

RUNNING HEAD: Compulsive checking and anger

Relationships between anger, symptoms and cognitive factors in OCD checkers

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Abstract

The purpose of this study was to examine whether individuals diagnosed with obsessive compulsive disorder (OCD) with primary checking compulsions report higher levels of trait anger and anger expression compared to a student control group, and whether trait anger and anger expression are correlated with specific beliefs and interpretations that are common among individuals who compulsively check. A group of individuals with OCD reporting significant checking compulsions ($n = 33$) and a group of undergraduate students ($n = 143$) completed a questionnaire package that included measures of trait anger and anger expression, as well as measures of obsessive compulsive symptoms and beliefs. The compulsive checking group reported greater trait anger, though not greater anger expression, than the student control group. Furthermore, beliefs concerning perfectionism and intolerance of uncertainty were positively correlated with anger expression and trait anger among compulsive checkers but not among the student control group. The implications of these findings are discussed in terms of cognitive-behavioural treatments for and models of compulsive checking in OCD.

Keywords: OCD, compulsive checking, anger, emotion, beliefs.

Anger in OCD: The role of beliefs in compulsive checking

Although obsessive-compulsive disorder (OCD) is currently classified as an anxiety disorder (APA, 2000), there has been much recent interest in research on the experience of other emotions associated with OCD such as disgust (Berle & Phillips, 2006; Mancini, Gragnani, & D'Olimpio, 2001; Rachman, 2004) and shame/guilt (Mancini & Gangemi, 2004; Rachman, 1993; Shafran, Watkins, & Charman, 1996). We sought to build upon recent work on anger in OCD (Whiteside & Abramowitz, 2004, 2005) as it applies to those who engage in compulsive checking behaviour. We chose this particular symptom of OCD as a focus for this work on anger for a number of different reasons. A 36 year old married female with obsessive compulsive disorder, characterized primarily by checking compulsions and aggressive obsessions said during a therapy session,

I hope you don't take this the wrong way, but I'm worried that I might be full of rage. I get so angry sometimes because I have to keep repeating and checking things; but then I worry that maybe the anger makes me dangerous so I try to shut it down. I'd never do anything harmful to anyone, but sometimes my anger and frustration make me wonder about how safe a person I might be. These emotions sometimes make me think that I'm really a dangerous person and I know that if I could stop checking so much, I wouldn't be so angry and maybe I wouldn't worry so much about this anger getting out of control.

This quote suggests that this patient's feelings of anger and rage are intimately linked to her compulsive checking, and it is typical of the anger and frustration sometimes expressed by individuals with checking compulsions in therapy. Consistent with clinical observations, several studies have noted that individuals with both clinical and sub-clinical levels of OCD report elevated levels of anger compared to individuals without an anxiety disorder (Rubenstein,

Altemus, Pigott, Hess, & Murphy, 1995; Spinella, 2005; Whiteside & Abramowitz, 2005).

Relative to other manifestations of OCD, compulsive checking -- characterized by doubts and repetitive attempts to verify whether an action has been completed properly -- may be associated with greater anger (Rachman & Hodgson, 1980). Rachman and Hodgson suggested that checkers may report higher levels of anger due to the frustration that their doubts are rarely resolved by checking. In other words, because the act of checking rarely results in clear confirmation that harm has been prevented, an individual may experience increased frustration at having to check over time. There are a number of characteristics and beliefs prevalent in OCD, such as intolerance of uncertainty and perfectionism, which may influence doubt and the ability of those who compulsively check to verify whether something has been done properly (OCCWG, 1997). These may well be related to increased anger, as these beliefs are frequently elevated in individuals with OCD (OCCWG, 1997, 2005).

Not only might individuals with compulsive checking in particular experience more anger than individuals without OCD, it may also be the case that they express anger differently from other individuals with OCD (Rachman, 1993; Whiteside & Abramowitz, 2004). Rachman (1993) suggested that the difficulty individuals with OCD have in expressing their anger may stem from the fact that they feel excessively responsible for the prevention of harm. This inflated sense of responsibility has been associated with a number of different forms of OCD (Salkovskis, 1985), but is often most strongly related to compulsive checking (e.g., Lopatka & Rachman, 1995). Rachman (1993) suggested that such excessive responsibility may lead individuals with OCD to express anger internally rather than externally. Recent research also suggests that individuals with OCD not only feel more responsible to prevent harm, but may also believe that other people are less responsible than they are for preventing harm (Ashbaugh,

Gelfand, & Radomsky, 2006). Believing that other people are irresponsible *and* that one must take full responsibility to prevent harm may further contribute to feelings of anger. This is also consistent with clinical observations. For example, a 21 year old female with primarily checking compulsions stated in therapy, “I get very angry at people when they try to make me hurry; all of my checking takes time and people [who do not check] don’t seem to understand it.”

Two recent studies have examined whether individuals with OCD express anger differently compared to individuals without OCD. Whiteside and Abramowitz (2004) found that individuals with subclinical symptoms of OCD report greater anger expression, as assessed by the Spielberger State Trait Anger Expression Inventory (STAXI; Spielberger, 1988), compared to individuals without symptoms of OCD. However, this greater anger expression was not due to their greater *outward* expression of anger, such as verbal or physical aggression; rather, it was due to greater control of anger and inner expression (or suppression) of anger. Additionally, Whiteside and Abramowitz found that the OCD symptoms of washing, checking, and doubting were those most strongly related to anger expression and control. However, after controlling for symptoms of depression, many of these relationships between anger expression and OCD disappeared, though the correlations between anger expression and anger control and checking did remain significant. This last finding complicated matters, as it was therefore unclear whether anger control and the inner expression (suppression) of anger were related to OCD or to depressive symptomatology.

