

## ORDERING AND ARRANGING COMPULSIONS

### Symmetry, Ordering and Arranging Compulsive Behaviour

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### Abstract

Compulsive ordering and arranging, and a preoccupation with symmetry are features of obsessive-compulsive disorder (OCD) that have not been examined experimentally. Three connected studies were conducted to examine this phenomenon: a self-report measure of this behaviour was developed and validated, participants were asked to engage in tasks designed to assess preferences for order, and to assess the interference of disorder in the completion of a stressful activity. The self-report measure has sound psychometric properties and validity. Participants with a strong preference for order were made more anxious by having to complete a difficult task in a disorganized environment. Participants without this preference did not show this effect. The results are discussed in terms of the phenomenology of compulsive ordering and arranging, and its relationship to both OCD and normal human behaviour. It is suggested that compulsive ordering and a drive for symmetry are extreme manifestations of the common preference for order and symmetry.

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### **Symmetry, Ordering and Arranging Compulsions**

A feature of obsessive-compulsive disorder (OCD) that has received little attention is a compulsion to order and arrange one's surroundings, to avoid disorderly surroundings, and to ensure that objects are arranged in "exactly the right way". This may often include an increased preference for symmetry, either generally, or with respect to a few select possessions. Patients will often report that they need to ensure that their belongings are "just right" before they can proceed with their day, often spending several hours in front of a shelf or table, repositioning objects until their anxiety decreases to a tolerable level. While our knowledge of different types of OCD has been expanding (Rachman, 1997, 1998, 2002), little attention has been given to this set of symptoms.

Given the results of epidemiological data indicating that ordering and arranging is one of the more common presentations of OCD (e.g., Rasmussen & Eisen, 1992; Sasson et al., 1997), in adults (e.g., Leckman et al., 1997; Summerfeldt et al., 1999), and in children (e.g., Flament et al., 1988; Valleni-Bassile et al., 1994), the neglect is surprising. There is an absence of experimental analyses of ordering and arranging, and of theoretical explanations of this behaviour. Little is known about the specific phenomenology of ordering and arranging other than the experiences of those who encounter the problem clinically.

Compulsive ordering and arranging are often seen in children with OCD. In a study of the development of OCD, it was found that nearly half of a sample of children with OCD were engaged in ordering and arranging behaviour and/or were preoccupied with a need for symmetry (Shafraan, Rachman, & Teachman, 2001). For many parents, compulsive ordering and arranging is the first sign that their child is encountering problems. The prominence of ordering and arranging in childhood OCD is not matched by a comparable prominence in adult OCD,

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suggesting that the problem gradually wanes in intensity or is perhaps overshadowed by the emergence of more intrusive problems. Of course, not all ordering and arranging behaviour is abnormal and the dividing line between normal and abnormal aspects of this compulsive activity remains to be determined. It is an important feature of socially meaningful ritualistic behaviour in many cultures (Dulaney & Fiske, 1994; Fiske & Haslam, 1997). Given the wide range of data about obsessional and compulsive phenomena in the normal population (see review by Gibbs, 1996), it is quite likely that ordering and arranging behaviour occur, and can be investigated in both normal and clinical samples. Indeed, it has been reported as one of many types of behaviour engaged in by normal participants in a study of normal rituals (Rassin, Merckelbach, Muris & Stapert, 1999).

It is possible that this compulsion serves the same purpose as many other compulsions - to reduce anxiety (Rachman & Hodgson, 1980). People with ordering and arranging compulsions may feel that by obtaining control over a small part of their external environment (which may also include an internal sense of being “just right”), they can feel safe and/or more in control of the rest of their environment. This is similar to some conceptualizations of eating disorders, in which it is hypothesized that some of these patients restrict their diets because they feel that weight is one of the few things that they can control - and this limited control provides some relief from a perceived chaotic world (Fairburn, Shafran & Cooper, 1999; Rodin, 1977). This similar formulation may account for the strong overlap between eating disorders and the specific subtype of ordering and arranging within OCD found by Matsunaga and colleagues (1999). Theoretical and established areas of overlap between eating disorders and compulsive disorders are common. These include Thought-Action Fusion in OCD (Shafran, Thordarson &

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Rachman, 1996) and Thought-Shape Fusion in eating disorders (Radomsky, et al., 2002; Shafran, Teachman, Kerry & Rachman, 1999).

There is also an obvious overlap between OCD and obsessive-compulsive personality disorder (OCPD). This personality disorder is characterized by a “preoccupation with orderliness, perfectionism, and mental and interpersonal control” (American Psychiatric Association, 1994, p.669), and there is no reason to assume that ordering and arranging behaviour in OCD is different from the behaviour in OCPD. The conceptualization of this behaviour as an attempt at gaining more control is applicable to both disorders. OCD ordering and arranging may serve a different *function* - as anxiety reducing behaviour; whereas OCPD ordering and arranging may be done because of a simple preference for orderly environments.

Much like other symptoms of OCD, we would expect that ordering and arranging behaviour lies on a continuum from normal, adaptive, everyday ordering and arranging behaviour to more significant, clinically impairing compulsive ordering and arranging. Certainly, we all need some degree of order in our lives. We tend to sort and arrange things naturally - for convenience (e.g., plates, glasses, pots, are kept in groups/piles in the kitchen), for aesthetics (e.g., pictures tend to hang on our walls level with the floor/ceiling, organized rooms are more appealing, etc.), and for cultural reasons (Dulaney & Fiske, 1994; Fiske & Haslam, 1997). In the absence of any ordering and arranging, it would be more difficult to find the things we need, to manoeuvre safely through our homes, and to live in our complicated physical and social environments.

Some of us tend to prefer more order than others and many people feel as if the objects in their home (e.g., trophies, prized possessions, etc.) have an exact and proper place. Obsessions and compulsions occur in non-clinical populations (Gibbs, 1996); for example, virtually all

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people experience the same types of thoughts as patients with obsessions (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984). We also know that behaviour almost identical to compulsions occurs in non-clinical groups (Muris, Merkelbach & Clavan, 1997; Rassin et al., 1999). It is reasonable to expect then, that a preference for order and some amount of arranging behaviour is prevalent in a majority of people. This hypothesis needs to be tested however, and evidence from other studies of normal undergraduates and community adults suggests that, if it is present, it can be easily detected (Gibbs, 1996).

