participant missed one question on the Symmetry, Ordering and Arranging Questionnaire (SOAQ; item 8) and one

participant failed to answer one question on both the VOCI (item 14)and the SOAQ (item 16). These missing scores were pro-rated using the participants' existing scores. To pro-rate scores on the VOCI the sub-section that contained the missing value was used to establish the average score for the existing answers which then provided the score for the missing value. For example, if a participant did not provide a score on the 'checking' subscale then their other scores from the checking subscale would be used to identify their average score for items on this subscale and this average score would be attributed to the missing value. For missing scores on the SOAQ the scores were pro-rated using the whole scale scores. This pro-rating method is commonly used to obtain complete datasets where minimal data is missing.

Further information is provided below, in the relevant sections, about how questionnaire and behavioural measures were managed during the data analysis.

3.2.4 Extreme scores and Outliers

3.2.4.1Questionnaire measures

Extreme scores were identified by studying boxplots of the questionnaire data in SPSS. The data was initially investigated by overall means across the groups. Two extreme scores were found on the SOAQ. These scores were checked in the data files and were found to be accurate. A Windsorising method was applied to these scores whereby they were changed to match the next highest score on the SOAQ that was not an extreme score (Field, 2013). This resulted in the outlying scores of 59 and 49 being changed to 46.

The data gathered from three of the questionnaire measures (VOCI, SOAQ and RAS) was then explored to identify potential outliers. Box-plots were obtained and studied (see Appendix 20) for each of the measures to look at overall scores and scores by experimental group. It was found that there were outliers identified for the SOAQ (n = 6) and RAS (n = 1). Given that these represented 6.7% and 1.1%, of each respective measure, these scores were all Windsorised to match the highest score that was not an outlier. This resulted in the outlying scores of 34, 42, and 46

(x3) being changed to 28 on the SOAQ and an outlying score of 175 being changed to 154 on the RAS.

As the study was interested in investigating the differences between groups on the dependent behaviour measures of checking, ordering and cleaning the questionnaire measures were also checked for outliers at this level as well. Further outliers were identified for the *control* group on the VOCI (2) and outliers were also found for the *conservation* group for the SOAQ (n = 2) and RAS (n = 1). There were no further outliers identified for the *openness* group. All of the outliers identified by group were again dealt with by Windsorising the outlier scores. This resulted in the outlying scores of 28 and 25 being changed to 23 on the SOAQ, 90 and 101 being changed to 88 on the VOCI and a score of 50 being changed to 78 on the RAS.

The Portrait Values Questionnaire (PVQ) data was not included in the checks for extreme scores and outliers due to the nature of the analysis that was planned with the PVQ. As this questionnaire was to be used to rank each individual participants' value scores (following a standardisation procedure as recommended by Schwartz, 2005) against their other individual value scores it was unnecessary to remove extreme scores and outliers. Further details of the procedure for analysing the PVQ data can be found in the Method (section 2.6.3.2) and below (section 3.4.5).

3.2.4.2 Behaviour measures

One extreme score was identified on the checking behaviour measure and this was Windsorised to match the next highest score that was not an extreme score. This resulted in the outlying score of 487 being changed to 415.

Box-plots obtained for the behaviour measure of checking and ordering showed that there were several outliers for both overall measures (see Appendix 20). There were 6 outliers identified for the checking scale and 10 outliers identified for the ordering behaviour scale. These outlier scores were also Windsorised. This resulted in the outlying scores of 415 (x2), 410, 389, 377 and 374 being changed to 347 on the checking behaviour measure. On the ordering measure scores of 10 and 12 (x8) were changed to 9, as well as a score of 0 being changed to 2. There were no further outliers identified by experimental group.

The cleaning behaviour was not checked for extreme scores and outliers because it was categorical (Yes/No) in nature rather than a scaled measure.

3.2.5 Tests of Assumptions for Analysis of Variance

The design of the study was cross-sectional (between subjects). The data were checked for assumptions prior to analysis to determine the most suitable methods to employ in order to test the hypotheses. The main assumptions of 1) dependent variables measured at the interval or ratio level, 2) independent variables consist of two or more categorical, independent groups, 3) independence of observations, 4) adequate sample size, 5) no univariate or multivariate outliers, 6) multivariate normality, 7) linear relationships between pairs of dependent variables, 8) homogeneity of variance and 9) no multicollinearity are outlined below with further details.

1) The dependent variables should be measured at the interval or ratio level.

The Portrait Values Questionnaire (PVQ), Vancouver Obsessive Compulsive Inventory (VOCI), Symmetry, Ordering and Arranging Questionnaire (SOAQ) and Responsibility Attitudes Scale (RAS) are all interval based measures with responses given on a scale. Checking behaviour was measured by time taken to complete a letter identification task (in seconds) and so is interval in nature and the ordering measure is based on the number of pens placed in certain positions with scores falling from 0-12. Cleaning behaviour is ratio (number of participants who do use a wipe versus those who do not).

2) The independent variable should consist of two or more categorical, independent groups.

All independent variables consisted of two or more categories from independent groups of participants. There were different independent variables investigated depending upon the hypotheses being tested. For example Hypothesis 1 focused on the independent variable of the three groups (*conservation, openness* and *control*)

whereas Hypothesis 3 focused on *high* obsessionality participants versus *low* obsessionality participants.

3) There should be independence of observations

Participants were randomly allocated to the main experimental groups (*conservation prime, openness prime* and *controls*) which were mutually exclusive. All other groups used i.e., *high* versus *low* obsessionality were also mutually exclusive. As such, there were different participants between each group and there was independence between the observations within each group.

4) There should be an adequate sample size

The power analysis previously completed (see method section 2.3) indicated that there was sufficient power. The power analysis estimated that 86 participants were necessary in order to show sufficient power based on previous similar experiments (e.g. Maio *et al*, 2009). The current study had 89 participants (29 in conservation group, 30 in openness group and 30 in the control group) meaning that there was a sufficient sample size.

5) There are no univariate or multivariate outliers

This is previously outlined and was dealt with in section 3.2.4 (above)

6) There is multivariate normality

Skew and kurtosis scores were obtained for all of the measures (aside from the PVQ and the cleaning behaviour, for the reasons outlined above) as were Q-Q Plots and histograms to study the distribution of the scores (see Appendix 21-26). Kolmogorov-Smirnov tests were also carried out for each measure and were interpreted in conjunction with the other information available (as recommended by Field, 2013). This was initially done for the measures as overall scores (using the scores from across the three experimental groups) before being repeated for scores

within the three experimental groups separately. The interpretation of this analysis for each measure is outlined below.

Vancouver Obsessive Compulsive Inventory (VOCI)

A Kolmogorov-Smirnov test indicated that the distribution of the overall VOCI scores deviated significantly from normal ($D(89) = .149$, $p<.001$) and this was supported by studying the relevant Q-Q plot as well as skew and kurtosis scores (see Appendix 21). There was particularly significant positive skew ($z = 3.557$, $p<.001$) within the overall measure. There were mixed results when the VOCI was investigated using the individual groups with the *conservation group* ($D(29) = .208$, $p<.01$) and the *control* group ($D(30) = .210$, $p<.01$) both showing significant deviation from normal. The *openness group* ($D(30) = .148$, $p=.09$) was found to not deviate from a normal distribution. However, within the *openness* and *control* groups the distributions of scores were found to be significantly positively skewed ($p<.05$ and $p<.01$ respectively) suggesting that normal distribution should not be assumed.

Symmetry Ordering and Arranging Questionnaire (SOAQ)

Indications of significant positive skew were seen in the overall measure ($z = 2.894$ $p<.01$) and within the *conservation* and *openness* groups ($z = 2.002$, $p<.05$ and $z = 1.991$, $p<.005$ respectively). Studying the Q-Q Plots and histograms suggested that the distribution could be close to normal in some of the subgroups (see Appendix 22). Kolmogorov-Smirnov analysis indicated that the distribution of the overall SOAQ scores deviated from normal ($D(89) = .121$, $p<.01$). However, the individual group scores suggested that the SOAQ did not deviate from normal (*conservation*, $D(29) = .177$, $p=.02$; *openness*, $D(30) = .148$, $p=.09$; *control*, $D(30) = .130$, $p=.20$). This discrepancy could be due to the sample sizes as the K-S test has been shown to be overly stringent with larger sample sizes where very small deviations from a normal distribution can lead to significant results. However the significant skew scores for the conservation and openness groups suggest that normal distribution should not be assumed (Field, 2013).

Responsibility Appraisal Survey (RAS)

The RAS in contrast had very small positive skew scores and small negative kurtosis scores generally across the three groups indicating that this scale was closer to

being normally distributed than the VOCI and SOAQ and this was supported by examining the Q-Q plots (see Appendix 23). A subsequent Kolmogorov-Smirnov analysis (D(89) = .086, p=.10) indicated that the distribution of the overall RAS scores did not deviate from normal. The distribution across the individual group scores were also found to not deviate from normal (*conservation*, D(29) = .083, p=.20; *openness*, D(30) = .112, p=.20; *control*, D(30) = .145, p=.10). Therefore the RAS can be considered to have a normal distribution.

Checking behaviour

There were general positive skew and negative kurtosis scores within the checking behaviour measure which approached significance levels although the histogram and Q-Q Plots suggested that the overall measure was close to normally distributed (see Appendix 24). Kolmogorov-Smirnov analyses indicated that the overall checking measure did not differ significantly from a normal distribution (D(89) = .091, p=.067). Within all three of the groups the Checking behaviour measure was found to not differ significantly from a normal distribution (*conservation*, D(29) = .072, p=.20; *openness*, D(30) = .150, p = .09; *control*, D(30) = .148, p<.10). Considering all of the information available a normal distribution could be assumed for this measure.

Ordering behaviour

The Q-Q plot along with the significant positive skew score (z = 2.447, p<.05) and a negative kurtosis score which approached significance indicated that there was significant deviation from a normal distribution across this measure (see Appendix 25). Supporting this, Kolmogorov-Smirnov analyses suggested that the distribution of the overall ordering behaviour measure differed significantly from normal (D(88) = .201, p<.001). This was also the case within the *conservation group* (D(29) = .172, p< .05), the *openness group* (D(30) = .271, p<.001) and the *control group* (D(30) = .160, p<.05) which all showed positive skew and negative kurtosis although only the openness group skew score reached significance (p<.05). With this in mind a normal distribution could not be assumed.

7) There is a linear relationship between each pair of dependent variables for each group of the independent variable

Scatterplot matrices were obtained for all of the variables comparing the questionnaire measures against the behaviour measures at the group level (i.e. for the *conservation, openness* and *control* groups). Indications were that linearity could not be assumed (see Appendix 27) with r^2 scores of 0.058 at the highest and 0.003 at the lowest. Linearity refers to whether the amount/rate of change, between scores on two variables is constant for the entire range of scores. If the relationship between the variables is non-linear then using statistical methods that assume a linear relationship will underestimate the strength of the relationship, or will fail to detect the existence of a relationship (Field, 2013).

8) Homogeneity of variance

The homogeneity of variance was also assessed in the questionnaire data. Levene's test showed that for the VOCI and the SOAQ homogeneity of variance could be assumed (VOCI, $F(2, 86) = .691$, $p = .50$; SOAQ, $F(2,86) = .531$, $p = .60$). Whereas for the RAS the Levene's test indicated that the variances of scores were significantly different between the *conservation, openness* and *control* groups ($F(2,86) = 6.003$, $p<.01$) meaning that for this measure homogeneity of variance could not be assumed. The checking and ordering behaviour measures both showed that homogeneity of variance could be assumed (Checking, $F(2,86) = .909$, $p = .41$; Ordering, $F(2,86) = .057$, $p = .95$). When the variance ratios were calculated it was shown that none of the ratios for any of the measures fell above the critical value ($F(2,86) = 3.09$) suggesting that the Levene's tests might be overly stringent (Field, 2013). Generally homogeneity of variance was therefore assumed.

9) There is no multicollinearity

The correlation matrix below in Table 3.6 (section 3.4.2) shows that the correlations between the questionnaire measures are between -0.496 & 0.586 which are significant correlations. This indicates that there could be difficulties with multicollinearity if regression analyses are used as two closely related independent

variables could cause the predictive value of the regression model to be inflated. However, there are simple strategies for dealing with these difficulties and Field (2013) recommends removing one of the strongly correlated variables from the analysis to ensure that the regression model is not biased.

3.2.6 Summary of Assumptions

Several of the measures did not meet assumptions for using parametric tests. In particular the VOCI and ordering behaviour measures did not show a normal distribution and none of the measures showed linearity when independent variables were mapped against dependent variables. However, the majority of the measures did show normal distributions and all measures showed homogeneity of variance could be assumed.

Three options were considered to deal with the violation of assumptions:

1) Transforming the data
2) Leaving the data as it is, as ANOVA is robust to violations
3) Using non-parametric equivalents

1) The main arguments for transforming data are that it changes the relationship between the variables in question to account for violated assumptions. Transforming data can maintain the different relationships in the data between participants while changing the data values in a systematic way to better fit with the assumptions of the model. However, there are also difficulties with transforming data. Firstly, as there were several measures in the current study that violated assumptions, the nature of the analysis would mean that all of the measures would need to be transformed to be meaningfully compared. Secondly, transforming the data means that the nature of the hypothesis being tested would be changed and so interpreting the results would be more complicated (Grayson, 2004). Thirdly, there is considerable debate as to whether transforming data actually improves the accuracy of the analysis subsequently carried out (e.g. Levine and Dunlap, 1982; Games, 1984).

2) ANOVA is considered to be robust to several assumptions such as deviation from a normal distribution and non-homogeneity of variance (Field, 2013). However, with the current data showing non-linear relationships between the independent and dependent variables parametric analysis of variance (ANOVA) tests would not be appropriate as they rely on a linear model.

3) The benefit of using non-parametric tests is that they are robust to violations of assumptions as they generally make fewer assumptions about the data. Although non-parametric tests are considered to have less power, this is only true if the sampling distribution is normal which in the current study in not consistently the case across the variables (see section 3.2.5 above). There are, however, less non-parametric tests available meaning that often more sophisticated experimental designs are not able to be analysed using these techniques (Field, 2013).

As there were concerns about transforming the data, it was decided that the best way to proceed with analysis would be to use robust statistical methods. In the current circumstances this meant using non-parametric statistical methods to analyse the data in line with the hypotheses. Further details of the statistical methods used are given below in the relevant sections.

3.3 DESCRIPTIVE STATISTICS

3.3.1 Participants

Demographic information was gathered for all participants. In total there were 89 participants included in the data-analysis. There were 29 participants in the *conservation* group, 30 in the *openness* group and 30 in the *control* group. Table 3.1 outlines the age, gender and primary ethnicity of the three groups of participants.

In terms of ethnicity, of the participants in the *conservation* group the majority were White British (90%) as was the case with the *openness* group (83%) and the *control* group (70%). In all three groups the remainder of the participant sample constituted participants of varying ethnicities.

Table 3.1 – Descriptive Statistics of participants

	Conservation	Openness	Control
Age Range	18-40	18-40	19-50
Mean age (StD)	20.76 (4.51)	21.07 (4.43)	22.63 (7.41)
Gender (%female)	90%	90%	80%
Ethnicity (%white British)	90%	83%	70%

A one-way ANOVA showed that there were no significant differences between the two experimental priming groups and the control group in terms of age ($F(2,86)=.947$, $p=.392$). A chi-square analysis of variance showed that there were no significant differences in terms of the ethnicity of the three groups ($x^2= 3.860$, $p=.145$). The expected frequencies for a chi-square of the gender ratios showed 50% of the expected frequencies were below 5 suggesting that the test should not be carried out. The percentages observed in the Table 3.1 above would suggest that there are unlikely to be significant differences between the gender ratios seen in the three groups.

Overall there was a significant difference between gender observed in the overall sample ($x^2(1) = 47.472$, $p<.001$) with more females being present in the sample than would occur by chance alone. Likewise there was a significant difference between the primary ethnicity observed in the overall sample ($x^2=67.978$, $p<.001$) with more white British participants making up the sample than all other ethnicities together.

3.3.2 Descriptive Statistics for Measures

3.3.2.1 Questionnaire Measures (Independent Variables)

The descriptive statistics for the Vancouver Obsessive Compulsive Inventory (VOCI), Symmetry, Ordering and Arranging Questionnaire (SOAQ) and Responsibility Attitudes Scale (RAS) are shown below in Table 3.2. The Portrait Values Questionnaire (PVQ) data is presented in Table 3.3. The descriptive data for the behaviour measures are shown in Tables 3.4 to 3.6. The mean scores, standard deviations and the scale ranges obtained from the overall sample and from the three experimental groups are presented for each measure with the exception of the **cleaning** behaviour for which the percentages for each response are shown. The PVQ data is presented as showing the proportion of participants from each experimental group (and overall) who rated each value quadrant as their highest and

lowest value priority. Several participants had more than one equally ranked quadrant priority and these participants were excluded from the PVQ analysis.

Table 3.2 – Descriptive statistics for questionnaire measures

		Overall	Conservation	Openness	Control
VOCI	Mean *(sd)*	33.830 *(25.33)*	33.793 *(24.37)*	24.097 *(27.78)*	33.600 *(24.51)*
	Range*(Min-Max)*	97 *(3-100)*	85 *(5-90)*	97 *(3-100)*	84 *(4-88)*
SOAQ	Mean *(sd)*	9.973 *(8.12)*	8.759 *(7.36)*	10.037 *(8.57)*	11.083 *(8.47)*
	Range *(Min-Max)*	28 *(0-28)*	23 *(2-23)*	28 *(0-28)*	29 *(0-28)*
RAS	Mean *(sd)*	104.98 *(20.67)*	102.24 *(15.27)*	106.60 *(20.41)*	106.00 *(25.37)*
	Range *(Min-Max)*	91 *(63-154)*	50 *(78-128)*	86 *(68-154)*	91 *(63-154)*

Generally the data in Table 3.2 show that there was some variance between the three groups across the obsessionality and responsibility belief questionnaire measures. The data for the VOCI showed that the *conservation* and *control* groups had similar means and standard deviations, which were in keeping with the VOCI overall mean score. The *openness* to change group by contrast had a lower mean score with a slightly larger standard deviation than the other groups and a larger range of scores. The mean scores of the SOAQ differed slightly across the groups although this questionnaire had smaller standard deviations and ranges as well with the *conservation* group showing the lowest mean, standard deviation and range. The RAS scores showed similar means across groups but the standard deviations differed with the *conservation* group showing the lowest standard deviation as well as the lowest range and the *control* group showing the highest standard deviation and range.

Overall mean scores for the VOCI are generally consistent with published scores obtained for similar populations. For example, Thordarson *et al* (2004) report mean VOCI scores of 36.37 (StD 26.56) for their student sample while Radomsky and Rachman (2004) report a mean score of 44.9 (StD 30.52) within their student sample. Mean VOCI scores for OCD populations in comparison have been published as 86.26 (StD 37.47; Thordarson *et al*, 2004) and 81.27 (StD 36.93; Gonner *et al*, 2010). Mean scores on the SOAQ are lower within the current sample than when compared to published scores for similar populations reported by Radomsky & Rachman (2004; mean SOAQ score 18.6, StD 16.0) and Chiorri *et al* (2011; mean SOAQ score 22.91, StD 19.46) although the standard deviations are also much higher in these two studies than in the current study. Within an OCD

population Gonner *et al* (2010) report a mean SOAQ score of 30.85 (StD 23.59) for comparison. The RAS mean score for the current sample is slightly higher when compared to scores published by Salkovskis *et al* (2000) for a non-clinical student and community sample. Salkovskis *et al* (2000) give mean scores calculated as an individual question response as opposed to an overall questionnaire mean (i.e. mean RAS score 3.48, StD, 1.01 compared to an equivalent mean RAS score of 4.03 in the current sample). For comparison, Salkovskis *et al* (2000) give a mean score of 4.69 (StD 1.01) for an OCD diagnosed sample. There are no published recommended clinical cut-off criteria for the VOCI, SOAQ or RAS at present, but it appears from the published mean scores outlined above that the current participant sample show mean scores largely consistent with previous student or community populations as opposed to clinical populations.

In terms of the value priorities of participants, Table 3.3 shows that generally very few participants rated conservation values as being their highest priority values whilst the vast majority of participants in all three groups rated self-transcendence values as being their highest value priorities. Openness to change values and self-enhancement values were equally likely to be the highest value when considering participants overall. In contrast conservation values were the most likely to be rated as least important with self-transcendence values least likely to be rated as of lowest importance.

Table 3.3 – Highest and lowest quadrant priorities for the PVQ

	Overall		Conservation		Openness		Control	
	Highest	Lowest	Highest	Lowest	Highest	Lowest	Highest	Lowest
Conservation	3 *(3.5%)*	35 *(40.7%)*	1 *(3.7%)*	12 *(42.9%)*	1 *(3.6%)*	11 *(37.9%)*	1 *(3.3%)*	12 *(41.4%)*
Openness	13 *(15.3%)*	22 *(25.6%)*	6 *(22.2%)*	6 *(21.4%)*	2 *(7.1%)*	7 *(24.2%)*	5 *(16.7%)*	9 *(31%)*
Self-Enhancement	13 *(15.3%)*	24 *(27.9%)*	3 *(11.1%)*	7 *(25%)*	5 *(17.9%)*	10 *(34.5%)*	5 *(16.7%)*	7 *(24.2%)*
Self-Transcendence	56 *(65.9%)*	5 *(5.8%)*	17 *(63%)*	3 *(10.7%)*	20 *(71.4%)*	1 *(3.4%)*	19 *(63.3%)*	1 *(3.4%)*
Total	85	86	27	28	28	29	30	29

3.3.2.2 Behaviour Measures (Dependent Variables)

Table 3.4 – Descriptive statistics for Checking and Ordering behaviour

		Overall	Conservation	Openness	Control
Checking	Mean *(sd)*	230.43 *(58.26)*	243.07 *(49.92)*	215.43 *(66.14)*	233.20 *(55.84)*
	Range *(Min-Max)*	232 *(115-347)*	195 *(152-347)*	232 *(115-347)*	202 *(145-347)*
Ordering	Mean *(sd)*	5.16 *(2.10)*	5.07 *(2.17)*	5.20 *(2.11)*	5.21 *(2.08)*
	Range *(Min-Max)*	7 *(2-9)*	7 *(2-9)*	6 *(3-9)*	7 *(2-9)*

The *conservation* group showed the highest mean scores on the **checking** behaviour measure (as shown in Table 3.4) along with the smallest standard deviation and ranges. The *openness* group by comparison had the lowest scores on the **checking** behaviour measure along with the highest standard deviation and range with the *control* group falling in between these two groups. The *ordering* behaviour measure showed consistent means across the three groups with similar standard deviations and ranges. The *conservation* group also showed the highest proportion of participants who performed **cleaning** behaviour (see Table 3.4) with the *openness* group showing the highest proportion of participants who did not perform the **cleaning** behaviour.

Table 3.5 – Descriptive Statistics for Cleaning behaviour

	Overall	Conservation	Openness	Control
Used wipe	39 (43%)	18 (62%)	9 (30%)	12 (40%)
Did not use wipe	50 (56%)	11 (38%)	21 (70%)	18 (60%)

3.4 MAIN STATISTICAL ANALYSIS

All statistical analyses were carried out using SPSS 20 (IBM Corp., 2011). The methods and findings are presented in the following section organised by the main hypotheses.

3.4.1 Hypothesis 1

Hypothesis 1 predicted that participants primed for obsessionality (*conservation priming* group) would show more obsessionality related behaviours than *controls* while the participants primed for non-obsessionality (*openness priming* group) would show less obsessionality related behaviours than *controls*. As such, this section of the analysis focused on investigating differences between the three groups of participants in terms of **checking, ordering** and **cleaning behaviour**. As noted

above (see section 3.2.5) linearity could not be assumed and therefore non-parametric methods of analysis were used. The **cleaning** behaviour measure is categorical in nature and as such was not subjected to the assumption checks.

Figure 3.1 below represents the mean scores of each group on the **checking** behaviour measure (see Table 3.4) and indicates that there are only small differences between the three groups. A Kruskal-Wallis independent samples test confirmed this by showing that there was no significant difference between the distribution of the three groups, H(2) = 5.114, p = .078. As no significant difference was found overall, multiple comparisons were not performed between the groups.

It can be seen from Figure 3.2 that the mean scores across the groups on the **ordering** behaviour measure were practically identical (see also Table 3.4). Indeed, a Kruskal-Wallis independent samples test showed that the null hypotheses should be retained meaning that there was no significant difference seen between the distribution of the three groups, H(2) = .191, p = .909. As there was no overall significant difference found multiple comparisons were not performed between the groups.

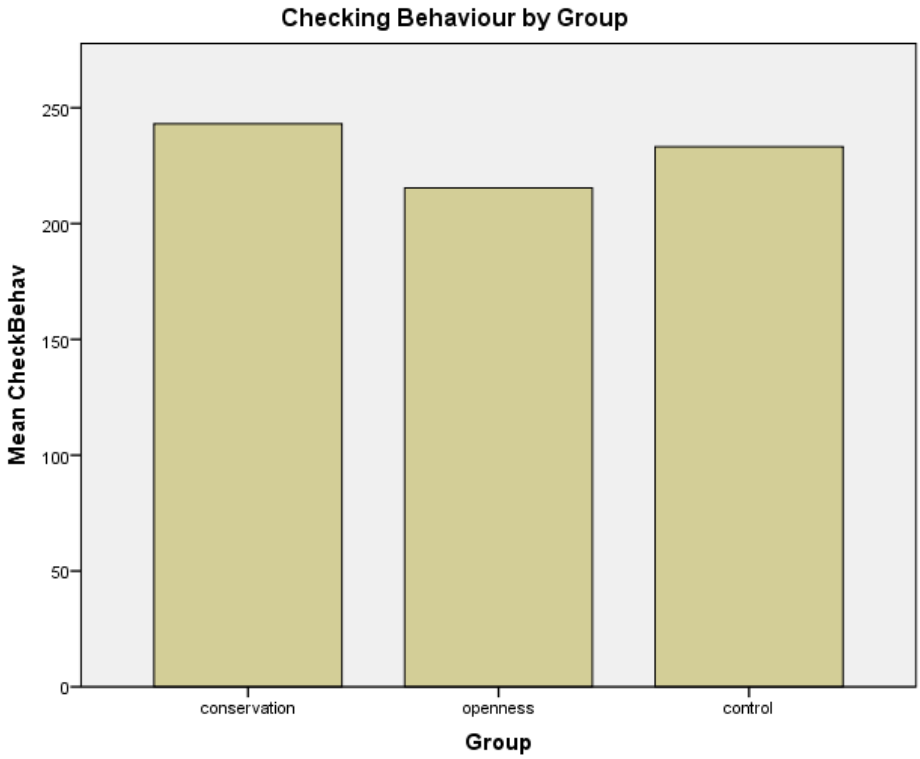

Figure 3.1 – Checking Behaviour by Group

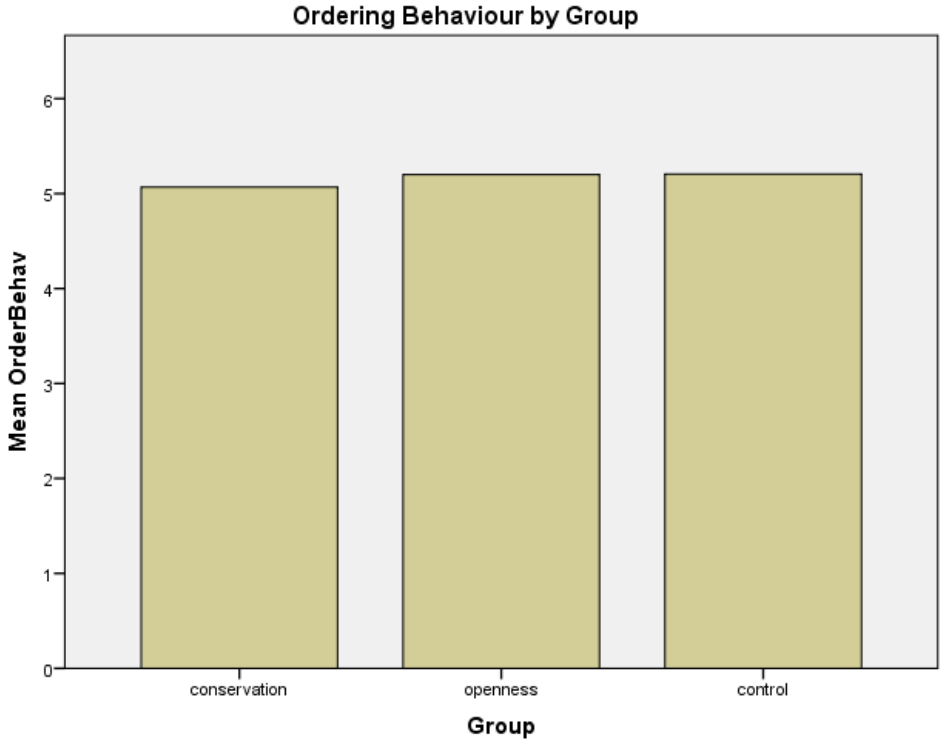

Figure 3.2 – Ordering Behaviour by group

Figure 3.3 below shows the percentages of participants who did or did not use a cleaning wipe in each group (see Table 3.5). It can be seen that the *conservation* group showed a higher proportion of participants who used wipes compared to the other two groups while the *openness* group showed a higher proportion who did not use wipes. A chi-square analysis was carried out to assess for association between the three groups and the **cleaning** behaviour. All of the expected frequencies within the cross-tabs table were above 5 so no assumptions were violated with regards to participant numbers (Field, 2013). The results indicated that there was a significant association between the groups and whether or not participants used a cleaning wipe x^2 (2) = 6.428, $p<.05$. The Cramer's V value suggests that this effect size is small (.269) although this is a significant effect size ($p<.05$). More specifically, it was shown that the proportion of participants who used a wipe after the *conservation* prime (46.2%) was significantly higher than the proportion who did not use a wipe after the *conservation* prime (22%). There were no such differences found within the other two groups and none of the standardised residuals were significant so can offer no further interpretation of this result.