In a follow-up study, using a sample of individuals diagnosed with OCD, Whiteside and Abramowitz (2005) did not find that the STAXI measures of anger expression were elevated relative to a community control group or relative to the normative data reported by Spielberger (1988), though measures of trait anger were significantly higher in the clinical group.

Correlations between OCD symptoms and anger expression revealed no relationship between compulsive checking and anger expression. The authors (Whiteside & Abramowitz, 2005) also examined whether thought-action fusion (TAF), defined as the beliefs that having a negative thought about a bad action/event is morally equivalent to acting on that thought, and/or that it makes the bad event/action more likely to occur (Shafran, Thordarson, & Rachman, 1996), is related to anger expression. They found that only the tendency to report TAF beliefs related to the self were related to anger expression, particularly the inward expression of anger. However, TAF beliefs about others and moral TAF beliefs, which are forms of TAF most related to OCD (Shafran, et al., 1996), were unrelated to overall anger expression, though moral TAF was also significantly correlated with the inward expression of anger.

Although it is possible that OCD is completely unrelated to anger (though this would conflict with anecdotal clinical reports), it may be that the inability to clearly detect differences in anger expression between individuals with OCD and individuals without OCD were due to methodological issues in these two studies. In their first study on anger and OCD symptoms, Whiteside and Abramowitz (2004) relied on a non-clinical sample and used the Maudsley Obsessional Compulsive Inventory (MOCI; Hodgson & Rachman 1977) to assess symptoms of OCD. One of the limitations of the MOCI is the fact that items are answered on a true-false basis. Limited response options reduce respondents' ability to discriminate their responses and this may result in a loss of information (Streiner & Norman, 1995). This may have obscured potential differences between the high and low OCD symptom participants. Recently, a number of new scales have attempted to address this problem by both expanding the scale and using a Likert-type response format, including a revised version of the MOCI, the Vancouver Obsessional Compulsive Inventory (VOCI; Thordarson et al., 2004). This updated scale may

help improve our ability to detect differences between correlates and mechanisms associated with the various symptoms of OCD in anger and anger expression.

Though Whiteside and Abramowitz (2005) attempted to address the first limitation of their earlier paper by examining anger expression among a group of individuals diagnosed with OCD, the fact that their OCD sample was heterogeneous may have reduced their ability to detect differences in anger expression among compulsive checkers. Additionally, in their second study, though they did attempt to examine the relationships between anger expression and OCD-related cognitions, this was only limited to TAF beliefs, which conceptually may not be particularly related to anger or to its expression.

This study attempts to address some of these limitations and to more broadly examine trait anger and anger expression among individuals who compulsively check. Trait anger can be defined as, “individual differences in the disposition to perceive a wide range of situations as annoying or frustrating and by the tendency to respond to such situations with elevations in state anger” (Spielberger, 1999, p.1), whereas anger expression has four major components and generally measures the way in which an individual express anger (Spielberger, 1999, p.1). The four components of anger expression include inward- (suppression) and outward-based aspects of anger expression and anger control. We predicted that individuals diagnosed with OCD, who report checking compulsions as a primary problem, would have higher levels of trait anger and anger expression, especially inward expression and outward control of anger, compared to individuals without OCD. Additionally, we examined the degree to which OCD symptoms and beliefs relate to trait anger and anger expression. We predicted that beliefs concerning perfectionism and intolerance of uncertainty as well as compulsive checking behaviour would be

related to measures of trait anger, whereas inflated responsibility and compulsive checking symptoms would be related to measures of anger expression.

As described above, clinicians have observed that individuals with OCD who compulsively check report elevated levels of anger, however without clearly understanding how these phenomena are related to one another, it is difficult to assess the degree to which they will respond to the same treatment strategies. If certain beliefs characteristic of compulsive checking are found to be related to anger and its expression, this would suggest that targeting such beliefs will not only reduce OCD symptomatology, but may be effective in targeting anger as well.

Method

Participants

Participants consisted of 33 individuals diagnosed with OCD, whose primary symptom was compulsive checking (checking group), and 143 undergraduate students (control group) from Montreal, Quebec, Canada. Compulsive checkers were recruited via advertisements placed in local newspapers, and were provided with cash remuneration in exchange for participation. Participants in the control group were recruited through posters and class announcements at Concordia University, Montreal, Quebec, Canada. These participants either had their name entered in a draw for a cash prize, or received course credit in exchange for participating. The mean age of participants in the checking group was 41.90 ($SD = 16.07$, range 19-73) years, and 54% were female. In the control group, the mean age of participants was 23.89 ($SD = 6.07$, Range 17-60) years, and 75% were female. There was a significant difference in age between checkers and controls, $t(34.01) = 6.36, p < .01$, as well as a significant difference in the sex distributions between the two groups, $\chi^2(1, N = 176) = 5.36, p < .05$.

Participants in the clinical sample had on average 1.03 ($SD = .98$), ranging from 0 to 4, additional diagnoses. These diagnoses included generalized anxiety disorder ($n = 12$), social phobia ($n = 10$), panic disorder with agoraphobia ($n = 6$), depression ($n = 2$), specific phobia ($n = 1$), and hypochondriasis ($n = 1$). In the clinical sample, 30% of participants reported taking medication for their OCD. Twelve percent were prescribed an SSRI, 6% Tricyclic antidepressants, 6% an atypical antidepressant, 18% a Benzodiazepine, and 15% other medications, including mood stabilizers and atypical anti-psychotic medication. (These numbers add up to more than 30% because some participants were taking more than one medication).