In order to assess the degree to which this behaviour occurs in non-clinical populations, there is a need for a tool that measures ordering and arranging behaviour. One of the most popular pencil and paper measures of OCD symptomatology has been the Maudsley Obsessional Compulsive Scale (MOCI - Rachman & Hodgson, 1980). Regrettably, none of the 30 items in this scale assesses ordering or arranging behaviour or a desire for symmetry. The revision of the MOCI, the Vancouver Obsessive Compulsive Scale (VOCI - Thordarson, Radomsky, Rachman, Sawchuk, Shafran & Hakstian, 2003), contains only one relevant item, "I feel upset if my furniture or other possessions are not always in exactly the same position", and it does not adequately assess the full range of ordering and arranging behaviour hypothesized to occur among compulsive orderers and arrangers. While other self-report measures of ordering and arranging behaviour do exist (e.g., the Ordering Scale of the Obsessive-Compulsive Inventory, OCI, Foa et al., 1998; and the Dressing and Grooming Subscale of the revised Padua Inventory, Burns et al., 1996), problems have been suggested regarding the ease of use of the OCI (Thordarson et al., 2003) and both the specificity (Taylor, 1998) and comprehensiveness (Thordarson et al., 2003) of the Padua.

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The development of a new psychometric assessment tool provides an opportunity to gather information about the singularity of the construct. Unlike claustrophobia, which is comprised of both a fear of restriction and a fear of suffocation (Rachman & Taylor, 1993; Radomsky et al., 2001), it is unlikely that ordering and arranging behaviour is made up of highly separable elements. Compulsive ordering and arranging seem to be related to a simple distress or discomfort in the presence of disorderliness and a contrasting calmness in the presence of orderliness. While there are occasional cases that present with concerns about only symmetry, for example, the majority appear to have more general preferences for orderliness.

Idiosyncratic cognitions can underlie this behaviour (e.g., “if my belongings are not properly arranged, my husband will be in an accident” or “if my belongings are not just right, I will have bad luck”) - as with other compulsive behaviour. However, clinicians indicate that ordering and arranging compulsions often occur in the absence of these types of fear-related cognitions. The demonstration of a unitary factor structure within a self-report measure of ordering and arranging behaviour would lend support to this hypothesis, indicating consistency across this behaviour rather than a collection of idiosyncratic manifestations.

Additionally, an experiment in which participants are asked to indicate their preference for both orderly and disorderly environments would provide a more ecologically valid method for assessing the degree to which ordering and arranging preferences are prevalent.

Also, provoking participants who express a strong preference for orderly surroundings, by having them complete a difficult task in a disorderly and disorganized environment, should provide an opportunity to examine the beliefs and cognitions operating in these people *in vivo*, as well as to test the hypothesis that these people are more anxious when they are placed in disorderly surroundings. Should we find elevated anxiety among participants who have a

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preference for order, who are placed in disorderly surroundings, it may provide some indication of how these preferences lead to distress and interference in daily functioning.

In order to evaluate the present conceptualization of normal and abnormal ordering, arranging and symmetry compulsions, a set of psychometric, experimental, and ecologically valid studies was conducted.

### Study 1

**Aim:** The aim of this first study was to develop a psychometric scale (The Symmetry, Ordering and Arranging Questionnaire – SOAQ) to assess beliefs and behaviour associated with compulsive ordering and arranging. The scale was developed to serve as an optional module, to supplement the VOICI (Thordarson, et al., 2003) in cases where a more comprehensive assessment of ordering and arranging behaviour is desired.

### Method – Phase I

Thirty-four items pertaining to compulsive ordering, arranging and a desire for symmetry were formulated by the UBC Fear and Anxiety Disorders Laboratory from both theoretical conceptualizations and clinical presentations of ordering and arranging in OCD. Items were based on clinical reports, on logical extensions of items developed for the Vancouver Obsessional Compulsive Inventory (VOICI – Thordarson et al., 2003), and on extensions of current cognitive behavioural conceptions of OCD.

This scale was distributed to 250 undergraduate psychology students, who were asked to rate each item on a 0 to 4 scale to indicate how strongly they agree with each statement.

Participants were also asked to complete scales that assess both highly and moderately related constructs – e.g., the Maudsley Obsessional-Compulsive Inventory – MOCI (Rachman &



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Hodgson, 1980), the Vancouver Obsessive Compulsive Inventory – VOCI (Thordarson, et al., 2003), the Beck Anxiety Inventory – BAI (Beck & Steer, 1990), and the Beck Depression Inventory II – BDI (Beck, Steer, & Garbin, 1996). Participants were offered course credit upon the return of the completed questionnaires to the lab.

### Participants

We received 211 completed questionnaire packages (a return rate of 84.4%). 74.3% of participants who completed the questionnaires were female. Other participant characteristics are displayed in Table 1.

### Results – Phase 1

#### Inter-item reliability

The inter-item reliability of the 34 items was high, Cronbach's  $\alpha=0.98$ .

#### Factor Structure

Items were subjected to a principal components analysis (without rotation). The best solution (both statistically and conceptually) was a one-factor solution that accounted for 56.7% of the variance. Factor loadings, item means and standard deviations are displayed in Table 2.

Items from the original pool with factor loadings of less than 0.7 (items 9, 10, 17, 23, 29, 31, 33 and 34) were removed. Additionally, items with means at or less than 0.6 (items 5, 7, 14, 16, 24 and 25) were deleted in order to produce a scale that will better discriminate between normal and excessive orderers/arrangers.

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### Method – Phase 2

The revised 20-item SOAQ was distributed to an additional 250 undergraduate psychology students, along with related questionnaires (MOCI, VOICI). Questionnaires which assess problems that are NOT hypothesized to be closely related to compulsive ordering and arranging, such as the BDI, the BAI, the Claustrophobia Questionnaire – CLQ (Radomsky et al., 2001), the Agoraphobic Cognitions Questionnaire – ACQ (Chambless et al., 1984), and the Body Sensations Questionnaire – BSQ (Chambless et al., 1984) were also included. Participants received course credit for completing the questionnaires if/when they returned them to the lab.

