

Available online at www.sciencedirect.com

SCIENCE @ DIRECT®

Clinical Psychology Review xx (2006) xxx–xxx

**CLINICAL
PSYCHOLOGY
REVIEW**

Anxiety disorders and control related beliefs: the exemplar of Obsessive–Compulsive Disorder (OCD) [☆]

Richard Moulding ^{a,*}, Michael Kyrios ^b^a *Department of Psychology, University of Melbourne, Melbourne, VIC 3010, Australia*^b *Faculty of Life and Social Sciences, Swinburne University of Technology, Melbourne, Australia*

Received 16 June 2005; received in revised form 20 December 2005; accepted 4 January 2006

Abstract

Beliefs about control have been postulated to be important to anxiety and mood disorders. In particular, the phenomenology of Obsessive–Compulsive Disorder (OCD) suggests that it may be an exemplar of an anxiety disorder where control issues related to the self (behavior and thoughts) and world (the external environment) are particularly important. However, only beliefs concerning the need to control thoughts have been incorporated into contemporary theories of OCD. This article summarizes the theoretical and empirical research relevant to control-related beliefs in OCD. It is suggested that discrepancies between an individual's desired level of control and their perceived level of control could contribute to OCD symptoms, and exacerbate the tendency for individuals with OCD to engage in magical ideation and superstitious rituals. Overall, this review demonstrates how consideration of control cognitions could enhance our understanding of OCD and further improve its treatment.

© 2006 Published by Elsevier Ltd.

Keywords: Cognition; Obsessive–Compulsive Disorder; Psychological needs; Magical thinking; Internal external locus of control

1. Introduction

Constructs of control have been implicated in a number of areas of psychology, from physical health to achievement and emotion (Shapiro & Astin, 1998). In particular, both the empirical and theoretical literature link individuals' beliefs regarding control to anxiety and the anxiety disorders, and to depression (e.g., Bandura, 1997). While cognitive models of some anxiety disorders have incorporated control cognitions (Panic Disorder; Generalized Anxiety Disorder), theories of Obsessive–Compulsive Disorder (OCD) have not focused on these concepts, outside of the control of thoughts. This article aims to demonstrate how consideration of more general control beliefs, specifically individual's desire for control and sense of control, may expand cognitive models of OCD.

A number of constructs related to control have been investigated in psychological studies (for reviews, see Shapiro, Schwartz, & Astin, 1996; Skinner, 1995, 1996; Thompson & Spacapan, 1991). In particular, two broad constructs are

[☆] The authors would like to acknowledge Guy Doron and Maja Nedeljkovic for comments on an earlier draft of this paper, and would like to thank the editors and reviewers for their suggested revisions.

* Corresponding author. Tel.: +61 3 8344 8142; fax: +61 3 9349 4195.

E-mail address: moulding@unimelb.edu.au (R. Moulding).

widely accepted and have relevance for anxiety. Firstly, the *sense of control* (SC; often termed perceived control) refers to the individual's belief about what level of control is available within a particular context (Skinner, 1996). For simplicity, this article will refer to a number of related theoretical constructs under the rubric of an individual's sense of control, including internal locus-of-control (Levenson, 1973, 1974) and self-efficacy (Bandura, 1997), although there are differences in conceptualization (Skinner, 1996). Individuals' sense of control is a core construct in many empirical and theoretical investigations of anxiety and the anxiety disorders (e.g., Barlow, 2000; Mineka, Watson, & Clark, 1998). For example, Bandura (1990, 1997) suggests that anxiety results from an individual's low SC and consequent inability to cope with potential threat, leading to avoidant behaviors and disturbing thoughts. This diminished or uncertain sense of control contrasts with the hopelessness and perceived absence of control in depression (Mineka et al., 1998).

The concept of *desire for control* (DC; also termed "need" or "motivation" for control) has long been suggested to be a fundamental human motivation, along with other needs such as attachment and relatedness (Deci and Ryan, 2000; Skinner, 1995; White, 1959; see Doron and Kyrios, 2005, for a discussion of attachment and OCD). The desirability of control has been defined as the individual's general motivation to be able to exert control over events in their life (Burger & Cooper, 1979), and is therefore positively correlated with individual's general SC (Burger, 1992). Individuals with high DC are suggested to be assertive, decisive and active in their lives and prefer to avoid failure or unpleasant situations by manipulating events to ensure desired outcomes (Burger & Cooper, 1979). While DC is conceptualized as a personality trait it can vary in different contexts (Baron & Logan, 1993; Smith, Wallston, Wallston, Forsberg, & King, 1984; Wise, Roos, Leland, Oats, & McCrann, 1996), and is normally distributed in the population (Burger, 1992).

The relationships between perceived and desired control have implications for the individual's psychological and emotional well-being (Evans, Shapiro, & Lewis, 1993). Generally, DC is negatively correlated with trait anxiety (Burger, 1992). However, individuals who have a perceived discrepancy between the level of control they desire and that attained may experience negative psychological consequences, such as anxiety and depression (Baron, Cusumano, Evans, Hodne, & Logan, 2004; Burger, 1984, 1991, 1992; Conway, Vickers, & French, 1992; Evans et al., 1993; Garant & Alain, 1995; Wilkinson & Camove, 1992). For example, Braith, McCullough, and Bush (1988) found that those individuals who experienced increases in anxiety following a relaxation session had higher levels of DC. They suggest that this counterintuitive response to relaxation training may be due to a fear of losing control. Similarly, there are suggestions that those with a high DC also display more physiological reactivity to stress, due to stress undermining their sense of control (Burger, 1992). For example, Lawler, Schmied, Armstead, and Lacy (1990) found that women with Type A behavior and a high DC had larger increases in heart rate than those with a low DC during a mildly stressful task. In the context of dental anxiety, one research group has shown repeatedly that individuals with a high DC and low SC (relevant to dental situations) showed higher fear and distress prior to stressful dental procedures (Baron & Logan, 1993). Further, these individuals were the only group to benefit from a control-enhancing intervention (Law, Logan, & Baron, 1994). Thus, investigations of both general well-being and emotional reactions to specific situations, have found that when individual's SC does not reach the desired level the individual suffers distress and anxiety. Furthermore, in a clinical situation, the suitability of interventions may depend on the individual's underlying pattern of control-related beliefs. Finally, individuals with extreme levels of DC may be particularly vulnerable to anxiety and distress, due to difficulties in achieving the required level of control.