Measures

Anxiety Disorders Interview Schedule for the DSM-IV (ADIS-IV; Brown, DiNardo & Barlow, 1994). The ADIS-IV is a semi-structured interview designed to assess for the presence of various anxiety disorders, mood disorders, and to screen out alcohol and substance related disorders based on DSM-IV criteria (American Psychiatric Association, 2000). Ratings of 4 or higher indicate that the person meets the diagnostic criteria for a given disorder. The ADIS-IV has exhibited excellent inter-rater reliability ($\alpha = .77$; Brown, DiNardo, Lehman, & Campbell, 2001), and has shown excellent test retest reliability (DiNardo, Moras, Barlow, Rapee, & Brown, 1993). The ADIS-IV was administered by a graduate level research assistant, who had been fully trained to administer the interview. The ADIS-IV was used to assess for the presence of OCD.

Yale-Brown Obsessive Compulsive Scale (YBOCS, Goodman et al., 1989a). The YBOCS is a 10-item clinician administered interview designed to assess the severity of obsessions and compulsions among individuals diagnosed with OCD. The scale also includes a 64-item checklist that assesses various types of obsessions and compulsions. The interview has

demonstrated acceptable reliability across different raters ($\alpha > .88$) (Goodman et al., 1989a), though some researchers have found somewhat lower levels of internal consistency ($\alpha = .51 - .77$; Woody, Steketee, & Chambless, 1995). Research has demonstrated that the Y-BOCS exhibits excellent test-retest reliability (Kim, Dysken, & Kuskowski, 1990; Kim, Dysken, & Kuskowski, 1992). The Y-BOCS has also demonstrated convergent validity, though it has correlated highly with measures of anxiety and depression (Goodman et al., 1989b). The Y-BOCS was used to assess for OCD symptom severity and to assess the primary nature of checking compulsions.

State Trait Anger Expression Inventory-2 (STAXI-2; Spielberger, 1999). The STAXI-2 is a 57-item self-report inventory that measures the experience, expression, and control of anger. For the purposes of this study, only the scales assessing trait anger and anger expression were examined. The trait anger scale (T-ANG) measures the frequency with which individuals experience anger across time, both without provocation and in response to frustration or negative evaluation. The anger expression index (AX) is a general measure of anger expression. It contains several subscales: anger expression out (AX-O) measures the tendency to express anger verbally or physically, whereas anger expression in (AX-I) measures the tendency to suppress anger inwardly; anger control out (AC-O) measures the tendency for an individual to control the outward expression of anger, and anger control in (AC-I) measures the tendency to control anger by calming down and self-soothing. To account for the sex and age differences between the groups, raw scores on these three composite scores were converted to sex and age specific T-scores and percentile scores established in the initial validation of the scale (Spielberger, 1999). The STAXI-2 has demonstrated adequate reliability on most subscales across age groups ($\alpha >$

.70) with the exception of the AX-O subscale among individuals above the age of 30 (Males $\alpha = .55$; Females $\alpha = .67$) (Spielberger, 1999).

Vancouver Obsessional Compulsive Inventory (VOCI; Thordarson et al., 2004). The VOCI (Thordarson, et al., 2004) is a 55-item self-report questionnaire that assesses a variety of symptoms and characteristics of OCD. Along with a total score, the VOCI also contains 6 subscales, each assessing a specific symptom area of OCD: contamination, checking, obsessions, hoarding, “just rightness,” and indecisiveness. The VOCI exhibits good internal consistency and good test-retest reliability within both a student sample ($\alpha > .83$) and in a sample of individuals with OCD ($\alpha > .85$) (Radomsky et al., 2006; Thordarson et al., 2004). Furthermore, the VOCI exhibits good convergent and divergent validity in both clinical and student populations (Radomsky et al., 2006; Thordarson et al., 2004).

Obsessional Beliefs Questionnaire-44 (OBQ-44; OCCWG, 2005). The OBQ-44 is a 44-item self-report scale designed to measure beliefs related to OCD. The OBQ-44 contains three subscales measuring responsibility and threat estimation (RT), perfectionism and intolerance of uncertainty (PC), and the importance of and control of thoughts (ICT), all which have been identified as beliefs that are implicated in the development and maintenance of obsessive-compulsive symptoms (OCCWG, 1997). The OBQ-44 exhibits high internal consistency ($\alpha > .89$) and good convergent validity (OCCWG, 2005). The OBQ-44 was used to examine how beliefs, particularly responsibility, perfectionism and the intolerance of uncertainty are related to self-reported anger and anger expression.

Beck Depression Inventory – II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report questionnaire measuring depressive symptomatology and was used as a measure of depression for this study. The BDI-II exhibits high internal consistency ($\alpha > .92$)

and excellent test-retest reliability (Beck et al., 1996). Furthermore, this measure demonstrates good convergent and divergent validity (Beck et al., 1996).

Procedure

Prior to completing the questionnaire packages, individuals in the checking group were administered the ADIS-IV to confirm diagnostic status and the Y-BOCS to assess for the severity of obsessions and compulsions. To be included in the checking group, participants were required to report checking as a primary symptom, indicated by the report that checking behaviour was the most distressing and/or interfering, and that checking symptoms were present for at least an hour each day. Checking group participants were also required to be on a stable medication regime. This was defined as having had no changes in medication status for the past three months. Diagnoses of bipolar disorder, substance dependence or a psychotic disorder served as exclusionary criteria for the study among clinical participants. Nonclinical participants were unscreened to create a more representative control group. All participants completed the questionnaires described above and were asked to complete them in one sitting.