### Participants

There were 190 questionnaire packages returned by psychology undergraduate students (a return rate of 76.0%). 72.3% of the participants who completed the questionnaire packages were female. Other participant characteristics are displayed in Table 1.

### Results – Phase 2

#### Inter-item reliability

The inter-item reliability of the SOAQ was high, Cronbach's  $\alpha=0.96$ .

#### Factor structure

The SOAQ data were subjected to a principal components analysis (without rotation) to confirm the factor structure from Phase 1. Again, there was strong evidence for a one-factor solution, accounting for 58.5% of the variance. Eigenvalues for the first five components are displayed in Table 3. Factor loadings, item means and item standard deviations are displayed in Table 2.

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### Convergent and divergent validity

Convergent validity was examined through correlations between the SOAQ and the VOCI total score ( $r=0.64$ ,  $p<0.001$ ), and between the SOAQ and the VOCI “just right” subscale score ( $r=0.72$ ,  $p<0.001$ ). In order to assess divergent validity, these correlations were contrasted with correlations between the SOAQ and other scales (e.g., ACQ, BSQ, CLQ, BAI, BDI, etc.). Correlations between the SOAQ and other self report measures, the BDI ( $r=0.34$ ,  $p<0.001$ ), BAI ( $r=0.44$ ,  $p<0.001$ ), CLQ ( $r=0.41$ ,  $p<0.001$ ), BSQ ( $r=0.37$ ,  $p<0.001$ ) and ACQ ( $r=0.37$ ,  $p<0.001$ ) were significantly lower than those between the SOAQ and OCD measures reported above (all Hotelling’s t-tests for testing differences between dependant correlations (Hotelling, 1940) were greater than 4.11,  $p<0.001$ ).

### Normative Data

This sample of 190 undergraduate students obtained a mean of 18.6 with a standard deviation of 16.0 on the SOAQ. The range of scores obtained by this sample was from 0 to 70 with a possible maximum range from 0 to 80.

### Discussion

This final form of the Symmetry, Ordering and Arranging Questionnaire (SOAQ) is a 20-item self-report scale designed to assess ordering and arranging beliefs and behaviour. Phase 1 of this study reduced a pool of 34 items to the final 20 items and provided a preliminary look at a one-factor structure, and evidence of very good inter-item reliability. Phase 2 of this study confirmed that the SOAQ has a strong and stable one-factor solution accounting for a large

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portion of the variance in the scale. It also confirmed that the SOAQ has very good inter-item reliability as well as very good convergent and divergent validity. Test-retest reliability was investigated in Study 2.

Of course, there are some limitations to this investigation of the psychometric properties of the SOAQ. All of the participants were undergraduate students, the majority of whom were female. We sought to base the development of this scale on an undergraduate sample for several reasons. The most important one is that ordering and arranging behaviour is hypothesized to occur on a continuum. Therefore, we expected to find a wide range of this behaviour in an undergraduate student sample. In fact, the range obtained by this sample (0 to 70) reflects a wide distribution of this behaviour in undergraduate students. A clinical validation was not included in the proposal for this project because of the naturally occurring preferences for order and symmetry in the general population (Gibbs, 1996; also see Study 2).

The one-factor solution of the SOAQ may provide information about the nature and structure of this behaviour. It is proposed that a preference for order and symmetry is either present in some degree or absent, and is not likely the result of multiple beliefs, fears, concerns, etc. We chose initial items for the scale anticipating the possibility that there may be several domains of ordering and arranging behaviour (e.g., only at home, only in the kitchen, motivated by anxiety, motivated by pleasure, etc.) but, consistent with our hypotheses, there appears to be only one. However, it is important to note that the one factor solution found in the current study may result from the homogenous nature of the sample and of the items used in the scale (i.e., having much content addressing stimulus conditions and little content addressing specific appraisals or interpretations). The utility of the SOAQ and information about its psychometric properties is now being determined with a clinical sample of patients with OCD.

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The unitary factor structure of the SOAQ does however warrant further investigation. It may be that the nature of the population used in this validation of the scale is such that more complicated variants of ordering and arranging behaviour were not adequately represented and this leaves the possibility that a clinical validation would result in a different factor structure. Furthermore, the nature of the items and of the validation samples may have contributed to the single factor solutions obtained. Replication of this factor structure in a more diverse sample would be desirable.

The SOAQ may warrant further investigation in association with other constructs. Compulsive ordering and arranging behaviour have been related to the concept of perfectionism. It is not uncommon to hear reports of patients with a perfectionistic style who engage in this type of behaviour. We often associate a sense of things being ‘just right’ with things being ‘perfect’. The role of compulsive ordering and arranging behaviour will likely be different, depending on the personal significance it holds for the individual. In an eating disorder, for example, it might be important for the person to order their food – or even to impose an order on the content and style of their meals; in body dysmorphic disorder, the order and symmetry would be associated with the person’s appearance (e.g., “Is my face symmetrical?”); etc. The prevalence of ordering and arranging behaviour in OCPD and its relation to perfectionism are subjects that remain to be tackled. The relation to perfectionism is probably close, but perfectionism covers a wider range of attitudes and behaviour (e.g., social behaviour, etc.). Similarly, inflated responsibility may be an important psychological factor in compulsive ordering and arranging. If these patients did not feel responsible for the stability or control of their environment, they might not be so driven by this behaviour - or by the desire to achieve the internal and external state of things being “just right”. This formulation is consistent with Salkovskis’s (1985) theory of OCD and also opens

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the way to more detailed cognitive analyses of concepts like perceived control, and feeling “just right”. These other constructs were not the focus of the development of the scale, but their relationships with ordering and arranging behaviour would likely benefit from investigation.

The SOAQ is strongly correlated with other measures of OCD (e.g., the VOICI) and with symptoms of OCD that are consistent with ordering and arranging behaviour (e.g., the VOICI “just right” subscale). These correlations are significantly larger than those between the SOAQ and other scales measuring constructs less relevant to ordering and arranging (i.e., claustrophobia (CLQ), symptoms of depression (BDI), symptoms of anxiety (BAI), and symptoms of panic disorder and agoraphobia (ACQ, BSQ)). This convergent and divergent validity lends support to the specificity of the scale.