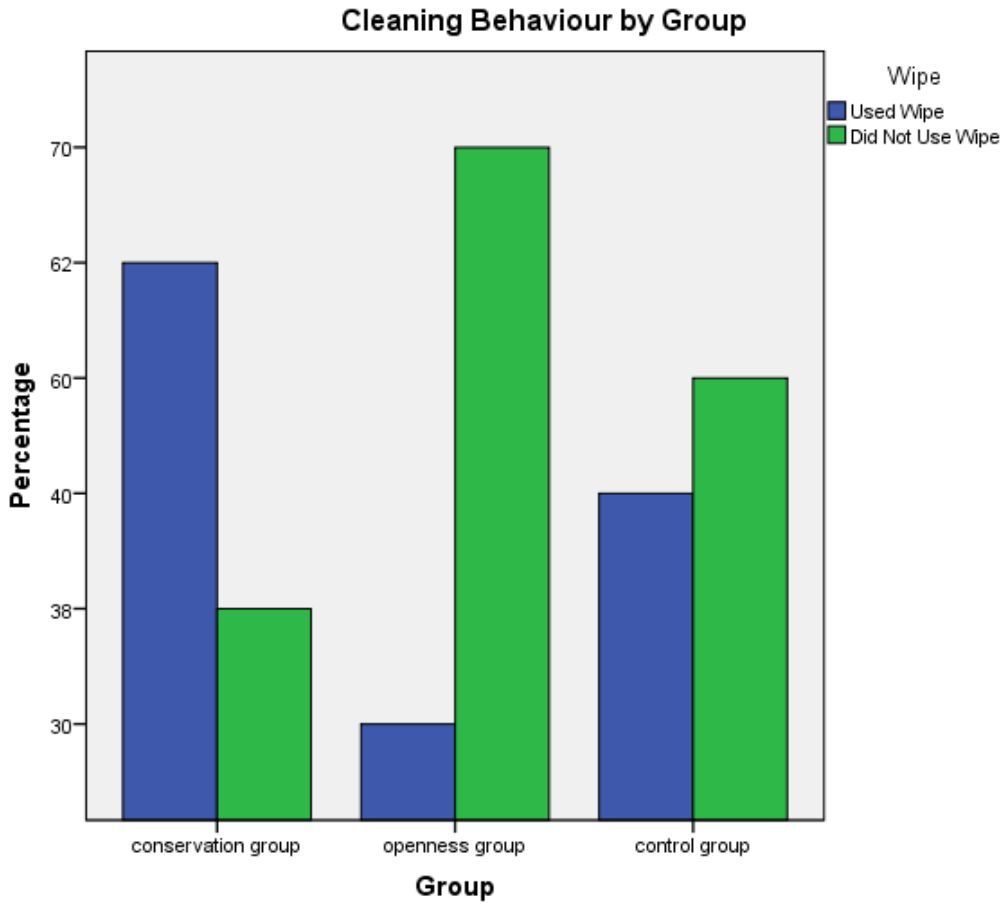

Figure 3.3 – Cleaning Behaviour by group

Summary for Hypothesis 1

The analyses above offer mixed results with regards to Hypothesis 1. Specifically Hypothesis 1a, that following the *obsessionality prime (conservation group)* participants will spend more time **checking** than participants in the *control* group was not supported. Likewise Hypothesis 1b, that following the *non-obsessionality prime (openness group)* participants would spend less time **checking** than participants in the *control* group was also not supported. Therefore, regarding **checking** behaviour Hypotheses 1a and 1b were not supported.

Hypothesis 1c, that those *primed for obsessionality* would show higher **ordering** scores than those in the *control* group was not supported and neither was Hypothesis 1d, that those *primed for non-obsessionality* would show lower scores of **ordering** than the *control* group. Therefore, regarding **ordering** behaviour Hypotheses 1c and 1d were not supported.

Hypothesis 1e, that *obsessionality priming* would lead to more participants showing **cleaning** behaviour than those in the *control* group was supported. Hypothesis 1f, that *non-obsessionality priming* would lead to less participants showing **cleaning** behaviour than those in the *control* group was not supported. Therefore, regarding **cleaning** behaviour Hypotheses 1e was supported while 1f was not.

3.4.2 Hypothesis 2

Hypothesis 2 predicted that there would be significant correlations within the *control* group participants between the obsessionality and responsibility belief questionnaire measures (VOCI, SOAQ and RAS) and the obsessionality behaviour measures (**checking, ordering** and **cleaning**). It was expected that those participants who scored highest on the obsessionality and responsibility measures would show higher scores on the **checking** and **ordering** behaviour as well as a higher chance of showing **cleaning** behaviour.

Scores from the *control* group were correlated across the three questionnaire measures and the behaviour scores. As the assumptions for parametric analysis were not met for all the measures intended for the correlations Kendall's Tau was used. Kendall's Tau was chosen over Spearman's Rho due to the number of tied ranks that are present in the SOAQ and ordering data (Field, 2013). The cleaning behaviour was analysed using point-biserial correlations due to being categorical in nature (Field, 2013). Table 3.6 shows the correlations between the questionnaire measures and the **checking, ordering** and **cleaning** behaviour.

Table 3.6 – Correlations within Control group

	VOCI	SOAQ	RAS	Checking	Ordering	Cleaning
VOCI		.586**	-.560**	-.052	.042	.093
SOAQ	.586**		-.496**	-.026	.182	.153
RAS	-.560**	-.496**		-.090	-.071	.180
Checking	-.052	-.026	-.090		-.026	.145
Ordering	.042	.182	-.071	-.026		.140
Cleaning	.093	.153	.180	.145	.140	

**indicates correlation is significant at the 0.01 level (2-tailed)

The results indicate that there are significant positive correlations between the VOCI and the SOAQ as well as significant negative correlations between the RAS and

both the VOCI and SOAQ as would be expected from the reverse scoring of the RAS. This suggests that the three questionnaires are measuring related constructs in that as participants rate themselves as having more obsessionality symptoms on the VOCI they also do the same on the SOAQ. Likewise as obsessionality scores increase (on both the VOCI and the SOAQ) participants rate themselves as having more responsibility beliefs (as indicated by lower scores on the RAS).

There were, however, no significant correlations seen between the obsessionality or responsibility questionnaire measures (VOCI, SOAQ and RAS) and the **checking, ordering** and **cleaning** behaviour. That is, as obsessionality and responsibility scores increase we do not see more time spent checking or higher ordering scores or higher proportions of cleaning wipe use within the *control* participants. This suggests that there is no relationship within the *control* group between the levels of obsessionality (as recorded by the VOCI and SOAQ) and the obsessionality behaviour measures of **checking, ordering** and **cleaning** or between the levels of responsibility beliefs (as measured by the RAS) and the obsessionality behaviour measures.

It is also of interest to note that there were no significant correlations between the three behavioural measures within the *control* group. That is, as scores on one of the obsessionality behaviour measures increase, scores on the other obsessionality behaviour measures do not necessarily also increase. This suggests that there are no relationships within the *control* group between the levels of **checking**, **ordering** and **cleaning** behaviours shown.

Summary for Hypothesis 2

Contrary to Hypothesis 2 there were no significant correlations between the obsessionality questionnaire measures (VOCI and SOAQ) and the obsessionality behaviour measures within the control group. There was also no significant correlation between the responsibility beliefs measure (RAS) and the obsessionality behavioural measures. It should be held in mind that the number of participants included in these correlations is low (n=30) so they should be interpreted with some caution.

3.4.3 Hypothesis 3

Hypothesis 3 stated that participants who scored *high* on the obsessionality questionnaire measures (VOCI and SOAQ) would show higher scores on the behaviour measures of **checking, ordering** and **cleaning** compared to those who scored *low* on the obsessionality questionnaire measures.

In order to test hypothesis 3 the scores from the VOCI and SOAQ were added together to give each participant an overall obsessionality score. These two questionnaires were found to be strongly correlated both within the individual groups and across the three groups (Kendall's Tau correlations of between .429 to .586, $p<.001$). The original purpose of including the SOAQ in this study was due to the VOCI lacking items that sufficiently captured the ordering and arranging type symptoms related to obsessionality (e.g. Radomsky & Rachman, 2004; see method section 2.6.3.4). As such, the SOAQ adds a further valuable dimension to those already measured by the VOCI and they are rated using a very similar 0-4 rating scale. The rationale for adding the two scales together was that this would give an overall obsessionality score that best captured the breadth of symptoms related to obsessionality. It also meant that the subsequent analysis outlined below was not carried out with two separate obsessionality measures which would have increased the chances of a Type 1 error occurring.

This overall obsessionality measure (VOCI-SOAQ) was subjected to the same assumptions checks as those outlined in section 3.2.5. There were no outliers identified over the measure as a whole (see appendix 28). Table 3.7 shows the descriptive statistics for the VOCI-SOAQ measure from the complete participant sample. There was highly significant positive skew in the scores ($z = 4.357$, $p<.001$) and Q-Q Plots indicated significant deviation from a normal distribution across all groups which was supported by a Kolmogorov-Smirnov test for the overall measure ($D(89)=.156$, $p<.001$). Generally a normal distribution within this measure cannot be assumed (as was the case with the original VOCI and SOAQ measures).

Table 3.7 – descriptive statistics for the VOCI-SOAQ obsessionality measure

	VOCI-SOAQ
Mean	44.809
Standard Deviation	33.156
Median	34
Range	155 *(4-159)*

In order to identify a *high* obsessionality group and a *low* obsessionality group a split at the median was carried out (a median split is less likely to be affected by skewed distribution than a split at the mean). This split identified that overall there were 42 participants who fell above the median (34) and 44 participants who fell below the median. There were three participants whose scores fell on the median score and these participants were excluded from this analysis.

The obsessionality scores were used to investigate whether *high* or *low* obsessionality (as measured by the VOCI-SOAQ) had an effect on the levels of obsessionality behaviour (**checking, ordering** and **cleaning** behaviours – see Figures 3.4, 3.5 and 3.6 respectively).

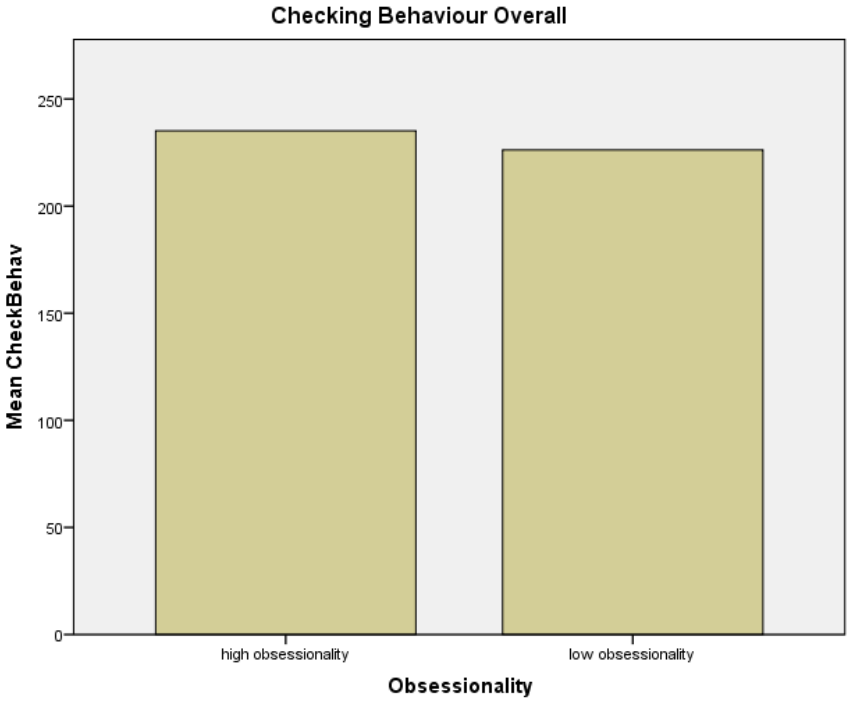

Figure 3.4a - Mean Checking behaviour scores in high and low obsessionality groups overall

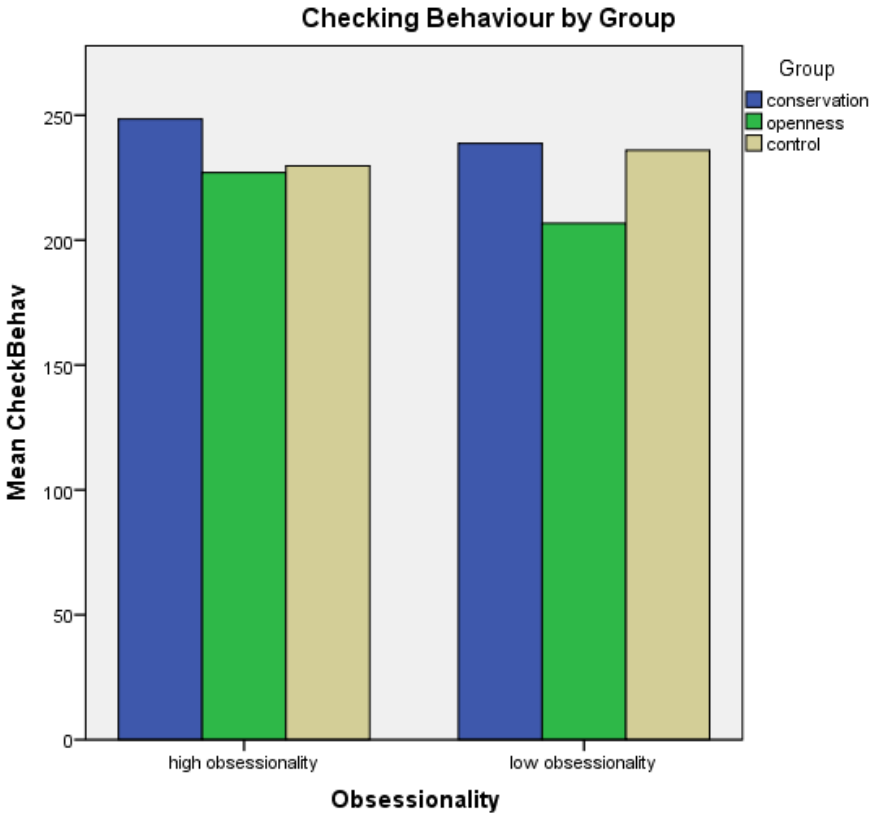

Figure 3.4b – Mean Checking behaviour scores in high and low obsessionality groups by experimental group

As seen in Figure 3.4a there did not appear to be large differences in the mean scores of Checking behaviour between the *high* and *low* obsessionality groups and it can be seen in the Figure 3.4b that this was also true when mean scores were examined by experimental group. A Mann-Whitney U test revealed that **checking** behaviour in the *high* obsessionality (mean rank = 45.68) participants did not differ significantly from the *low* obsessionality (mean rank = 41.42) participants, U = 832.5, z = -.791, p =.50, r = -0.09.

As can be seen in Figure 3.5a there was again no differences observed between the *high* and *low* obsessionality groups overall although the *high* obsessionality participants did have a slightly higher mean score on the **ordering** behaviour than the *low* obsessionality participants. Looking at the individual groups (Figure 3.5b) there did appear to be a pattern showing that *high* obsessionality participants performed higher levels of **ordering** behaviour than the *low* obsessionality group which was most marked for the control group. However, a Mann-Whitney U test revealed that **ordering** behaviour in *high* obsessionality (mean rank = 47.23)

participants did not differ significantly from the *low* obsessionality (mean rank = 39.94) participants, U = 767.5, z = -1.375, p = .20, r = -.15 meaning that this pattern of result did not reach significance.

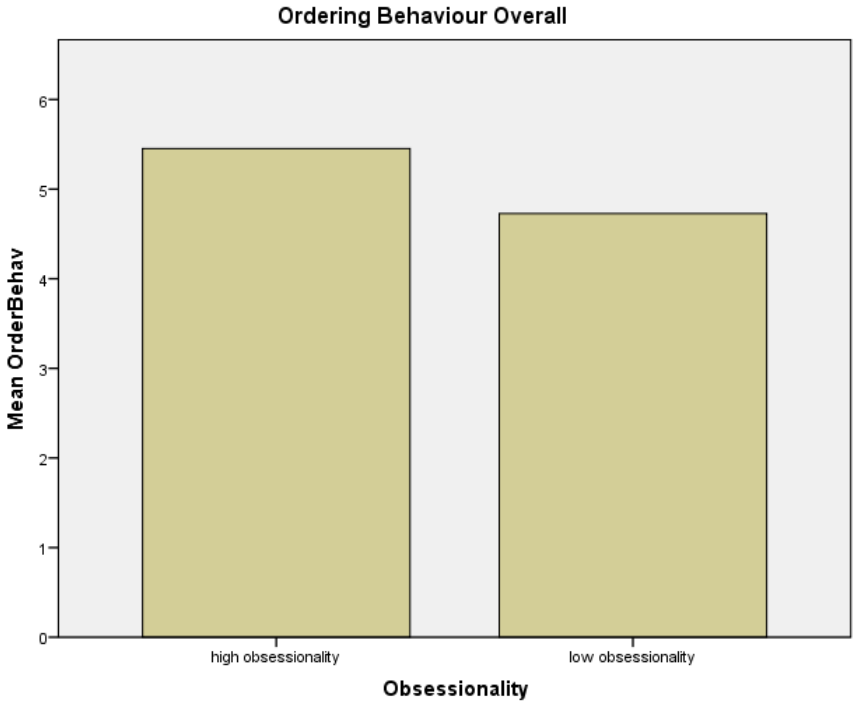

Figure 3.5a - Mean Ordering behaviour in high and low obsessionality groups overall

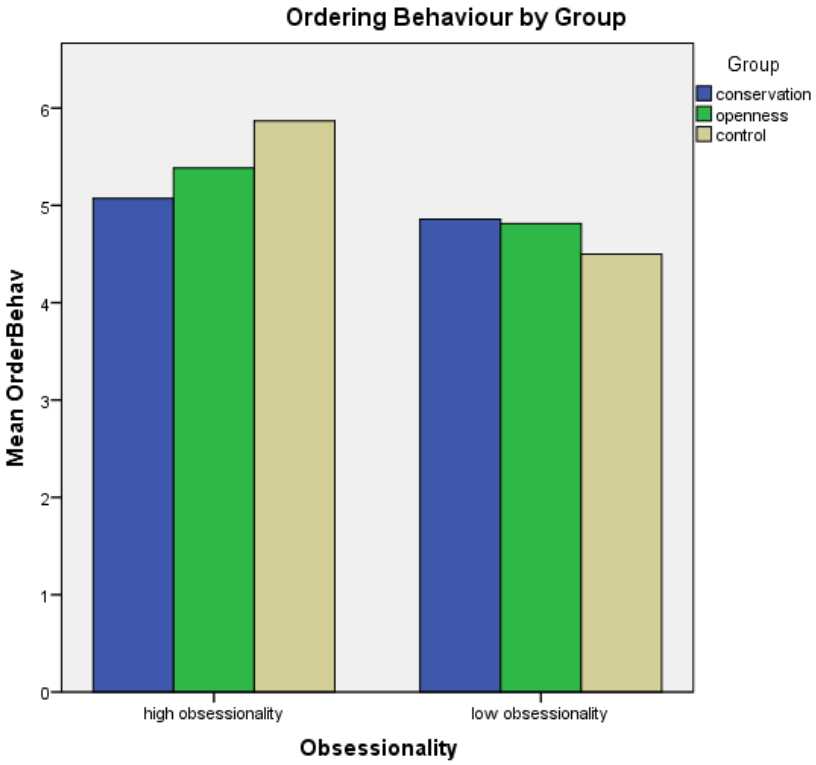

Figure 3.5b – Mean Ordering behaviour scores in high and low obsessionality groups by experimental group

With regards to the Cleaning behaviour, Figure 3.6a below shows that overall there was no difference between the percentage of participants who were in the *high* obsessionality group who used a **cleaning** wipe compared to those in the *low* obsessionality group who used a wipe (Figure 3.6a). It can also be seen that there were differences in the percentages when broken down into the three groups of participants with those in the *conservation* group showing higher proportions of wipe use when compared to the *openness* group across both the *high* and *low* obsessionality groups (Figure 3.6b). This suggests that the priming of obsessionality related values in the *conservation* group may have had more of an effect on subsequent **cleaning** behaviour than *high* or *low* levels of obsessionality as measured by the VOCI-SOAQ (see Hypothesis 1). In line with this a Chi-Square analysis showed that there was no significant association between the *high* and *low* levels of obsessionality and whether or not participants demonstrated **cleaning** behaviour $x^2(1) = .001$, $p = .98$.

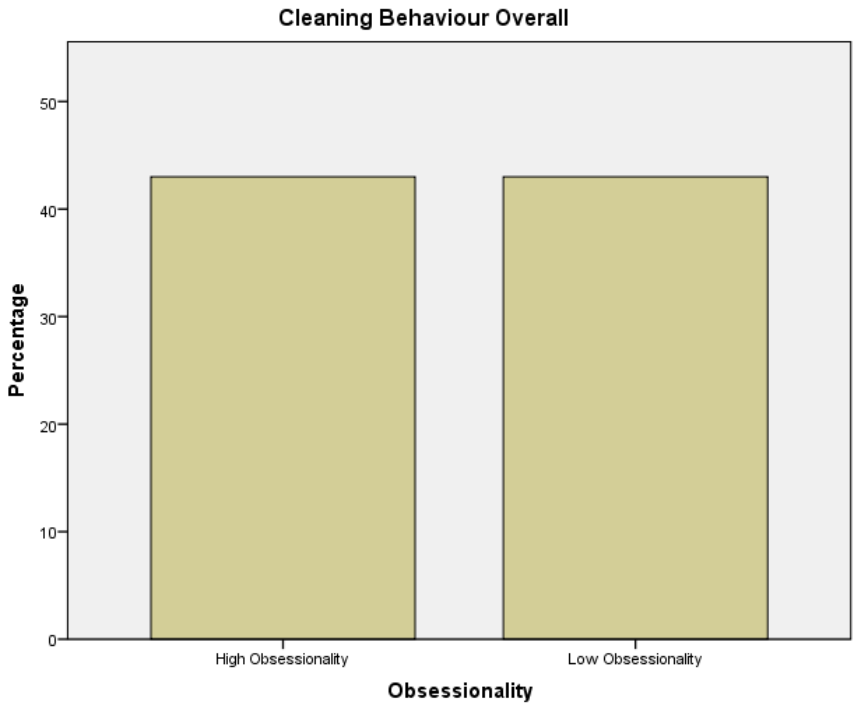

Figure 3.6a - Proportions of Cleaning behaviour scores in high and low obsessionality groups overall

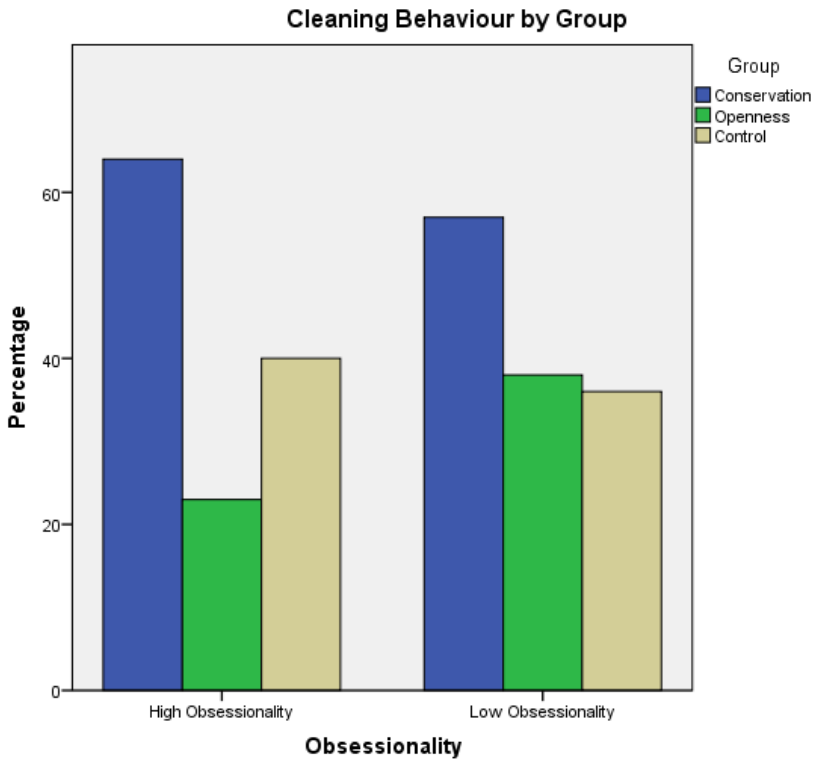

Figure 3.6b – Proportions of Cleaning behaviour scores in high and low obsessionality groups arranged by experimental group

Summary for Hypothesis 3

These results indicated that there were no significant relationships between the levels of self-reported obsessionality, as measured by the VOCI-SOAQ and the obsessionality behavioural measures of **checking, ordering** and **cleaning** which is in contrast to what was predicted in hypothesis 3. There were indications that the *conservation* group were most likely to show **cleaning** behaviour regardless of their levels of obsessionality (Figure 3.6b) suggesting that for this behaviour at least the priming task had more effect than the levels of obsessionality (as measured by the VOCI-SOAQ).

3.4.4 Hypothesis 4

Hypothesis 4 stated that those participants *high* in responsibility beliefs (as measured by the RAS) would show higher levels of obsessionality behaviours on the **Checking, Ordering** and **Cleaning** behaviours when compared to those who were *low* in responsibility beliefs. In order to identify a *high* responsibility belief group and a *low* responsibility belief group a split at the median was carried out on the RAS

data. A median split was chosen due to the overall RAS scores showing significant skew and a median split is less likely to be affected by skewed distributions than a split at the mean (Field, 2013). This split identified that overall there were 44 participants who fell below the median (102) and were therefore identified as having *high* responsibility beliefs, and 44 participants who fell above the median and were identified as having *low* responsibility beliefs. One participant scored on the median and was excluded from the analysis.

The responsibility scores from all participants were used to investigate whether *high* or *low* responsibility had an effect on the levels of obsessionality behaviour across all participants. Figure 3.7 below shows that the mean scores for **checking** behaviour overall between the *high* and *low* responsibility groups was the same (Figure 3.7a). This was supported by the Mann-Whitney U test which revealed that **checking** behaviour in the *high* responsibility (mean rank = 45.16) participants did not differ significantly from the *low* responsibility (mean rank = 43.84) participants, U = 939.00 z = -.242, p =.80, r = -0.02. Figure 3.7b shows that breaking down the *high* and *low* responsibility participants into their original experimental groups did not appear to suggest any meaningful patterns.