2. Control and Obsessive–Compulsive Disorder (OCD)

While control constructs have been seen to be relevant to anxiety, these concepts have not yet been explicitly incorporated into models of OCD. However, OCD may be an exemplar of an anxiety disorder where control issues relating to the self (emotions and thoughts) and world are particularly important. For example, phenomenological descriptions of OCD have often highlighted the role of control within this disorder. It has been suggested that OCD is characterized by the individual striving to control their thoughts and by using rituals to control the world, and the individual's concern regarding the potential loss of control over their own thoughts and actions (Carr, 1974). Indeed, the first cognitive-behavioral model of OCD suggested that, "...on the basis of clinical experience alone, the centrality of the issue of control appears to exert relatively more influence upon the cognitive appraisals of individuals with obsessive–compulsive ... symptoms" (McFall & Wollersheim, 1979 p.337).

OCD is an anxiety disorder characterized by obsessive thoughts and by compulsive and ritualized behaviors (American Psychiatric Association [APA], 2000). Obsessions are persistent ideas, thoughts, images or impulses, which are unwanted and objectionable (i.e., ego-dystonic), and that cause marked distress or impairment (APA, 2000).

Common obsessive themes include fears of contamination, pathological doubt, somatic obsessions and the need for symmetry, and fears of performing inappropriate or aggressive acts (Attiullah, Eisen, & Rasmussen, 2000). Compulsions are repetitive and deliberate overt or covert acts that are performed to prevent or reduce the distress associated with the obsessions (APA, 2000). The most common compulsive acts include repetitive checking, washing, counting, the need for reassurance seeking or unnecessary confessions, and repetitive attempts to attain symmetry (Attiullah et al., 2000).

Cognitive theories of OCD are relatively recent, but have received a large amount of empirical support and been incorporated into effective treatments (Frost & Steketee, 2002). Cognitive theories propose that individuals with OCD misappraise the significance of normal intrusive thoughts, leading to neutralization strategies such as compulsions in an attempt to ameliorate the potential negative outcomes, which paradoxically serve to worsen the intensity and frequency of the intrusions (Salkovskis, 1985). The misappraisals are due to dysfunctional beliefs, which are based around the themes of (1) inflated personal responsibility over their own and other's safety; (2) thought-action-fusion (TAF; the belief that having a thought is morally or physically similar to causing the consequence it implies) and beliefs concerning the over-importance of thoughts; (3) excessive concerns about the importance of controlling one's thoughts; (4) overestimation of the probability and severity of threat; (5) an intolerance for uncertainty; and (6) perfectionism (Obsessive Compulsive Cognitions Working Group [OCCWG], 1997). In particular, the domains of responsibility, TAF and thought-control have formed the basis for recent models of OCD (Clark & Purdon, 1993; Rachman, 1997, 1998; Salkovskis, 1985; Wells, 1997).

While current theories of OCD have been successful in providing a plausible account for the disorder, the role of control has been largely ignored in recent formulations of OCD, outside of the importance of controlling one's thoughts. This is surprising, given the phenomenology of OCD, as well as potential links between the cognitions identified as OCD-relevant and other control constructs. Beliefs such as the intolerance of uncertainty, perfectionism, inflated personal responsibility, and the need for control of thoughts imply a strong desire for control over events and outcomes, while estimations of threat have often been linked to individual's perceived control over outcomes (Bandura, 1997). Therefore, a detailed examination of control in OCD could further the conceptualization of OCD by contextualizing the OCD-specific research within the wider theoretical literature, as well as aiding treatment through consideration of control cognitions in treatment protocols.

3. Investigations of control and OCD

The recent experimental and theoretical literature has suggested that metacognitive beliefs regarding the need for control of thoughts are important factors in maintaining OCD (Clark, 2004; Clark & Purdon, 1993; Purdon & Clark, 1999; Wells, 1997). Experimental investigations have largely supported the importance of the desire to control thoughts in OCD, with an accumulation of evidence suggesting that individuals with OCD report a greater need to control thoughts than normal or anxiety-disordered control groups (Clark, Purdon, & Wang, 2003; OCCWG, 1997, 2001; Steketee, Frost, & Cohen, 1998; Taylor, Kyrios, Thordarson, Steketee, & Frost, 2002; Wells & Papageorgiou, 1998). In contrast, individuals with obsessions hold a lower sense of control over intrusive thoughts than non-clinical participants (Churchill, 1990; Freeston & Ladouceur, 1997; Ladouceur et al., 2000). Thus, individuals with OCD may have a high desire to control their thoughts, which is not matched by their sense of control over thoughts, leading to distress, and ineffective attempts to regain control through neutralization and thought control strategies (for comprehensive reviews of studies on thought-control in OCD, see Clark, 2004; Purdon & Clark, 2002). However, thought-control is more relevant to intrusions that are inconsistent or threatening to the individual's values and sense of self (i.e., ego-dystonic, Lee & Kwon, 2003; Purdon & Clark, 1999). In contrast, some thoughts would lead to concern regarding control over the environment and dangerous situations, rather than thoughts per se (e.g., those concerning accidents or contamination), suggesting that examination of more general control beliefs is warranted. While limited, some evidence has been obtained regarding general levels of perceived and desired control in OCD.

In studies on sense of control, Zebb and Moore (2003) found that a lower SC in relation to threat was related to higher scores on measures of OC symptomatology in a normal sample, although SC was also related to other measures of anxiety. McLaren and Crowe (2003) found that OC symptoms in both clinical and non-clinical groups were associated with individuals having recently experienced uncontrollable stressful life events, coupled with their strong efforts to control their thoughts. This suggests that stressors undermining an individual's SC may increase attempts to control thoughts and OCD symptoms.

A final study investigated the locus-of-control in various clinical groups presenting with depression or anxiety disorders, including a group of individuals with OCD, and a normal comparison group (Kennedy, Lynch, & Schwab, 1998). Kennedy et al. found that all groups (including the control group) had similar scores on the internal sense of control scale, indicating they equally attributed outcomes to be the result of their own actions. However, the OCD group had the lowest scores of any patient group on a measure of whether outcomes were under the control of others or due to chance, not differing from the control group. The authors suggest these results are due to OCD patients maladaptively securing their internal SC and reducing their external SC through their obsessions and rituals. Further evidence for this suggestion was the moderate to large negative correlation between the internal and powerful other SC scales, a relationship that was not significant in any other group. Thus, individuals with OCD were less likely to see their lives as being under the active influence of others compared to other anxious patients, consistent with clinical descriptions. The lack of a relationship of OC symptoms to lower internal control may be due to the use of a non-threat relevant control measure, as was used in Zebb and Moore's study. That is, individuals with OC symptoms may be particularly mindful of how potential danger undermines their SC, due to their higher levels of DC over the environment. Thus, recent studies have provided some support for individuals with OC symptoms having lowered levels of perceived control, consistent with their higher levels of anxiety; in particular, low perceived control in the face of threat or stress may be relevant to OCD.