However, it is of note that the SOAQ was significantly correlated with all of the scales completed in this investigation. This result could be interpreted as indicating that ordering and arranging behaviour is a non-specific coping strategy for emotional distress; however another interpretation is likely more accurate. Connections between stress and low mood are common. It would not be surprising to find that people who engage in a great deal of ordering and arranging behaviour are particularly depressed. In fact, it has long been established that depression is strongly associated with virtually every anxiety disorder, with the possible exception of specific phobia (see Barlow, 2002; Craske, 1999). It would also not be surprising to find that people who spend a great deal of time ordering and arranging their surroundings are probably anxious, particularly since we are approaching ordering and arranging behaviour as a component of an anxiety disorder (i.e., OCD).

We anticipate that the SOAQ will be useful in a variety of research and clinical applications including examinations of ordering and arranging behaviour in normal adults,

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patients with OCD, patients with OCPD, patients with related problems (e.g., eating disorders), and for measuring treatment progress. It is available from the first author for public use.

### Study 2

**Aim:** The aim of this experiment was to test the hypothesis that people will report a preference for orderly and arranged objects and environments over disorderly objects and environments.

#### Predictions:

1. Participants will indicate a preference for orderly environments (as depicted in photographs).
2. Participants will indicate more uneasiness about being in disorderly environments than they will about being in orderly and arranged environments (as depicted in photographs).
3. The amount of uneasiness in Prediction 2 will be positively correlated with SOAQ scores.

### Method

#### Participants

Seventy-four psychology undergraduate students volunteered to participate in this study. Participants had a mean age of 21.3 (SD=4.27) years. 81.1% of the participants were female. Other participant characteristics are displayed in Table 4.

#### Procedure

Participants were asked to sort 60 photographs into one of six piles, indicating how comfortable/uneasy they would feel if they were in the environment depicted in each of the pictures. The piles were labelled “very uncomfortable”, “uncomfortable”, “slightly uncomfortable”, “slightly comfortable”, “comfortable”, and “very comfortable”. These labels

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were assigned values of 0 to 5, respectively. Participants were asked to visualize themselves in the scene depicted in each picture before placing it in one of the six piles.

Photographs were randomly ordered before being given to the participants for sorting and consisted of 15 pairs of target items and 15 pairs of distractor items. Target items were 30 photographs of 15 scenes. Each (otherwise identical) scene was photographed in both an orderly/arranged condition and a disorderly condition. Distractor items were 30 photographs of different objects or scenes, and consisted mostly of photographs of scenery or of rooms similar to those used in the target photographs.

After sorting the target and distractor items, participants completed the SOAQ, and were asked to return in two week's time to complete it again.

### Results

Overall comfort ratings of orderly target photographs ( $M=3.5$ ,  $SD=0.73$ ) were significantly higher than those of disorderly target photographs ( $M=2.0$ ,  $SD=0.79$ ), paired-samples  $t(73)=14.0$ ,  $p<0.001$ . That is, participants indicated that they would feel significantly more comfortable in the organized scenes than in the disorganized scenes. This preference, measured by the difference between the orderly target mean score and the disorderly target mean score, was highly correlated with SOAQ scores,  $r=0.57$ ,  $p<0.001$ , indicating that participants who scored higher on the SOAQ had a larger difference between their rankings of orderly and disorderly target photographs. A more conservative analysis of this relationship was conducted using a part correlation between SOAQ scores and target differences, controlling for the influence of orderly target scores. This part correlation demonstrated a similar significant relationship,  $r=0.55$ ,  $p<0.001$ .



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### Test-retest reliability of the SOAQ

Of the 74 participants who completed the SOAQ at the time of sorting the photographs, 33 returned to complete the SOAQ a mean of 16.2 ( $SD=9.0$ ) days later. Test-retest reliability was very high, Pearson's  $r=0.92$ ,  $p<0.001$ . Scores at time one ( $M=27.25$ ,  $SD=21.25$ ) were not significantly different from scores at time two ( $M=24.51$ ,  $SD=19.07$ ),  $t(30)=1.87$ , n.s. Similarly, there were no significant differences between the time one SOAQ scores of participants who returned to complete the scale a second time ( $M=27.25$ ,  $SD=21.25$ ) and those who did not ( $M=22.58$ ,  $SD=17.40$ ),  $t(72)=1.04$ , n.s.

### Discussion

Results indicated that participants rated their preference for photographs of organized scenes higher than photographs of disorganized scenes. Participants indicated that they would feel more comfortable/relaxed in organized environments than they would in disorganized environments. Moreover, this preference was present in all but two of the 74 participants who completed Study 2. Additionally, the degree of this preference was strongly correlated with SOAQ scores, indicating that increases in ordering and arranging beliefs and behaviour were associated with increases in the degree to which participants preferred the photographs of orderly scenes over disorderly scenes.

These results support the hypothesis that there is a general reported preference for orderliness over disorderliness in normal adults. This preference is adaptive (imagine a world without order) and it is not surprising to find an association between disorderliness and discomfort. Of course, it would have been more ecologically valid to use actual rooms in orderly

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and disorderly states, but much less practical. Additionally, it would have been interesting to use a third type of photograph, one in which the scene was only slightly disordered. Target photographs used in the study were pairs of photographs of the same scene in drastically different states. For example, one of the orderly target items was a photograph of approximately 10 pairs of shoes, all neatly lined up in a row. The disorderly target matching this item showed the same shoes, but randomly piled. Since few of us live and/or function in surroundings which are completely disorderly, it might be useful to include a set of photographs which shows scenes that are only partially disordered (e.g., 10 pairs of shoes, 9 of which are neatly lined up in a row and one of which has been set askew or upside down). This would provide an indication of how sensitive people are to small amounts of disorderliness.

This study also demonstrates additional convergent validity of the SOAQ. The fact that SOAQ scores were strongly and significantly correlated with the degree of preference of orderly scenes over disorderly scenes, whether measured by a standard correlation coefficient or through a more conservative part correlation, indicates that the SOAQ score can predict the degree to which participants report feeling relaxed/comfortable when imagining themselves in scenes of varying states of orderliness.

Finally, the SOAQ had very high test-retest reliability. This is promising for the potential use of the SOAQ in longer term applications and might also provide an indication of the stability of these types of preferences. Interestingly, the mean SOAQ values obtained in Study 2 appear larger than those found in Study 1. This is likely because of the higher experimental demands of Study 2 and the orientation to ordering and arranging concerns that participants would have received when completing the consent form for Study 2 and from the photograph sorting task.