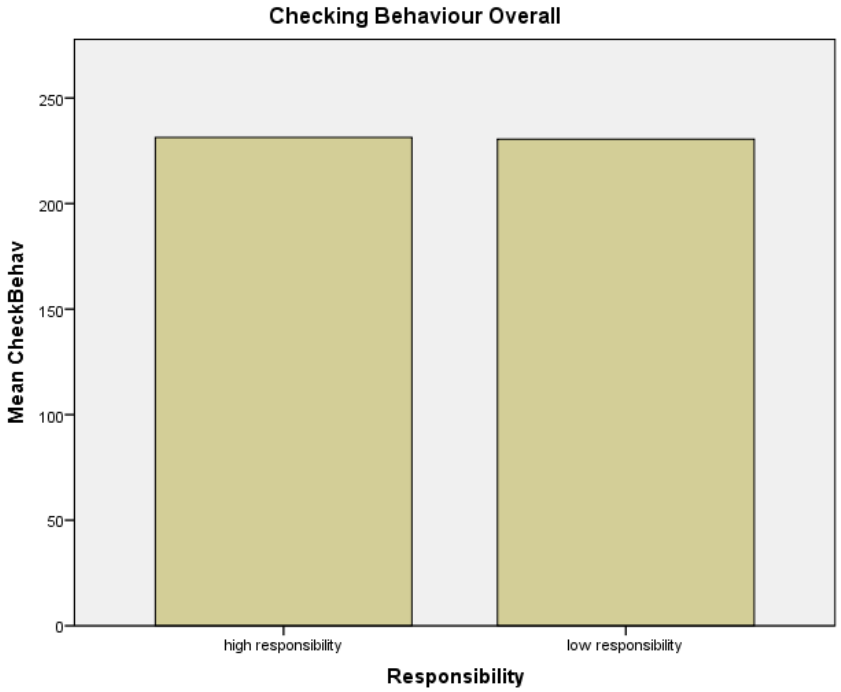

Figure 3.7a - Mean Checking behaviour scores in high and low responsibility groups overall

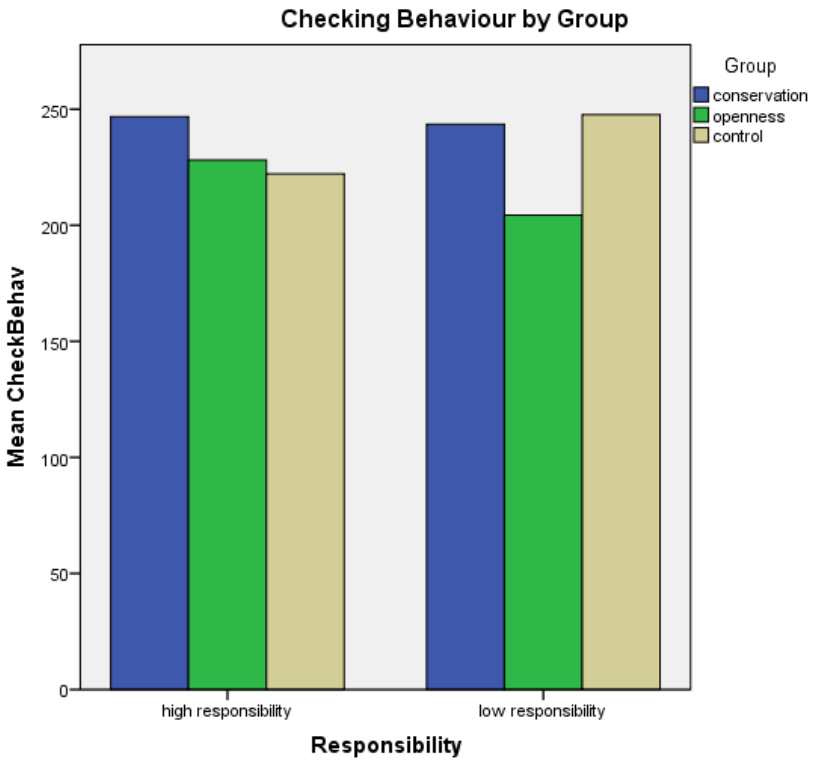

Figure 3.7b – Mean Checking behaviour scores in high and low responsibility groups by experimental group

Figure 3.8a shows that there was a slight difference in the mean scores of **ordering** behaviour between the *high* and *low* responsibility participants although these differences were not large (Figure 3.8a,). It can also be seen that there were no large differences in mean scores when *high* and *low* responsibility participants were split into their experimental groups (Figure 3.8b). A Mann-Whitney U test showed that **ordering** behaviour in *high* responsibility (mean rank = 47.53) participants did not differ significantly from the *low* responsibility (mean rank = 40.38) participants, U = 790.50, z = -1.342, p = .20, r = 0.14.

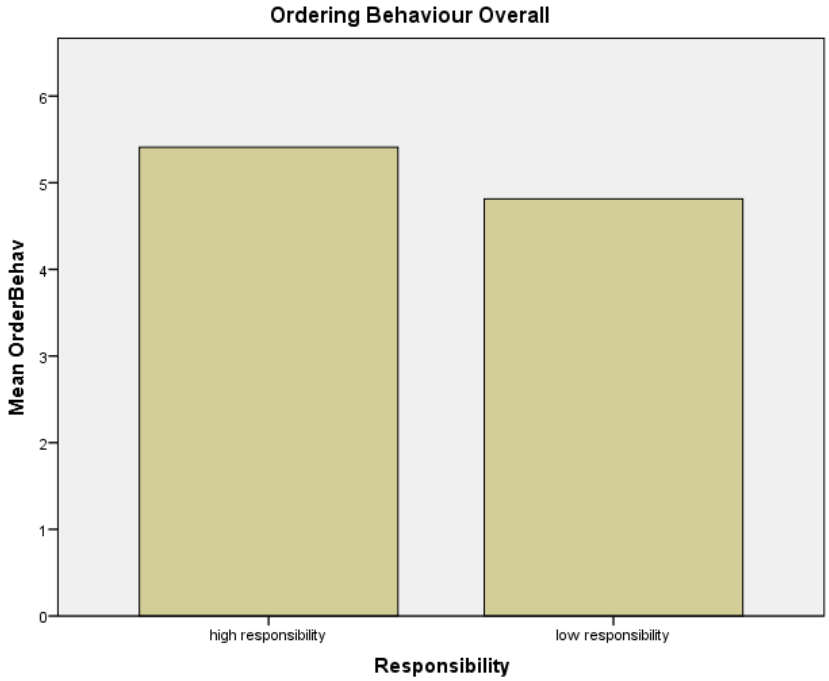

Figure 3.8a - Mean Ordering behaviour scores in high and low responsibility groups overall

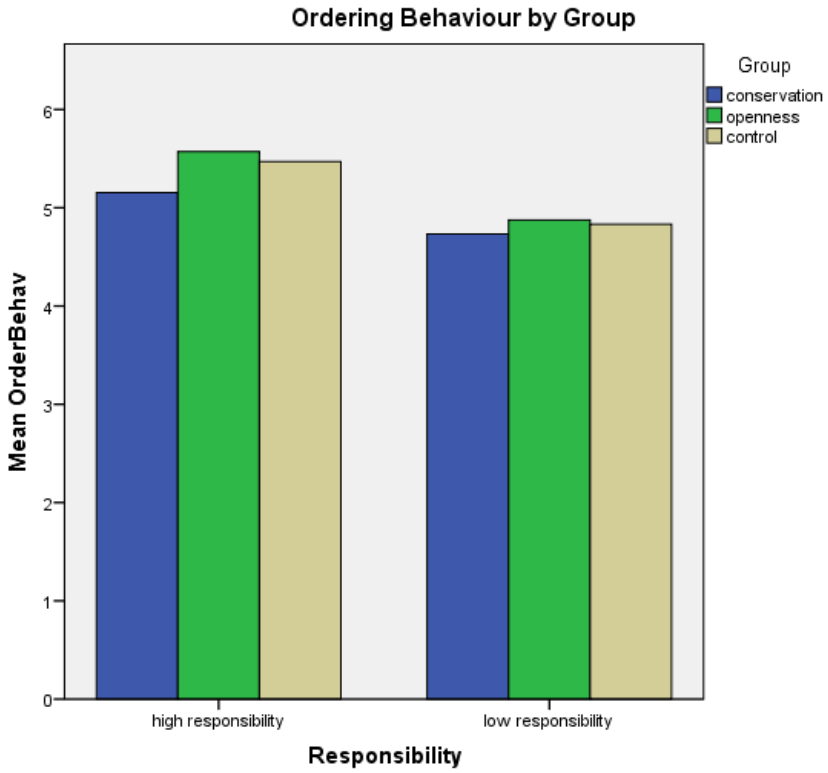

Figure 3.8b – Mean Ordering behaviour scores in high and low responsibility groups

With regards to **cleaning** behaviour it can be seen in Figure 3.9a that slightly higher proportion of participants in the *high* responsibility group used a **cleaning** wipe than those in the *low* responsibility group (Figure 3.9a). When the proportions were broken down into the groups it can be seen that those in the *conservation* group had the highest proportions of **cleaning** behaviour compared to the other groups regardless of whether they had *high* or *low* responsibility scores, with those in the *openness* group showing the least **cleaning** behaviour (Figure 3.9b). This suggests that the priming of obsessionality related values in the *conservation* group may have had more of an effect than participants' levels of responsibility beliefs (see Hypothesis 1). In line with this a Chi-Square analysis showed that statistically there was no significant association between *high* and *low* levels of responsibility and whether or not participants demonstrated **cleaning** behaviour $x^2(1) = .185$, $p = .70$.

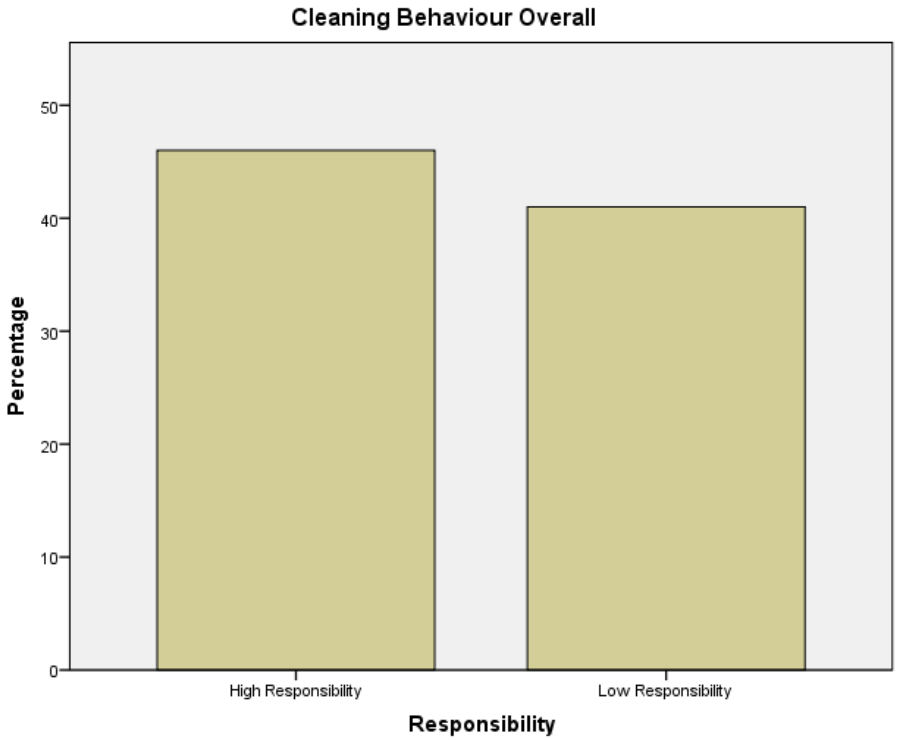

Figure 3.9a - Proportions of Cleaning behaviour in high and low responsibility groups overall

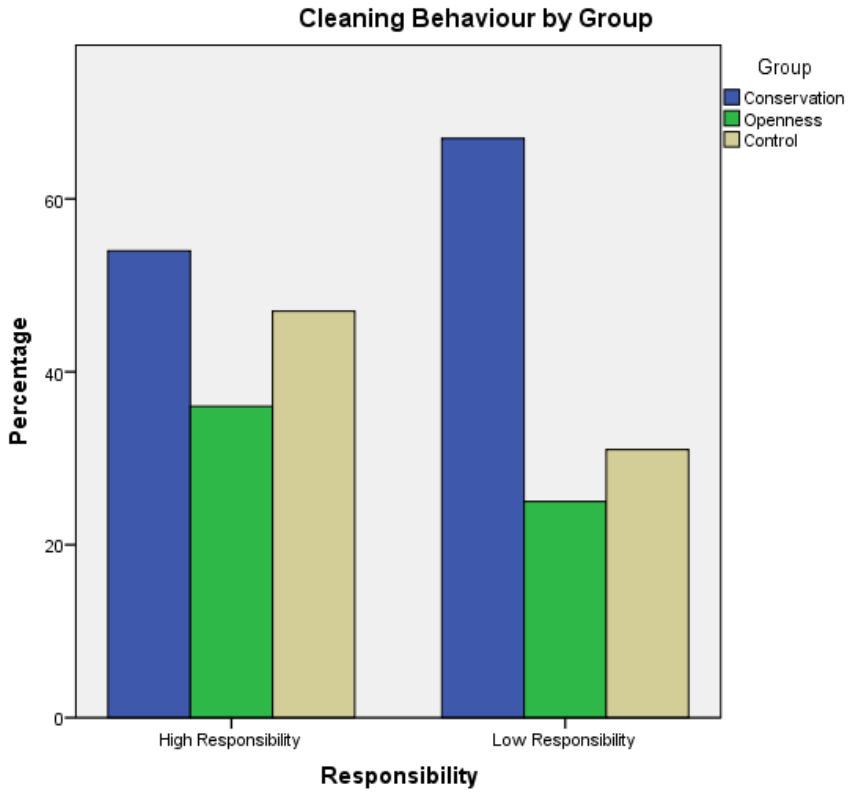

Figure 3.9b – Proportions of Cleaning behaviour in high and low responsibility groups by experimental group

Summary for Hypothesis 4

These results indicate that there were no significant relationships between the levels of self-reported responsibility (as measured by the RAS) and the obsessionality related behavioural measures meaning that hypothesis 4 is not supported. There were indications that the *conservation* group were most likely to show **cleaning** behaviour regardless of levels of responsibility (see Figure 3.9b), once again suggesting that the priming task had more of an effect than the levels of responsibility beliefs on this behaviour.

3.4.5 Hypothesis 5

Hypothesis 5 predicted that those who have *high conservation value priorities* would score higher on obsessionality as measured by the VOCI and SOAQ measures than other participants, particularly those with *high openness value priorities*. In relation to the responsibility measure it was predicted that those with *high self-transcendence*

value priorities would have higher responsibility beliefs as measured by the RAS than those with other value priorities, particularly *self-enhancement*.

The PVQ data was analysed using the method outlined in the methods section (see section 2.6.3.2) which is briefly described here. Each individual participant's scores for each of the 21 individual PVQ items was first standardised across that participant in order to account for the different ways participants may respond to a Likert response scale. This standardisation procedure simply involved each participant's average response score from the scale as a whole being subtracted from their individual scores (procedure recommended by Schwartz, 2005). Following this, the actual value scores were derived by adding together the individual standardised scores for each item belonging to a value (2 or 3 items for each value) and calculating an average score for each of the 10 values (i.e. the total scores of the 2/3 items divided by the number of items). The 10 value scores were then added together to form quadrant scores (Verkasalo *et al*, 2012) with these scores also averaged by the number of values within each quadrant (there were 2 or 3 values per quadrant – see introduction section 1.3.2). These final four quadrant scores were then ranked within each individual participant with the lowest quadrant score ranked as 1 up to the highest quadrant score ranked as 4 (the lowest score indicates strongest importance and the highest score least importance).

This resulted in each individual having the four value quadrants ranked in order of their value priorities (see Table 3.3 above) which shows the proportion of participants who rated each quadrant as their highest or lowest priority). Four participants had tied ranks for their highest value priority and so were not included in this part of the analysis. The descriptive statistics for the questionnaire data arranged using the value quadrant priorities are shown in Tables 3.8 to 3.10 below. It is important to note that very few participants rated Conservation values as being of highest importance to them and therefore the analyses below should be interpreted with caution.

It can be seen that participants who highly value *Openness values* show the lowest mean score on the VOCI whilst those who most highly value *Conservation values* show the highest mean score (see Table 3.8 below). Both of these groups also

show lower ranges of scores and lower standard deviations than the *Self-enhancement* and *Self-transcendence* groups. A Kruskal-Wallis Test, however, found that those who rate *conservation* values as being higher in importance to them relative to other value quadrants are statistically no more likely to score high on the VOCI obsessionality questionnaire measure, H(3) = 4.020, p = .259. It is of interest to note, however that the *Conservation* and *Self-enhancement value priority* groups had higher mean scores on the VOCI measure of obsessionality than the other two groups even though this result did not reach significance.

Table 3.8 - Scores on VOCI arranged by value priority

	Conservation	Openness	Self-Enhancement	Self-Transcendence
No. of p's	3	13	13	56
Mean	43.33	23.154	41.923	34.052
StD	18.771	17.063	34.789	24.582
Median	33	20	28	27.5
Range	33 (32-65)	48 (4-52)	93 (7-100)	92 (3-95)

The data in Table 3.9 shows that participants who rated *Conservation values* as of highest importance to them had the highest mean and median scores on the SOAQ measure of obsessionality with *Openness values* again showing the lowest scores as found with the VOCI scores above. However, a Kruskal-Wallis Test found that those who rate *conservation values* as being higher in importance to them relative to other value quadrants are statistically no more likely to score high on the SOAQ obsessionality questionnaire measure, H(3) = .586, p = .90.

Taken together, the information from Tables 3.8 and 3.9 indicate that there could be a link between the value priorities that people have and the levels of obsessionality that they report on the VOCI and SOAQ measures in the direction that we would predict i.e. that those who highly favour *conservation values* show more obsessionality than those who have *Openness value priorities*. However, this data is based on small participant numbers, especially in the case of the *Conservation value priorities* group and is not supported statistically.

Table 3.9 - Scores on SOAQ arranged by value priority

	Conservation	Openness	Self-Enhancement	Self-Transcendence
No. of p's	3	13	13	56
Mean	11	7.923	9.5	10.466
StD	3.606	4.838	7.165	9.114
Median	12	7	9	8.5
Range	7 (7-14)	15 (2-17)	27 (1-28)	28 (0-28)

The same patterns were again seen when investigating the responsibility belief measure and the value priorities (see Table 3.10). Those participants who had *conservation value priorities* appeared to be more likely to show higher levels of responsibility beliefs (as indicated by lower scores on the RAS) whilst those who had *Openness to Change value priorities* were more likely to show lower responsibility beliefs. Statistical analyses demonstrated that there was a statistically significant effect of value priority on responsibility belief scores, $H(3) = 9.016$, $p = .029$. Pairwise comparisons showed that there were no significant differences between responsibility belief scores when participants had *conservation value priorities* compared to *self-transcendence values* ($p = 1.0$, $r = -.08$), *self-enhancement values* ($p = 1.0$, $r = -.10$) or *openness values* ($p = .237$, $r = .22$). There were also no significant differences in responsibility belief scores when participants had *self-transcendence value priorities* compared to *self-enhancement values* ($p = 1.0$, $r = .06$) or when participants had *self-enhancement value priorities* compared to *openness values* ($p = .439$, $r = .19$). However, there was a significant difference in responsibility scores when participants had *self-transcendence value priorities* compared to *openness value priorities* ($p = .029$, $r = .30$).

Table 3.10 - Scores on RAS arranged by value priority

	Conservation	Openness	Self-Enhancement	Self-Transcendence
No. of p's	3	13	13	56
Mean	92.67	119.23	105.46	101.55
StD	8.622	16.027	21.881	20.928
Median	91	118	97	99
Range	17 (85-102)	59 (95-154)	61 (74-135)	91 (63-154)

Summary for hypothesis 5

The descriptive statistics shown in Tables 3.8 to 3.10 above suggested that there could be links between the value priorities that individuals have and their levels of obsessionality and responsibility (as measured by the VOCI, SOAQ and RAS). Specifically, that having *Conservation value priorities* might be linked to higher

obsessionality and responsibility whilst *Openness value priorities* might be linked to lower obsessionality and responsibility. However, this was most likely a result of the small sample sizes included in the *Conservation values priority group* as statistical analyses shown above clearly did not support there being any relationships between value priorities and scores on the questionnaire measures.

More specifically hypothesis 5a which stated that participants with *Conservation value priorities* would score higher on measures of obsessionality (VOCI and SOAQ) was not supported by the statistical analysis.

Hypothesis 5b which stated that participants with *Self-transcendence value priorities* would score higher on measures of responsibility (RAS) is tentatively accepted although the exact direction of this relationship was not as predicted as the participants who had self-transcendence value priorities were found to show significantly different responsibility scores compared to the *Openness value priorities* group rather than the *Self-enhancement group* predicted.

As noted above, the number of participants who had *Conservation value priorities* was very low compared to other groups and this could have had an effect on this analysis.

3.5 ADDITIONAL ANALYSIS

Given the questionable reliability of the continuous measure used for the **Ordering** behaviour (see sections 3.2.4 and 3.2.5), further analysis was carried out on the ordering data giving consideration to this variable as being categorical, similar to the **Cleaning** behaviour. As such participants were categorised as either ordering the pens or not ordering the pens. However, when identical analyses as those carried out above for the **Cleaning** behaviour were replicated with the **Ordering** behaviour as a categorical variable it was found that there were no significant results in relation to any of the hypotheses which was consistent with the results already reported above for the **Ordering** behaviour. As such, this additional analysis is not reported further.

3.6 SUMMARY OF RESULTS

Against expectations there was little difference observed between the three groups of participants in terms of the obsessionality related behaviours of **Checking, Ordering** and **Cleaning**. It was found that there was no effect of the *Conservation priming* task or the *Openness priming* task on the levels of obsessionality seen in **Checking** and **Ordering** behaviours when these groups were compared with a *control* group (Hypothesis 1a-d). The sole exception was that the *Conservation prime* group showing a higher proportion of **Cleaning** behaviour compared to the *Openness prime* and *Control* groups (Hypothesis 1e). The opposite effect was, however, not seen in the *Openness* group with them using no less cleaning wipes than the *Control* group (Hypothesis 1f). These results indicate that there was no effect of priming *Openness* values on behaviours of **Checking, Ordering** and **Cleaning** related to obsessionality. They also indicate that there was no effect of priming *Conservation* values on behaviours of **Checking** and **Ordering** related to obsessionality but that there was a significant effect of priming *Conservation* values on **Cleaning** behaviour.

In relation to general patterns of relationships that were expected to be seen in the data it was found that control group participants did not show a relationship between obsessionality as measured by the VOCI and the SOAQ and the obsessionality behaviours of **Checking, Ordering** and **Cleaning** as measured by the behavioural measures (Hypothesis 2).

In line with this analyses indicated that against expectations participants from across all three groups who scored *high* on obsessionality (as measured by the VOCI-SOAQ) did not show higher levels of obsessionality related behaviours of **Checking, Ordering** and **Cleaning** than those who scored *low* on obsessionality (Hypothesis 3). Likewise, analyses also indicated that participants who scored *high* on responsibility beliefs (as measured by the RAS) did not perform more obsessionality related behaviours of **Checking, Ordering** and **Cleaning** than those who scored *low* on responsibility beliefs (Hypothesis 4). These results generally indicated that there was no significant relationship between obsessionality (as measured by the VOCI-

SOAQ) and responsibility beliefs (as measured by the RAS) and the obsessionality behaviour measures of **Checking, Ordering** and **Cleaning**.

Finally, it was found that although the descriptive statistics supported relationships between *Conservation* value priorities being linked to higher obsessionality and responsibility (as measured by the VOCI, SOAQ and RAS) and *Openness value priorities* being related to lower obsessionality and responsibility this was not supported by the statistical analysis carried out. Statistically, the value priorities of participants in terms of their value quadrant priorities did not have any effects on obsessionality as measured by the VOCI and SOAQ (Hypothesis 5a). The quadrant priorities did show an effect on responsibility beliefs (as measured by the RAS) such that those with high *Self-transcendence value priorities* were more likely to score high on responsibility measures as predicted compared to those with high *Openness value priorities* although all other comparisons between quadrants were not significant (Hypothesis 5b).

All of the results above are discussed in further detail in the following chapter.

Chapter 4 - Discussion

4.1 INTRODUCTION

The following chapter gives a summary of the results before interpreting these findings in relation to obsessionality, values and the priming literature. It moves on to consider the implications and clinical relevance of the results before detailing the strengths and limitations of the research. The chapter then outlines further research directions and gives conclusions for the current study.

4.2 SUMMARY OF RESULTS

1) Effects of priming obsessionality values on behaviours related to obsessionality

It was found that the priming task only had an effect on the cleaning behaviour, that is, whether the participants used a wipe or not. A higher proportion of those in the conservation priming group used a cleaning wipe compared to the other groups. There were no other effects of the conservation prime found on the obsessionality related behaviours. Contrary to expectations the openness to change priming group had no effects on any of the behaviours at all.

2) Relationships between questionnaire measures of obsessionality and behaviours related to obsessionality

The results also showed that there were no significant relationships between the questionnaire measures and the behaviour measures within the control group.

3) Effects of obsessionality and responsibility levels on behaviours related to obsessionality

Levels of obsessionality and responsibility were found to generally not be related to the behaviour measures. Those who scored higher on the obsessionality measures did not score higher on the behaviour measures just as those who scored lower on the obsessionality measure did not score lower on the behaviour measures. Similarly with the responsibility measure, which was expected to have a mediating

relationship there was no effect of high or low responsibility on the behaviour measure scores.

4) Relationship between value orientation and obsessionality

The value orientation of participants was also found to not have any significant effect on the questionnaire measures generally or on the behaviour measures. There was a small exception to this in that those with self-transcendence value priorities scored significantly higher on the measure of responsibility than those with openness to change value priorities.

4.3 INTERPRETATION OF RESULTS

4.3.1 Effects of priming obsessionality values on behaviours related to obsessionality

Statistical analysis indicated no effects of the obsessionality value primes on behaviours of checking and ordering. However, there were effects of the obsessionality value primes on cleaning behaviours. There were also no effects found of priming openness values on the measures of checking, ordering and cleaning behaviours. These results are interpreted below in relation to differences between how the three behaviours relate to the priming task, to values and to obsessionality. Consideration is also given to how the openness prime relates to motivations underlying obsessionality as an explanation for the lack of effects seen in this area of the study.

4.3.1.1 Links between the priming task and behaviours

The obsessionality (conservation values) priming task asked participants to give reasons why being 'clean, healthy and self-disciplined' were important in order to see the effects on obsessionality value congruent behaviours. As only the cleaning behaviour measure showed any effects of the prime it is possible that the 'clean' instantiation used in the priming task may have led to more use of wipes due to the more concrete link between giving reasons for the importance of being clean and being provided with cleaning wipes. However, the fact that only one participant raised any suspicions of the conservation values priming task being related to the

subsequent tasks in this way suggests that the vast majority of participants were not explicitly aware of this link. Instead this would suggest that being primed with the 'clean' value instantiation may have subconsciously activated this and other linked concepts in line with the theory of spreading activation (e.g. Shroder & Thagard, 2012; Bargh, 1996).

The links to the checking and ordering behaviours in contrast were more abstract from the value instantiations being used in the obsessionality related priming task. This would suggest that the priming manipulation only works under certain conditions and could be linked to the research carried out by Maio *et al* (2009b) which demonstrated that priming typical instantiations of values is more likely to lead to value congruent behaviour than priming atypical instantiations. This means that the more recognisable the value instantiation is as an example of a concept related to the value the more likely it is to have effects in line with the value. In the case of the current research it is possible that 'clean' and 'healthy' are more recognisable as concepts related to obsessionality than 'self-discipline' especially considering the contamination aspects of obsessionality beliefs (e.g. Calamari *et al*, 1999). As such this may have led to obsessionality related behaviour in line with these particular instantiations rather than other obsessionality related behaviours of checking and ordering. Obsessionality research indicates that a cleanliness/contamination factor is commonly identified as a subtype of Obsessive Compulsive Disorder (e.g. Calamari *et al*, 1999; Lechman *et al*, 1997).

4.3.1.2 Priming motivations of obsessionality

The other aspect to consider is whether the motivation to perform the obsessionality behaviours was primed by the priming task. The Schwartz model (Schwartz 1992; Schwartz *et al*, 2012) suggests motivational underpinnings for the values within the conservations quadrant that have been linked to obsessionality such as the anxiety motivational dimension (Schwartz *et al*, 2012). In previous experimental research it has been found that priming security values (part of the conservation quadrant) successfully led to the use of more cleaning wipes which was interpreted as being related to the motivations of avoiding the threat of uncertainty and conserving the existing order (Maio *et al*, 2009a, experiment 3). This is consistent with understandings of obsessionality particularly with regards to clinical obsessionality

where there is an element of distress or anxiety about avoiding harm which motivates behaviours (e.g. Salkovskis *et al* 2001). In the case of the current study, the priming of obsessionality related (conservation) values may have had an effect on the motivations underlying the cleaning behaviour (as previously demonstrated by Maio *et al*, 2009a) but may not have primed motivations underlying the checking and ordering behaviours.

It is also possible that priming conservation values did lead to the obsessionality motivations being primed (as supported by the fact that the cleaning behaviour showed an effect) but that participants did not perceive the other behaviours as fulfilling these motivations suggesting that the checking and ordering behaviours were less salient behaviours for fulfilling the conservation/obsessionality motivations than the cleaning behaviour. This is an important point as it could be the case that the checking and ordering behaviours are related to other values within the Schwartz (1992) values model (see Figures 1.1 & 1.2) whereas the cleaning behaviour may have been primarily related to the primed values. For example, in the case of the checking behaviour, the primary motivation might be a motivation to achieve which could be linked to getting the answers right or might be related to getting the task finished as soon as possible. With no way on knowing which of these two motivations the participant was experiencing it is possible that both were at play within participants and between different participants. As such, the obsessionality related priming task may have had an effect on cleaning behaviour because of there being a much clearer single motivation to perform this behaviour compared to the other two behaviours.

Checking and ordering behaviours may be less linked to the conservation values quadrant than cleaning behaviour suggesting that there are other links between obsessionality and values within the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012). For example, it is possible that achievement based motivations exist with regards to checking and ordering behaviour, specifically in relation to perfectionism and the need to ensure that something is done right. This is related to obsessionality with regards to the common 'not quite right' feelings that individuals can experience (e.g. Coles *et al*, 2003) which can motivate behavioural responses. Indeed perfectionism has been shown to be a common variable in several mental health

difficulties (e.g. eating disorders, see Shafran *et al*, 2006) and was indicated to be a factor in the relationship between priming high social standards and eating behaviours (Shafran *et al*, 2006). As such, it is possible that similar motivations may underlie the checking and ordering motivations of obsessionality behaviour meaning that priming the conservation quadrant values may have only primed certain aspects of obsessionality. This would fit with the general obsessionality literature which suggests that there are different subtypes of obsessionality symptoms that are commonly seen (Calamari *et al*, 1999).