There has been little empirical interest in the construct of desire for control in OCD, outside of the desire to control thoughts. Indirect support for OCD being linked with high DC comes from personality studies indicating that OC symptoms are related to higher neuroticism and introversion (Gershuny, Sher, Rossy, & Bishop, 2000; Rector, Hood, Richter, & Bagby, 2002; Sher, Frost, Kushner, Crews, & Alexander, 1989). As Gibbs (1996) notes in her review of non-clinical OCD research, this constellation of personality traits is associated with individuals who "often dislike spontaneity and prefer safety and predictability in order to appease their strong need for control over the environment" (p. 756). Such findings are consistent with evidence suggesting that individuals with OCD display high levels of risk-avoidance (Kennedy, Schwab, & Hyde, 2001; Pföhl et al., 1990; Richter, Summerfeldt, Joffe, & Swinson, 1996), as do non-clinical samples exhibiting OC symptoms (Frost, Sher, & Geen, 1986).

Few studies have directly investigated the relationship between desire for control and OC symptomatology. Using the Vulnerability Schemata Scale, Sookman, Pinard, and Beck (2001) found that need for control was higher in individuals with OCD than in clinical and normal control groups. The authors suggested that need for control in OCD is a dysfunctional response to perceived vulnerability and fear of negative affect (Sookman & Pinard, 2002), and hypothesize that this accounts for the high correlation they found between fear of strong affect and need for control (Sookman et al., 2001).

The most direct investigation of desire for control in OCD was conducted by Brown (2001). In the first part of this study, a combined sample of clinical participants with OCD ($N=10$) and normal participants ($N=26$) were asked to imagine themselves in a situation related to a personally distressing intrusive thought and think about the related negative outcomes. This was followed by the completion of a series of items assessing OCD-relevant beliefs such as threat and responsibility, as well as items related to control (using an adaptation of the Responsibility Questionnaire Rheaume, Ladouceur, Freeston, & Letarte, 1995). The results supported the existence of a desire for control over outcomes, regardless of whether the outcomes were threatening. Further, those individuals whose DC was independent of the threatening outcomes were also more likely to report that severe negative outcomes would occur when they were not in control. This suggests that for those individuals with a generally elevated DC, being asked not to exert that control increases anxiety and the threat value of the negative outcome associated with intrusive thoughts (cf. Sookman & Pinard, 2002). In a second part of the experiment, Brown found that her clinical cohort, but not her non-clinical cohort, experienced a short term increase in their sense of control when they were engaging in active neutralization behavior following exposure to personally-relevant intrusions, perhaps due to their higher DC. Thus, Brown's study provides early support for the existence of a general DC, which is not mediated solely through threat. Furthermore, this desire can lead to an increased likelihood of the appraisal of intrusive thoughts as threatening.

Therefore, studies examining the relationship of control to OC symptomatology have suggested that OC symptoms are associated with a low sense of control over the self and world, particularly when the individual is under threat. Direct investigations of desire for control are more limited, but the evidence is consistent with elevated DC, particularly regarding control of thoughts, being associated with OC symptoms. Further, appraisals of the threat value of intrusive thoughts may be magnified when perceived control does not reach the desired level. The discrepancy between DC and SC in individuals with OC symptoms will likely lead to distress and a motivation to act to increase perceived control, consistent with findings from studies on general anxiety (Baron & Logan, 1993; Burger, 1992). Thus, this discrepancy could provide motivation for compulsive actions. However, the relationship between motivation for control and

obsessive–compulsive symptomatology may vary across subtypes of the disorder, such as those that are linked with magical thinking.

4. The illusion of control and superstition

It has been noted that some individuals with OCD display rituals that are “entirely superstitious” and irrational (Jakes, 1996 p. 17), and even non-pathological contamination fears are “tinged with magical thinking” (Rachman, 2004 p. 1228); indeed, OCD sufferers often bemoan the irrationality of their own rituals. Magical thinking has been broadly defined as (a) the belief that thoughts, words or actions can serve to control situations through rules that are outside of normal cultural concepts of scientific effect or transfer of information (Bolton, Dearsley, Madronal-Luque, & Baron-Cohen, 2002; Woolley, 1997; Zusne & Jones, 1989); or (b) the transfer of energy or information between physical systems solely because of their similarity or contiguity in time and space (Zusne & Jones, 1989). Superstitious behaviors are rooted in magical thinking, and one of their functions may be to assist individuals to regain a sense of control. Such strategies may be utilized even by individuals who objectively disavow superstitious behaviors (for further discussion of models of superstition, see Campbell, 1996; Keinan, 1994; Lindeman, 1998; Woolley, 1997). Indeed, there is considerable evidence suggesting that the need for control can induce both illusory control and magical beliefs.

The illusion of control refers to an individual’s belief that they hold more control in a situation than is objectively present (i.e., an elevated sense of control with respect to the actual level of control held within a situation, Langer, 1975). Investigations of the illusion of control have indicated that it is influenced by a number of situational and individual factors, including the need for an outcome and the desire for control (for a review, see Thompson, Armstrong, & Thomas, 1998). For example, Biner and colleagues found across a number of studies that participants with a higher need for an outcome had more confidence in winning that outcome in games of chance (Biner, Angle, Park, Mellinger, & Barber, 1995; Biner & Hua, 1995; Biner, Huffman, Curran, & Long, 1998). Investigations have suggested that need for an outcome manifested itself in a higher level of DC, which influenced the view of the situation as skill-based (i.e., personally controllable) rather than chance-based (Biner et al., 1998). There is weaker evidence that individuals with a high general level of DC are more likely to display an illusory sense of control (Burger, 1986, 1991; Burger & Cooper, 1979; cf. Burger, 1992; Gollwitzer & Kinney, 1989; Rudski, 2000; Wolfgang, Zenker, & Viscusi, 1984). Finally, Friedland and colleagues investigated the notion that stress undermines an individual’s SC, leading to efforts to regain the perception of control (Friedland, Keinan, & Regev, 1992). Consistent with this hypothesis, stressed individuals were more likely to prefer forms of games that gave an illusory SC, even when it undermined the actual probability of winning (Friedland et al., 1992). Thus, when the need for an outcome or DC is increased, or the individual’s SC is threatened, the individual is motivated to increase their subjective SC over an outcome. Notably, this occurs even when their actions to increase their perceived control have little or no relationship to the objective level of control present within the situation.