Results

Symptom and Belief Measures

A two-way MANOVA with group (checking vs. control) and sex as the between-participant factors and the BDI-II, VOCI total and checking subscale, and OBQ subscale scores as the dependent variables was calculated to determine if there were differences between the two groups and the two sexes with regard to these variables. The main effect of group was significant, $F(6, 161) = 31.02, p < .01$, whereas the main effect of sex approached significance, $F(6, 161) = 2.07, p < .10$. The group x sex interaction, $F(8, 159) = 1.39, n.s.$ was not significant. The group and sex main effects were therefore followed up with univariate

ANOVAs for each dependent variable. As shown in Table 1, which reports the means and standard deviations (in parentheses) for each measure, the checking group scored significantly higher than the control group on all OC related measures, $F_s(1, 166) > 6.13, p_s < .01$, as well as the BDI-II, $F(1, 166) = 14.85, p < .01$. Additionally, on the Y-BOCS checkers scored in the moderately severe range.

With regard to sex, males scored significantly higher on ICT ($M = 31.80, SD = 14.01$) than females ($M = 27.07, SD = 12.65$), $F(1, 166) = 4.76, p < .05$. There were no other main effects for sex, $F_s(1, 166) < 3.28, p_s < .08$.

When age was entered as a covariate, results for the main effects of group or sex did not change.

Anger

To account for differences in sex and age, raw scores on the STAXI-2 were converted to percentile and T-scores using STAXI-2 age and sex norms (Speilberger, 1999).

Normative Comparison

Compulsive checkers scored at the 72nd percentile on the T-ANG whereas controls scored at the 54th percentile. The mean T-score is 50, and T-scores above 60 and below 40 are considered to fall outside the normative range. As shown in Table 2, T-scores for T-ANG were within the normal range for both checkers and controls. Checkers T-ANG T-scores of compulsive checkers were significantly greater than T-ANG T-scores and percentile scores than controls, after controlling for symptoms of depression. For both compulsive checkers and controls, T-scores were within the normal range for AX and all of its subscales. After controlling for symptoms of depression, Checkers scored significantly higher than controls on

AX-O and AC-I T-scores, whereas differences in percentile scores on these two measures approached significance.

Correlations between anger and OCD symptoms and beliefs

To examine the relationships between OCD symptoms and beliefs, depression, and anger, Pearson correlations between the VOCI checking subscale, the OBQ subscales, and BDI-II, with the T-ANG, and AX composite and subscale T-scores of the STAXI-2 were calculated separately for the checking and control groups. As shown in Table 3 and consistent with our hypotheses, T-ANG was significantly and positively correlated with PC and the BDI-II among compulsive checkers. Surprisingly and contrary to expectations, among checkers, T-ANG was significantly negatively correlated with the VOCI checking subscale score.

Among control participants, T-ANG was positively correlated with VOCI checking, all three OBQ subscales, and the BDI-II.

With respect to anger expression among checkers, AX was significantly related to PC and the BDI-II. Both AX-O and AX-I were positively correlated with the BDI-II. With respect to the control subscales, both AC-O and AC-I were significantly negatively correlated with RT, PC, and the BDI-II. Contrary to expectations, AX and its components were unrelated to VOCI checking among compulsive checkers.

Among control participants, AX was also significantly related to all three OBQ subscales and the BDI-II. AX-O and AX-I were significantly correlated with RT, and the BDI-II. AX-O was also significantly correlated with ICT, whereas the AX-I was significantly correlated with VOCI checking, and PC. With respect to measures of anger control, AC-O and AC-I were both negatively correlated with ICT and the BDI-II. AC-O was also significantly correlated with RT. AX and its components were unrelated to VOCI checking among the control participants.

Is trait anger uniquely related to OCD symptoms and/or related beliefs?

We were interested in determining whether or not T-ANG scores were uniquely predicted by symptoms and/or beliefs associated with OCD, after controlling for symptoms of depression. To examine if OCD symptoms and beliefs uniquely predicted trait anger, separate hierarchical regressions for students and checkers were calculated with T-ANG as the dependant variable. The BDI-II was entered in the first step to control for depression and the VOICI-checking subscale, and the 3 OBQ subscales were entered in the second step. Table 4 presents the unstandardized coefficients for step two of the regression.

For checkers, the first step was significant, $R^2(1, 29) = .20, p < .05$, indicating the depression significantly predicted trait anger. The second step was also significant, $R^2(4, 25) = .51, R^2\Delta = .31, p < .05$. Surprisingly trait anger was significantly, but negatively predicted by the VOICI-checking subscale. Contrary to our hypotheses the OBQ-PC did not significantly predict trait anger.

Among students, the first step was also significant, $R^2(1, 137) = .17, p < .01$, as was the second step, $R^2(4, 133) = .24, R^2\Delta = .07, p < .05$. Unstandardized coefficients for the second step indicate that among students trait anger was significantly predicted by the OBQ-ICT and the BDI.

Is anger expression uniquely related to OCD symptoms and/or beliefs?

We were also interested in examining whether the various components of anger expression were unique predictors of OCD symptoms and/or of OCD beliefs. For checkers and students separately, hierarchically regressions for each anger expression variable were calculated. In the first step BDI-II was entered to control for depression, and in the second step

the VOCI-checking, and OBQ subscales were entered. Table 4 presents the unstandardized coefficients for step 2 of each regression that were or nearly were significant.