4.3.1.3 Underlying motivations of obsessionality behaviours

Leading on from the motivation argument above, the three behaviours were chosen to consider different aspects of the concept of obsessionality (e.g. Thordarson *et al*, 2004). Considering that there are studies which indicate that there are sub-types of symptoms within the presentation of obsessionality (e.g. Calamari *et al*, 1999; Lachman *et al*, 1997; Van Oppen *et al*, 1995) and that measures of obsessionality tend to be constructed of several subscales (e.g. the VOCI; Thordarson *et al*, 2004; OCI; Foa *et al*, 1998) it is clear that there is a multi-factorial presentation to obsessionality. The results of the current study indicated that within the control group there were no significant correlations between the three behavioural measures (see results section 3.4.2). This could suggest that the behavioural measures may have been tapping into different factors of obsessionality in line with the argument above. Although these factors may differ slightly between measures and participant samples it is apparent that a wide range of symptoms can occur related to obsessionality and that different individuals may experience very different symptoms. For example, one individual may focus their obsessionality on avoiding contamination and performing cleaning behaviours while another may focus on preventing harm to others by repeatedly checking that the oven and plugs are switched off. It is also possible that another individual will perform checking behaviour because they have obsessional doubts about whether they have done something right. As such, there is no clear understanding within the obsessionality literature as to what drives one individual to experience one type of symptoms over another. It is therefore possible that it is the fact that there are different underlying motivations for these different obsessionality behaviours that affects which symptoms an individual is likely to suffer from. In this way the different

obsessionality related behaviours used in the current research may be related to conservation values generally but may also be related to other values within the Schwartz model (Schwartz, 1992; 1994; Schwartz *et al*, 2012) depending upon the behaviour and its motivation.

It is therefore possible that the proposed links between the values within the conservation quadrant of the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) and obsessionality are not robust enough for priming conservation values to lead to obsessionality related behaviours generally. Rather, the priming of conservation values activated certain aspects of obsessionality such as contamination/cleanliness (e.g. Maio *et al*, 2009a) which led to cleaning behaviour but did not activate wider related concepts of checking and ordering due to confounding links with other values outside of the conservation quadrant.

4.3.1.4 Non-obsessionality (openness) related values

The openness to change (non-obsessionality) priming task had no effect at all on the obsessionality behaviour measures in the current study. Considering the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) we would have expected these values to be related to the opposing motivational goals of the conservation values and as such to have seen different effects on behaviour as seen in previous studies of opposing values (e.g. Maio *et al*, 2009a; Smeesters *et al*, 2009). As such we would have expected to have seen a relationship between priming these values and seeing less obsessionality related behaviours as the underlying motivations of seeking independence and new experiences would be in opposition to behaviours of checking, ordering and cleaning (e.g. Maio *et al*, 2009). However, as noted above, the checking and ordering behaviour may have had underlying motivations that are consistent with values outside of the conservation quadrant meaning that the openness values would not necessarily have been priming the opposing motivations for these behaviours. With regards to the cleaning behaviour, which did show an increase following the conservation primes, the current results would suggest that the opposing openness to change values may not hold enough motivational pull for participants with regards to performing less of the obsessionality related behaviours.

However a study by Karremans (2007) indicated that priming opposing values (in this case benevolence and achievement values) does not necessarily lead to opposite effects with regards to the same behaviour. They found that priming benevolence values increased helpfulness behaviour but priming achievement values did not decrease helpfulness behaviour to lower levels than controls. This demonstrates that being primed for achievement does not mean that participants are primed to not be helpful. However, it is possible that if there had been an alternative behaviour available to the participants that would have fulfilled the achievement motivation then they may have engaged in that behaviour rather than the helping behaviour. This was demonstrated to some extent in the Maio *et al* (2009) experiment which primed opposing conservation and openness values to investigate the effects on cleaning behaviour. In this study the participants had opposing value motivations competing for their attention with regards to the task they were asked to complete being a creative task (an openness to change value instantiation) that also made their hands dirty (a conservation value instantiation). This gave participants two competing motivations at the same time in terms of wanting to fulfil a creativity motivation and a being clean motivation (Maio *et al*, 2009). In this competing motivations paradigm the effects of the opposing primes were in the directions expected with those primed for conservation values engaging in cleaning behaviour at an earlier stage of the task compared to controls and those who were primed for openness values engaging in the cleaning behaviour at a later stage than controls (Maio *et al*, 2009).

In the current study it could be argued that the clean behaviour had a being clean motivation but no clear opposing motivation. Although participants were asked to complete a messy sticking task in order to provide the motivation for participants to be clean, the sticking task was not necessarily as creative as that used in the Maio *et al* (2009) study meaning that in the current research participants in the openness prime may not have recognised the sticking task as fulfilling these creativity motivations. There are also other reasons why the behaviour measures may not have shown relationships to the openness primes which are discussed further in the limitations section.

4.3.1.5 Summary for section 1

There were differences between the effects of the obsessionality related priming task on behaviours related to obsessionality. Specifically cleaning behaviour was found to occur more often following the prime while the other behaviours of checking and ordering did not. An interpretation of these findings is that the clean and healthy primes used in the conservation priming task have stronger links conceptually with the contamination aspects of obsessionality in particular rather than obsessionality as a whole (e.g. Calamari *et al*, 1999; Lechman *et al*, 1997; Thordarson *et al*, 2004). This means that the 'clean' and 'healthy' instantiations may have activated concepts related to this aspect of obsessionality but activation may not have spread to other aspects of obsessionality. As well as this, there is the likelihood that the cleaning behaviour is based upon a single motivation (wanting to be clean) whereas checking and ordering behaviour could be related to multiple motivations and therefore multiple values from the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012). This could also have led to the cleaning behaviour being seen more often while there was no effect of the conservation values primes on checking and cleaning. The non-obsessionality openness primes are unlikely to have had an effect on behaviour due to the experimental tasks not providing participants with a channel for their primed openness motivations (e.g. Karremans, 2007).

4.3.2 Relationships between questionnaire measures of obsessionality and behaviours related to obsessionality

Statistical analyses showed that there were no links between control participants' levels of obsessionality as measured by the obsessionality questionnaires (VOCI & SOAQ) and the three obsessionality related behaviours. There were also no links between the measure of responsibility and the behaviour measures. These results are interpreted below with regards to the priming literature as well as in relation to obsessionality in non-clinical populations.

4.3.2.1 Obsessionality in non-clinical samples

The control group, who did not receive a priming task, showed no relationship between obsessionality (as measured by the VOCI and SOAQ) and the

obsessionality related behaviours (Checking, Ordering and Cleaning). This suggests that there were no links between the questionnaire measures and the behavioural measures which indicates that the two could be measuring very different concepts. However, there is already strong evidence that congruent behaviours do not necessarily follow on from intentions or values (e.g. Kristiansen & Hotte, 1996) and there is an evidence base for the fact that obsessionality can occur in the non-clinical population to varying degrees both with regards to purely obsessional symptoms (e.g. Rachman & DeSilver, 1978; Belloch *et al*, 2004) as well as related to behaviour (e.g. Thordarson *et al*, 2004; Mathews *et al*, 2004).

As stated above, there is evidence that obsessionality exists along a continuum meaning that obsessionality related symptoms (as related to OCD) can be seen in non-clinical as well as clinical populations (e.g. Coles *et al*, 2003; Mathews *et al*, 2004; Rassin & Muris, 2006). As non-clinical populations can often report obsessionality related symptoms without fitting the criteria of OCD (as outlined in DSM-V; American Psychiatric Association, 2013) there is theorised to be another factor that links the actual experience of obsessionality symptoms and clinical levels of OCD which could be related to underlying motivations such as appraisals of obsessional thoughts and desire to reduce anxiety (e.g. Salkovski *et al*, 1995; Berry & Laskey, 2012). In the case of the current study it has already been highlighted above that it is the motivations underlying the primed values of conservation which are proposed to be linked to whether obsessionality congruent behaviours will follow.

As highlighted by Verplanken & Holland (2002) it is also the case that values only lead to behaviour when they are primed. This is relevant when considering the control group as this could also be related to participant's overt displays of obsessionality. For example, although we might expect individuals with higher levels of obsessionality to perform more obsessionality related behaviours they would still need to identify the behaviours in question as being capable of fulfilling this motivational goal. It has been highlighted above that the checking and ordering behaviours may have had ambiguous motivations meaning that these behaviours may not have been seen as obsessionality relevant. It is also true that obsessionality within non-clinical populations has been shown to have similar factor structures to those in clinical populations (e.g. Mathews *et al*, 2004; Thordarson *et al*,

2004). As such, it is reasonable to expect that even those control participants high in obsessionality would show tendencies towards certain symptoms and the behaviours in the current study may not have been consistent with their usual obsessional symptoms. However, as the obsessionality subscales of the VOCI were not investigated in the current study it is unknown what symptom structures were reported by participants to be able to verify this.

Levels of self-reported responsibility beliefs also did not show relationships to scores on the obsessionality related behaviours within the control participants although there were significant positive correlations between the obsessionality scores and the responsibility measures which supports the findings from previous research (e.g. Salkovskis *et al*, 1999, 2000; Arntz *et al*, 2007). It is thought that obsessionality is related to responsibility beliefs in such a way that those who experience increased responsibility beliefs are more likely to become distressed by their obsessionality symptoms especially in regards to whether they attribute the symptoms to a need to prevent harm to the self or others (Salkovskis *et al*, 2000). Although a range of obsessionality and responsibility scores were apparent within the control group it appears that the occurrence of high levels of these two factors together is not enough to motivate obsessionality related behaviours. This is discussed further in the section that follows.

4.3.2.2 Summary for section 2

There were no effects found between control group scores on questionnaire measures and obsessionality related behaviours. This could be due to behaviours generally only occurring when they have a motivation to be performed (e.g. Verplanken & Holland, 2002). As such, it is possible that the control participants did not have a motivation to engage in the obsessional behaviours in relation to their pre-dispositional obsessionality and responsibility. This is in line with the hypothesis that obsessionality is a continuum and that the presence of obsessionality symptoms is not necessarily related to obsessionality behaviours (e.g. Rachman & DeSilver, 1978; Belloch *et al*, 2004).

4.3.3 Effects of obsessionality and responsibility levels on behaviours related to obsessionality

Levels of obsessionality and responsibility as measured by the VOCI, SOAQ and RAS did not appear to have an effect on behaviours related to obsessionality across the three groups or within the individual experimental groups. It had been predicted that overall the high obsessionality group would show more obsessionality behaviour than the low obsessionality group. However, it was also predicted that priming obsessionality related values would over-ride the level of obsessionality such that those in the conservation priming condition would show more of the behaviours in both the high and low obsessionality groups whilst the openness priming condition would show the least behaviours across the high and low obsessionality groups. These results are interpreted below in relation to the priming and obsessionality literature.

4.3.3.1 Relationships between primes and obsessionality

Although the statistical analysis did not show any meaningful relationships between the high and low obsessionality/responsibility groups and the behaviours, there were some interesting patterns within the descriptive data (see results sections 3.4.3 & 3.4.4) which supported the fact that the prime over-rode the levels of pre-existing obsessionality and responsibility as predicted. Specifically it was noted that for the cleaning behaviour those within the conservation group had the highest proportion of wipe use across the high and low obsessionality groups whilst the openness to change group had the lowest proportion of wipe use as had been predicted. However, the openness to change group showed this pattern in the opposite direction to what was expected (i.e. they showed more use of wipes in the low obsessionality group and less use of wipes in the high obsessionality group) which may have led to no differences being found in the statistical analysis overall.

The cleaning behaviour in relation to the high and low responsibility beliefs groups showed a similar pattern of results to those above when looking at the descriptive data, but again the statistical analysis found no significant effects. In this case the conservation group again had a higher proportion of cleaning wipe use in both the high and low responsibility groups but with more seen in the low responsibility group

than the high which was not as expected. The openness to change group had the least wipe use overall with less use in the low responsibility group and more use in the high responsibility group as would be expected.

As noted these patterns of results were not supported statistically but are commented upon here in relation to the strength of the priming paradigm used. With regards to the cleaning behaviour it is of interest that the prime had stronger effects on the proportion of wipe use than the levels of obsessionality or responsibility as measured by the questionnaires (and as also supported by Hypothesis 1). The proposed mechanisms for why the cleaning behaviour may have shown this effect while the other behaviours did not have been discussed elsewhere. Briefly, it is proposed that the conservation priming task may have been successful at activating certain concepts related to obsessionality (i.e. contamination and cleanliness; e.g. Calamari *et al*, 1999; Lechman *et al*, 1997) but not others, which may have led to participants engaging in the cleaning behaviour to fulfil the primed motivation underlying this behaviour (Schwartz, 1992; Schwartz *et al*, 2012).

4.3.3.2 Obsessionality and responsibility as dispositional tendencies

In relation to the fact that no statistically significant differences were found between the high and low obsessionality or responsibility groups and the behavioural measures there are two points of consideration. The first is that these results are in contrast to some aspects of the values priming literature in that there are often interactions seen between priming values and related pre-dispositional tendencies as we expected to see here. For example, Hart & Albarracin (2009) found that priming achievement only led to achievement based perseverance behaviour in those with a pre-dispositional achievement focused personality trait. Similarly Smeesters *et al* (2003) found that pro-social primes had effects on cooperative behaviour when individuals had a pre-existing (i.e. prior to the prime) dispositional tendency towards being pro-social. This is similar to what we expected within the current study, in that those with higher dispositional tendencies towards obsessionality would be more likely to perform the obsessionality related behaviours.

However, the second point is that in relation to the obsessionality literature these results may not seem as surprising. When we consider that obsessionality appears

to exist as a continuum in the general population (e.g. Clark & Rhyno, 2005; Belloch *et al*, 2004; Mathews *et al*, 2004) it has been indicated that it is not the presence of symptoms alone that accounts for clinical levels of obsessionality (e.g. Salkovskis *et al*, 2005; Berry & Lasky, 2012). Indeed in order for obsessionality to lead to behaviours related to obsessionality there needs to be a motivated direction for the behaviour and the motivations proposed by current theories are around significant anxiety and misinterpretations of obsessions as well as responsibility beliefs (e.g. Salkovskis *et al*, 2000). Whether the current study was successful at motivating the obsessionality behaviours has been mentioned elsewhere. Although responsibility has been proposed as a significant mediating factor between obsessionality and anxiety (e.g. Rheaume *et al*, 1995) it is apparent from the current study that the presence of both obsessionality and responsibility is not enough to motivate obsessionality related behaviours but that these concepts need to be activated (e.g. Verplanken & Holland, 2002) in order to lead to directed behaviour. Indeed it has been demonstrated by Arntz *et al* (2007) that manipulating perceived responsibility in an experimental study can lead to higher obsessionality symptoms being reported and higher levels of checking behaviour. This suggests that responsibility does have a role to play in mediating the effects of obsessionality when responsibility is activated to be salient to the individual rather than just as a dispositional tendency.

4.3.3.3 Summary for section 3

As previously the presence of higher obsessionality alone was not enough to lead to obsessionality related behaviours and this was also the case for the responsibility behaviours. This can be interpreted in line with obsessionality being a continuum in the general population (e.g. Clark & Rhyno, 1995) and is consistent with priming research which indicates that pre-dispositional tendencies often interact with a prime to lead to behaviour (e.g. Hart & Albarracin, 2009; Smeesters *et al*, 2003). The effect of the priming task for the cleaning behaviour appeared to override the obsessionality and responsibility pre-dispositions although for other behaviours stronger motivations to perform the behaviour may need to be primed.

4.3.4 Relationship between value orientation and obsessionality/responsibility

As highlighted in the systematic review there is a great deal of evidence for value priorities having an effect on the prime to behaviour pathway (e.g. Verplanken & Holland, 2002; Utz *et al*, 2004; Smeesters *et al*, 2003; Bechtoldt *et al*, 2012). In particular these studies indicate that the extent to which participants endorse the values focused on in the studies as being important to them (i.e. the more central the values are to the persons sense of identity), the stronger the effects of priming these values is in relation to leading to value congruent behaviours. The current study did not find the expected relationships between value centrality and obsessionality. In particular, conservation value priorities were not significantly related to higher obsessionality scores on questionnaire measures. It was found however, that responsibility questionnaire measures were related to self-transcendence value priorities as predicted. These results are interpreted below in relation to the literature.

4.3.4.1 Value centrality

The main point in relation to these results is that there were very few participants identified as having conservation value priorities (see results section 3.4.5). In fact only three participants out of the 89 participants overall were found to have this value priority orientation. This makes it extremely difficult to interpret these results. With regards to the descriptive data (see Table 3.3 section 3.3.2.2) it appears that there is potential for further research in this area as mean scores on the obsessionality and responsibility measures appeared to be in the predicted directions. However, as these scores are based on very few participants and the statistical results do not support these patterns in the data these conclusions cannot be drawn at the current time.

The fact that the majority of participants were found to have self-transcendence values as their highest priority values is an important point as Verplanken & Holland (2002) state that centrality of values is essential for being able to see value congruent behaviours following priming. This could also be a contributing factor in the relative lack of significant results for the current study. It is argued that priming values that are central to the individual has more of an effect on value congruent

behaviours through the mechanisms of these values being more easily accessible to the individual cognitively (e.g. Bardi, 2000). If participants in the current study had conservation value priorities it is possible that this would have led to these values being more easily activated by the conservation primes which may have led to stronger motivations for behaviour congruent with obsessionality.

The high levels of participants rating self-transcendence values as their value priorities could also have affected the results of the current study as responsibility is a value that is present within the basic value of benevolence which is located within the self-transcendence quadrant (Schwartz, 1992; Schwartz *et al*, 2012). The fact that the self-transcendence value priority group showed significantly lower scores on the RAS (indicating higher responsibility beliefs) than the openness value priority group supports the location of responsibility as a self-transcendence value (Schwartz, 1992; Schwartz *et al*, 2012). Self-transcendence values are most associated with underlying motivations in line with pro-social tendencies such as supporting others within our community and to looking after the planet more generally (Schwartz, 1992; Schwartz *et al*, 2012). These values could be argued to represent the most socially desirable values in the Schwartz model and appear to have been the subject of the most research within the social values psychology arena (e.g. Arieli *et al*, 2013; Maio *et al*, 2001; Maio *et al*, 2009b; Verplanken & Holland, 2002; Karremans, 2007). The self-transcendence quadrant also shares the anxiety motivation dimension of the Schwartz model (Schwartz *et al*, 2012) and the fact that responsibility is located here in the model is also in line with conceptualisations of responsibility within the obsessionality literature as responsibility is often related to feeling accountable for the safety and well-being of other people as well as the self (e.g. Salkovskis *et al*, 1999, 2000).

4.3.4.2 Summary for section 4

The majority of participants were identified as having self-transcendence value priorities which were also related to scores on the responsibility belief measure as predicted in line with the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012). Generally, the lack of participants who were identified as having conservation value

priorities meant that further relationships with regards to value centrality and obsessionality could not be explored.

4.4 CLINICAL IMPLICATIONS

There are important implications that can be drawn from the current study in relation to clinical practice, specifically with regards to values underlying obsessionality and the use of values within therapies more generally. There are also important implications with regards to the values priming literature in general and how it relates to therapies which should be considered. These implications are presented in detail in the following sections.

4.4.1 Values and obsessionality

The current study indicates that there are some links between values as conceptualised by the Schwartz model of basic human values (Schwartz, 1992; Schwartz *et al* 2012) and obsessionality. In particular, priming conservation values had an effect on cleaning behaviour which has been linked to obsessionality (e.g. Calamari *et al*, 1999; Thordarson *et al*, 2004) while levels of obsessionality as measured by the VOCI and SOAQ did not appear to have an effect on the levels of this same behaviour. As such considering reasons for the obsessionality related values provided a motivational direction for subsequent behaviour leading to more obsessionality related behaviour. In contrast, high self-reported levels of obsessionality did not necessarily lead to obsessionality related behaviour. This finding supports current conceptualisations of obsessionality within a mental health context (e.g. Salkovskis *et al*, 1999, 2000; Rassin & Muris, 2006). Within mental health conditions, such as OCD, obsessionality is thought to only lead to related behaviours when the obsessionality has caused significant anxiety and the individual is seeking to reduce this anxiety (e.g. Salkovskis *et al*, 2000). As such, the levels of obsessionality themselves are not indicators of risk for obsessionality related behaviours but the levels of anxiety and distress caused by the obsessionality is the important factor. In terms of the obsessionality values primed in the current study, these values have an anxiety based motivation underlying them (Schwartz *et al*, 2012) meaning that when these values are activated they promote motivations to maintain the status quo and protect the self and society. If behavioural options are available to the individual that they recognise as being able to fulfil these motivations

then this will lead to behaviours (Schwartz *et al*, 2012) as seen in the current study with regards to the cleaning behaviour.

However, despite the above there are also important implications to draw from the fact that other behaviours of checking and ordering did not show relationships to the obsessionality primes. As previously highlighted, obsessionality is understood to be a wide concept that incorporates a multitude of symptoms and behaviours (e.g. Calamari *et al*, 1999). It is therefore possible that different aspects of obsessionality are related to different values within the Schwartz model. For example, the contamination and cleaning aspect of obsessionality appears to be most closely related to security values which has been demonstrated in the current study. This may be due to the fact that considering security values such as 'clean' and 'healthy' primes concerns about maintaining well-being and avoiding illness (Schwartz *et al*, 2012) which instils a motivation to behave in accordance with this i.e. keeping clean. In contrast, the checking aspect of obsessionality may be more closely related to achievement values such as 'successful' and 'capable' which might prime concerns about proving yourself and getting things right which could instil a motivation to behave in such a way as to ensure that things are done properly i.e. checking behaviour. This latter could also be related to perfectionism which is often seen in high achievers and is often related to mental health difficulties (e.g. Shafran *et al*, 2006).

It is important that these relationships between the Schwartz model values (Schwartz, 1992; Schwartz *et al*, 2012) and obsessionality are considered as there is currently no clear systematic conceptualisation of why one person develops particular symptoms related to obsessionality over other symptoms. It has been proposed that individuals become more distressed about obsessionality symptoms when those symptoms are in relation to topics that they consider as being of high importance to them (e.g. Rachman, 1997; Salkovskis, 1999). For example if a mother experiences an intrusive thought about harming her children and believes that this thought is significant then it is likely that she will become distressed by this thought which in turn leads to further similar thoughts (e.g. Salkovskis *et al*, 1999, 2000). As such, obsessionality is sometimes understood to focus on the areas of life that individuals are most concerned about or feel the most responsible for and as

such investigating value priorities within obsessionality may be an important future direction for systematically understanding why certain individuals develop certain symptoms compared to others. More importantly understanding these relationships could also allow directions for future interventions for obsessionality related mental health difficulties.

4.4.2 Values in therapies

As noted in the introduction there is widespread interest in using values in therapies such as Acceptance and Commitment Therapy (ACT; Hayes, 2004; Hayes *et al*, 1999), Positive Psychology (Seligman & Czikszentmihalyi, 2000) and Narrative Therapy (White & Epston, 1990). However, the way that values are conceptualised differs between the different therapies and there is no clear evidence base for these conceptualisations (e.g. Wilson & Murrell, 2004). As noted above, there is some evidence that the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) could offer a more comprehensive and systematic way of understanding values within obsessionality.

For example, when therapies are encouraging clients to engage with their values there is a general lack of evidence as to how engaging with different values might actually affect the individual. Considering the evidence from the priming values literature there is considerable reason to believe that priming values can lead to value congruent behaviours (e.g. Maio *et al*, 2009a; Maio *et al*, 2009b; Verplanken & Holland, 2002; Karremans, 2007; Arieli *et al*, 2012). Considering the current study, it may be the case that understanding how values are related to obsessionality is more complicated than a simple prime to behaviour pathway. However, as also indicated in the systematic review, there are commonly mediating factors within the prime to behaviour pathway in the priming values literature as well (e.g. Verplanken & Holland, 2002; Maio *et al*, 2001; Utz *et al*, 2004; Karremans, 2007). The current study also indicates useful directions in which these mediating factors might be found. For example, it has been indicated that responsibility and obsessionality as measured by questionnaires varies to a large extent within the general population in line with understandings of obsessionality as a continuum (e.g. Clark & Rhyno, 1995). It has also been indicated that high obsessionality or responsibility within itself is not a factor in observing subsequent behaviour related to obsessionality.

However, responsibility was not a primed variable within the current study and there is reason to believe that had responsibility been manipulated so that participants were induced to experience high responsibility or low responsibility prior to priming the conditions of having motivation to perform the obsessionality behaviours may have been met (e.g. Arntz *et al*, 2007).

The current study also indicates that with regards to contamination and cleaning aspects of obsessionality, values work in therapy that focuses on conservation values, as understood by the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012), that have a potential anxiety motivation may not be useful as this anxiety based motivation might lead to further obsessionality related behaviours and thereby exacerbate their current difficulties. Focusing on values placed elsewhere in the Schwartz model may be more useful for the client instead to counteract the anxiety based motivations (Schwartz *et al*, 2012; Maio *et al*, 2009a). As such, the Schwartz model may provide a useful framework for values work in a therapeutic setting although further research needs to be carried out with regards to this.

4.4.3 Priming mechanisms and mental health

Considering the methods by which values are generally utilised in therapeutic settings it can be argued that a priming paradigm is the basis of this work. Generally clients are asked to think about their values and in some cases devise goals in line with those values. In the priming literature these methods have been shown to be very successful at priming value congruent behaviours (e.g. Maio *et al*, 2001; Maio *et al*, 2009b; Karremans, 2007) and have been indicated to show priming effects that are stronger than more implicit methods of priming (e.g. Maio *et al*, 2001). It has also been shown by Arieli *et al* (2013) that utilising a battery of priming techniques can lead to changes in values priorities and increased value congruent behaviour. It is also important to consider the values as truisms hypothesis (e.g. Bernard *et al*, 2003; Karremans, 2007) which suggests that we do not have clear reasons in support of our values. If therapies such as ACT (Hayes, 2004) and positive psychology (e.g. Seligman & Czikszentmihalyi, 2000) are aiming to promote living in valued directions, an essential part of the therapeutic interaction is a focus on the reasons why those values are important for the individual.

4.5 STRENGTHS AND LIMITATIONS OF THE CURRENT STUDY

There were several strengths and limitations identified with regards to the current research. These were generally in relation to the methods used in the study and are outlined below.

4.5.1 Participant Sample

The sample used in the current study included mainly university undergraduate students who were predominantly white British and female. This is in line with the majority of previous research on the effects of priming values on value congruent behaviour (e.g. Maio *et al*, 2001; Arieli *et al*, 2013; Parzuchowski & Wojciszke, 2014 etc.), however it does have limitations with regards to the generalisability of the results to a wider population. It is also important to consider what effects this sample might have had on the result of the study. For example, the majority of participants in the current study had self-transcendent value priorities which could be a feature of this particular sample of participants rather than being representative of the general population.

4.5.2 Priming methods

The priming method used in the current study has been shown to be valid in other studies (i.e. Maio *et al*, 2001; Karremans, 2007; Maio *et al*, 2009b). However, the values chosen for the current study could have had a large impact on the research findings. In particular, the use of the value 'clean' within the obsessionality priming task may have been a direct cause of the increase in participants performing cleaning behaviour. This is unlikely to have been the case due to the thorough debriefing procedure during which the participants were probed for suspicion particularly in relation to whether they linked the priming task with the rest of the study. It was found that one participant demonstrated awareness of the prime in direct relation to the 'clean' prime being related to the cleaning wipes but no other participants in the obsessionality prime condition made these links. However, it would be useful in future research to avoid potential confounding factors such as this.

4.5.3 Debriefing procedure and the choice of tasks

One participant demonstrated that they were explicitly aware of links between the priming task and the behaviour measures. The fact that no other participants demonstrated any awareness of this link in the debrief procedure suggests that the set-up of the study was robust in terms of preventing suspicion of these links. However, most priming studies utilise an unrelated studies methodology in which participants are led to believe that the studies they are completing are not related at all (e.g. Maio *et al*, 2001; Rasinski *et al*, 2005; Verplanken & Holland, 2002). In the current research participants were aware that the tasks were related in some way but were misdirected in terms of what exactly was being measured. The most common link that participants made was between the study being related to OCD and how they stuck the stars in the sticking task or how many letters they found in the letter checking task. The sticking and letter checking tasks were deliberately chosen in order to misdirect participants in this way and they appeared to be successful in this respect. It is possible, however, that these tasks gave the participants a motivationally different goal to achieve which in some way could have distracted from the target behaviour goals of interest.

4.5.4 Choice of behavioural measures

The behavioural measures utilised in this study were experimental in many respects and although they have already been discussed above there are a few more important points that can be made about the cleaning behaviour measure in particular.

The cleaning behaviour had been previously used in a study by Maio *et al* (2009a) and had shown effects within this study. They scored this behaviour on a scale of 0-3 depending upon at what point during two tasks the participants showed cleaning related behaviour (Maio *et al*, 2009a). In the current study adaptations were made to the way the cleaning behaviour measure was scored as the sticking task had a time limit of five minutes due to time constraints which was deemed to not be long enough for the participants to be motivated to use a wipe during completion of the task in the majority of cases. Instead it was generally recorded that if participants used a wipe it was at the end of the five minutes which could have been due to the fact that they were aware of how long they would have to tolerate being unclean and were

potentially more motivated to complete the sticking task in the time allotted rather than waste time using a wipe during the task although the task instructions attempted to avoid this being the case. The fact that this behaviour had been successfully measured in a previous study (Maio *et al*, 2009a) and the fact that there was a difference between the groups in the current study could suggest that the measure is valid which in turn could offer an explanation as to why this behaviour showed effects whereas the other behavioural measures did not.