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Clinicians often report that the treatment of “pure” ordering and arranging compulsions is very difficult and slow compared with the treatment of patients with other subtypes of OCD.

While it has been established that the course of OCD fluctuates over time (Rachman & Hodgson, 1980), the course of “pure” ordering and arranging compulsions may be more stable than that of other subtypes. Alternatively, OCPD, is thought to be highly stable over time (APA, 1994), and perhaps the high test-retest reliability of the scale is simply a reflection of this. One way to resolve these issues would be to examine the test-retest reliability of the scale in a larger sample and over longer periods of time.

### Study 3

**Aim:** The aim of this experiment was to test the hypothesis that people who excessively order and arrange their surroundings are more likely to be disturbed (e.g., feel anxious) when asked to complete a difficult task in disorderly surroundings than are people who do not excessively order and arrange their surroundings.

#### Predictions:

1. Participants who score highly on the SOAQ will be more anxious after preparing a difficult task in a disorderly environment than will high SOAQ scoring participants who prepare the task in an orderly environment.
2. This difference in anxiety will not be significant among participants with low SOAQ scores.

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### Method

Participants from Study 2 were selected for this experiment based on their SOAQ scores. Twenty-four participants with SOAQ scores greater than 0.5 standard deviations above the normative mean were assigned to the High SOAQ group, and twenty-four participants with SOAQ scores lower than 0.5 standard deviations below the normative mean were assigned to the Low SOAQ group.

All participants completed a questionnaire package that included the VOICI, BDI, and the BAI as well as a measure of social anxiety, the Social Phobia and Anxiety Inventory – SPAI (Turner, Beidel & Dancu, 1996). After completion of the questionnaire package, participants provided a baseline measure of anxiety on a subjective units of distress scale (SUDS - reported from 0 - 100). Participants were told that a SUDS score of 0 would represent no anxiety whatsoever and a score of 100 would represent maximal anxiety or panic.

Participants were then told to prepare a 5-minute speech on a topic of their choice, which would be presented to three faculty members. Participants were informed that their speech was to be graded on both its content and style. They were told that because this task often produces some anxiety, they would be given a few minutes and a space in which to prepare their speech.

Participants were then randomly assigned to one of two workspace conditions and were subsequently taken to either a desk in a room which had been put into a standardized orderly and arranged state, or a standardized disorderly state. After 3 minutes, an experimenter asked participants to provide another (post-provocation) SUDS rating to indicate how anxious they were after preparing their speech. Participants were not given instructions about whether or not to alter their workspace, although they were free to do so.

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Participants in the High SOAQ group were then given a very brief interview to assess their cognitions and beliefs about disorderly objects, environments, etc., and about why it was important for them to order and arrange their surroundings. The structured part of the interview consisted of four questions:

1. What kinds of thoughts go through your mind while you are ordering and arranging your surroundings or when you are unable to order or arrange your surroundings?
2. Why do you think you engage in ordering and arranging behaviour?
3. What do you think would happen if you were unable to order or arrange your surroundings?
4. Do you think that this behaviour is excessive? How much of it do you think is acceptable?

Following each question, the interviewer was free to probe for more details or to ask for more information.

Finally, all participants were told that there was no speech to be given and were debriefed from the study.

### Participants

Participants in this study had a mean age of 21.7 ( $SD=5.5$ ) years. 79.2% of participants were female. Other participant characteristics are displayed in Table 5. The high SOAQ group had significantly higher scores on all measures than the low SOAQ group.

### Results

Baseline SUDS ratings for the two groups and two conditions are displayed in Figure 1, and an ANOVA on these data confirm that there were significant differences in baseline SUDS

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ratings between the two conditions,  $F(1,44)=6.26$ ,  $p<0.02$ . Post-provocation SUDS ratings are also displayed in Figure 1.

Because of baseline differences, and to ensure that differences obtained resulted from the state of the room and not from baseline differences in social anxiety, a 2 (group) by 2 (room condition) ANCOVA was conducted on post-provocation SUDS means with baseline SUDS ratings and SPAI scores as covariates.

Results indicated that while participants in the High SOAQ group were significantly more anxious at post-provocation than were participants in the Low SOAQ group,  $F(1,42)=22.37$ ,  $p<0.001$ , there was a significant interaction between condition and SOAQ group,  $F(1,42)=4.07$ ,  $p<0.05$ . Planned univariate one-way ANCOVA's (with SUDS and SPAI scores entered as covariates) confirmed that High SOAQ participants were significantly more anxious after having to prepare their speech in a disorderly environment than in an orderly environment,  $F(1,20)=5.79$ ,  $p<0.03$ , while Low SOAQ participants were not,  $F(1,20)=2.70$ , n.s.

### Interview Results

The 24 participants in the High SOAQ group indicated a narrow range of explanations and beliefs associated with their ordering and arranging behaviour. Two participants indicated that they engaged in ordering and arranging behaviour because it reduced feelings of impending doom, although neither was able to identify a specific threat that they were trying to prevent. The other 22 participants in this group reported a variety of similar explanations for their ordering behaviour. These included "not feeling right" until things were arranged properly, waiting for an internal "click" that would enable them to stop ordering and arranging, and feelings that this type of behaviour would be the only way to reduce general or unspecified anxiety. All 24 participants in this group reported that they felt that this behaviour was

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somewhat irrational and excessive, although all of them also reported that some small to moderate degree of it was necessary to function well in their lives.

### Discussion

The experiment confirmed our hypothesis that people with strong ordering concerns (High SOAQ participants) are significantly more anxious about completing a difficult task (speech preparation) in a disorderly environment than after completing the task in an orderly environment. These participants also appear to be significantly more anxious generally than are participants without strong concerns about ordering and arranging.

By contrast, people without strong ordering concerns (Low SOAQ participants) fail to report more anxiety about completing a difficult task in a disorderly environment than they do about completing a difficult task in an orderly environment.