For checkers, the first step for all regressions involving anger expression (e.g., AX, AX-O, AX-I, AC-O and AC-I) was significant, R^2 s(1, 29) < .13, , $ps < .05$, indicating that the BDI-II significantly predicted anger expression. Step two for AX was also significant, R^2 (4, 25) = .67, $R^2\Delta = .17$, $p < .05$. AX was significantly predicted by both the BDI and the OBQ-PC. For AX-O, the second step indicated that measures of OC beliefs and symptoms did not predict AX-O, R^2 (4, 25) = .23, $R^2\Delta = .11$, n.s.. For AX-I, the addition of beliefs and symptoms in step two approached significance, R^2 (4, 25) = .52, $R^2\Delta = .20$, $p = .06$. Both the BDI-II and the OBQ-PC significantly predicted inward expression of anger. For AC-O, step two also approached significance, R^2 (4, 25) = .56, $R^2\Delta = .17$, $p < .10$. However, only the BDI-II significantly predicted the outward control of anger. Finally, for AC-I, step two was significant, R^2 (4, 25) = .61, $R^2\Delta = .27$, $p < .05$. Both the BDI-II and the OBQ-RT significantly predicted the inward control of anger. Contrary to expectations, VOCI checking was unrelated to any measure of anger expression.

Among students, the first step was significant for all regressions involving anger expression, R^2 s(1, 137) < .03, $ps < .05$, indicating that the BDI-II significantly predicted anger expression. However, step two was not significant for AX, R^2 (4, 133) = .15, $R^2\Delta = .02$, n.s., AX-O, R^2 (4, 133) = .06, $R^2\Delta = .03$, n.s., AX-I, R^2 (4, 133) = .20, $R^2\Delta = .04$, n.s., AC-O, R^2 (4, 133) = .08, $R^2\Delta = .05$, n.s., or for AC-I, R^2 (4, 133) = .10, $R^2\Delta = .02$, n.s..

Discussion

Based on current theories of emotion and psychopathology, on previous research, and on clinical observations, we expected that trait anger and anger expression would differentially

relate to checking symptoms and beliefs. Consistent with our hypotheses and with the findings of Whiteside and Abramowitz (2005), we did find that compulsive checkers reported more trait anger than control participants. Furthermore, consistent with hypotheses, perfectionism and intolerance of uncertainty beliefs were associated with greater trait anger after controlling for OCD symptoms and depressive symptomatology, but only among OCD checkers. Though we did find a relationship between checking symptoms and trait anger, it was in the opposite direction to our prediction. Among checkers, greater self-reported checking was associated with less trait anger, despite the fact that checkers as a group overall reported more trait anger than the student control group. After accounting for depression, the relationships between checking symptoms, beliefs and trait anger were only observed among OCD checkers.

With regard to anger expression, we hypothesized that individuals who compulsively check would report more anger expression compared to controls. We also anticipated that anger expression would be associated with greater checking and stronger beliefs about responsibility. Consistent with our hypotheses, inflated responsibility was correlated with more self-reported anger expression among checkers, although there was no difference between checkers and controls with regard to self-reported levels of anger expression. Additionally, beliefs about intolerance of uncertainty and perfectionism were correlated with anger expression among compulsive checkers. In contrast to expectations, these OCD-related beliefs appeared to be particularly related to less self-reported inward control of anger among checkers. Furthermore, perfectionism and intolerance of uncertainty were also associated with greater inward expression of anger (e.g., greater suppression of anger). These relationships were absent among control participants.

Contrary to results reported by Whiteside and Abramowitz (2004, 2005), we did not find that general distress accounted for the relationship between checking symptoms, beliefs and anger among compulsive checkers. In fact, after controlling for depression, many of the initial correlations remained significant, principally among checkers. In particular, the correlations between perfectionism and intolerance of uncertainty and both trait anger and anger expression appeared to be especially robust. In contrast, within the student sample few of the significant relationships between OCD symptoms, beliefs and anger remained after controlling for BDI scores. This suggests that among compulsive checkers, trait anger and the way in which anger is expressed are uniquely related to symptoms and beliefs. It also speaks to the need to examine these variables separately among the different manifestations of OCD.

One of the most consistent findings was that perfectionism and intolerance of uncertainty were strongly related to both trait anger and anger expression in the checking group. In fact, it was this subscale of the OBQ that was most consistently related to the anger variables. This is consistent with findings in non-clinical samples suggesting that perfectionism may be particularly elevated among compulsive checkers (Ferrari, 1995; Gershuny & Sher, 1995). Perhaps other subtypes of OCD in which perfectionism is particularly relevant might also exhibit elevated levels of anger and anger expression. Whiteside and Abramowitz (2005) did find that symmetry, ordering and arranging compulsions, a symptom of OCD characterized by a desire to make sure that actions or objects in someone's environment are symmetrical and performed to exacting standards (Radomsky & Rachman, 2004), were associated with increased anger expression. This desire to have things done in exactly the right way intuitively seems indicative of elevated levels of perfectionism. Additionally, it would be interesting to examine if other anxiety disorders that are associated with either elevated perfectionism (e.g., social anxiety) or

intolerance of uncertainty (e.g., generalized anxiety disorder) also have a tendency towards elevated trait anger and anger expression. In the case of social anxiety disorder, researchers have indeed found that these individuals exhibit increased anger and poorer anger expression skills, and furthermore that individuals with social anxiety who exhibited more anger were less likely to complete group cognitive-behavioural treatment (Erwin, Heimberg, Schneier, & Liebowitz, 2003). Future research might examine the impact that increased anger and anger expression have on treatment process and/or outcome among individuals who compulsively check.