The ordering and checking behaviour measures had not been utilised in the current context before and as such were experimental in nature. In terms of the ordering behaviour measure it was apparent that the checking and cleaning behaviours may not pick up on the ordering aspects of the obsessionality conceptualisation (e.g. Overduin & Furnham, 2012; Calamari *et al*, 1999). In terms of fitting an unobtrusive task into the experimental schedule it was decided that asking the participants to put something away would be the easiest way of measuring ordering to see whether they would put the objects away in a prescribed fashion when this information was available to them. Hence the putting away of the colouring pens was devised as a task to measure ordering behaviour. As this behaviour measure did not show any effects it could be argued that the measure is invalid. However, there are other perspectives to offer, such as the fact that the checking, ordering and cleaning behaviours were devised in order to measure different aspects of the obsessionality concept (e.g. Overduin & Furnham, 2012; Calamari *et al*, 1999). As such it is possible that the priming task did not activate the whole conceptual breadth of obsessionality within participants and as such they may not have been motivated to order the pens any differently compared to other participants.

With regards to the checking behaviour it was decided that the overall timing from when participants started the task to indicating that they were finished would be used for this measure as attempting to time actual time spent checking would have been difficult to implement using a paper and pencil test and a manual stop-watch. However, total time spent checking was decided to offer a valid alternative as longer times spent on the measure should generally indicate more care and attention taken on the task. However, it is acknowledged that a computer based task which would

have been able to automatically and unobtrusively time the participants would have provided a potentially more valid measure for this behaviour.

4.5.5 Questionnaire measures

The PVQ-21 has some limitations over the PVQ-40 in terms of how well it captures the individual values (e.g. Hinz *et al*, 2005; Verkasalo *et al*, 2009). However, the current study was interested in the quadrants of the Schwartz model (Schwartz 1992; Schwartz *et al*, 2012) rather than the individual values and as such the PVQ-21 has been shown to provide a very stable and valid quadrant structure (Verkasalo *et al*, 2009). In the case of the current study the PVQ-21 therefore gave a suitable measure of the quadrants and the difficulty with using these quadrant priorities in analyses came from the limited number of participants who rated conservation quadrant values as their value priorities rather than from the way that the quadrants were measured.

The factor structure of the VOCI within a non-clinical sample is unclear (Thordarson *et al*, 2004). This is the main reason why the VOCI subscales were not used within the current study to investigate the relationships between subscales of obsessionality and the different obsessionality behaviours. It was decided that utilising the overall scores on the VOCI would be a more valid method of analysis. Although this may have limited the analyses and potential relationships that were investigated in the current study it provided a more valid measure considering the non-clinical population being investigated. However, it was shown that there were difficulties with a normal distribution within the VOCI with issues of significant positive skew generally present. As such it could be questioned whether the VOCI is a suitable measure for use with non-clinical populations and whether an alternative measure may have been more useful and valid.

The SOAQ was a potentially useful addition to the current study as it was recommended that this measure be used alongside the VOCI (e.g. Overduin & Furnham, 2012l Gonner *et al*, 2010) in order to better capture the ordering and arranging type of symptoms that were not covered by the VOCI. As mentioned above the aims of the current study were not to investigate the sub-types of obsessionality assessed by instruments such as the VOCI but it was still important to

ensure that a comprehensive measure that incorporated the entire conceptual breadth of obsessionality was included in the study (e.g. Overduin & Furnham, 2012). Again there was considerable difficulty with this measure in terms of a lack of a normal distribution with several outliers having to be changed and significant positive skew apparent across the measure as with the VOCI. As both of these measures showed difficulties with regards to the distribution of scores within a normal population this could indicate that these measures are generally not as valid within a non-clinical population and another method of measuring obsessionality may have been better for the current study.

The RAS (Salkovskis *et al*, 1999) was included as a measure of responsibility beliefs as responsibility has been investigated as one of the main additional factors that impacts on obsessionality in clinical samples i.e. within OCD (e.g. Rachman, 1998, 2002; Salkovskis, 1985, 1989, 1993; Salkovskis, Wroe, Gledhill, Morrison & Forrester *et al*, 2000; Freeston, Ladouceur, Gagnon & Thibodeau, 1993) and because responsibility is also a value instantiation (Schwartz, 1992; Schwartz *et al*, 2012) and as such could be a mediating factor between obsessionality related values and behaviours. As the current study showed, levels of responsibility beliefs (as measured by the RAS) did not appear to be related to the levels of obsessionality related behaviours that were seen. However, it was found that the levels of responsibility were related to whether an individual showed self-transcendence value priorities as opposed to openness to change values and potentially the other values quadrants as well. In contrast to the obsessionality measures, the RAS did not show any difficulties with relation to a normal distribution which suggests that this measure was more valid within the non-clinical population.

4.5.6 Analysis

There were issues with all of the questionnaire and behaviour measures used in the study with regards to meeting the assumptions for parametric analysis (Field, 2013), in particular with regards to linearity and normal distributions. It was decided for several reasons in the current study to use non-parametric methods of analysis rather than transforming the data for all of the measures (see results section 3.2.6). However, non-parametric tests can be argued to be less likely to show an effect when there is in fact an effect present, although there is a counter-argument that this

only occurs when comparing parametric and non-parametric methods on data with normal distributions (Field, 2013). Generally, there are many reasons outlined throughout this chapter which indicate why effects may not have been found between the different priming groups and the obsessionality behaviour measures which go beyond the methods of analysis used.

4.5.7 Number of participants

It is also important to note that the initial power analysis that was carried out before undertaking the study was focused on the number of participants needed to ensure adequate power when using three groups of participants. However, for the quadrant priorities analyses there were four groups of participants being analysed rather than the original three which could have affected the power of the analyses.

4.6 FUTURE RESEARCH

It is important that potential relationships between the Schwartz model values (Schwartz, 1992; Schwartz *et al*, 2012) and obsessionality are considered as there is currently no clear systematic conceptualisation of why one person develops particular symptoms related to obsessionality over other symptoms. Utilising measures such as the PVQ (Schwartz, 1994), and SVS (Schwartz, 1992) within therapeutic contexts would be helpful to begin to understand how the comprehensive Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) may be related to a wide range of mental health conditions including obsessionality. This would enable interventions based upon values to be focused, not just in directions identified as important by the individual, but also in directions identified as important for individual mental health conditions based upon a wide understanding of social values and their underlying motivation (e.g. Schwartz *et al*, 2012).

Further research related to understanding the motivating factor of responsibility would be a useful direction for research as well. In particular, based upon the study by Arntz *et al* (2007) is would be important to know whether manipulating perceived responsibility as well as priming obsessionality related values would predict more expression of obsessionality related behaviour. This would not only highlight important underlying motivations of responsibility in obsessionality related

experiences but would also provide further examination of values in relation to obsessionality. As such it would be important for research to attempt to distinguish whether different values are related to different aspects of obsessionality i.e. security values related to contamination, achievement values related to checking and so on. However, it would be important for future research to ensure that the motivations for the participant to perform the behaviour is highly significantly present, hence the manipulation of responsibility suggested above.

It would also be helpful for further research to use more participants to measure some of the potentially useful directions of the results seen in the current research. For example, more participants in the values priorities analysis would lead to more participants falling within each of the value quadrants and allow for a more thorough examination of the relationships between value priorities, priming obsessionality values and obsessionality measures.

4.7 SUMMARY

The measure of cleaning behaviour may have been more likely to be effected by the obsessionality priming task for several reasons. There were more concrete links between the obsessionality priming task and the cleaning behaviour which may have led to the obsessionality concept of contamination and cleanliness being activated leading to cleaning related behaviour. There was also a clearer motivation to perform the cleaning behaviour than the other obsessionality related behaviours which may have had more ambiguous motivational drives. As the three behaviours were measuring different aspects of obsessionality it is also possible that in line with the idea of spreading activation (e.g. Shroder & Thagard, 2012), only certain aspects of obsessionality were activated through the conservation value primes.

The fact that there were links between the cleaning behaviour and the conservation value primes suggests that the conservation values are linked with some aspects of obsessionality as predicted. It is possible that the conservation values are linked to obsessionality through the underlying anxiety motivation of maintaining the status quo and protecting the self and society which is consistent with current psychological understandings of obsessionality in clinical samples (e.g. Salkovskis *et al*, 1999, 2000). For example, in OCD it is the anxiety that is felt around needing to avoid

harmful consequences that drives the desire to behave in obsessional ways and reduce anxiety (e.g. Salkovskis *et al*, 2000).

The current study indicated that high or low levels of obsessionality did not predict levels of obsessionality related behaviour which is in line with previous research which suggests that obsessionality symptoms are common in the general population and do not necessarily predict overt obsessionality behaviours (e.g. Rachman & DeSilver, 1978; Belloch *et al*, 2004). This supports the idea of obsessionality as a continuum (e.g. Clark & Rhyno, 1995). As there were no significant correlations between the self-reported levels of symptoms and the obsessionality related behaviours it appears that there has to be a motivation present in order to perform behaviours in line with obsessionality pre-dispositions. This has been supported in the priming literature which consistently shows that motivated behaviour can follow value primes when there are motivationally consistent behaviours present (e.g. Maio *et al*, 2009a; Karremans, 2007; Arieli *et al*, 2013) and that there are often interactions between pre-dispositional tendencies and the value primes on the subsequent effects of behaviours (e.g. Smeesters *et al*, 2003).

Another important aspect of the study was that responsibility beliefs were related to self-transcendence value priorities such that participants with these value priorities had higher levels of responsibility beliefs than those in the openness to change value priority group. This suggests that responsibility beliefs are linked to the values that incorporate the responsibility value instantiation (self-transcendence quadrant values) and offers support for the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) when considering responsibility beliefs. As so few participants rated conservation values as their value priorities it is difficult to comment on how these value priorities may have been related to obsessionality measures. The potential for value centrality having a role to play in obsessionality and responsibility experiences should not be overlooked as value centrality has been shown to be linked to behaviours in many studies related to social values (e.g. Verplanken & Holland, 2002; Utz *et al*, 2004; Arieli *et al*, 2013) and the use of values in therapies tends to take the stance of considering those values that the individual rates as being most important to them (e.g. Hayes, 2004; Seligman & Csikszentmihalyi, 2000).

Generally the results of the current research are clinically relevant due to adding to our understanding of concepts that can be linked to obsessionality as a construct. Values are utilised a great deal in therapies with very little understanding empirically of the effects that this might have on clients with regards to their particular difficulties (e.g. Wilson & Murrell, 2004). The current results suggest that when working with individuals with obsessionality difficulties it might be wise to carefully consider any values work that is carried out with relation to how exactly those values might relate to obsessionality in terms of their underlying motivations. If the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) is correct then any values worked on that have an underlying anxiety motivation may not be as helpful for these clients. Further understanding of how the Schwartz *et al* (2012) model may be linked to different obsessionality subtypes would add greatly to this area.

It is also useful to consider how priming mechanisms themselves are utilised in therapy work in relation to values. It can be argued that through asking clients to consider their values and goals in relation to these values, therapies are utilising a values priming paradigm with the aim of increasing the clients motivation to engage in value directed behaviours (e.g. Maio *et al*, 2009a; Karremans, 2007). Generally there are important implications for understanding how values are linked to mental health construct in more robust ways in order to more effectively utilise values in a systematic way within a therapy context.

There were several strengths and limitations of the current research. Generally the procedures used to carry out the actual experimental sessions appeared to be robust as only one participant identified any links between the priming tasks and the measures. There were however concerns with the obsessionality related questionnaires which did not show normal distributions within this non-clinical sample of participants. In terms of the analysis, non-parametric methods were used due to the difficulties with distributions of scores on some of the measures and lack of linearity between variables. It is also possible that there was a lack of power in one section of the analysis due to too few participants.

4.8 CONCLUSIONS

Overall the current research indicated that there are links between the Schwartz (1992, Schwartz *et al*, 2012) values model and obsessionality. In particular priming obsessionality related conservation quadrant values led to more obsessionality related cleaning behaviour although there were no statistically significant effects on other obsessionality related behaviours of checking and ordering. This could have been related to the obsessionality priming task particularly priming the clean/contamination dimension of obsessionality rather than the obsessionality concept as a whole. Priming the non-obsessionality openness to change quadrant values did not appear to reduce obsessionality related behaviours although this could have been due to there not being available an alternative behavioural response in line with the openness to change values (Schwartz, 1992; Schwartz *et al*, 2012; Maio *et al*, 2009a).

It appeared that obsessionality related primes only led to obsessionality related behaviours when there was a clear motivation to engage in the behaviour and a clear opportunity to do so. This is in line with previous research that suggests that values only lead to value congruent behaviours when they are activated (Verplanken & Holland, 2002). It is also in line with research on obsessionality related disorders such as OCD which state that obsessionality symptoms only lead to diagnosable levels when the obsessionality symptoms cause severe distress or anxiety which motivates the individual to engage in obsessionality related behaviours to reduce the anxiety (e.g. Salkovskis *et al*, 2000). It was further found that responsibility beliefs were related to self-transcendence value priorities as predicted which supports the Schwartz model (Schwartz, 1992; Schwartz *et al*, 2012) as being a useful tool for exploring further relationships with obsessionality related concepts.

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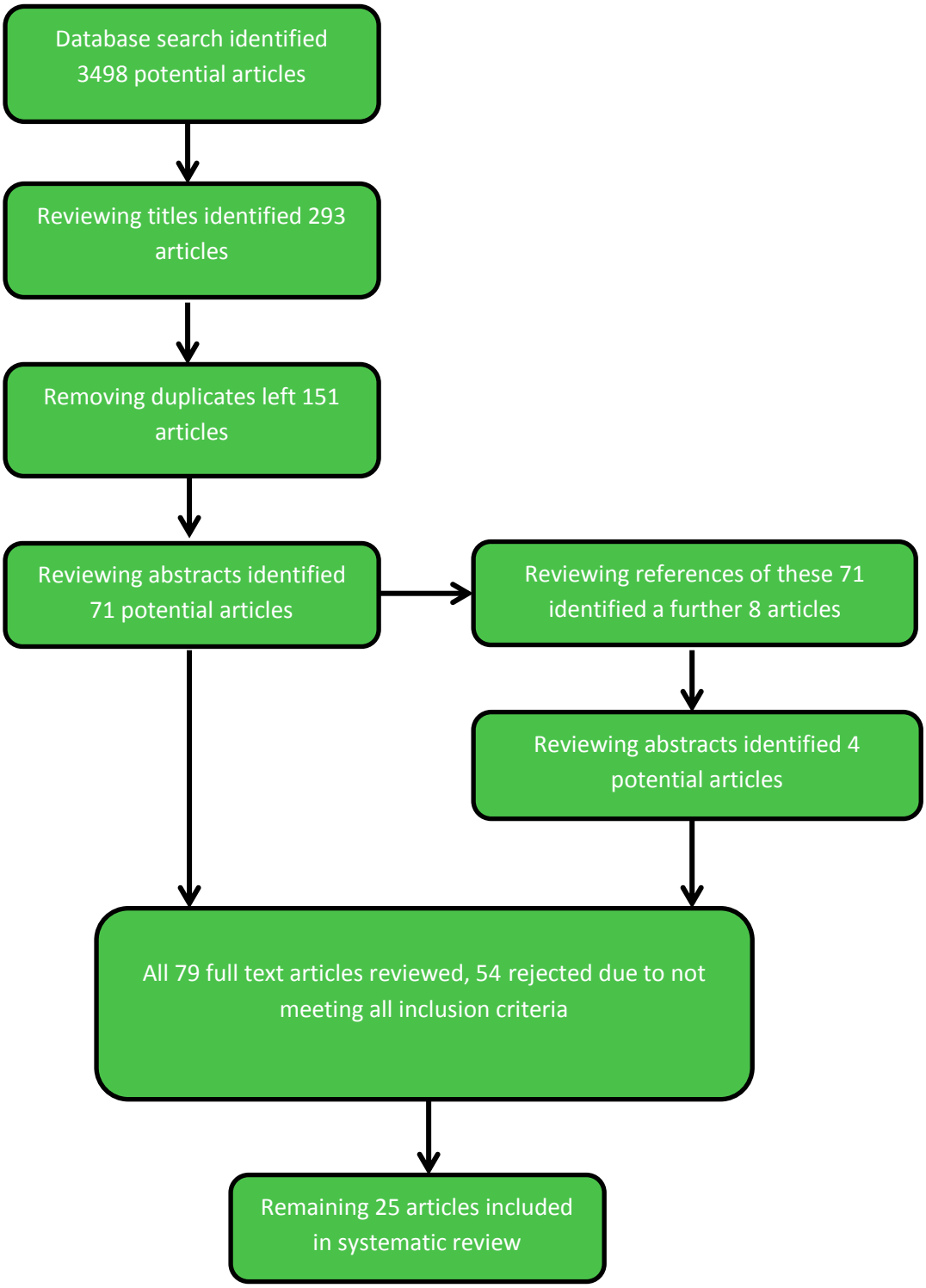
Appendix 1

Flow chart of review process



Appendix 2

Reference (Authors, Date, Experiment No.)	Participants (Total no., %Female, Age, Sample)	Values focus	Priming task	Behavioural measure	Main effects (yes/no)	Main results (direct effects of priming on behaviour)	Mediating effects (yes/no)	Additional analysis (mediating factors etc.)	Limitations
Maio, Olsen, Allen & Bernard (2001) Ex 1	177 (97F, no age provided) undergraduate students	Equality	1 - Making reasons salient (listing reasons for and against equality) (conscious – explicit) 2 - Anagrams (around the theme of equality) (unconscious – implicit)	Minimal group paradigm (equality measure)	Yes	In-group favouritism lower for participants in the reasons salient condition than for participants in the values salient or control conditions	Yes	Participants who gave more clear reasons and concrete cognitions in the reasons salient condition exhibited less in-group favouritism	Generalisability to general population
Maio, Olsen, Allen & Bernard (2001) Ex 2	58 (50F, no age provided) undergraduate students	Tradition Helpfulness	1 – Making reasons salient (listing reasons for and against helpfulness) (conscious – explicit) 2 – Indicating feelings about values in response to 10 questions (unconscious – implicit)	Volunteering time to complete further research for no payment or course credit (helpfulness measure)	Yes	Participants in the reasons salient condition offered more time than those in the value salient condition	Yes	Participants who gave more clear reasons and concrete cognitions in the reasons salient condition volunteered more time	No control group Feelings group spent less time on the task than reasons salient group Small number of participants Generalisability to general population

Arieli, Grant & Savig (2013) Ex 2	48 (17F, 22.89 mean age) undergraduate students	Benevolence	1 – reading evidence for benevolence 2 – tick list of benevolence behaviours 3 – writing stories of own experiences related to benevolence 4 – writing a persuasive essay on benevolence (conscious and unconscious)	Volunteering intention (benevolence measure)	Yes	more p's in benevolence condition gave their details for volunteering than in the control condition	Yes	the benevolence values condition increased in benevolence values following the priming which mediated the effect of prime on behaviour	All participants increased in benevolence values Small sample size University students Which priming exercise had an effect (participants in benevolence group did all four priming tasks) Not probed for suspicion Experimenters not blind to condition
Maio, Hahn, Frost & Cheung (2009b) Ex1	90 (76F, no age provided) undergraduate students	Equality	Asked to list reasons why equality was important for typical and atypical instantiations (via two different stories) (conscious – explicit)	Minimal Group Paradigm (allocating points) (measure of egalitarianism)	Yes	The typical equality prime condition exhibited less in group favouritism than both the control and atypical prime groups	No	There were no sig effects of priming on ratings of importance of equality or on the measure of equality value strength.	Behaviour measure is loaded to substantially favour the in group Generalisability to general population
Maio, Hahn, Frost & Cheung (2009b) Ex3	60 (47f, no age provided) undergraduate students	Equality	Reading a short story about typical/atypical instantiations (unconscious – implicit)	Minimal group paradigm (measure of egalitarianism)	Yes	Typical equality prime group exhibited less in group favouritism than atypical equality prime	No	No significant effects of priming on importance of equality, or extent that participants feel they should use equality	Small participant numbers Behaviour measure loaded to substantially favour the in group Generalisability to general population

Maio, Hahn, Frost & Cheung (2009b) Ex4	77 (60f, no age provided) undergraduate students	Equality	Reading a short story about typical/atypical instantiations (unconscious – implicit)	Minimal group paradigm (measure of egalitarianism)	Yes	Typical equality prime group exhibited less in group favouritism than atypical equality prime group	No	No significant effects of condition on ratings of importance of equality	No control group Behaviour measure loaded to favour the ingroup Generalisability to general population
Jonas, Sullivan & Greenberg (2013) Ex2	68 (44f, no age provided) undergraduate students	Generosity Kindness	Reading biography of Florence Nightingale (or Marie Curie) and then answering questions (unconscious – implicit)	Donating money to charity (measure of generosity)	Yes	Participants in the mortality salience condition made more donations following kindness prime, no effects of prime in dental pain condition as expected	Yes	Significant interaction between mortality salience and money importance	Reliant on p's having money to donate. Measure of attitudes to money needs investigating No control group Generalisability to general population
Jonas, Sullivan & Greenberg (2013) Ex3	76 (36f, no age provided) undergraduate students	Fairness	Scrambled sentences (unconscious – implicit)	Dictator game (measure of fairness)	Yes	Significant effect of fairness prime leading to more fair behaviour	Yes	Marginal main effect for mortality salience as well as significant interaction between mortality salience and prime	No control group Generalisability to general population
Parzuchowski & Wojciszke (2014) Ex3	48 (40F, 20.16 yrs mean age) undergraduate students	honesty	Hand placement on heart or hip while looking at faces of women (unconscious – implicit)	Rating the attractiveness of the women's faces (measure of honesty)	Yes	Main effect of prime on ratings of unattractive faces – honesty primed gave lower ratings than neutral primed	Yes	Attractiveness – the effects were only seen for the unattractive faces with no difference in rating of attractive faces	Placement of hand over body rather than over heart a factor No control group Generalisability to general population

Parzuchowski & Wojciszke (2014) Ex4	52 (34F, no ages provided) undergraduate students	Honesty	Hand on heart vs hand on shoulder and no gesture controls (unconscious – implicit)	Self-reported performance on a maths test (measure of honesty)	Yes	Main effect of prime – Honesty primed reported less correct answers (in line with controls) than neutral primed	No		No way of knowing how many questions participants actually solved in prime groups Small participants numbers No mediating factors examined (i.e. actual maths ability) Generalisability to general population
Bargh, Gollwitzer, Chai, Barndollar & Trotschel (2001) Ex 2	60 (0F, 24.1 yrs mean age) undergraduate students	cooperation	Scrambled sentences (unconscious – implicit)	Fishing game (allocating resources) (measure of cooperation)	Yes	Main effect of priming – cooperation prime led to more cooperative behaviour	Yes	Main effect for conscious goal – led to more cooperation Experienced intentions to behave cooperatively showed no significant differences across groups	Behaviour measure ambiguous as could include caring about the environment rather than cooperation with another person Small no of participants Possible intentions rated based on the behaviour just performed - order effects Generalisability to general population Male only sample
Rasinski, Visser, Zagatsky & Rickett (2005)	66 (no gender or age provided) undergraduate students	Honesty	Word similarities task (unconscious – implicit)	Self-reported measures of undesirable alcohol related behaviours	Yes	Main effect of prime – those exposed to honesty admitted more of the undesirable behaviours than the neutral words	Yes	Significant interaction between prime and order of questions - effect of prime significant when alcohol related questions came sooner after prime	No debrief of participants Generalisability to general population

Hertel & Kerr (2001)	56 (40F, no age provided) undergraduate students	Loyalty Equality	Memory task (unconscious – implicit)	Minimal group paradigm (measure of egalitarianism)	No	No significant main effect of primes	Yes	Significant interaction effect between prime and perceived group expectation of loyalty vs equality Significant interaction between prime and type of matrices	No control group Generalisability to general population
Verplanken & Holland (2002) Ex1	40 (no gender or age provided) undergraduate students	Concern for the environment	Impression formation task (unconscious – implicit)	Consumer choice task (environmental measure)	Yes	Environmental status of the chosen alternative and acceptable alternatives was significantly higher in the priming condition than the control condition	Yes	Mediating effect of perceptions of attribute importance was statistically significant	Small sample size Not blind to conditions Not clear how allocated participants to conditions Generalisability to general population
Verplanken & Holland (2002) Ex2	99 (no gender or age provided) undergraduate students	Concern for the environment	Scrambled sentences task (unconscious – implicit)	Consumer choice task (environmental measure)	Yes	Environmental status of the chosen alternative was significantly higher in the priming condition than the control condition	Yes	main effect of value centrality on environmental status of chosen alternative highly significant	Not clear if experimenters blind to conditions Not clear how participants were allocated to conditions Generalisability to general population

Verplanken & Holland (2002) Ex3	105 (no gender or age provided) undergraduate students	Concern for the environment	Impression formation task (unconscious – implicit)	Consumer choice task (environmental measure)	No	No significant main effects of primes on environmental status of chosen alternative or acquired number of pieces of environmental information	Yes	Main effect of value centrality for the environmental status of the chosen alternative and the proportion of environmental information acquired Significant interaction between value centrality and primes	Not clear if experimenters were blind to conditions Not clear how participants were allocated to condition Do not state the effects of time spent on behaviour task on the choices made Generalisability to general population
Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013) Ex1	16 (no gender or age provided) market vendors	Cleanliness (morality)	Given clean or dirty money (unconscious – implicit)	Weight of vegetables (measure of fairness)	Yes	Sales made by vendors following clean prime more fair than following dirty prime, clean money boosted fairness, dirty money caused decline in fairness	No		Vendors not debriefed No suspicion probed Limitations of field research No manipulation checks No alternative explanations considered No information about other contextual factors Small participant numbers
Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013) Ex2	68 (50f no age provided) undergraduate students	Cleanliness (morality)	Finger dexterity task (counting clean or dirty money of paper) (unconscious – implicit)	Trust game (measure of sharing)	Yes	Clean money group returned more money than dirty do difference in clean and dirty money groups	No		Small sample size Not probed for suspicion No control group Generalisability to general population

Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013) Ex3	60 (25f no age provided) undergraduate students	Cleanliness (morality)	Finger dexterity task (counting clean or dirty money of paper) (unconscious – implicit)	Morality questionnaire (indicating how much would need to be paid to perform immoral behaviours)	Yes	Clean money demanded more money to perform immoral acts than dirty money	Yes	Differences between money versus paper groups, i.e. clean money most moral, then dirty paper, then dirty money then clean paper	Potential for multiple hypotheses/predictions Not clear which they are testing/expecting No control group Generalisability to general population
Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013) Ex4	156 (101f no age provided) sample unknown	Cleanliness (morality)	Finger dexterity task (unconscious – implicit)	Prisoners dilemma game (measure of sharing)	Yes	Clean money shared more than dirty money prime	Yes	Differences between money versus paper groups, Clean money most sharing, then dirty paper, clean paper and dirty money	Not probed for suspicion Unknown sample No control group
Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013) Ex5	112 (52f no age provided) undergraduate students	Cleanliness (morality)	Finger dexterity task (unconscious – implicit)	Ultimatum game (measure of fairness)	Yes	Clean money rejected more unfair offers than dirty money	Yes	Accepting low or unfair offers shaped by interaction between dirt and money variables	No control group Generalisability to general population
Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013) Ex6	127 (67F, no age provided) undergraduate students	Cleanliness – morality	Reading article about cleanliness/dirtiness of nations money (unconscious – implicit)	Dictator game (measure of fairness)	Yes	Clean money significantly more generous and fairer than controls, dirty money less fair than controls	Yes	Evaluation of trade-related words mediated fairness in the dictator game	Unclear whether words chosen indicate 'fairness' Ratings of the words more about how they valued trade – different construct to fairness Generalisability to general population

Yang, Wu, Zhou, Mead, Vohs & Baumeister (2013) Ex7	108(40f, no age provided) undergraduate students	Cleanliness – morality	Reading article about cleanliness/dirtiness of nations money (unconscious – implicit)	Dictator game (measure of fairness)	Yes	Clean money more generous and fair than controls, dirty money more selfish and less fair than controls	Yes	Favourable ratings of fairness or greed mediated money allocations, clean money endorsed fairness, dirty money endorsed more greed	Not clear that handling money was necessary Generalisability to general population
Shafran, Lee, Payne & Fairburn (2006)	41 (41F, 22.6 yrs mean age) university undergraduate and community sample	Personal Standards (an aspect of perfectionism)	Contracts that highlight sticking to high or low personal standards in all aspects of life for next week (conscious – explicit)	Food consumption over course of a week (measure of perfectionism)	Yes	Attempted restraint different between high and low standards groups post prime - regret after eating and number of high calorie foods eaten different after primes	Yes	Post prime there were group differences for all aspects of clinical perfectionism between the high and low standards groups	Participant awareness of nature of study Not probed for suspicion Cannot be generalised to eating disorders population Do not report whether any differences on questionnaire scales pre prime or pre and post prime No control group Female only participants Small participant numbers
Wheeler, Morrison, DeMarree & Petty (2008)	49 (31F, no age provided) undergraduate students	Politeness Rudeness	Computer task (subliminal)	Time taken to interrupt experimenter (measure of rudeness)	No		Yes	Significant interactions between prime and levels of self-monitoring, internal state awareness and self-reflection	No control group Generalisability to general population