Post-provocation anxiety results are consistent with those found in other subtypes of OCD. It has been well established that compulsive washers become anxious when exposed to contamination, and that compulsive checkers become anxious when exposed to doubt or uncertainty about the state of the compulsively checked object. It is therefore not surprising that compulsive orderers and arrangers become anxious when asked to complete a difficult task in a disorderly environment. However, since the study of OCD has been almost exclusively limited to compulsive washing and checking (with a few recent contributions in the areas of compulsive hoarding and repugnant obsessions), it was important to establish that the same basic phenomenology applies to compulsive orderers and arrangers as well.

It is of some concern that the baseline differences in anxiety were not between groups but between conditions that had yet to be assigned. It had been planned that baseline anxiety levels

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would be used as a covariate in the analyses, but with the assumption that any differences would be between the Low SOAQ group and the High SOAQ group and not between participants who were about to prepare a speech at a tidy desk and those who were about to prepare a speech at a messy desk. This may simply be the result of variance in the population and a relatively small sample size. A replication of this experiment should resolve this issue. An additional limitation of this investigation is that both groups had significant baseline differences on all of the administered psychometric measures (see Table 5). The use of SPAI scores as covariates reduces the concerns raised by this, however it is important to acknowledge this aspect of the data when interpreting the post-test anxiety results.

Results from the brief interview about cognition and beliefs indicate that there may be something about compulsive ordering and arranging behaviour that is quite different from other compulsive behaviour. In most manifestations of OCD, the person engages in compulsive activity to prevent some dreaded event from occurring (Rachman & Hodgson, 1980). Compulsive washers and cleaners commonly attempt to reduce the likelihood of disease or illness. Compulsive checkers commonly attempt to reduce the likelihood of harm; that their stove will cause a fire; that they accidentally ran someone over and didn't stop; that they have left the water running and will run up a large bill; etc. Knowledge about other subtypes of OCD is consistent with this conceptualization (e.g., compulsive hoarders often try to ensure that they will be prepared by having appropriate supplies or documentation; patients with blasphemous obsessions try to avoid going to hell, etc.). However, this preliminary investigation of ordering and arranging has shown that this may not always be the case. It appears as if High SOAQ orderers and arrangers engage in this behaviour as an anxiety-reducing (discomfort-reducing?) technique but not as a threat-reducing technique. None of the participants in the High SOAQ



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group were able to articulate a specific threat that would present itself should they be unable to order and arrange their surroundings.

It seems unlikely that clinical manifestations of compulsive ordering and arranging behaviour would be drastically different from that seen in the High SOAQ group used in this investigation (see Gibbs, 1996). It could be a concern to cognitive theorists that there do not appear to be any threat related cognitions involved in compulsive ordering and arranging, although this is a preliminary investigation.

One other possibility is that instead of direct threat-related cognitions maintaining compulsive ordering and arranging (e.g., “I must keep my belongings orderly and arranged or I will never be able to find anything in my home”), broader based cognitions may be at work (e.g., “Ordering and arranging makes me feel more in control of my life”, “When I order my belongings, I can achieve a sense that things are ‘just right’ ”, or “ordering and arranging helps me to cope with my terrible memory”). These types of thoughts and beliefs were not assessed in the current study but could advance our understanding of compulsive ordering and arranging concerns and on the apparent lack of threat-relevant cognitions in association with this type of compulsive behaviour.

### Overall Discussion

The three studies are exploratory investigations of compulsive ordering and arranging behaviour. The first study enabled the development of the Symmetry, Ordering and Arranging Questionnaire (SOAQ), a self-report measure with good initial psychometric properties, including very high inter-item reliability, a one-factor solution, and good convergent and divergent validity. The second study provided additional information on the validity of the

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SOAQ, its test-retest reliability, and also established that reported preferences for order are common in normal adults. The third study showed that people who endorse ordering and arranging behaviour experience anxiety in disorderly or disorganized environments. Anxiety in compulsive ordering and arranging is consistent with other subtypes of OCD, but the beliefs and cognitions associated with ordering and arranging may be somewhat different.

Of course, these investigations have only partially answered several important questions about ordering and arranging behaviour and raised many new ones. There are reasons to expect a single factor associated with measures of ordering and arranging behaviour, but it is possible that a future validation of the SOAQ using clinical populations or a more diverse sample might prove differently. In addition to the reasons for expecting a single factor listed above (e.g., clinical impressions, possible lack of threat-related cognitions, use of undergraduate validation sample, etc.), there are neuropsychological models of OCD (see Tallis, 1997 for a review) that might implicate ordering and arranging behaviour as a basic prepared response to disorderliness. As such, it would be difficult to argue that ordering and arranging behaviour should be multifactorial. However there is evidence that strictly neuropsychological approaches to understanding OCD may be inadequate (Radomsky & Rachman, 1999; Radomsky, Rachman & Hammond, 2001).

It is reasonable to assume that there are adaptive preferences for order, as well as for cleanliness, for stability, for confidence, etc. (see Dulaney & Fiske, 1994; Fiske & Haslam, 1997). We might also assume that a similarly adaptive uneasiness occurs with disorder, contamination, uncertainty and even for the basic movements of reptiles and insects (possible carriers of disease). These tendencies are likely at least partially accounted for by genetic and neuropsychological factors. They would result in an internal negative reinforcement of

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situations where, for example, order replaces disorder, and uneasiness subsequently subsides.

The finding that all but two participants indicated feeling more relaxed in ordered surroundings than in disordered surroundings in the photograph sorting study lends support to a basic calmness and ease in association with an orderly environment. A genetic and/or neuropsychological analysis of prepared responses to disorder is not within the scope of this investigation; however future studies of this nature – or even the use of tachistoscopic studies of comparisons between reactions to ordered and disordered scenes – might provide an indication of how basic these processes are to human functioning.

The current investigations did not examine possible gender differences in preferences for order. Certainly stereotypic descriptions of males tend to indicate that they are much less “tidy” than females (see Gunter & Gunter, 1991). The development of the SOAQ enables controlled research on gender differences in this behaviour. These differences were not a focus of the current studies because of our interest in examining the basic structure and function of the behaviour but would certainly be easy to examine in future work of this type.

One issue common to compulsive ordering and arranging that was not assessed in the current set of investigations was mental ordering or prioritizing. It is not uncommon for patients with these concerns to report that they also engage in a great deal of mental ordering or prioritizing before they can begin the physical ordering and arranging of their surroundings. An investigation of this more complex mental aspect of this behaviour would follow well from the investigations reported above.