A question that remains to be answered, however, is why elevated perfectionism and intolerance of uncertainty among compulsive checkers are associated with greater trait anger and anger expression. We could find no studies that have examined the relationship between intolerance of uncertainty and anger. In contrast, there is a wide body of research that demonstrates that perfectionism is associated with elevated trait anger (Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991; Saboonchi & Lundh, 2003; Vallance, Dunn, & Causgrove Dunn, 2006). Frost and colleagues (1990) found that in a sample of undergraduate females using the Frost Multidimensional Perfectionism Scale (FMPS) that greater hostility was associated with concern about mistakes and doubts about actions, whereas obsessive compulsive symptomatology was most strongly related to doubts about actions. Studies assessing the relationships between trait anger and perfectionism as assessed by Hewitt and Flett's (1991) Multidimensional Perfectionism Scale have found that both self-oriented perfectionism (e.g., high standards imposed by the self) and socially prescribed perfectionism (e.g., perceived high standards for the self imposed by society) are related to elevated levels of trait anger (Hewitt & Flett, 1991; Saboonchi & Lundh, 2003). Additionally, though no studies to the best of our knowledge have directly explored anger expression in relation to perfectionism, research has

demonstrated that individuals high in socially prescribed perfectionism are interpersonally more hostile than those lower on this variable of perfectionism (Hill, Zrull, & Turlington, 1997).

In the case of checking, as described by Rachman (1993), the goal may be to eliminate all doubt as to whether the action aimed to prevent a negative outcome has been performed correctly. Unfortunately, because of the nature of evidence required to ensure that the goal is achieved is unclear (e.g., how do you know when you've checked enough?), individuals who compulsively check rarely achieve their goal. It may be that this blockage of goal attainment and the perception that either oneself is not doing enough to attain the goal or that others are somehow blocking attainment of the goal (e.g., because they are believed to be less responsible) (Ashbaugh et al., 2006) lead to elevated levels of anger. This would be broadly consistent with some cognitive appraisal models of anger (e.g., Averill, 1982; Stein & Levine, 1990). Unfortunately, because intolerance of uncertainty and perfectionism were measured together, it is difficult to determine if it is the high standards or the desire to eliminate doubt that best predicts anger.

Contrary to predictions we did not find that inflated responsibility, or intolerance of uncertainty and perfectionism were related to more inward and outward control of anger, but rather surprisingly to *less* control of anger among checkers. In fact, it appears that the significant relationship between anger expression and intolerance of uncertainty, perfectionism and inflated responsibility can be accounted for by the negative relationship between these variables and the control of anger. This negative relationship between anger control and beliefs related to OCD is consistent with findings by Whiteside and Abramowitz (2004, 2005). Though it might be expected that compulsive checkers make more efforts to control their anger, the results of this study might better reflect the idea that these individuals *believe* that they don't control their

anger enough. The very nature of OCD can be conceptualized as reflecting the belief that one is not in control of his/her thoughts. When these individuals feel particularly responsible to prevent harm, and/or have excessively high standards, they may also believe that they are not in control of their emotions – particularly negative ones, such as anger, that could impact others. That is, the belief that one is not in control of the expression of their anger may reflect a general desire to feel in control of one's thoughts and feelings.

Perhaps one of the most surprising findings of this study is the negative correlation between checking symptoms and trait anger among compulsive checkers. We had expected to find the opposite relationship; that is the greater the checking symptoms, the more self-reported trait anger. This finding also makes confusing the fact that, as a group, compulsive checkers reported more trait anger than a student sample. Presumably, compulsive checkers with high VOCI checking scores have more severe OCD than those with elevated but less extreme scores. It may be that individuals with more severe OCD have difficulty reporting trait anger due to their more frequent or intense obsessions. For example, due to TAF beliefs, an individual with OCD may be reluctant to report on paper (i.e., on a questionnaire) that they feel angry because this might mean to them that they are an angry person capable of doing harm to others. Alternatively, they may be motivated to underreport their trait anger because of a desire to appear to the researchers to be a safe individual who will not lose control because of his/her anger. This is consistent with clinical reports that individuals diagnosed with OCD are often preoccupied with how others perceive them (Newth & Rachman, 2001). Future research will need to be conducted to better understand why individuals with more severe checking compulsions report less anger than those with less severe compulsions. Behavioural experiments

in which anger is induced via a frustrating task may be useful to objectively determine if severe compulsive checkers are indeed less angry than mild or moderate checkers.

Future research should examine relationships between perfectionism, intolerance of uncertainty and both anger and its expression in other psychological disorders in which these beliefs are also implicated, such as Generalized Anxiety Disorder and Social Anxiety Disorder, to determine if this relationship is specific to OCD checkers, or if it is perfectionism in general that leads to increased trait anger and anger expression. The fact that perfectionism and intolerance of uncertainty were unrelated to trait anger or anger expression among control participants suggests this relationship might be particular to individuals with checking compulsions, though floor effects cannot be discounted for the absence of a relationship in this group. Furthermore, as evidence suggests that perfectionism can impact on treatment outcome in the case of social phobia (Ashbaugh, et al. 2007; Erwin et al., 2003), research should examine whether it too impacts upon and/or is affected by treatment outcome in the case of compulsive checking.

Though there are some clear limitations of this research, there are several strengths to this study, including the use of a homogenous group of compulsive checkers, and the use of updated measures of both anger (STAXI-2) and obsessive-compulsive symptomatology (VOCI). Though this study did examine anger and anger expression among a homogeneous sample of compulsive checkers, we did not obtain a non-checking sample of individuals with OCD. It is possible that the relationships observed in this study are not specific to compulsive checkers, and instead are characteristic of people with OCD, or anxiety disorders in general. Our understanding of the relationship between anger expression and compulsive checking would benefit from research that includes an anxious control group and perhaps also a non-checking OCD control group.