Bargh, Chen & Burrows (1996) Ex1	34 (no gender or age provided) undergraduate students	Politeness Rudeness	Scrambled sentences (unconscious – implicit)	Time taken to interrupt experimenter (measure of rudeness)	Yes	Main effect of prime – those in rude prime interrupted significantly faster than those in neutral or polite prime	No	No reliable difference in ratings made of the experimenters politeness post experiment – suggests perceptions of experimenter not a factor	Perceptions could be the same for other reasons and may not be accurate reflection of true feelings Large number of participants did not interrupt at all Small participant numbers Generalisability to general population
Epley & Gilovich (1999) Ex1	34 (no gender or age provided) undergraduate students	Conformity	Scrambled sentences (unconscious – implicit)	Agreeing with confederates on interestingness of a task (measure of conformity)	Yes	Main effect of prime – conformity group rated task more favourably than those primed with non-conformity	No		Note that scores for non-conformity group were still high Conformity and non-conformity could both prime conformity No control group Small no of participants Generalisability to general population
Epley & Gilovich (1999) Ex2	120 (no gender or age provided) undergraduate students	Conformity	Scrambled sentences (unconscious – implicit)	Agreeing with confederate on interestingness of a task (measure of conformity)	Yes	Main effect of prime on behaviour - conformity rated task more interesting than other two conditions	Yes	No priming effects seen when pressure to conform is absent (control groups)	Suggest pattern of results supports idea that non-conformity can prime conformity but t-test results do not confirm this Generalisability to general population
Harris, Coburn, Rohrer & Pashler (2013) Ex 1	106 (73F, no ages provided) undergraduate students	Achievement	Word search (unconscious – implicit)	Performance on three further word searches (measure of achievement)	No	No effect of prime condition on behaviour in two different scoring analyses (stringent scoring and lenient scoring)	No	No main effect of gender, no significant interaction of gender and prime	Participants aware the experimenter blind to conditions Not all original materials available to replicate Added measures to ensure experimenter bias was reduced

Harris, Coburn, Rohrer & Pashler (2013) Ex 2	72 (49F, no ages provided) undergraduate students	Achievement	Word search (unconscious – implicit)	Five minute delay (with filler task) then performance on three further word searches tested (measure of achievement)	No	No effect of primes on behaviour in two different scoring analyses (stringent scoring and lenient scoring)	No	Significant main effect of gender – females found more words, no interaction of gender with condition	No other mediating factors considered i.e. differences between the students in terms of the university they are studying at, course they are studying, cultural differences compared to original study
Bargh, Gollwitzer, Chai, Barndollar & Trotschel (2001) Ex 1	78 (48F, no age provided) undergraduate students	Achievement	Word search (unconscious – implicit)	Word search performance (measure of achievement)	Yes	Main effect of prime – achievement primed found more words than neutral prime	No		Instructed to find 'as many words as possible' - extra prime No mediating factors considered Generalisability to general population
Bargh, Gollwitzer, Chai, Barndollar & Trotschel (2001) Ex 3	288 (186F, no age provided) undergraduate students	Achievement	Word search (unconscious – implicit)	Word search performance after a delay (also impression formation task after a delay) (measure of achievement)	Yes	Main effect of prime – achievement primed found more words after a delay	Yes	Significant interaction between prime, delay and task Primed group achievement related impressions became less extreme over time and performance on word search increased over time	No control group Generalisability to general population

Bargh, Gollwitzer, Chai, Barndollar & Trotschel (2001) Ex 4	76 (50F, no age provided) undergraduate students	Achievement	Word search (unconscious – implicit)	Scrabble task (measure of achievement)	Yes	Main effect of prime – those primed with achievement were more likely to carry on searching after being told time was up	No		No mediating factors investigated Generalisability to general population
Bargh, Gollwitzer, Chai, Barndollar & Trotschel (2001) Ex 5	65 (36F, no age provided) undergraduate students	Achievement	Word search (unconscious – implicit)	Choice of which task to complete after an interruption (measure of perseverence)	Yes	Main effect of prime – more of the achievement primed choose to continue with task than those not primed	Yes	Significant effect of gender – more women than men chose Scrabble task	Call the gender effect a hypothesis irrelevant effect – but it is an effect so how could this be explained No other mediating effects investigated Generalisability to general population
Hart & Albarracin (2009) Ex 3	104 (43M, no age provided) undergraduate students	Achievement	Computer based lexical decision task (subliminal)	Choice of resuming puzzles or doing fun task (measure of perseverence)	No	No significant main effect of primes	Yes	Regression model 1 - reliable effect of achievement motivation but no effect of prime 2 - significant two way interaction between priming and chronic achievement motivation	Generalisability to general population

Hart & Albarracin (2009) Ex 4	226 (72M, no ages provided) undergraduate students	Achievement	Word search task (unconscious – implicit)	Number of words found in word search tasks (measure of achievement)	No	No significant main effect of prime	Yes	Regression model 1 – reliable effects of achievement motivation but no effect of prime 2 – significant interaction between prime and achievement motivation 3 – nature of interaction between chronic achievement and prime dependent upon task frame	Generalisability to general population
Utz, Ouwerkerk & van Lange (2004) Ex 1	93 (65F, no age provided) undergraduate students	Competence	Scrambled sentences (unconscious – implicit)	Dilemma task (measure of cooperation)	No		Yes	Significant interaction between prime and social value orientation – prime only affected competitive participants Main effect of social value orientation	No control group Generalisability to general population

Utz, Ouwerkerk & van Lange (2004) Ex 2	134 (103F, no age provided) undergraduate students	Competence	Scrambled sentences (unconscious – implicit)	Dilemma task (measure of cooperation)	No		Yes	Significant interaction between prime and social value orientation Main effect of social value orientation Main effect of strategy in task Interaction between strategy and social value orientation	No control group Generalisability to general population
Smeesters, Wheeler & Kay (2009a - Ex3)	106 (no gender or age provided) undergraduate students	Cooperation Competition	Computer based lexical decision task (subliminal)	Non-reciprocal dictator game (cooperation behaviour)	Yes	Main effect of primes - competition prime shared less than those primed with cooperation	Yes	Effect of primes on perception of other moderated by communal orientation as is the effect of perceptions on behaviour	Do not clearly conceptualise the values No control group Generalisability to general population
Maio, Pakizeh, Cheung & Rees (2009a – Ex5)	112 (67F, no age provided) undergraduate students	Achievement benevolence	Sorting task (memory task) (unconscious – implicit)	Word search (achievement measure) and volunteering for future research (benevolence measure)	Yes	Participants primed for achievement find more words than benevolence. Participants primed for benevolence volunteer more time than achievement	No		No orthogonal primes Behaviours could be linked to other values Generalisability to general population

Karremans (2007) Ex 1	94 (59F, 20.5yrs mean age) undergraduate students	Benevolence Achievement	Reasons for and against benevolence or achievement (conscious – explicit)	Helping to pick up pencils (measure of helpfulness)	Yes	Participants more likely to help in the benevolence condition than in the achievement condition and control condition	Yes	Favourability of the benevolence reasons was positively correlated with helping behaviour	Relatively small number of participants interpret correlations with care Generalisability to general population
Hertel & Fiedler (1998) Ex1	134 (97 females, no age provided) undergraduate students	Cooperation Competition	Memory task (unconscious – implicit)	Ring Measure of Social Values (measure of pro-social vs pro-self decisions)	No		Yes	The only strong predictor of cooperative behaviour was cooperative pre-disposition, also a consistency main effect, higher cooperation shown by people low in consistency	Small sample size Cannot differentiate between semantic and evaluative priming effects Not clear how people being more inconsistent relates to cooperation Generalisability to general population Ring measure validity as a behavioural measure
Hertel & Fiedler (1998) Ex2	94 (69 females no age provided) undergraduate students	Cooperation Competition	Memory task (unconscious – implicit)	Ring measure of social values (measure of pro-social vs pro-self decisions)	No	No significant effects of prime obtained when data pooled across all participants	Yes	Dispositional preference had an effect Significant effect of consistency of pre-dispositions on behaviour	No new control group Primes not previously presented together Assumptions that coop +- and comp +- would lead to cooperation and competition respectively as social norms Generalisability to general population Ring measure validity as a behavioural measure

Smeesters, Warlop, Van Avermaet, Corneille & Yzerbyt (2003) Ex1	203 (no gender or age) undergraduate students	Morality Might	Scrambled sentences (unconscious – implicit)	Prisoners dilemma game (measure of cooperation)	Yes	Main effect of primes – Morality primed more cooperative than neutral primes and might primes	Yes	Significant two way interaction between social value orientation and primes Main effect of primes for low consistent participants High consistent pro-socials more cooperative than pro-individuals	Conception of morality and might unclear Morality prime words related to pro-social values, might words to pro-individual values Potential demand characteristics Hypothetical game lacking actual monetary payoffs Single trial interactions, responses to feedback would be useful Generalisability to general population
Smeesters, Warlop, Van Avermaet, Corneille & Yzerbyt (2003) Ex2	193(no age or gender) undergraduate students	Morality Might	Scrambled sentences (unconscious – implicit)	Prisoners dilemma game (measure of cooperation)	Yes	Main effect of primes – morality more coop than neutral, might less coop than neutral	Yes	Main effect of social value orientation Three way interaction between social value orientation, consistency and primes Morality elicited higher expectations of partners coop	Conceptualisation of morality and might unclear – as above Potential demand characteristics Hypothetical game lacking actual monetary payoffs Single trial interactions, responses to feedback would be useful Generalisability to general population

Smeesters, Warlop, Van Avermaet, Corneille & Yzerbyt (2003) Ex3	140(no age or gender) undergraduate students	Morality Might	Lexicle decision making task (subliminal)	Prisoners dilemma game (measure of cooperation)	Yes	Main effect of primes – morality primes more cooperative than might	Yes	Main effect of social value orientation Main effect of consistency Three way interaction between social value orientation consistency and primes Correlations between expectations of partners cooperation and cooperative behaviour	Conceptualisation of morality and might unclear – as above Potential demand characteristics Hypothetical game lacking actual monetary payoffs Single trial interactions, responses to feedback would be useful Generalisability to general population
Smeesters, Warlop, Van Avermaet, Corneille & Yzerbyt (2003) Ex4	167 (no gender or age provided) undergraduate students	Morality Might	Scrambled sentences (unconscious – implicit)	Prisoners dilemma game	Yes	Main effect of primes - morality primes more coop than neutral and might less coop than neutral	Yes	Main effect of social value orientation Main effect of consistency Three way interaction between social value orientation consistency and primes Correlations between expectations of cooperation and behaviour	Did not examine specific nature of mediating process (i.e. personality impression vs behaviour expectations) Potential demand characteristics Hypothetical game lacking actual monetary payoffs Single trial interactions, responses to feedback would be useful Generalisability to general population

Neuberg (1988)	94 (0F, no ages provided) undergraduate students	Competitive (achievement) Cooperation	Computer based decision task (subliminal)	Prisoners dilemma game (Measure of cooperation)	No	No significant main effect of primes	Yes	Significant interaction between prime and behavioural predisposition Main effect of behavioural tendency on first move to subsequent behaviour Main effect of partners initial move on subsequent behaviour	Male only participants Some awareness of prime evident Generalisability to general population
Karremans (2007) Ex 2	107 (81F, 20.0yrs mean age) undergraduate students	Helpfulness Equality Success Varied life	1 - Reasons for and against values (conscious – explicit) 2 – anagrams themed around a value (unconscious – implicit)	Minimal group paradigm (measure or egalitarian)	Yes	Helpfulness and equality reasoning conditions allocated points more equally and choose the equal option more often than all other conditions	Yes	Favourability of the reasons for helpfulness correlated positively with choosing the equal option, same for the reasons for equality group	Did not probe for suspicion in participants Small number of participants Generalisability to general population
Verplanken, Trafimow, Khusid, Holland & Steentjes (2009) Ex2	68 (no gender or age provided) undergraduates	Private self Collective self	Writing what have in common with or how differ from people feel close to (unconscious – implicit)	Choosing an apartment based on attributes (measure of loyalty)	Yes	Main effect of prime – collective self gave more weight to loyalty attribute in their decision making than private self	No		No control group Generalisability to general population

Bechtoldt, Choi & Nijstad (2012)	174 (82F, 21.3 yrs mean age) undergraduate students	Individual values Collectivist values	Via task instructions as either individual rewards or group rewards (unconscious – implicit)	Fluency and originality of ideas (measure of creativity)	Yes	Fluency – Main effect of values prime - more ideas in collectivist values group than individualist values group Originality – No main effect of values prime	Yes	Significant interaction between self-construal's and value orientation for originality	No control group Generalisability to general population
Maio, Pakizeh, Cheung & Rees (2009a – Ex2)	116 (84F, no age provided) undergraduate students	Stimulation Tradition	Unscrambling sentences (unconscious – implicit)	Better-than-average effect (modesty behaviour)	Yes	Better-than-average effect weaker after tradition values primed than controls, and stronger after stimulation values primed than controls	No		Generalisability to general population No mediating factors considered in analysis
Maio, Pakizeh, Cheung & Rees (2009a – Ex3)	58 (52F, no age provided) undergraduate students	Self-direction Security	Unscrambling sentences (unconscious – implicit)	Leaky pen and sticky crayons (cleanliness behaviour)	Yes	Participants in the security condition requested another pen or used cleaning wipes earlier than controls and the self-direction condition	No		Small sample size Generalisability to general population Validity of behavioural measure No consideration of mediating factors in analysis

Maio, Pakizeh, Cheung & Rees (2009a – Ex4)	60 (49F, no age provided) undergraduate students	Self-direction security	Sorting task (memory task) (unconscious – implicit)	Indicating which questions would like to know more about on a quiz (curiosity measure)	Yes	self-direction condition showed more curiosity than the security condition	No		Small sample size Generalisability to general population Validity of behavioural measure No consideration of mediating factors in analysis

Appendix 3

Obsessionality Priming Task

Importance of values – Version A Gender: M / F Age:

List as many reasons as you can as to why:

It is important to be clean

It is important to be healthy

It is important to be self-disciplined

Appendix 4

Non-obsessionality priming task

Importance of values – Version B Gender: M / F Age:

List as many reasons as you can as to why:

It is important to have freedom

It is important to have variation in life

It is important to be curious

Appendix 5

Control group task

Importance of different beverages Gender: M / F Age:

List as many reasons as you can as to why:

You like or dislike tea

You like or dislike orange juice

You like or dislike fizzy drinks

Appendix 6

Letter identification task

Please work through the following passage of text putting a line through every letter ‘t’ ‘g’ and ‘h’. Please use a different colour pen for each of the three letters and write at the bottom of the page how many of each letter there was in the passage of text. Please work as quickly as you can but try to avoid making mistakes.

When John and Cathy first saw their new home they had liked how big the garden was. It was one of the things that they had both been looking for in a new house and they had dreamt of being able to grow their own vegetables, have space for a dog to run around and building a patio area to have parties in the summer with their friends.

Totals **t =** **g =** **h =**

Appendix 7

Demographic Questionnaire

Please indicate your answer by ticking the appropriate box or writing in the space provided.

1. Are you:
☐ Male
☐ Female

2. What is your age in years? ……

3. What is your ethnic group? Choose ONE section A to E, and then tick the appropriate box to indicate your ethnic group.

A: White
☐ British
☐ Irish
☐ Any other White background, please state ……..

B: Mixed
☐ White and Black Caribbean
☐ White and Black African
☐ White and Asian
☐ Any other mixed background, please state ……

C: Asian or Asian British
☐ Indian
☐ Pakistani
☐ Bangladeshi
☐ Any other Asian background, please state …….

D: Black or Black British
☐ Caribbean
☐ African
☐ Any other Black background, please state ……..

E: Chinese or other ethnic group
☐ Chinese
☐ Any other, please state ……..

☐ **Not stated**

Appendix 8 – Portrait Values Questionnaire 21 item version – PVQ-21

Here we briefly describe some people. Please read each description and think about how much each person is or is not like you. Tick the box to the right that shows how much the person in the description is like you.

	HOW MUCH LIKE YOU IS THIS PERSON?					
	Very much like me	Like me	Some-what like me	A little like me	Not like me	Not like me at all
1. Thinking up new ideas and being creative is important to her. She likes to do things in her own original way.	1	2	3	4	5	6
2. It is important to her to be rich. She wants to have a lot of money and expensive things.	1	2	3	4	5	6
3. She thinks it is important that every person in the world be treated equally. She believes everyone should have equal opportunities in life.	1	2	3	4	5	6
4. It's important to her to show her abilities. She wants people to admire what she does.	1	2	3	4	5	6
5. It is important to her to live in secure surroundings. She avoids anything that might endanger her safety.	1	2	3	4	5	6
6. She likes surprises and is always looking for new things to do. She thinks it is important to do lots of different things in life.	1	2	3	4	5	6
7. She believes that people should do what they're told. She thinks people should follow rules at all times, even when no-one is watching.	1	2	3	4	5	6
8. It is important to her to listen to people who are different from her. Even when she disagrees with them, she still wants to understand them.	1	2	3	4	5	6
9. It is important to her to be humble and modest. She tries not to draw attention to herself.	1	2	3	4	5	6
10. Having a good time is important to her. She likes to "spoil" herself.	1	2	3	4	5	6
11. It is important to her to make her own decisions about what she does. She likes to be free to plan and not depend on others	1	2	3	4	5	6
12. It's very important to her to help the people around her. She wants to care for their well-being.	1	2	3	4	5	6
13. Being very successful is important to her. She hopes people will recognize her achievements.	1	2	3	4	5	6
14. It is important to her that the government insure her safety against all threats. She wants the state to be strong so it can defend its citizens.	1	2	3	4	5	6
15. She looks for adventures and likes to take risks. She wants to have an exciting life.	1	2	3	4	5	6
16. It is important to her always to behave properly. She wants to avoid doing anything people would say is wrong.	1	2	3	4	5	6
17. It is important to her to get respect from others. She wants people to do what she says.	1	2	3	4	5	6
18. It is important to her to be loyal to her friends. She wants to devote herself to people close to her.	1	2	3	4	5	6
19. She strongly believes that people should care for nature. Looking after the environment is important to her.	1	2	3	4	5	6
20. Tradition is important to her. She tries to follow the customs handed down by her religion or her family.	1	2	3	4	5	6
21. She seeks every chance she can to have fun. It is important to her to do things that give her pleasure.	1	2	3	4	5	6

Appendix 9 – Vancouver Obsessive Compulsive Inventory – VOCI

VOCI

Please rate each statement by putting a circle around the number that best describes how much the statement is true of you. Please answer every item, without spending too much time on any particular item.

How much is each of the following statements true of you?	Not at all	A little	Some	Much	Very Much
1. I feel compelled to check letters over and over before mailing them.	0	1	2	3	4
2. I am often upset by my unwanted thoughts of using a sharp weapon.	0	1	2	3	4
3. I feel very dirty after touching money.	0	1	2	3	4
4. I find it very difficult to make even trivial decisions.	0	1	2	3	4
5. I feel compelled to be absolutely perfect.	0	1	2	3	4
6. I repeatedly experience the same unwanted thought or image about an accident.	0	1	2	3	4
7. I repeatedly check and recheck things like taps and switches after turning them off.	0	1	2	3	4
8. I use an excessive amount of disinfectants to keep my home or myself safe from germs.	0	1	2	3	4
9. I often feel compelled to memorize trivial things (e.g., licence plate numbers, instructions on labels).	0	1	2	3	4
10. I have trouble carrying out normal household activities because my home is so cluttered with things I have collected.	0	1	2	3	4
11. After I have decided something, I usually worry about my decision for a long time.	0	1	2	3	4
12. I find that almost every day I am upset by unpleasant thoughts that come into my mind against my will.	0	1	2	3	4
13. I spend far too much time washing my hands.	0	1	2	3	4
14. I often have trouble getting things done because I try to do everything exactly right.	0	1	2	3	4
15. Touching the bottom of my shoes makes me very anxious.	0	1	2	3	4
16. I am often upset by my unwanted thoughts or images of sexual acts.	0	1	2	3	4
17. I become very anxious when I have to make even a minor decision.	0	1	2	3	4
18. I feel compelled to follow a very strict routine when doing ordinary things.	0	1	2	3	4

How much is each of the following statements true of you?	Not at all	A little	Some	Much	Very Much
19. I feel upset if my furniture or other possessions are not always in exactly the same position.	0	1	2	3	4
20. I repeatedly check that my doors or windows are locked, even though I try to resist the urge to do so.	0	1	2	3	4
21. I find it very difficult to touch garbage or garbage bins.	0	1	2	3	4
22. I become very tense or upset when I think about throwing anything away.	0	1	2	3	4
23. I am excessively concerned about germs and disease.	0	1	2	3	4
24. I am often very late because I can't get through ordinary tasks on time.	0	1	2	3	4
25. I avoid using public telephones because of possible contamination.	0	1	2	3	4
26. I am embarrassed to invite people to my home because it is full of piles of worthless things I have saved.	0	1	2	3	4
27. I repeatedly experience the same upsetting thought or image about death.	0	1	2	3	4
28. I am often upset by unwanted thoughts or images of blurting out obscenities or insults in public.	0	1	2	3	4
29. I worry far too much that I might upset other people.	0	1	2	3	4
30. I am often frightened by unwanted urges to drive or run into oncoming traffic.	0	1	2	3	4
31. I almost always count when doing a routine task.	0	1	2	3	4
32. I feel very contaminated if I touch an animal.	0	1	2	3	4
33. One of my major problems is repeated checking.	0	1	2	3	4
34. I often experience upsetting and unwanted thoughts about losing control.	0	1	2	3	4
35. I find it almost impossible to decide what to keep and what to throw away.	0	1	2	3	4
36. I am strongly compelled to count things.	0	1	2	3	4

How much is each of the following statements true of you?	Not at all	A little	Some	Much	Very Much
37. I repeatedly check that my stove is turned off, even though I resist the urge to do so.	0	1	2	3	4
38. I get very upset if I can't complete my bedtime routine in exactly the same way every night.	0	1	2	3	4
39. I am very afraid of having even slight contact with bodily secretions (blood, urine, sweat, etc.).	0	1	2	3	4
40. I am often very upset by my unwanted impulses to harm other people.	0	1	2	3	4
41. I spend a lot of time every day checking things over and over again.	0	1	2	3	4
42. I have great trouble throwing anything away because I am very afraid of being wasteful.	0	1	2	3	4
43. I frequently have to check things like switches, faucets, appliances and doors several times.	0	1	2	3	4
44. One of my major problems is that I am excessively concerned about cleanliness.	0	1	2	3	4
45. I feel compelled to keep far too many things like old magazines, newspapers, and receipts because I am afraid I might need them in the future.	0	1	2	3	4
46. I repeatedly experience upsetting and unacceptable thoughts of a religious nature.	0	1	2	3	4
47. I tend to get behind in my work because I repeat the same thing over and over again.	0	1	2	3	4
48. I try to put off making decisions because I'm so afraid of making a mistake.	0	1	2	3	4
49. I often experience upsetting and unwanted thoughts about illness.	0	1	2	3	4
50. I am afraid to use even well-kept public toilets because I am so concerned about germs.	0	1	2	3	4
51. Although I try to resist, I feel compelled to collect a large quantity of things I never actually use.	0	1	2	3	4
52. I repeatedly experience upsetting and unwanted immoral thoughts.	0	1	2	3	4
53. One of my major problems is that I pay far too much attention to detail.	0	1	2	3	4
54. I am often upset by unwanted urges to harm myself.	0	1	2	3	4
55. I spend far too long getting ready to leave home each day because I have to do everything exactly right.	0	1	2	3	4

Thordarson, D.S., Radomsky, A.S., Rachman, S., Shafran, R., Sawchuk, C.N., Hakstian, A.R. (2004). The Vancouver Obsessional Compulsive Inventory (VOCI). *Behaviour Research & Therapy, 42(11),* 1289-1314.

Appendix 10 – Symmetry Ordering and Arranging Questionnaire – SOAQ

SOAQ

Please *circle* a number from 0 to 4 to indicate how much you agree with each statement:

	Not at all	Slightly	Moderately	Very	Extremely
1. I feel upset if my furniture or other possessions are not always in exactly the same position.	0	1	2	3	4
2. Other people think I spend too much time ordering and arranging my belongings.	0	1	2	3	4
3. It is essential that I arrange my clothing in a particular and specific way.	0	1	2	3	4
4. I am more at ease when my belongings are "just right".	0	1	2	3	4
5. I must keep my papers, receipts, documents, etc. organized according to a specific set of rules.	0	1	2	3	4
6. It is important that my belongings are placed in a symmetrical and evenly distributed way.	0	1	2	3	4
7. If someone accidentally disturbs my belongings – however slightly, I become bothered or upset.	0	1	2	3	4
8. I feel compelled to arrange my possessions until it feels "just right".	0	1	2	3	4
9. When I think that my belongings are out of place, I am uncomfortable or anxious.	0	1	2	3	4
10. When I put things away, I feel compelled to do it carefully and precisely.	0	1	2	3	4
11. The furniture in my home must be in exactly the "right" spot.	0	1	2	3	4
12. I feel calm and relaxed only when objects around me are organized and placed correctly.	0	1	2	3	4
13. I feel compelled to arrange cans or boxes of food on my kitchen shelves in a specific way.	0	1	2	3	4
14. When I see that my belongings are out of place, I become anxious until I can arrange them properly.	0	1	2	3	4
15. I feel compelled to arrange objects so that they are balanced and evenly spaced.	0	1	2	3	4
16. I feel calm/at ease only when my surroundings are neat and tidy.	0	1	2	3	4
17. Even when my home is messy, I keep things organized according to a specific set of rules.	0	1	2	3	4
18. Things in my home have a proper and exact place.	0	1	2	3	4
19. I cannot concentrate unless things are in the right place.	0	1	2	3	4
20. I don't like to disturb objects once they are properly arranged.	0	1	2	3	4

Radomsky, A.S., & Rachman, S. (2004). Symmetry,ordering and arranging compulsive behaviour. *Behaviour Research & Therapy, 42(8),* 893-913.

Appendix 11 – Responsibility Attitudes Scales – RAS

RAS

This questionnaire lists different attitudes or beliefs which people sometimes hold. Read each statement carefully and decide how much you agree or disagree with it.
For each of the attitudes, show your answer by putting a circle round the words which BEST DESCRIBE HOW YOU THINK. Be sure to choose only one answer for each attitude. Because people are different, there is no right answer or wrong answer to these statements.
To decide whether a given attitude is typical of your way of looking at things, simply keep in mind what you are like MOST OF THE TIME.

1. I often feel responsible for things which go wrong.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

2. If I don't act when I can foresee danger, then I am to blame for any consequences if it happens.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

3. I am too sensitive to feeling responsible for things going wrong.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

4. If I think bad things, this is as bad as doing bad things.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

5. I worry a great deal about the effects of things which I do or don't do.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

6. To me, not acting to prevent disaster is as bad as making disaster happen.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

7. If I know that harm is possible, I should always try to prevent it, however unlikely it seems.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

8. I must always think through the consequences of even the smallest actions.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

9. I often take responsibility for things which other people don't think are my fault.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

10. Everything I do can cause serious problems.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

11. I am often close to causing harm.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

12. I must protect others from harm.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

13. I should never cause even the slightest harm to others.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

14. I will be condemned for my actions.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

15. If I can have even a slight influence on things going wrong, then I must act to prevent it.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

16. To me, not acting where disaster is a slight possibility is as bad as making that disaster happen.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

17. For me, even slight carelessness is inexcusable when it might affect other people.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

18. In all kinds of daily situations, my inactivity can cause as much harm as deliberate bad intentions.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

19. Even if harm is a very unlikely possibility, I should always try to prevent it at any cost.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

20. Once I think it is possible that I have caused harm, I can't forgive myself.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

21. Many of my past actions have been intended to prevent harm to others.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

22. I have to make sure other people are protected from all of the consequences of things I do.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

23. Other people should not rely on my judgement.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

24. If I cannot be <u>certain</u> I am blameless, I feel that I am to blame.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

25. If I take sufficient care then I can prevent any harmful accidents.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

26. I often think that bad things will happen if I am not careful enough.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Appendix 12 – Information Sheet

NHS WALES GIG CYMRU

School of Psychology
Ysgol Seicoleg

South Wales Doctoral Programme in Clinical Psychology
De Cymru Rhaglen Doethuriaeth mewn Seicoleg Glinigol

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Cymru Y Deyrnas Unedig

12th September 2013

INFORMATION SHEET

Title of Project: The motivational structure of human values.

Name of Researcher: Rebecca Woodfield

Information about the project

You are invited to participate in a research study conducted by Rebecca Woodfield (Trainee Clinical Psychologist, South Wales Doctoral Programme in Clinical Psychology) and supervised by Dr Andrew Vidgen (Principal Lead, South Wales Doctoral Programme in Clinical Psychology) and Prof Greg Maio (Professor, School of Psychology, Cardiff University).