Like the illusion of control, superstitious behaviors and magical thinking have often been suggested as acting to increase individuals’ sense of control in low-control circumstances, such as when the individual is under stress (Bolton et al., 2002; Case, Fitness, Cairns, & Stevenson, 2004; Frost et al., 1993; Malinowski, 1948; Vyse, 1997; Woolley, 1997). Empirical studies have found that measures of superstition are correlated with indexes of threat to quality of life (e.g., McCann & Stewin, 1984; Padgett & Jorgenson, 1982), and are positively related to neuroticism (Wiseman & Watt, 2004), trait anxiety (Wolfradt, 1997) and negative mood (Dudley, 2000). Further, magical and superstitious thinking have been experimentally induced when control is undermined (Dag, 1999; Dudley, 1999), and are related to lower levels of perceived control (Tobacyk, Nagot, & Miller, 1988; Tobacyk & Shrader, 1991). Superstitious individuals have been found to be more susceptible to the illusion of control (Blackmore & Troscianko, 1985). Keinan (1994) found that during the 1991 gulf-war in Iraq, levels of magical thinking and superstition were higher in individuals who lived in areas of Israel under threat of missile attack, relative to those in non-threatened areas. This effect was particularly pronounced in individuals with a low tolerance for ambiguity. Keinan suggested the emergence of magical ideation was due to the need for the individual to regain their sense of control when they are placed under stress. More recently, Keinan (2002) investigated superstitious behavior as a function of DC and anxiety related to an upcoming exam. Both variables increased levels of a superstitious behavior (the “knock-on-wood” phenomena), and they were found to interact synergistically, with those both desiring control and under stress demonstrating a far higher level of superstition (see also Case et al., 2004). Thus, superstitious behavior and magical thinking have been found to increase in circumstances that decrease SC or increase DC over an outcome, and that they serve to increase perceived control in such circumstances.

Investigations of superstitious and magical thinking and the illusion of control suggest that people may be likely to bias or distort their thinking in order to restore a threatened sense of control. Similarly, it has been suggested that individuals with OCD may be disturbed by their low sense of control over events that are important to them (Bolton, 1996; Franzblau, Kanadianian, & Rettig, 1995; Frost et al., 1993) or the perceived loss of control over their own behavior (Carr, 1974). Thus, objectively-irrational compulsive behaviors may help to restore feelings of control in threatening situations, when individuals feel that no other avenue for control exists (Aycicegi, Harris, & Dinn, 2002; Bolton, 1996; Frost et al., 1993; McFall & Wollersheim, 1979). Consistent with this proposition, empirical research has consistently linked superstitious and magical beliefs to OC symptoms; the strongest relationships demonstrated with compulsive checking (Bolton et al., 2002; Emmelkamp & Aardema, 1999; Frost et al., 1993; Rosen & Tallis, 1995; Roth & Baribeau, 2000; cf. Sica, Novara, & Sanavio, 2002). For example, Zebb and Moore (2003) found that superstition was related to OC symptoms, but only in females, with the strongest relationship with checking symptoms (as with Frost et al., 1993), and weaker relationships with cleaning. They found that the relationship between superstitious beliefs and OC symptoms was largely reduced when individual's SC was controlled for, although correlations with checking and mental control remained significant. This supports the role of SC in driving both superstition and OC symptomatology, although it suggests some unique relationship between the constructs (Zebb & Moore, 2003).

Further, evidence has linked OC symptoms with the cognitive bias of thought-action fusion (TAF), the belief that thinking about a negative event increases the likelihood of its occurrence (for reviews, see Berle & Starcevic, 2005; Shafraan & Rachman, 2004). More recent investigations suggest that TAF is a specific manifestation of a tendency for individuals with OC symptoms to hold magical beliefs (Amir, Freshman, Ramsey, Neary, & Brigidi, 2001; Einstein & Menzies, 2004a,b; Lee, Cougle, & Telch, 2005; Muris & Mercklebach, 2003). In sum, studies suggest that individuals with OC symptoms may be particularly susceptible to magical thinking, both in the appraisal of thoughts as dangerous, and the selection of response strategies to eliminate the threat. The relationship between desire for control and the illusion of control suggests that extreme discrepancies between DC and SC can produce this elevation in magical thinking found in OCD. The stronger relationship between magical thinking and checking rituals may be because the aim of checking rituals is to prevent future harm. This is impossible to ensure with certainty (Rachman, 2002), which may magnify the likelihood of control discrepancies. Consistent with this suggestion, most "normal" superstitious rituals also aim to prevent future harm (Aeschleman, Rosen, & Williams, 2003; Zebb & Moore, 2003).

5. Implications for treatment

Current OCD treatments are based around the normalization of intrusions and exposure-and-response prevention (ERP). These are likely to help reduce the individual's desire to control thoughts and situations, and improve their perceived control over the occurrence of thoughts. Incorporating the constructs of SC and DC into cognitive-behavioral therapy (CBT) may further assist the development of case conceptualizations and idiosyncratic treatments for individuals with OCD. The relevance of beliefs about control to OCD suggests that it may be particularly important for therapy that clients learn how and when *not* to act to control a situation. Learning strategies of yielding control as opposed to using strategies to regain a sense of control (e.g., compulsive behaviors) may help restore the equilibrium of SC and DC, reducing the motivation to neutralize. Shapiro and Astin (1998) detail a number of strategies for increasing a yielding or accepting mode of control. In particular, clients should learn to recognize when they are experiencing an urge to act driven by a dysfunctional desire to control the situation, and to develop skills not to act on this impulse (particularly through relaxation, cognitive restructuring and other techniques). This may require the consideration of other OCD-related beliefs (e.g., inflated responsibility, threat overestimation), but the focus should be on decisions to act or not in order to gain an unnecessary sense of control.