Additionally, this study used a student sample for the control group. Future research should incorporate a community adult control group since research does suggest that students score differently than community adults on some measures (e.g., Thordarson et al., 2004). Though the observed relationships between anger and OC symptoms and beliefs appear to be robust given the powerful effect sizes and therefore are unlikely to be due to chance alone, our small sample size prohibited us from correcting for family-wise error. Future studies should replicate our findings using a larger sample of individuals with checking compulsions.

To our knowledge, this is the first study to examine anger and anger expression exclusively among a group of compulsive checkers. It is also the first to examine the relationships between a variety of OCD-related beliefs and anger expression, and thus is well positioned to suggest that certain OCD-related beliefs, particularly perfectionism, intolerance of uncertainty, and inflated responsibility, predict anger and anger expression among individuals who compulsively check. Our results indeed suggest that compulsive checkers, possibly because of certain beliefs common among individuals with OCD, report that they experience more anger and express that anger differently than individuals without OCD.

It does not appear to be the case that the symptoms of compulsive checking (e.g., recurrent doubts and checking behaviour) directly relate to increased levels of anger. Rather, results from this study suggest that the act of compulsive checking and the elevated levels of anger among compulsive checkers may be linked by common beliefs and interpretations, particularly regarding perfectionism, intolerance of uncertainty, and inflated responsibility. This suggests that recent appraisal-based models and treatments of OCD that focus on modifying these beliefs, may also be effective in reducing anger and its expression among individuals who compulsively check. It also suggests that anger is an important emotion to be assessed and

addressed in the cognitive-behavioural treatment of compulsive checking in OCD. Future research should explore the clinical implications of these findings, such as whether reductions in perfectionism, intolerance of uncertainty, and inflated responsibility lead not only to a reduction in OCD symptoms but also to a reduction in anger and its expression among individuals who compulsively check.

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Table 1

Mean and (standard deviation) symptom scores for Checkers and Students

	OCD Checking Group	Student Control Group	F^a
<i>N</i>	31	139	
VOCI Total	76.91 (36.82)	37.29 (32.90)	28.70**
VOCI Checking	17.10 (6.02)	3.13 (5.10)	106.86**
Y-BOCS Total	20.52 (4.78)	-	-
Y-BOCS Obsessions	9.15 (2.87)	-	-
Y-BOCS Compulsions	11.36 (2.58)	-	-
RT	61.61 (18.08)	48.86 (18.62)	13.23**
PC	72.52 (16.01)	57.68 (20.04)	18.52**
ICT	34.52 (11.87)	27.08 (13.13)	6.13**
BDI-II	16.45 (11.58)	11.43 (9.32)	14.85**

Note. Values enclosed in parentheses represent standard deviations. VOCI = Vancouver Obsessional Compulsive Inventory (Thordarson et al., 2004). Y-BOCS = Yale-Brown Obsessive Compulsive Scale (Goodman et al., 1989a). The following abbreviations are subscales of the Obsessive Beliefs Questionnaire (OBQ: OCCWG, 2005): RT = Responsibility/Threat Estimation subscale; PC = Perfectionism/Intolerance of Uncertainty subscale; ICT = Importance/Control of Thoughts subscale. BDI-II = Beck Depression Inventory-II (Beck et al., 1996).

^a Degrees of Freedom are 1, 166

** $p < .01$

Table 2

Mean and standard deviation STAXI-2 percentile and T-score differences between Checkers and Students controlling for depression as measured by the BDI-II.

	Raw Scores		Percentile Scores			T-Scores		
	Checkers	Controls	Checkers	Controls	<i>F</i>	Checkers	Controls	<i>F</i>
<i>N</i>	33	142	33	142		33	142	
T-ANG	21.57 (6.20)	18.97 (4.80)	72.03 (26.60)	54.70 (28.66)	4.87*	58.00 (11.06)	51.54 (9.44)	6.03*
AX	39.36 (16.34)	38.41 (12.78)	65.24 (31.12)	62.20 (26.26)	.50	56.18 (12.21)	53.78 (9.50)	.00
AX-O	17.03 (4.63)	15.64 (3.89)	67.24 (30.84)	53.71 (29.81)	3.62 [†]	56.97 (13.66)	50.90 (10.71)	4.85*
AX-I	18.67 (5.35)	17.94 (4.77)	66.24 (31.49)	60.24 (29.33)	.03	56.79 (12.85)	53.55 (11.15)	.10
AC-O	22.18 (5.31)	22.01 (4.71)	38.52 (28.93)	41.62 (26.75)	.02	45.39 (10.78)	47.08 (9.20)	.02

AC-I	22.15	21.14	42.30	38.20	3.68 [†]	47.76	45.92	4.44*
	(5.56)	(5.50)	(28.81)	(25.93)		(9.86)	(9.50)	

Note. Values enclosed in parentheses represent standard deviations. STAXI-2 = State Trait Anger Expression Inventory – 2 (Spielberger, 1999). BDI-II = Beck Depression Inventory-II (Beck et al., 1996). The following abbreviations are subscales or composite scores of the STAXI-2 (Spielberger, 1999): T-ANG = Trait-Anger subscale; AX = Anger Expression composite score; AX-O = Outward Anger Expression subscale; AX-I = Inward Anger Expression subscale; AC-O = Outward Anger Control subscale; AC-I = Inward Anger Control subscale.

* $p < .05$

[†] $p < .10$

Table 3

The relationship between OC symptoms, as measured by the VOICI, and anger, as measured by the STAXI-2.