Please read the information carefully before deciding whether or not to take part.

What is the purpose of the study?

The study is investigating the structure of human values and how this structure relates to performance on certain tasks. The study aims to provide support for the circular values model proposed by Schwartz (1992) and to further our understanding of this model.

Why have I been chosen to take part?

You have been chosen to take part because you are a student at Cardiff University, and you have volunteered to consider taking part in the study.

Do I have to take part?

No. It is up to you to decide. The researcher will give you the opportunity to go through this information sheet and to ask any questions you might have. If you wish to take part you will be asked to sign a consent form to show that you agreed to take part. You will be given a copy of this information sheet to keep. If you do not wish to take part then you can say no. If you do decide to take part you are also free to

change your mind and withdraw at any time during the research without giving a reason. In this case any information collected from you will not be used in the research and will be destroyed if requested.

What will happen to me if I take part and what will I have to do?

If you decide to take part the following things will happen:-

- The researcher will give you a consent form to complete.
- You will then be given either a task that asks you to give reasons as to why certain values are important or you may be given a task asking for reasons why you may like or dislike certain beverages. You will be given 9 minutes to complete this task.
- You will then be asked to complete two practical paper and pen tasks including a colouring/design task and a task asking you to glue some shapes to a piece of card. Together you will have no more than 10 minutes to complete these tasks.
- Then you will be asked to complete some questionnaires. One will ask you to indicate how alike to an individual described you feel you are. The other three will ask you more questions about yourself. These questionnaires are well established and often used for research purposes. It is not anticipated that completing these will cause significant distress. This part of the study should take about 15-20 minutes.
- There will be a de-briefing at the end of the session and you will have the opportunity to ask any further questions that you have about the research.
- In total the session should last no longer than 40 minutes.

What are the possible disadvantages and risks of taking part?

No significant risks have been identified around taking part in this study. If, however, you felt that anything about taking part in the study had concerned you, there would be an opportunity for you to discuss this with the researcher who would be able to direct you to appropriate support if necessary. You would also be able to contact Dr Andrew Vidgen (academic supervisor) if you had any concerns.

What are the possible benefits of taking part?

All participants will be paid £4 for their participation. If you choose to withdraw from the study at any point you will still be paid for your time.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any harm you might suffer will be addressed. There are no foreseen risks in taking part. However, if you have a concern about any aspect of this study you should speak to the principal researcher in the first instance, who will do their best to answer your questions (contact details below). If you remain unhappy you can contact Dr Andrew Vidgen who would be able to discuss this with you and direct you to appropriate support.

Will my taking part in the study be kept confidential?

Yes. We will follow ethical and legal practice and all information about you will be handled in confidence. All information which is collected about you during the course of the research is strictly confidential and only accessible to the principal researcher. All data collected will be kept anonymously. Your consent form will be the only paperwork that identifies you by your name. The consent forms will be stored separately from your other data in a locked filing cabinet within the School of Psychology.

What will happen to the results of the study?

The results of the study will be written up and submitted to Cardiff University by the principal researcher (Rebecca Woodfield) in part fulfilment of Doctorate in Clinical Psychology qualification requirements. A report may also be sent to a peer-reviewed journal for publication. You will not be identified in any report or publication that follows this study.

Who has reviewed the study?

This study has been reviewed and ethically approved by the Psychology School Research Ethics Committee (SREC). If you have any concerns or complaints about the ethics of this research study these can be directed to Natalie Moran (Secretary of Ethics Committee) who can be contacted on 029 208 70360 or at psychethics@cardiff.ac.uk.

Contact for further information:

If you require any additional information please contact:-

Rebecca Woodfield (nee Bailey)
Trainee Clinical Psychologist
South Wales Doctoral Programme in Clinical Psychology
11th Floor, School of Psychology
Tower Building
70 Park Place
Cardiff
CF10 3AT

E-mail:- BaileyR6@cardiff.ac.uk
Rebecca.bailey@wales.nhs.uk

Or

Dr Andrew Vidgen
Principal Lead
South Wales Doctoral Programme in Clinical Psychology
11th Floor, School of Psychology
Tower Building
70 Park Place,
Cardiff
CF10 3AT

E-mail:- Andrew.vidgen@wales.nhs.uk

Thank you for taking the time to read this.

Appendix 13 – Consent Form

NHS WALES GIG CYMRU

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Cymru Y Deyrnas Unedig

12th September 2013

CONSENT FORM

Title of Project: The motivational structure of human values

Name of Researcher: Rebecca Woodfield

Please initial box

1. I confirm that I have read and understand the information sheet dated 12th September 2013 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason. ☐

3. I agree to take part in the above study. ☐

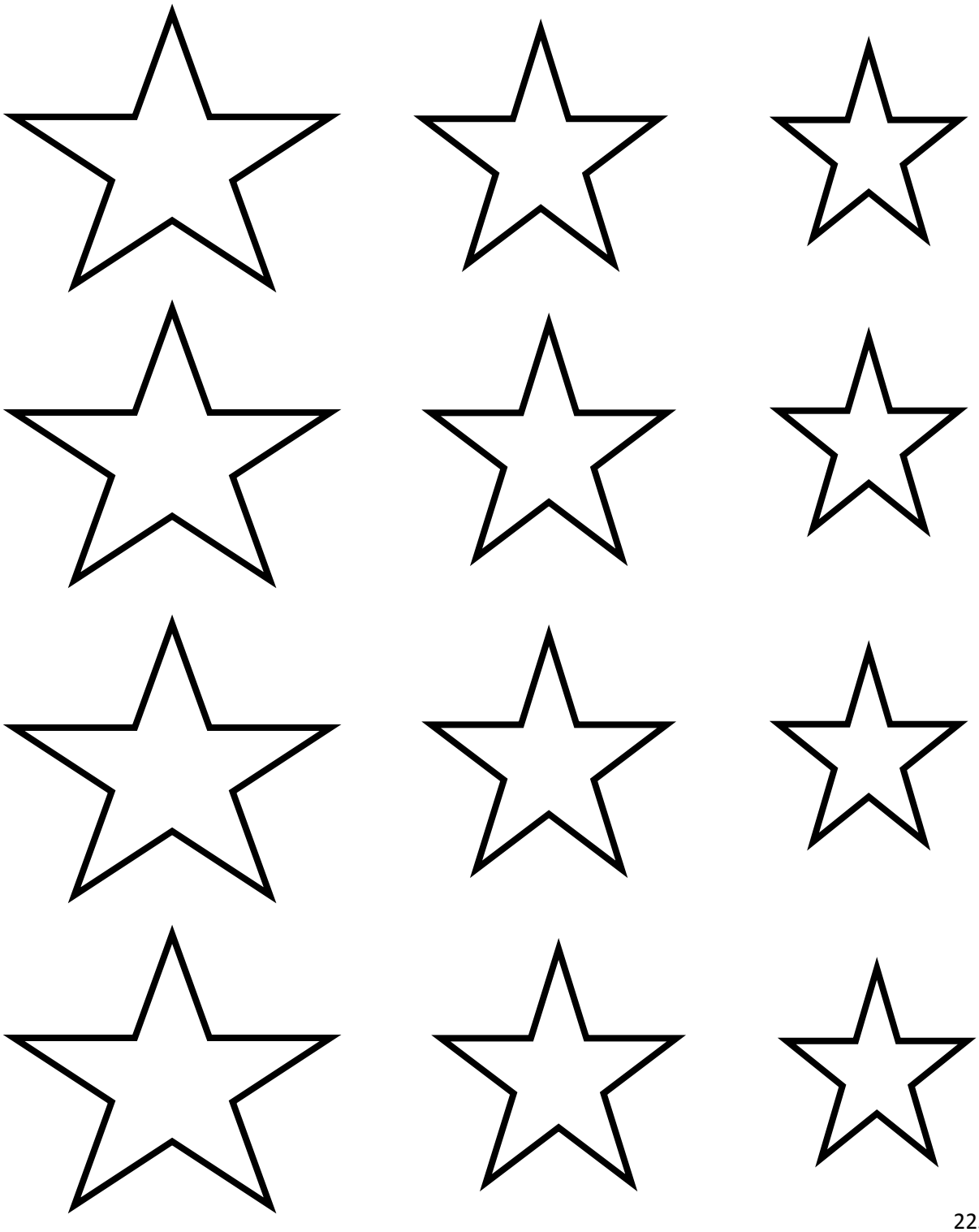
Name of Participant	Date	Signature
Name of researcher	Date	Signature

Appendix 14

Photograph of ordering task

Appendix 15 – Sticking stars task.

You have five minutes to spend on this task. You have been given some paper stars of different sizes. Please use the glue provided to stick the stars onto this sheet. Match the stars for size and try to be as precise as you can with how the stars are stuck to the page (i.e. make sure the points are stuck down as well as the middles of the stars). Please complete each star in order (i.e. work along the rows one star at a time). You are not expected to stick all of the stars in the time allowed and it is more important that you try to complete the task as neatly and carefully as possible than that you try to complete them all.



Appendix 16

Funnel de-briefing script

That was the last part of the study. Before you go I should give you some more detailed information about the study.

First, do you have any questions?

All research studies are guided by hypotheses, which are ideas that we want to test. We previously told you that we were interested in looking at the motivational structure of human values. Now I'd like to give you more details about the hypotheses that we are testing. We wait until the end of the session to explain the hypotheses because this makes it easier for you as a participant. Psychologists have previously noted that people have difficulty doing tasks naturally when they are aware of the hypotheses being tested. In fact, people tend to unconsciously alter their behaviour when they learn a particular hypothesis. So, in psychological research of this kind we often give people details about hypotheses after the studies are over. This way, we don't interfere with people's natural responses.

Before I describe our hypotheses, I am curious whether you had any ideas about hypotheses that we could, should or would test in this study? Did any ideas pop into your mind as you went through the tasks?

That's fine, I only ask because we are curious about anything that comes up spontaneously. It's ok not to have been distracted by any relevant ideas. We simply want people to respond naturally and not try to guess the nature of our studies.

OR

That's interesting and quite relevant to what we are examining.

In the questionnaires that you were asked to compete we were looking at variables related to obsessionality and responsibility which are clinically relevant for certain mental health conditions. These questionnaires have been used with students and general community samples before and show that there can be a wide variation in responses within the general population. We wanted to measure these variables so that we could investigate whether being primed for values related to obsessionality would lead to more behaviours related to obsessionality or a difference in the way participants answered the questionnaires.

We prime certain values by asking participants to give reasons why certain values are important. Some participants are primed to values that are related to obsessionality (clean, healthy and self-discipline), some are primed to values that are opposed to obsessionality (curious, freedom and variation in life) and others are not primed to any values at all so we have a control group, a group that just respond naturally with no influence from us.

During the other tasks we were actually trying to look at the effects of priming different values on behaviours related to obsessionality. We were interested in measuring how much time you spent checking through your work on the text crossing out task and how orderly you were when you put away the colouring pens at the end, for example did you put them away according to the colours on the pack or in some other arrangement. In the gluing task we were interested in how long you were doing the task before you used a wipe to clean your hands. We hope to see that priming the obsessionality values leads to more of these behaviours compared to the control group and that priming the opposing values leads to less of these behaviours compared to the control group. We also hope to show that being primed for different values doesn't affect the way people answer the questionnaires because then we can show that it doesn't matter how people answered the questionnaires as it is the priming task that affects behaviour and not pre-existing obsessionality related traits.

Hopefully, you understand the reasons why we designed the study in this way. As mentioned before if you had been aware of exactly what we were studying and that we were measuring certain aspects of your behaviour then you may have unconsciously changed the way that you responded to questions and tasks and may have changed your behaviour. We believe that this study could have important implications for helping us to understand how values can be better incorporated into therapies for people with mental health conditions related to obsessionality.

Did you think about these issues at all while you were completing the questionnaires and tasks? (If so, ask when and code for suspicion in notes, 0=not at all, 1=possibly, 2=definitely).

Thank you very much for participating. This feedback sheet (give copy of debriefing sheet) explains more about the study and indicates where you can reach me or Dr Andrew Vidgen or Prof Maio if you have any questions. You may also be interested in the readings at the bottom. Thanks again for taking part.

Appendix 17 – Debriefing Sheet

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12th September 2013

DEBRIEFING SHEET

Title of study: The motivational structure of human values.

Thank you for taking part in this study. This debriefing sheet will give you further information about the purpose of the study and hypotheses related to the research. Please feel free to ask any questions that you may have.

Aims of the research

This study aims to identify the impact of priming different values from the Schwartz (1992) model of human values on measures of obsessionality. The study aims to investigate whether priming values most closely linked with obsessionality (clean, healthy and self-discipline) leads to increased behaviours related to obsessionality and whether priming values that oppose obsessionality (curious, freedom and variation in life) decreases these behaviours. There is more information about this in the hypotheses section below.

We believe that this is important to investigate because it has large implications for the use of personal values within therapeutic interventions for disorders such as Obsessive-Compulsive Disorder (OCD). If we can show that priming different values can increase or decrease traits of obsessionality such as cleanliness, orderliness and checking behaviour, then we can begin to form a more structured and empirically valid way of using values within therapy.

Details about the tasks completed (i.e. what they measured)

Initially you completed three different tasks:

1) If you completed a task regarding why certain values were important to you, this was administered as a priming task to bring certain values to mind. There were two different versions of this task relating to values most closely related to obsessionality (clean, healthy and self-discipline) and those that most oppose obsessionality (curious, freedom and variation in life) respectively. You will have completed only

one version of this task depending upon the condition that you were randomly assigned to. If you were in the control condition you will have completed a similar task around why you like or dislike different soft drinks but this task was not designed to prime any specific values as if you were in this group we hoped to gain a measure of your natural responses to the tasks without any influence from us.

2) The task asking you to cross out different letters in a passage of text was used as a decoy task. Rather than measuring your accuracy in completing the task, what was actually being measured was the length of time that you engaged in checking behaviour after initial completion of the task. We were also interested in the orderliness of the colouring pens at the end of the task such as whether you put them away according to the colours indicated on the pack or in some other arrangement.

3) The task asking you to glue star shapes to a piece of paper was also used as a decoy task. Rather than measuring the accuracy of your work this part of the study was actually investigating the behaviour displayed in relation to being given a task that was messy. We were actually measuring how far into the task it was before you used a wipe to clean your hands and recorded how many wipes you used in total.

You then completed four different questionnaires:

4) The Portrait Values Questionnaire (PVQ) provides a profile of personal values for an individual. It identifies which values within the Schwartz model are the most important ones to you.

5) The Vancouver Obsessive Compulsive Inventory (VOCI) provides a general measure of obsessionality related to beliefs and feelings around contamination, checking, obsessions, hoarding, having something done 'just right' and indecisiveness.

6) The Symmetry, Ordering and Arranging Questionnaire (SOAQ) provides a more specific measure of compulsive ordering and arranging and pre-occupation with symmetry.

7) The Responsibility Appraisal Survey (RAS) provides a measure of responsibility beliefs.

These questionnaires might be used in clinical settings to help gather further information about behaviours and beliefs related to responsibility and obsessionality. It is not the purpose of this study to seek to diagnose participants with clinical conditions and a high score on either of these questionnaires does not provide the basis for the existence of a particular condition as we would naturally expect to see large variance on scores within the general population.

Reason why some mild deception was used

There were two aspects of mild deception used in this study that are commonly used in studies of this type:

Firstly, you were not explicitly informed that you would be primed with certain values or that the study was investigating obsessionality and responsibility. This is because having knowledge of the hypotheses of the study or that you are being primed could unconsciously affect your subsequent responses and behaviours when completing different tasks. Likewise, knowing that obsessionality and responsibility were being investigated might have affected the answers you gave to some of the questionnaires or affected your behaviour.

Secondly, you were not informed that your behaviour during and following the colouring and gluing tasks was being measured. Again, this was to gain ecologically valid measurement of your behaviour as had you been aware that your behaviour was being measured you may have behaved differently.

Hypotheses

1) We predict that priming different values related to obsessionality within the Schwartz's (1992) circular model will affect responses to behavioural measures of obsessionality. For example, when values most closely linked to obsessionality are primed (clean, healthy and self-discipline) we would expect to see an increase in scores on behavioural measures of obsessionality when compared to control participants scores. When values most opposed to obsessionality are primed (curious, freedom and variation in life) we would expect to see a decrease in scores on measures of obsessionality compared to controls.

2) We would predict that the priming task would not have an effect on how people answer the questionnaire measures so we shouldn't see any significant differences on scores across the three groups.

3) As long as the above hypothesis is correct we would also predict that the effects of priming are stronger than the effects of questionnaire measures of obsessionality. For example, if someone scores high on the questionnaire measure of obsessionality but is primed for the values that oppose obsessionality we would expect to see a decrease in scores on subsequent obsessionality behavioural measures regardless of their high initial scores on the questionnaires.

3) We also measured responsibility because it is closely linked with obsessionality in disorders such as OCD and we wanted to show that the effects of priming are also stronger than the effects of questionnaire measures of responsibility beliefs.

Assurance of data being held confidentially

All data collected from this study will be kept anonymous. Your consent form will be the only place where your name is recorded and this will be stored separately from your other data in a locked filing cabinet within the School of Psychology.

Relevant readings

For further information related to this research you may wish to read the following articles:

- Bardi, A. & Schwartz, S.H. (2003). Values and behaviour: Strength and structure of relations. *Personality and Social Psychology Bulletin, 29*, 1207-1220.
- Maio, G.R., Pakizeh, A., Cheung, W.Y., & Rees, K.J. (2009). Changing, Priming and Acting on Values: Effects via motivational relations in a circular model. *Journal of Personality and Social Psychology, 97*, 699-715.

Thank you for taking part in this study.

If you have any questions or concerns about this research then please contact us. If you would like a summary of the findings from this research study then please inform the principal researcher (Rebecca Woodfield). The study will be complete by June 2014 and a summary will be available to be forwarded to you via e-mail or post after this time.

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E-mail:- Maio@cardiff.ac.uk

Appendix 18

Ethical approval

Ethics Feedback - EC.13.10.08.3531

psychethics

Fri 18/10/2013 13:46

To:
Rebecca Woodfield;

Cc:
Gregory Maio;
Andrew Vidgen;

Dear Rebecca,

The Ethics Committee has considered your postgraduate project proposal: The influence of priming social values on behaviours related to obsessionality (EC.13.10.08.3531).

The project has been approved.

Please note that if any changes are made to the above project then you must notify the Ethics Committee.

Best wishes,

Natalie Moran

School of Psychology Research Ethics Committee
Tower Building
Park Place
CARDIFF
CF10 3AT

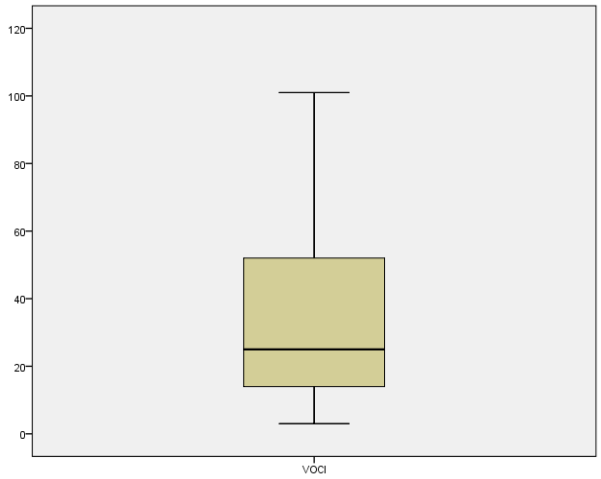
Ffôn /Telephone: +44 (0) 29 2087 0360
Ffacs/Fax: +44 (0) 29 2087 4858

http://psych.cf.ac.uk/aboutus/ethics.html

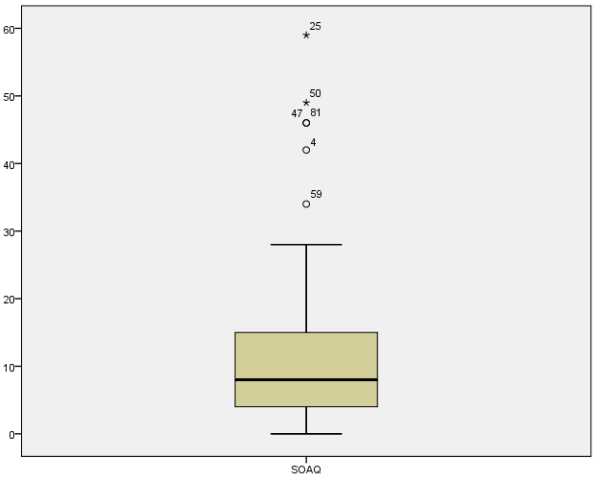
Appendix 19

Box-plots checking for extreme scores

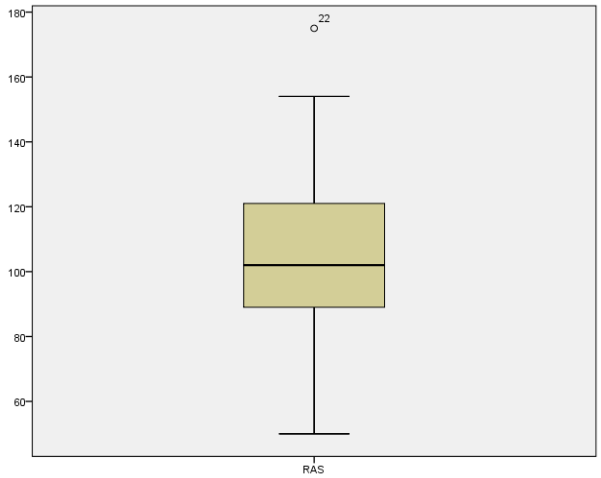
VOCI



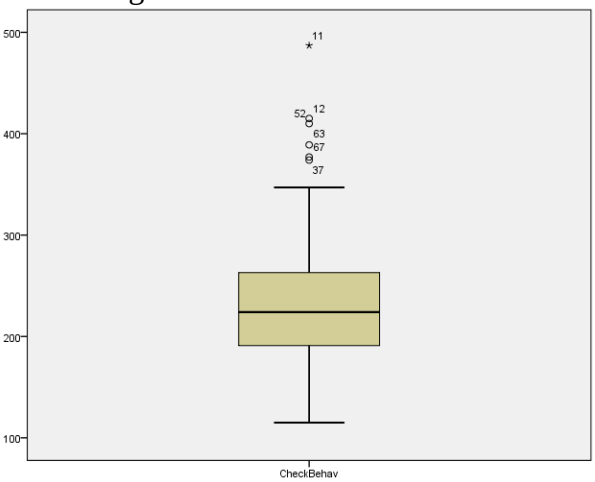
SOAQ



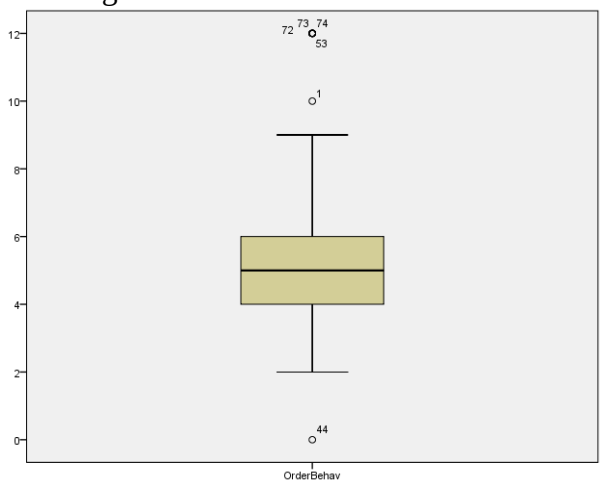
RAS



Checking Behaviour



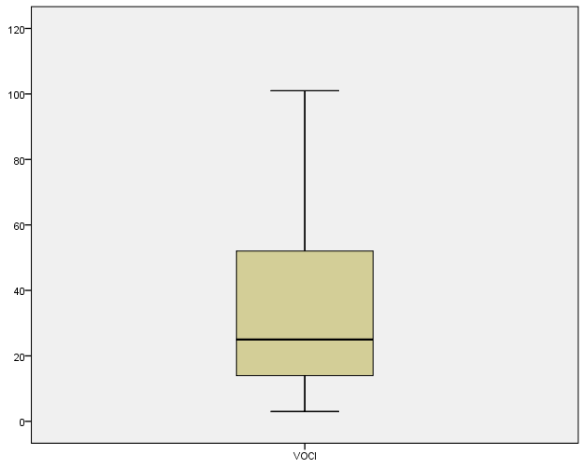
Ordering Behaviour



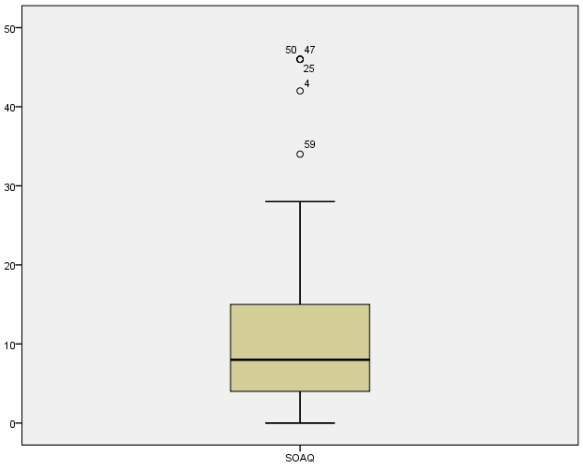
Appendix 20

Boxplots for outliers

VOCI



SOAQ



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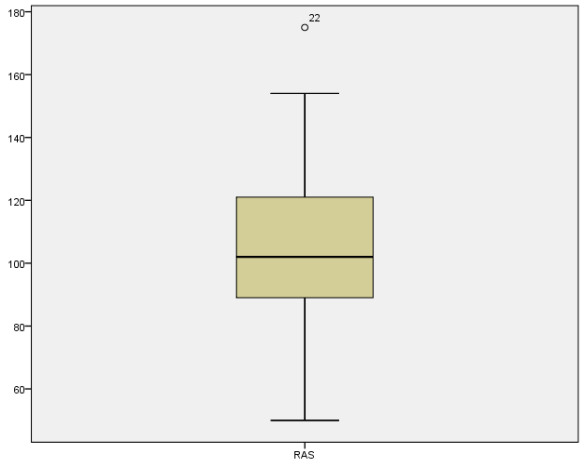

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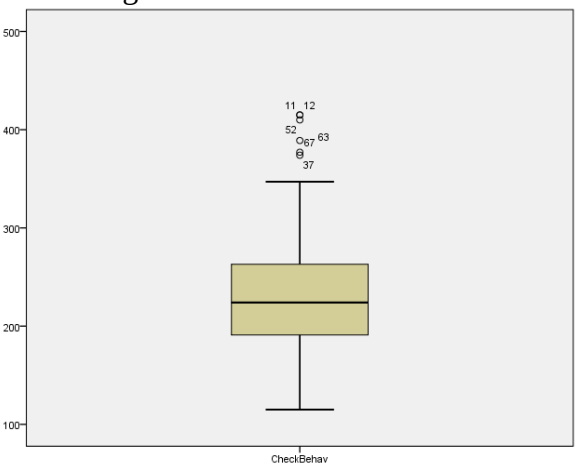
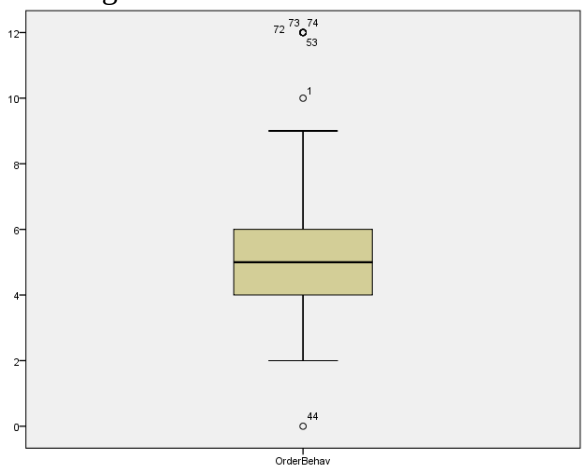


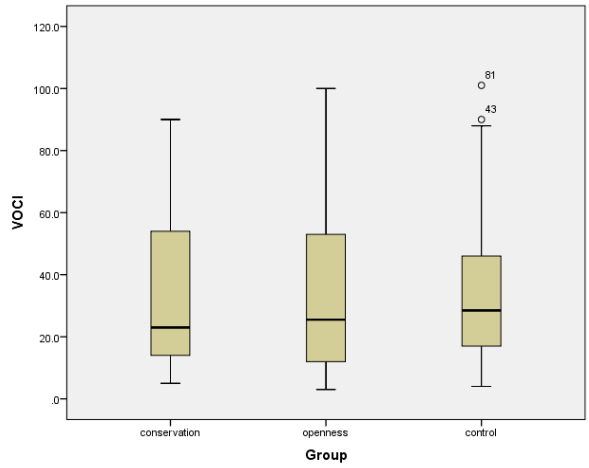
Ordering Behaviour



Appendix 20

Boxplots of outliers by group

VOCI



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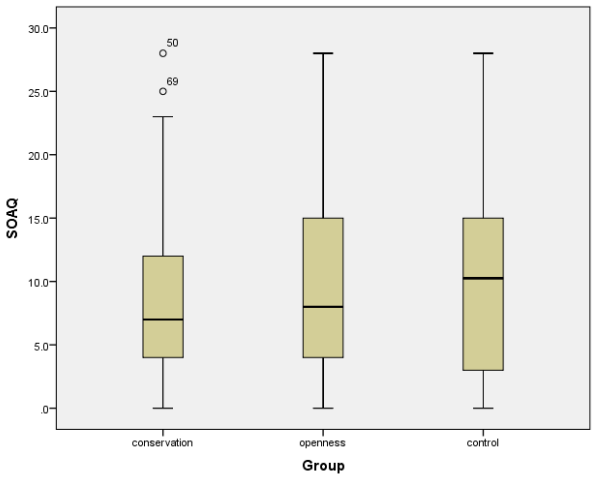