Therapy techniques should work to increase the client's belief in their ability to yield control, and on their motivation and skills to do so. Identifying successful past examples where the client has yielded control can elevate beliefs in ability. The therapist could also ask the client to identify other daily events that they accept but that could bother them, and question why they choose not to act in these situations. Setting up exposure exercises, role playing and, especially, behavioral experiments would assist in increasing the client's skills and self-efficacy beliefs (Bennett-Levy et al., 2004). The client's commitment to yielding control can be elevated through the use of motivational interviewing techniques such as cost/benefit analyses (Miller & Rollnick, 2002), and Socratic dialogue discussing whether the client has the responsibility to act in such situations and the right to do so (Shapiro & Astin, 1998). Relaxation and related techniques for tolerating uncertainty and negative emotions (Leahy, 2003), would help the client

endure the negative affect associated with the urge to act, so long as it does not interfere with cognitive restructuring. Helpful questions to assist these techniques include, “Where do I desire to gain control, and why?”, “Is this situation within my active control?”, “Will an assertive or yielding approach best address my goals?”, “Can I recognize my desire for control as a want rather than a need?”, and “Am I able to see the uncontrollable nature of many experiences and situations in life?” (based on Shapiro & Astin, 1998).

While the client’s focus would be upon OCD behaviors, for those clients with a generally elevated DC, it may be of use to identify other areas where clients feel a need to control, to illustrate their general need for control and to assist them in gaining skills to yield control. In addition, it could also be useful to identify general life stressors or situations that are undermining the client’s sense of control, as this would contribute to the discrepancy between the client’s DC and SC and thus their motivation to perform OCD-behaviors. Once identified, the therapist would work with the client to improve their skills to either act assertively or to tolerate these situations.

The application of more recent CBT methods may also assist the client in developing a yielding mode of control, for example those from mindfulness-based CBT (Segal, Williams, & Teasdale, 2002) and Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999). Mindfulness-based CBT may be useful in developing strategies for the radical acceptance of thoughts and feelings, particularly as an adjunct to ERP. Such techniques have the potential to allow the client to “step out” of a context-based analysis of their thoughts, centered on issues of control. That is, it allows the individual to be mindful of their thoughts and to observe them, without adding negative sequelae to the thoughts through dysfunctional appraisals that would then lead to increased salience of the thoughts. This would likely reduce the individual’s level of DC and, therefore, when the client is not able to control their thoughts, feelings, or the situation, they would not then have a compromised SC. For example, Twohig, Hayes and Masuda (May 2004) describe a technique where clients are asked to visualize a parade of people walking past them while holding placards. The clients imagine their thoughts appearing on the placards, and they are asked to allow the thoughts to flow past with the parade. This exercise is designed to encourage clients to view thoughts as simply being thoughts, rather than as beliefs that demand action.

6. Summary and future directions

In this article, it has been suggested that perceived disruption of control is important in maintaining anxiety and anxiety disorders. In particular, based on the review of the theoretical literature and empirical studies, it was argued that incorporation of the concepts might prove important to etiological theories of OCD. Given its phenomenology, it is perhaps surprising that such little attention has been given to the role of control cognitions in OCD. However, there is evidence that both anxiety and OC symptoms are associated with lowered levels of sense of control, and weaker evidence that OC symptoms are associated with elevated levels of desired control, both over thoughts and the environment. More importantly, a discrepancy between the concepts, where the desired level of control is not attained, may be an important factor in driving compulsive actions. This conceptualization may help to account for motivational aspects of the disorder (O’Kearney, 1998; Salkovskis & Freeston, 2001), such as why individuals with OCD feel an excessive need to be an active agent in dealing with their intrusions. Furthermore, investigations of the illusion of control and superstition in non-clinical participants suggest that such a discrepancy could lead to the magical and unreasonable nature of compulsions. This is consistent with recent studies suggesting that OCD may be linked to the presence of magical thinking and TAF.

However, it should be noted that studies that investigate DC, SC, magical thinking and OC symptoms concurrently are yet to be undertaken. Such studies would provide direct evidence on the suggested relationship between these constructs, and could prove an important aid to conceptualizing OCD from a cognitive viewpoint. They may also elaborate on the inter-relationship between the cognitions believed to be important in OCD, such as perfectionism, intolerance of uncertainty and responsibility (see also Doron and Kyrios, 2005), as well as the function of such beliefs in relation to control. For example, do responsibility appraisals lead to an elevated motivation to control a situation (“I am responsible and therefore must control this situation”), or do these beliefs work to *provide* a sense of control when the individual is experiencing uncertainty about the self or world (i.e., “I am responsible and therefore in control”)? Salkovskis’ definition of inflated responsibility implies a sense of control over threat, a “pivotal power over eventual negative outcomes that an individual believes he possesses” (Rheume et al., 1995 p. 167); however, these constructs have been found to be partially independent (Lopatka and Rachman, 1995). Clearly, more research is needed to elucidate the relationship between OC relevant constructs and control, which should include measures of both perceived and desired control.

Future investigations of OCD from specific control perspectives may help to delineate more clearly the processes involved in maintaining the disorder. For example, theories of self-efficacy suggest that an individual's belief that an action can cause an outcome (response–outcomes expectations) differs from the individual's confidence in being able to enact the action (self-efficacy belief, Bandura, 1997). Important differences may exist in how these beliefs relate to OCD; for example, magical thinking may work to increase act–outcome beliefs for which the individual already has a reasonable self-efficacy. Further, future studies should experimentally manipulate control-related variables, in order to provide a stronger test of the hypothesis that control beliefs play a causal role in maintaining obsessive–compulsive symptoms. Finally, given the specificity of compulsions within the disorder, the use of domain specific control measures for both DC and SC (such as the Anxiety Control Questionnaire; Rapee, Craske, Brown, & Barlow, 1996) are likely to be more relevant than general control measures (e.g., the Locus of Control Scale; Levenson, 1973; for a discussion of specificity of measures of control, see Baron & Logan, 1993).

In conclusion, this review has focused on the empirical and theoretical literature relating control constructs to anxiety disorders and OCD. While definitive studies have yet to be undertaken, there is reason to consider the interaction between desire for control and sense of control as relevant to the disorders. It is hoped that incorporation of such constructs into models may improve theory and treatment for the anxiety disorders and OCD.