It would not be surprising to find that the *form* of ordering and arranging behaviour in association with other disorders and personality styles is much like that observed in obsessive-compulsive disorder; however there are likely to be differences in the *function* of this behaviour

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in these other groups. More specifically, ordering and arranging in the context of OCD might serve the function of an external search for internal feelings or cues of certainty and safety, whereas in OCPD and perfectionism, it might serve the function of providing external and objective indications of correctness. Of course, there is overlap here as there is between the two disorders, but a proper functional analysis of ordering and arranging behaviour within the disorder in question is likely to be most fruitful in explaining its nature and function. These issues are empirical in nature and would be best addressed by experimental analyses of ordering and arranging behaviour in different normal and clinical populations, and by determining the relation of ordering and arranging to perfectionism.

Other useful follow-ups, in addition to the ones suggested above, include possible investigations of the relationships between some of the factors that have been established in other subtypes of OCD (e.g., inflated responsibility, thought-action fusion, neutralization, etc.) and behaviour associated with compulsive orderers and arrangers. One would suspect that in addition to these factors, a need for control and/or certainty might be particularly relevant to ordering and arranging and provocations which result in a lack of control or in uncertainty might lead to amplified ordering and arranging behaviour in these people.

Before these projects can be undertaken, there is a need for replication of the above findings in a clinical population. Additional behavioural experiments that elicit the uneasiness demonstrated here through placing participants in disorderly surroundings are likely to be fruitful. There would also be much to learn from an examination of the strategies and rules by which these people arrange their surroundings. What are the visual and non-visual cues that indicate that sufficient order has been achieved? Are they similar or different from those of normal participants? Investigations of these issues will likely provide important information

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about the nature of the behaviour both in normal adults and in populations of people who are greatly troubled by their need for things to be ordered, arranged, symmetrical and 'just right'.

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Table 1 – Participant characteristics, Study 1

	Mean	SD	Minimum	Maximum	Maximum possible
Phase 1 (n=211)					
Age	19.3	1.48	16.0	30.0	-
BDI	12.7	9.12	0.0	52.0	63.0
BAI	12.1	9.39	0.0	43.0	63.0
MOCI Total	8.6	5.85	0.0	25.0	30.0
VOCI Total	44.9	30.52	1.0	148.0	220.0
Phase 2 (n=190)					
Age	19.1	1.81	17.0	31.0	-
BDI	11.4	9.00	0.0	49.0	63.0
BAI	14.7	10.42	0.0	49.0	63.0
MOCI Total	9.8	10.13	0.0	26.0	30.0
VOCI Total	43.1	30.98	1.0	156.0	220.0
ACQ	26.3	9.16	14.0	57.0	64.0
BSQ	37.5	11.10	16.0	64.0	64.0
CLQ	32.8	16.85	1.0	88.0	104.0

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Table 2 – Factor loadings, item means and standard deviations, Study 1, Phases 1 and 2

Items	Phase 1			Phase 2		
	Factor	Item	Standard	Factor	Item	Standard
	Loading	Mean	deviation	Loading	Mean	deviation
1. I feel upset if my furniture is not always in exactly the same position.	0.760	0.670	0.931	0.758	0.687	0.901
2. Other people think I spend too much time ordering and arranging my belongings.	0.735	0.609	0.955	0.639	0.615	0.849
3. It is essential that I arrange my clothing in a particular and specific way.	0.727	0.868	1.102	0.724	0.844	0.999
4. I am more at ease when my belongings are “just right”.	0.720	1.308	1.058	0.712	1.447	1.132
5. I cannot go to sleep unless my belongings have been arranged properly.	0.748	0.528*	0.931	-	-	-
6. I must keep my papers, receipts, documents, etc. organized according to a specific set of rules.	0.751	0.821	1.000	0.739	1.111	1.121
7. Ordering and arranging take up so much time that I am prevented from doing important activities in my daily life.	0.740	0.420*	0.747	-	-	-
8. It is important that my belongings are placed in a symmetrical and evenly distributed way.	0.770	0.623	0.892	0.783	0.838	1.097
9. When I am anxious, I find myself arranging and ordering my surroundings much more than usual.	0.676*	0.835	1.019	-	-	-
10. The wall hangings (pictures, posters, etc.) in my home must be exactly even or straight.	0.624*	1.283	1.150	-	-	-

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11. If someone accidentally disturbs my belongings – however slightly, I become bothered or upset.	0.779	0.844	1.028	0.751	0.888	1.022
12. I feel compelled to arrange my possessions until it feels “just right”.	0.846	0.829	1.037	0.844	0.860	1.004
13. When I think that my belongings are out of place, I am uncomfortable or anxious.	0.843	0.733	0.995	0.818	0.721	1.017
14. I cannot leave my desk or workspace until it has been arranged so that it is “just right”.	0.847	0.564*	0.883	-	-	-
15. When I put things away, I feel compelled to do it carefully and precisely.	0.757	0.844	0.925	0.789	0.972	1.046
16. My main problem is that I spend too much time arranging my belongings	0.801	0.415*	0.765	-	-	-
17. Putting objects in order helps to calm me down.	0.685*	0.835	1.024	-	-	-
18. The furniture in my home must be in exactly the “right” spot.	0.855	0.706	0.941	0.810	0.620	0.931
19. I feel calm and relaxed only when objects around me are organized and placed correctly.	0.779	0.807	0.991	0.756	0.972	1.109
20. I feel compelled to arrange cans or boxes of food on my kitchen shelves in a specific way.	0.759	0.611	0.957	0.692	0.905	0.993
21. When I see that my belongings are out of place, I become anxious until I can arrange them properly.	0.867	0.632	0.912	0.873	0.777	1.009
22. I feel compelled to arrange objects so that they are balanced and evenly spaced.	0.800	0.687	0.950	0.794	0.821	1.045
23. Ordering and arranging take up so much of my time that I am often late for appointments, events, etc.	0.671*	0.332*	0.752	-	-	-