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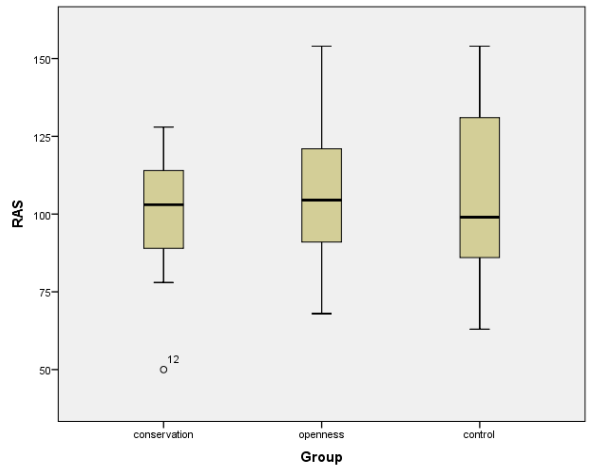

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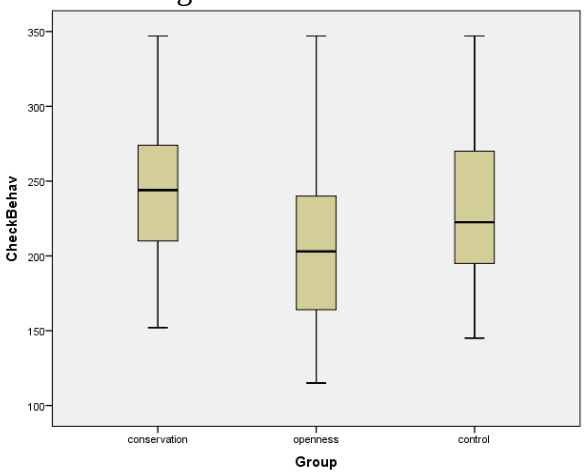
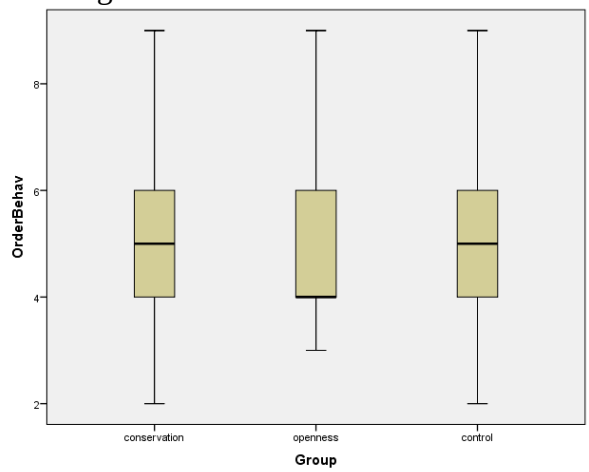


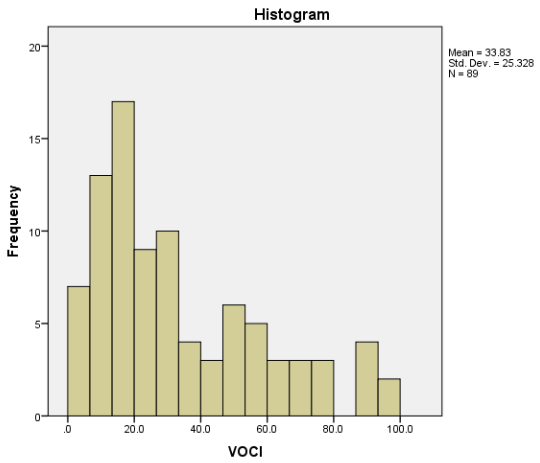
Ordering Behaviour

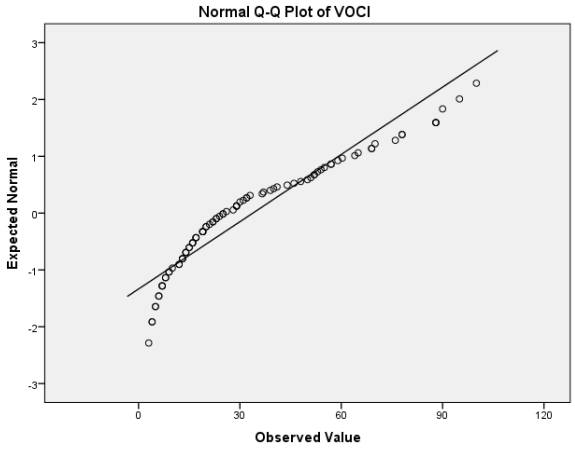


Appendix 21

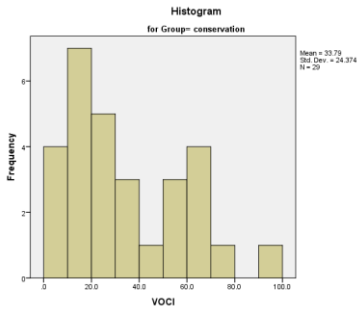
VOCI – normal distribution measures

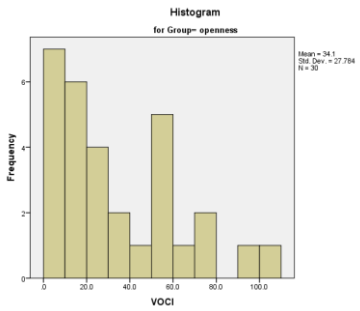
Overall

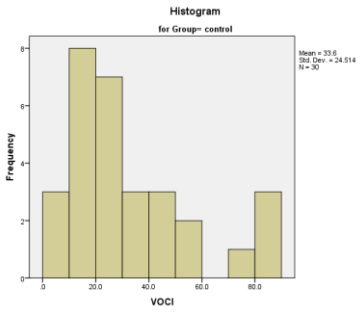


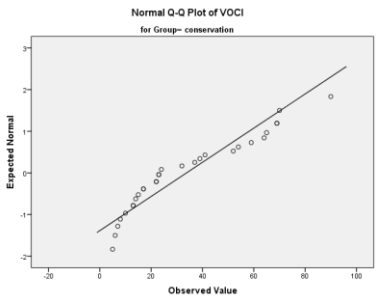


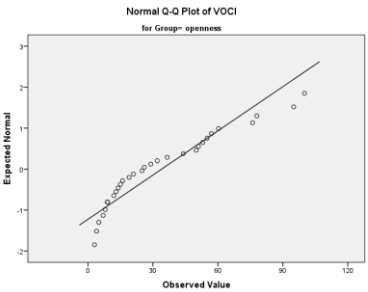
By Group

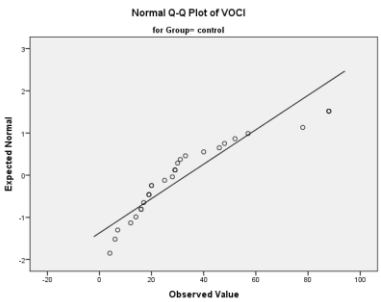








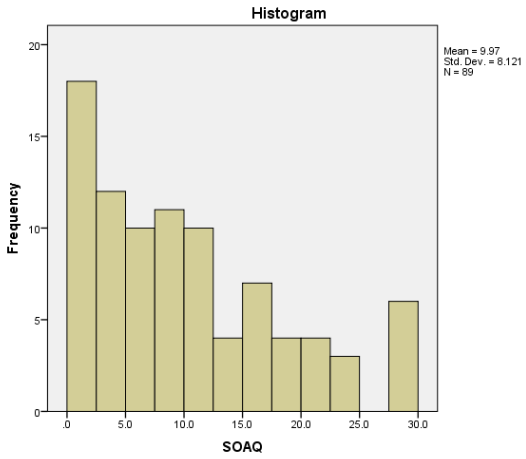


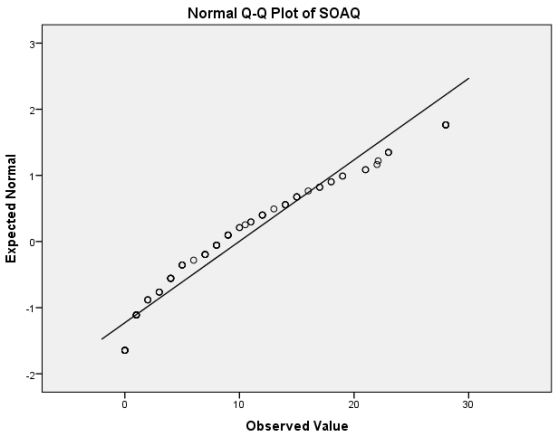


Appendix 22

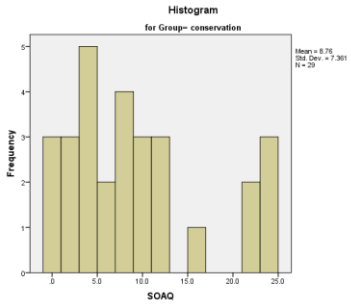
SOAQ – normal distribution measures

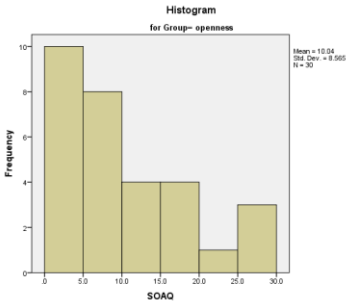
Overall

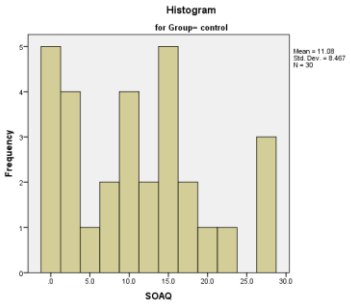


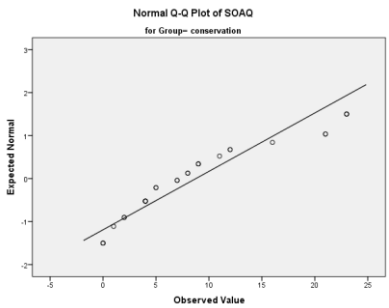


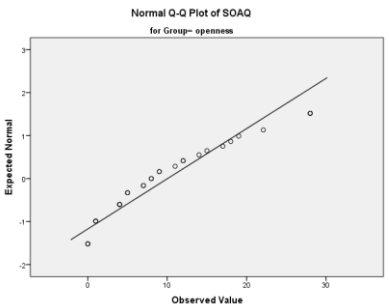
By Group

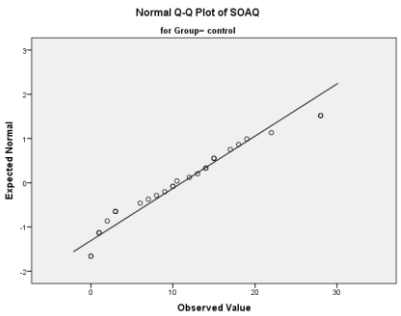








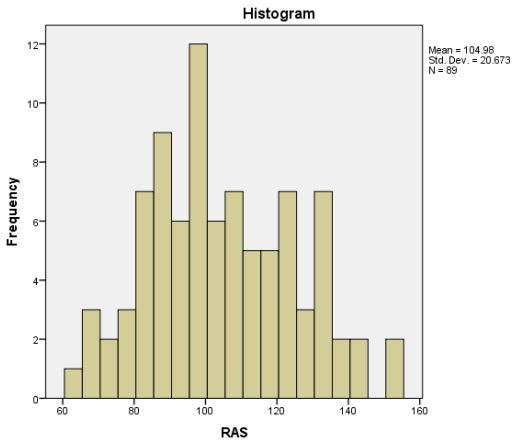


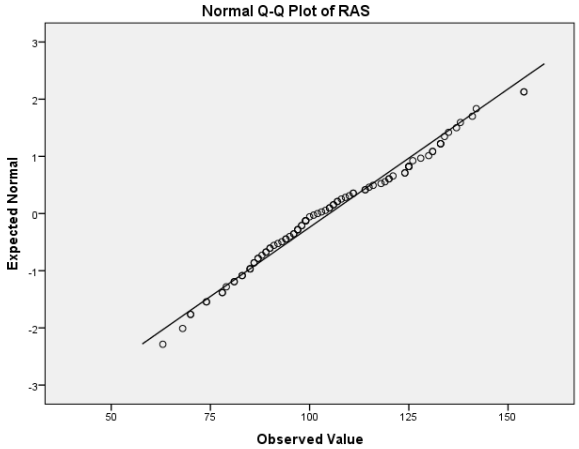


Appendix 23

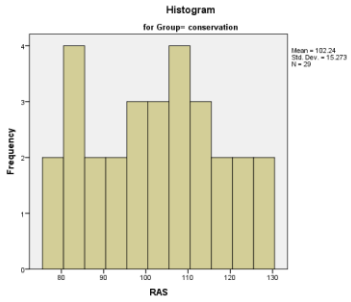
RAS – normal distribution

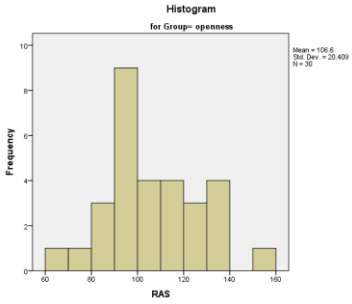
Overall

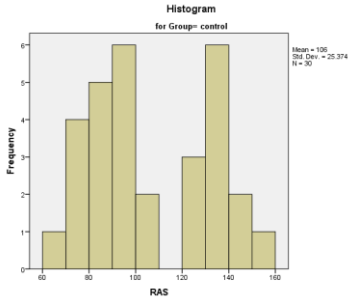


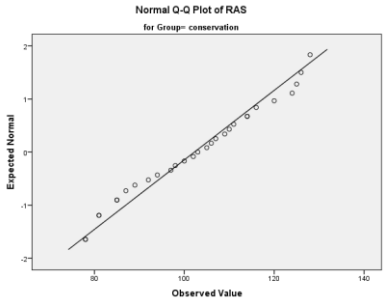


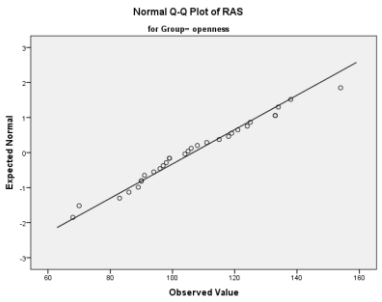
By Group

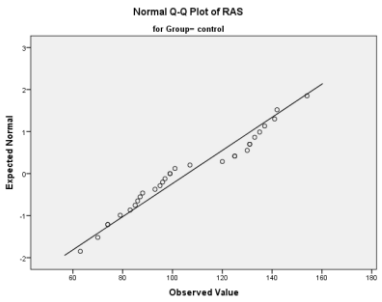








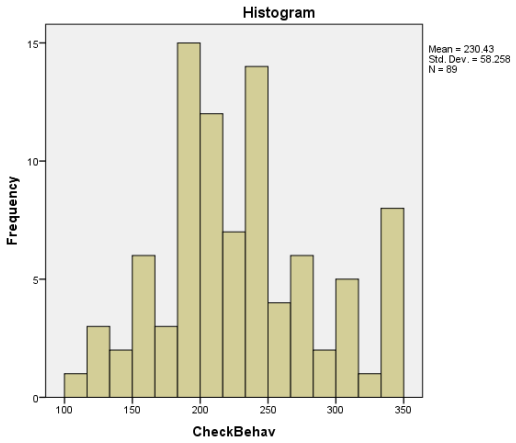


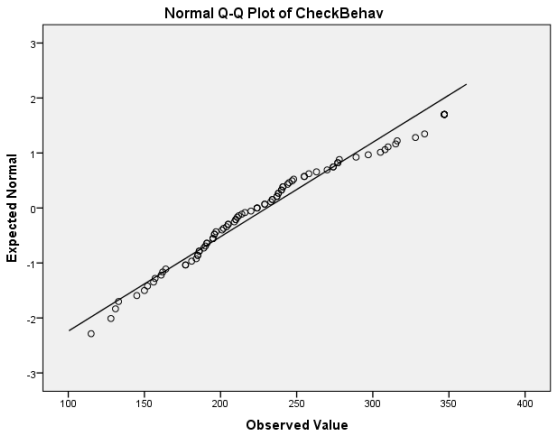


Appendix 24

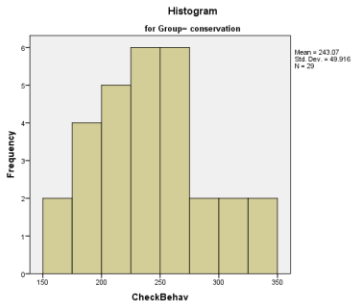
Checking behaviour – normal distribution

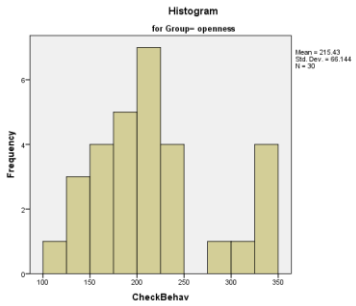
Overall

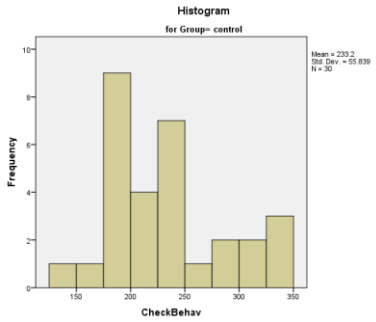


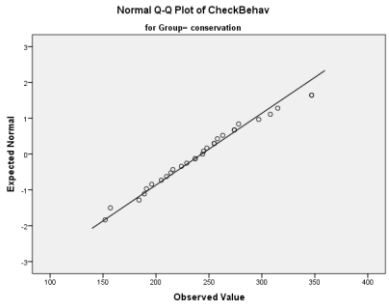


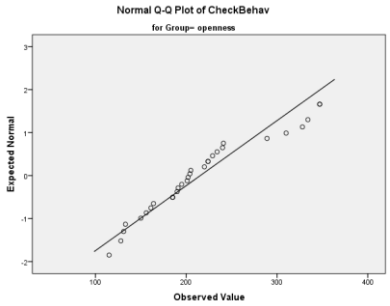
By Group

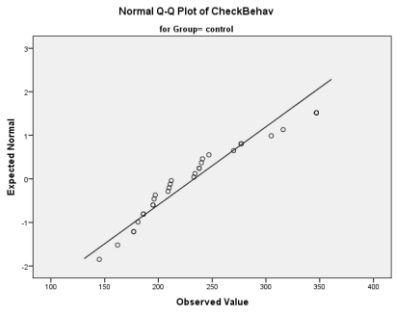








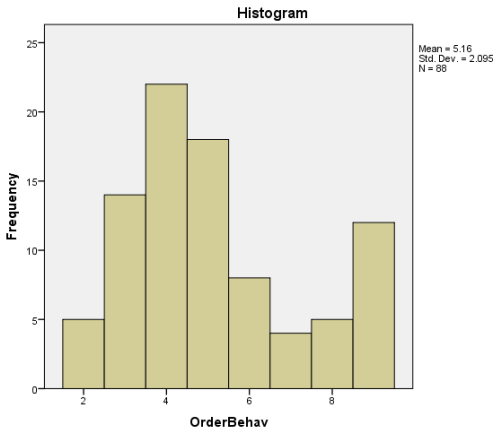


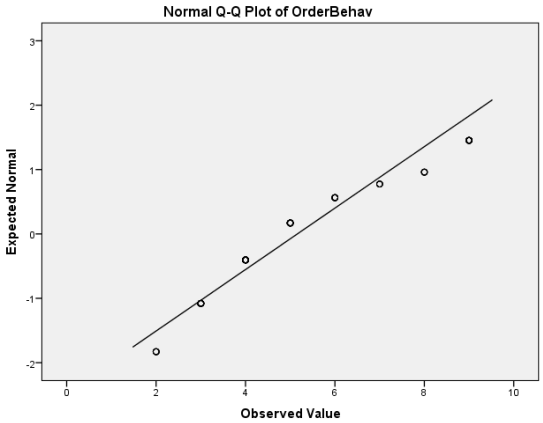


Appendix 25

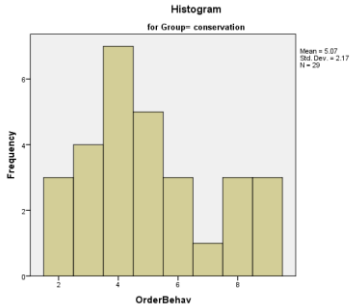
Ordering behaviour – normal distribution

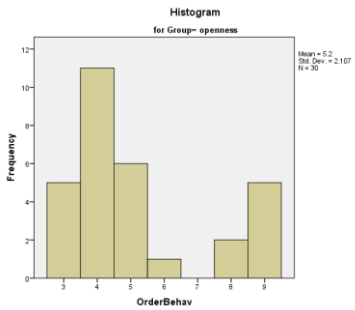
Overall

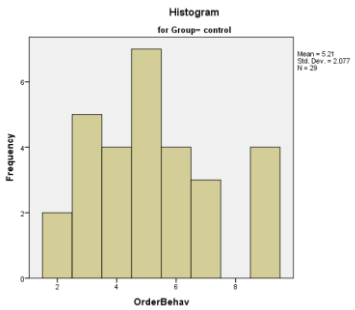


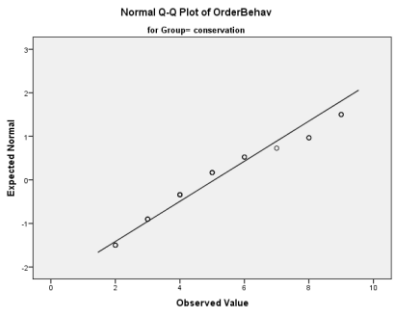


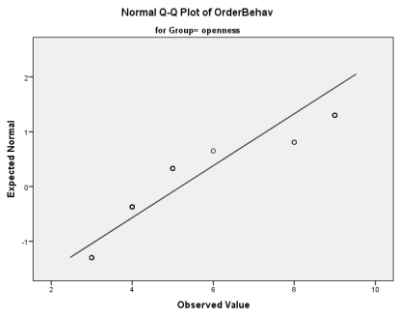
By Group

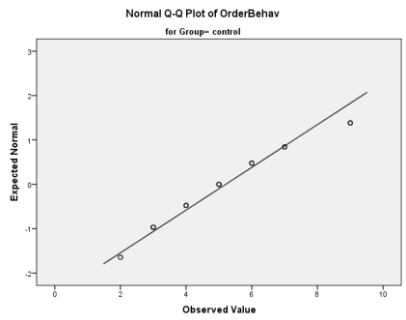












Appendix 26

Skew and Kurtosis Scores

Skew and kurtosis z-scores for all measures

	Group	Skew Statistic	Std Error	**Skew z scores**	Kurtosis Statistic	Std Error	**Kurtosis z scores**
VOCI	Overall	.907	.255	**3.557*** **	-.150	.506	**-0.296**
	Conservation	.682	.434	**1.571**	-.756	.845	**-0.895**
	Openness	.907	.427	**2.124***	-.074	.833	**-0.089**
	Control	1.205	.427	**2.822****	.579	.833	**0.695**
SOAQ	Overall	.738	.255	**2.894****	-.359	.506	**-0.709**
	Conservation	.869	.434	**2.002***	-.340	.845	**-0.402**
	Openness	.850	.427	**1.991***	-.149	.833	**-0.179**
	Control	.531	.427	**1.244**	-.448	.833	**-0.538**
RAS	Overall	.262	.255	**1.027**	-.603	.506	**-1.192**
	Conservation	.000	.434	**0.000**	-1.062	.845	**-1.257**
	Openness	.265	.427	**0.621**	-.227	.833	**-0.273**
	Control	.172	.427	**0.403**	-1.217	.833	**-1.461**
Checking behaviour	Overall	.437	.255	**1.714**	-.393	.506	**-0.777**
	Conservation	.313	.434	**0.721**	-.133	.845	**-0.157**
	Openness	.664	.427	**1.555**	-.292	.833	**-0.350**
	Control	.757	.427	**1.773**	-203	.833	**-0.244**
Ordering behaviour	Overall	.629	.257	**2.447***	-.657	.508	**-1.293**
	Conservation	.513	.434	**1.182**	-.751	.845	**-0.889**
	Openness	.973	.427	**2.279***	-.529	.833	**-0.635**
	Control	.474	.434	**1.092**	-.497	.845	**-0.588**
VOCI-SOAQ	Overall	1.111	.255	**4.357*** **	.742	.506	**1.466**
	Conservation	.667	.434	**1.537**	-.964	.845	**-1.141**
	Openness	1.250	.427	**2.927****	1.290	.833	**1.549**
	Control	1.339	.427	**3.136****	1.439	.833	**1.727**

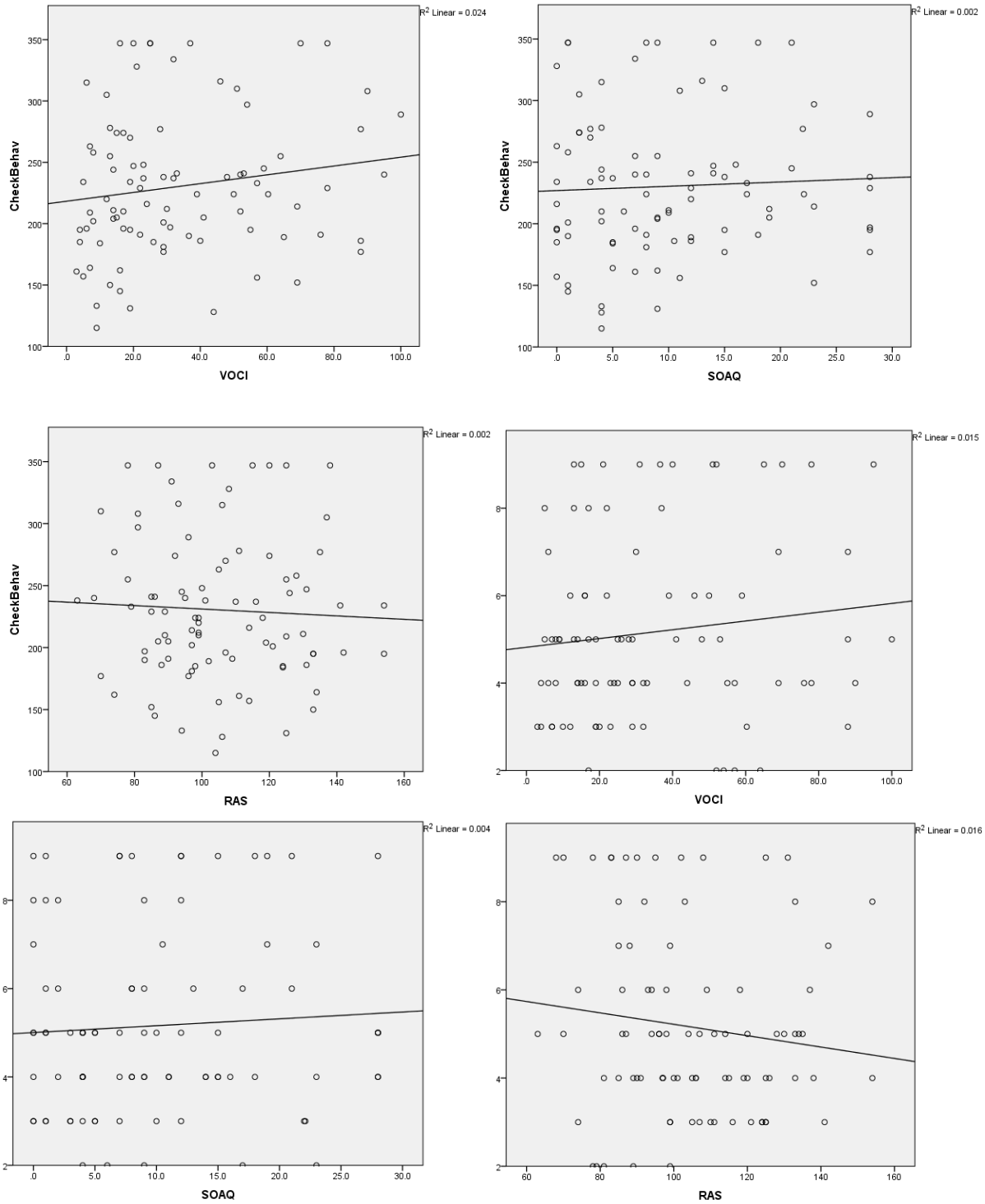
*significant at p<.05 level

** significant at p<.01 level

*** significant at p<.001 level

Appendix 27

Scatterplots



Appendix 28

VOCI-SOAQ Box-plot for outliers and normal distribution checks