References

- Aeschleman, S. R., Rosen, C. C., & Williams, M. R. (2003). The effect of non-contingent negative and positive reinforcement operations on the acquisition of superstitious behaviors. *Behavioural Processes*, 61, 37–45.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders*, Text Revision (4th ed.). Washington, D.C.: Author.
- Amir, N., Freshman, M., Ramsey, B., Neary, E., & Brigidi, B. (2001). Thought–action fusion in individuals with OCD symptoms. *Behaviour Research and Therapy*, 39, 765–776.
- Attiullah, N., Eisen, J. L., & Rasmussen, S. A. (2000). Clinical features of obsessive–compulsive disorder. *Psychiatric Clinics of North America*, 23, 469–491.
- Aycicegi, A., Harris, C. L., & Dinn, W. M. (2002). Parenting style and obsessive–compulsive symptoms and personality traits in a student sample. *Clinical Psychology and Psychotherapy*, 9, 406–417.
- Bandura, A. (1990). Self-regulation of motivation through anticipatory and self-reactive mechanisms. *Nebraska Symposium On Motivation*, 38, 69–164.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barlow, D. H. (2000). Unravelling the mysteries of anxiety and its disorders from the perspective of emotion theory. *American Psychologist*, 55, 1247–1263.
- Baron, R. S., Cusumano, M. A., Evans, D. C., Hodne, C. J., & Logan, H. (2004). The effect of desired control and anticipated control on the stress of childbirth. *Basic and Applied Social Psychology*, 26, 249–261.
- Baron, R. S., & Logan, H. (1993). Desired control, felt control, and dental pain: Recent findings and remaining issues. *Motivation and Emotion*, 17, 181–204.
- Bennett-Levy, J., Butler, G., Melanick, F., Hackmann, A., Mueller, M., & Westbrook, D. (Eds.). (2004). *Oxford guide to behavioural experiments in cognitive therapy*. Oxford: Oxford University Press.
- Berle, D., & Starcevic, V. (2005). Thought–action fusion: Review of the literature and future directions. *Clinical Psychology Review*, 25, 263–284.
- Biner, P. M., Angle, S. T., Park, J. H., Mellinger, A. E., & Barber, B. C. (1995). Need state and the illusion of control. *Personality and Social Psychology Bulletin*, 21, 899–907.
- Biner, P. M., & Hua, D. M. (1995). Determinants of the magnitude of goal valence: The interactive effects of need, instrumentality and the difficulty of goal attainment. *Basic and Applied Social Psychology*, 16, 53–74.
- Biner, P. M., Huffman, M. L., Curran, M. A., & Long, K. R. (1998). Illusory control as a function of motivation for a specific outcome in a chance-based situation. *Motivation and Emotion*, 22, 277–291.
- Blackmore, S., & Troscianko, T. (1985). Belief in the paranormal: Probability judgements, illusory control, and the 'chance baseline shift'. *British Journal of Psychology*, 76, 459–468.
- Bolton, D. (1996). Annotation: Developmental issues in obsessive–compulsive disorder. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 37, 131–137.
- Bolton, D., Dearsley, P., Madronal-Luque, R., & Baron-Cohen, S. (2002). Magical thinking in childhood and adolescence: Development and relation to obsessive compulsion. *British Journal of Developmental Psychology*, 20, 479–494.
- Braith, J. A., McCullough, J. P., & Bush, J. P. (1988). Relaxation-induced anxiety in a sub-clinical sample of chronically anxious subjects. *Journal of Behavior Therapy and Experimental Psychiatry*, 19, 193–198.
- Brown, A. (2001). Motivators for neutralising behaviour in obsessive–compulsive disorder. Unpublished BA(Hons) Thesis, University of Melbourne, Melbourne.
- Burger, J. M. (1984). Desire for control, locus of control, and proneness to depression. *Journal of Personality*, 52, 71–89.
- Burger, J. M. (1986). Desire for control and the illusion of control: The effects of familiarity and sequence of outcomes. *Journal of Research in Personality*, 20, 66–76.
- Burger, J. M. (1991). The effects of desire for control in situations with chance-determined outcomes: Gambling behaviour in lotto and bingo players. *Journal of Research in Personality*, 25, 196–204.
- Burger, J. M. (1992). *Desire for control: Personality, social, and clinical perspectives*. New York: Plenum Press.
- Burger, J. M., & Cooper, H. M. (1979). The desirability of control. *Motivation and Emotion*, 3, 381–393.
- Campbell, C. (1996). Half-belief and the paradox of ritual instrumental activism: A theory of modern superstition. *British Journal of Sociology*, 47, 151–166.