		RT	PC	ICT	BDI-II	T-ANG	AX	AX-O	AX-I	AC-O	AC-I
VOICI-C	Checkers	-.07	-.03	.21	.13	-.41**	.001	-.14	.11	-.07	-.02
	Controls	.41**	.37**	.21*	.31**	.27**	.13	.06	.26**	.06	-.07
RT	Checkers		.39*	.33	.09	.28	.30	.21	-.09	-.42*	-.46**
	Controls		.69**	.49**	.46**	.33**	.27**	.20*	.22*	-.09	-.21*
PC	Checkers			.31	.38	.47**	.61**	.34	.55**	-.54*	-.53*
	Controls			.45**	.43**	.34**	.19*	.10	.30**	.03	-.12
ICT	Checkers				.09	.20	.08	-.10	.06	-.25	-.03
	Controls				.34**	.35**	.24**	.18*	.11	-.17*	-.18*
BDI-II	Checkers					.45**	.71**	.37*	.56**	-.62**	-.60**
	Controls					.42**	.36**	.18*	.40**	-.17*	-.18
T-ANG	Checkers						.67**	.54**	.36*	-.63**	-.49
	Controls						.54**	.48**	.26**	-.38**	-.38**
AX	Checkers							.71**	.66**	-.89**	-.80**

	Controls	.69**	.40**	-.77**	-.79**
AX-O	Checkers		.39*	-.55**	-.36*
	Controls		.07	-.44**	-.44**
AX-I	Checkers			-.39*	-.28
	Controls			.01	-.03
AC-O	Checkers				.78**
	Controls				.67**

Note. VOCI = Vancouver Obsessional Compulsive Inventory (Thordarson et al., 2004). STAXI-2 = State Trait Anger Expression Inventory-2 (Spielberger, 1999). VOCI-C = Checking subscale of the VOCI (Thordarson et al., 2004). The following abbreviations are subscales of the Obsessive Beliefs Questionnaire (OBQ; OCCWG, 2005): Responsibility/Threat Estimation subscale; Perfectionism/Intolerance of Uncertainty subscale; Importance/Control of Thoughts subscale. BDI-II = Beck Depression Inventory-II (Beck et al., 1996).

The following abbreviations are subscales or composite scores of the STAXI-2 (Spielberger, 1999): T-ANG = Trait-Anger subscale; AX = Anger Expression composite score; AX-O = Outward Anger Expression subscale; AX-I = Inward Anger Expression subscale; AC-O = Outward Anger Control subscale; AC-I = Inward Anger Control subscale.

* $p < .05$

** $p < .01$

Table 4

Unstandardized coefficients and standard errors for significant hierarchical multiple regressions predicting anger and anger expression after accounting for symptoms of depression.

Predictor	Variable	Checkers			Students		
		<i>B</i>	<i>SE</i>	<i>t</i> -value	<i>B</i>	<i>SE</i>	<i>t</i> -value
T-ANG							
	Constant	48.18	9.02	5.34**	41.43	2.37	17.52**
	BDI-II	.38	.15	2.61*	.27	.09	3.04**
	VOCI	-.87	.27	-3.24**	.20	.16	1.30
	VOCI-C						
	RT	.03	.10	.28	.001	.06	.04
	PC	.16	.12	1.34	.05	.05	1.01
	ICT	.17	.15	1.14	.13	.06	2.02*
AX							
	Constant	24.35	8.39	2.90**	-	-	-
	BDI-II	.61	.14	4.48**	-	-	-
	VOCI	-.06	.25	-.25	-	-	-
	VOCI-C						
	RT	.10	.09	1.13	-	-	-
	PC	.30	.11	2.73*	-	-	-
	ICT	-.15	.14	-1.08	-	-	-
AX-I							

	Constant	29.45	10.57	2.79**	-	-	-
	BDI-II	.44	.17	2.54*	-	-	-
AX-O	VOCI	.14	.31	.44	-	-	-
	VOCI-C						
	RT	-.19	.11	-1.64	-	-	-
	PC	.43	.14	3.16**	-	-	-
	ICT	-.07	.17	-.46	-	-	-
AC-O	Constant	76.88	8.54	9.00**	-	-	-
	BDI-II	-.48	.14	-3.45**	-	-	-
	VOCI	-.05	.25	-.23	-	-	-
	VOCI-C						
	RT	-.15	.09	-1.68	-	-	-
	PC	-.17	.11	-1.50	-	-	-
	ICT	-.03	.14	-.27	-	-	-
AC-I	Constant	74.00	7.35	10.07**	-	-	-
	BDI-II	-.43	.12	-3.56**	-	-	-
	VOCI	-.007	.22	-.04	-	-	-
	VOCI-C						
	RT	-.23	.08	-2.90**	-	-	-
	PC	-.16	.10	-1.70	-	-	-
	ICT	.20	.12	1.65	-	-	-

Note. - Indicates that the unstandardized coefficients are not reported because the second step of the regression was not significant. The following abbreviations are subscales or composite scores of the STAXI-2 (Spielberger, 1999): T-ANG = Trait-Anger subscale; AX = Anger Expression composite score; AX-I = Inward Anger Expression subscale; AX-O = Outward Anger Expression subscale; AC-O = Outward Anger Control subscale; AC-I = Inward Anger Control subscale. BDI-II = Beck Depression Inventory-II (Beck et al., 1996). VOCI = Vancouver Obsessional Compulsive Inventory (Thordarson et al., 2004). VOCI-C = Checking subscale of the VOCI (Thordarson et al., 2004). The following abbreviations are subscales of the Obsessive Beliefs Questionnaire (OBQ; OCCWG, 2005): Responsibility/Threat Estimation subscale; Perfectionism/Intolerance of Uncertainty subscale; Importance/Control of Thoughts subscale.

* $p < .05$

** $p < .01$