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24. I am much more concerned about ordering and arranging than is necessary.	0.812	0.514*	0.857	-	-	-
25. I insist that people not touch my belongings because they might move them out of place.	0.784	0.597*	0.943	-	-	-
26. I feel calm/at ease only when my surroundings are neat and tidy.	0.704	1.000	0.993	0.764	1.212	1.176
27. Even when my home is messy, I keep things organized according to a specific set of rules.	0.735	0.925	1.116	0.770	1.123	1.160
28. Things in my home have a proper and exact place.	0.744	1.142	1.073	0.754	1.168	1.109
29. If I cannot have all of my belongings in a properly arranged manner, I feel that something awful might happen.	0.686*	0.311*	0.707	-	-	-
30. I cannot concentrate unless things are in the right place.	0.771	0.678	0.838	0.793	0.888	1.091
31. It is sometimes difficult to tell whether or not I have arranged things properly.	0.607*	0.613	0.898	-	-	-
32. I don't like to disturb objects once they are properly arranged.	0.775	0.807	0.991	0.689	1.084	1.101
33. Messiness in my home always makes me uncomfortable or anxious.	0.672*	0.920	0.943	-	-	-
34. Cooking items in my kitchen (e.g. pots, pans, measuring cups) must be arranged in a particular way.	0.687*	0.811	1.041	-	-	-

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\*These items were removed based on either their factor loading or mean score.

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Table 3 – Principal components analysis of the SOAQ, First 5 Components, Study 1, Phase 2

Component	Initial Eigenvalues		
	Total	% of variance	Cumulative %
1	11.691	58.46	58.46
2	0.992	4.96	63.42
3	0.891	4.45	67.87
4	0.819	4.10	71.96
5	0.654	3.27	75.24

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Table 4 – Participant characteristics, Study 2, n=74

	Mean	Standard Deviation	Minimum	Maximum
Post-secondary education	2.47	1.70	0.0	9.0
BDI	11.40	8.81	0.0	47.0
BAI	10.90	9.03	0.0	44.0



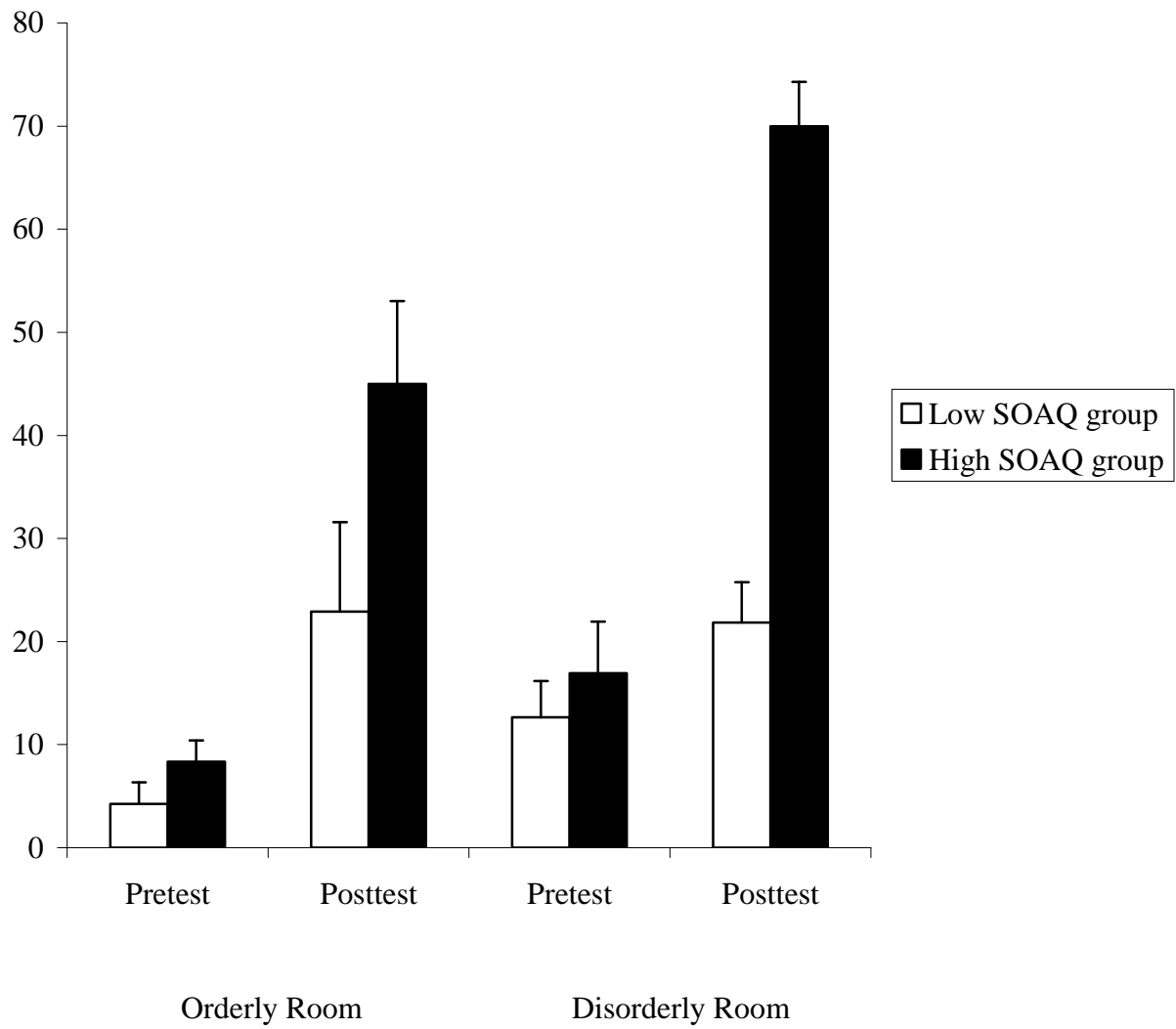
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Table 5 – Participant characteristics, Study 3

Group	SOAQ Score	VOCI Total Score	VOCI “just right” Subscale	BDI	BAI	SPAI
Low SOAQ	4.75 (3.00)	14.25 (18.25)	3.92 (5.09)	6.22 (5.13)	6.25 (6.58)	39.85 (27.96)
High SOAQ*	44.42 (12.96)	59.71 (31.66)	15.57 (8.67)	16.71 (10.38)	15.13 (11.06)	54.36 (19.92)

\*Groups were significantly different on all measures, all  $t$ 's > 2.08,  $p < 0.05$ .

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Figure 1 – Pre- and Post- provocation SUDS ratings, Study 3

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