- Carr, A. T. (1974). Compulsive neurosis: A review of the literature. *Psychological Bulletin*, *81*, 311–318.
- Case, T. J., Fitness, J., Cairns, D. R., & Stevenson, R. J. (2004). Coping with uncertainty: Supersititious strategies and secondary control. *Journal of Applied Social Psychology*, *34*, 848–871.
- Churchill, A. C. (1990). Metacognitive self-efficacy and intrusive thought. Unpublished Ph.D. Thesis, University of Melbourne, Melbourne.
- Clark, D. A. (2004). *Cognitive-behavioral therapy for OCD*. New York: Guilford Press.
- Clark, D. A., & Purdon, C. L. (1993). New perspectives for a cognitive theory of obsessions. *Australian Psychologist*, *28*, 161–167.
- Clark, D. A., Purdon, C. L., & Wang, A. (2003). The Meta-Cognitive Beliefs Questionnaire: Development of a measure of obsessional beliefs. *Behaviour Research and Therapy*, *41*, 655–669.
- Conway, T. L., Vickers Jr., R. R., & French Jr., J. R. P. (1992). An application of person–environment fit theory: Perceived versus desired control. *Journal of Social Issues*, *48*, 95–107.
- Dag, I. (1999). The relationship among paranormal beliefs, locus of control and psychopathology in a Turkish college sample. *Personality and Individual Differences*, *26*, 723–737.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*, 227–268.
- Doron, G., & Kyrios, M. (2005). Obsessive compulsive disorder: A review of possible specific internal representations within a broader cognitive theory. *Clinical Psychology Review*, *25*, 415–432.
- Dudley, R. T. (1999). The effect of superstitious belief on performance following an unsolvable problem. *Personality and Individual Differences*, *26*, 1057–1064.
- Dudley, R. T. (2000). The relationship between negative affect and paranormal belief. *Personality and individual differences*, *28*, 315–321.
- Einstein, D. A., & Menzies, R. G. (2004). The presence of magical thinking in obsessive compulsive disorder. *Behaviour Research and Therapy*, *42*, 539–549.
- Einstein, D. A., & Menzies, R. G. (2004). Role of magical thinking in obsessive–compulsive symptoms in an undergraduate sample. *Depression and Anxiety*, *19*, 174–179.
- Emmelkamp, P. M. G., & Aardema, A. (1999). Metacognition, specific obsessive–compulsive beliefs and obsessive–compulsive behaviour. *Clinical Psychology and Psychotherapy*, *6*, 139–145.
- Evans, G. W., Shapiro, D. H., & Lewis, M. A. (1993). Specifying dysfunctional control mismatches between different control dimensions. *British Journal of Psychology*, *84*, 255–273.
- Franzblau, S. H., Kanadianian, M., & Rettig, E. (1995). Critique of reductionistic models of obsessive–compulsive disorder: Toward a new explanatory paradigm. *Social Science & Medicine*, *41*, 99–112.
- Freeston, M. H., & Ladouceur, R. (1997). What do patients do with their obsessive thoughts? *Behaviour Research and Therapy*, *35*, 335–348.
- Friedland, N., Keinan, G., & Regev, Y. (1992). Controlling the uncontrollable: Effects of stress on illusory perceptions of controllability. *Journal of Personality and Social Psychology*, *63*, 923–931.
- Frost, R. O., Krause, M. S., McMahon, M. J., Peppe, J., Evans, M., McPhee, A. E., et al. (1993). Compulsivity and superstitiousness. *Behaviour Research and Therapy*, *31*, 423–425.
- Frost, R. O., Sher, K. J., & Geen, T. (1986). Psychopathology and personality characteristics of nonclinical compulsive checkers. *Behaviour Research and Therapy*, *24*, 133–143.
- Frost, R. O., & Steketee, G. (2002). *Cognitive approaches to obsessions and compulsions: Theory, assessment, and treatment*. Amsterdam: Pergamon/Elsevier Science.
- Garant, V., & Alain, M. (1995). Perception de controle, desire de controle et sante psychologique. *Revue Canadienne des Sciences du Comportement*, *27*, 251–267.
- Gershuny, B. S., Sher, K. J., Rossy, L., & Bishop, A. K. (2000). Distinguishing manifestations of anxiety: How do personality traits of compulsive checkers differ from other anxious individuals? *Behaviour Research and Therapy*, *38*, 229–241.
- Gibbs, N. A. (1996). Nonclinical populations in research on obsessive–compulsive disorder: A critical review. *Clinical Psychology Review*, *16*, 729–773.
- Gollwitzer, P. M., & Kinney, R. F. (1989). Effects of deliberative and implemental mind-sets on illusion of control. *Journal of Personality and Social Psychology*, *56*, 531–542.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: Guilford Press.
- Jakes, I. (1996). *Theoretical approaches to Obsessive–Compulsive Disorder*. Cambridge: Cambridge University Press.
- Keinan, G. (1994). Effects of stress and tolerance of ambiguity on magical thinking. *Journal of Personality and Social Psychology*, *67*, 48–55.
- Keinan, G. (2002). The effects of stress and desire for control on superstitious behaviour. *Personality and Social Psychology Bulletin*, *28*, 102–108.
- Kennedy, B. L., Lynch, G. V., & Schwab, J. J. (1998). Assessment of locus of control in patients with anxiety and depressive disorders. *Journal of Clinical Psychology*, *54*, 509–515.
- Kennedy, B. L., Schwab, J. J., & Hyde, J. A. (2001). Defence styles and personality dimensions of research subjects with anxiety and depressive disorders. *Psychiatric Quarterly*, *72*, 251–262.
- Ladouceur, R., Freeston, M. H., Fournier, S., Rheaume, J., Dugas, M. J., Gagnon, F., et al. (2000). Strategies used with intrusive thoughts: A comparison of OCD patients with anxious and community controls. *Journal of Abnormal Psychology*, *109*, 179–187.
- Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, *32*, 311–328.
- Law, A., Logan, H., & Baron, R. S. (1994). Desire for control, felt control, and stress inoculation training during dental treatment. *Journal of Personality and Social Psychology*, *67*, 926–936.
- Lawler, K. A., Schmied, L. A., Armstead, C. A., & Lacy, J. E. (1990). Type A behavior, desire for control, and cardiovascular responsivity in young adult women. *Journal of Social Behavior and Personality*, *5*, 135–158.
- Leahy, R. L. (2003). *Cognitive therapy techniques*. New York: Guilford Press.

- Lee, H. -J., Cogle, J. R., & Telch, M. J. (2005). Thought–action fusion and its relation to schizotypy and OCD symptoms. *Behaviour Research and Therapy*, *43*, 29–41.
- Lee, H. -J., & Kwon, S. -M. (2003). Two different types of obsessions: Autogenous obsessions and reactive obsessions. *Behaviour Research and Therapy*, *41*, 11–29.
- Levenson, H. (1973). Multidimensional locus of control in psychiatric patients. *Journal of Consulting and Clinical Psychology*, *41*, 397–404.
- Levenson, H. (1974). Activism and powerful others: Distinctions within the concept of internal–external locus of control. *Journal of Personality Assessment*, *38*, 377–383.
- Lindeman, M. (1998). Motivation, cognition and pseudoscience. *Scandinavian Journal of Psychology*, *39*, 257–265.
- Lopatka, C., & Rachman, S. (1995). Perceived responsibility and compulsive checking: An experimental analysis. *Behaviour Research and Therapy*, *33*, 673–684.
- Malinowski, B. (1948). *Magic, science and religion and other essays*. Garden City, NY: Doubleday Anchor Books.
- McCann, S. J., & Stewin, L. L. (1984). Environmental threat and parapsychological contributions to the psychological literature. *Journal of Social Psychology*, *122*, 227–235.
- McFall, M. E., & Wollersheim, J. P. (1979). Obsessive–compulsive neurosis: A cognitive-behavioral formulation and approach to treatment. *Cognitive Therapy and Research*, *3*, 333–348.
- McLaren, S., & Crowe, S. F. (2003). The contribution of perceived control of stressful life events and thought suppression to the symptoms of obsessive–compulsive disorder in both non-clinical and clinical samples. *Journal of Anxiety Disorders*, *17*, 389–403.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: preparing people for change* (2nd ed.). New York: Guilford Press.
- Minaka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology*, *49*, 377–412.
- Muris, P., & Mercklebach, H. (2003). Thought–action fusion and schizotypy in undergraduate students. *British Journal of Clinical Psychology*, *42*, 211–216.
- Obsessive Compulsive Cognitions Working Group. (1997). Cognitive assessment of obsessive–compulsive disorder. *Behaviour Research and Therapy*, *35*, 667–681.
- Obsessive Compulsive Cognitions Working Group. (2001). Development and initial validation of the obsessive beliefs questionnaire and the interpretation of intrusions inventory. *Behaviour Research and Therapy*, *39*, 987–1006.
- O’Kearney, R. (1998). Responsibility appraisals and obsessive–compulsive disorder: A critique of Salkovskis’s cognitive theory. *Australian Journal of Psychology*, *50*, 43–47.
- Padgett, V. R., & Jorgenson, D. O. (1982). Superstition and economic threat: Germany, 1918–1940. *Personality and Social Psychology Bulletin*, *8*, 736–741.
- Pfohl, B., Black, D., Noyes, J., Russell, Kelly, M., & Blum, N. (1990). A test of the tridimensional personality theory: Association with diagnosis and platelet imipramine binding in obsessive–compulsive disorder. *Biological Psychiatry*, *28*, 41–46.
- Purdon, C., & Clark, D. A. (1999). Metacognition and obsessions. *Clinical Psychology and Psychotherapy*, *6*, 102–110.
- Purdon, C., & Clark, D. A. (2002). The need to control thoughts. In R. O. Frost & G. Steketee (Eds.), *Cognitive approaches to obsessions and compulsions: Theory, assessment and treatment* (pp. 29–43). Oxford: Elsevier.
- Rachman, S. (1997). A cognitive theory of obsessions. *Behaviour Research and Therapy*, *35*, 793–802.
- Rachman, S. (1998). A cognitive theory of obsessions: Elaborations. *Behaviour Research and Therapy*, *36*, 385–401.
- Rachman, S. (2002). A cognitive theory of compulsive checking. *Behaviour Research and Therapy*, *40*, 624–639.
- Rachman, S. (2004). Fear of contamination. *Behaviour Research and Therapy*, *42*, 1227–1255.
- Rapee, R. M., Craske, M. G., Brown, T. A., & Barlow, D. H. (1996). Measurement of perceived control over anxiety-related events. *Behavior Therapy*, *27*, 279–293.
- Rector, N. A., Hood, K., Richter, M. A., & Bagby, R. M. (2002). Obsessive–compulsive disorder and the five-factor model of personality: Distinction and overlap with major depressive disorder. *Behaviour Research and Therapy*, *40*, 1205–1219.
- Rheaume, J., Ladouceur, R., Freeston, M. H., & Letarte, H. (1995). Inflated responsibility in obsessive–compulsive disorder: Validation of an operational definition. *Behaviour Research and Therapy*, *33*, 159–169.
- Richter, M. A., Summerfeldt, L. J., Joffé, R. T., & Swinson, R. P. (1996). The tridimensional personality questionnaire in obsessive–compulsive disorder. *Psychiatry Research*, *65*, 185–188.
- Rosen, K. V., & Tallis, F. (1995). Investigation into the relationship between personality traits and OCD. *Behaviour Research and Therapy*, *33*, 445–450.
- Roth, R. M., & Baribeau, J. (2000). The relationship between schizotypal and obsessive–compulsive features in university students. *Personality and Individual Differences*, *29*, 1083–1093.
- Rudski, J. M. (2000). Illusion of control relative to chance outcomes. *Psychological Reports*, *87*, 85–92.
- Salkovskis, P. M. (1985). Obsessional–compulsive problems: A cognitive-behavioural analysis. *Behaviour Research and Therapy*, *23*, 571–583.
- Salkovskis, P. M., & Freeston, M. H. (2001). Obsessions, compulsions, motivation, and responsibility for harm. *Australian Journal of Psychology*, *53*, 1–6.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy: A new approach to preventing relapse*. New York: Guilford Press.
- Shafan, R., & Rachman, S. (2004). Thought–action fusion: A review. *Journal of Behavior Therapy and Experimental Psychiatry*, *35*, 87–107.
- Shapiro Jr., D. H., & Astin, J. A. (1998). *Control therapy: An integrated approach to psychotherapy, health, and healing*. New York: John Wiley and Sons.
- Shapiro Jr., D. H., Schwartz, C. E., & Astin, J. A. (1996). Controlling ourselves, controlling our world: Psychology’s role in understanding positive and negative consequences of seeking and gaining control. *American Psychologist*, *51*, 1213–1230.
- Sher, K. J., Frost, R. O., Kushner, M., Crews, T. M., & Alexander, J. E. (1989). Memory deficits in compulsive checkers: Replication and extension in a clinical sample. *Behaviour Research and Therapy*, *27*, 65–69.
- Sica, C., Novara, C., & Sanavio, E. (2002). Culture and psychopathology: Superstition and obsessive–compulsive cognitions and symptoms in a non-clinical Italian sample. *Personality and Individual Differences*, *32*, 1001–1012.
- Skinner, E. A. (1995). *Perceived control, motivation, and coping*. Thousand Oaks, California: Sage.

- Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology*, *71*, 549–570.
- Smith, R. A., Wallston, B. S., Wallston, K. A., Forsberg, P. R., & King, J. E. (1984). Measuring desire for control of health care processes. *Journal of Personality and Social Psychology*, *47*, 415–426.
- Sookman, D., & Pinard, G. (2002). Overestimation of threat and intolerance of uncertainty in obsessive compulsive disorder. In R. O. Frost & G. Steketee (Eds.), *Cognitive approaches to obsessions and compulsions: Theory, assessment and treatment* (pp. 63–89). Oxford: Elsevier.
- Sookman, D., Pinard, G., & Beck, A. T. (2001). Vulnerability schemas in obsessive–compulsive disorder. *Journal of Cognitive Psychotherapy*, *15*, 109–130.
- Steketee, G., Frost, R. O., & Cohen, I. (1998). Beliefs in obsessive–compulsive disorder. *Journal of Anxiety Disorders*, *12*, 525–537.
- Taylor, S., Kyrios, M., Thordarson, D. S., Steketee, G., & Frost, R. O. (2002). Development and validation of instruments for measuring intrusions and beliefs in Obsessive Compulsive Disorder. In R. O. Frost & G. Steketee (Eds.), *Cognitive approaches to obsessions and compulsions: Theory, assessment, and treatment*. Oxford: Elsevier.
- Thompson, S. C., Armstrong, W., & Thomas, C. (1998). Illusions of control, underestimations, and accuracy: A control heuristic explanation. *Psychological Bulletin*, *123*, 143–161.
- Thompson, S. C., & Spacapan, S. (1991). Perception of control in vulnerable populations. *Journal of Social Issues*, *47*, 1–21.
- Tobacyk, J. J., Nagot, E., & Miller, M. (1988). Paranormal beliefs and locus of control: A multidimensional examination. *Journal of Personality Assessment*, *52*, 241–246.
- Tobacyk, J. J., & Shrader, D. (1991). Superstition and self-efficacy. *Psychological Reports*, *68*, 1387–1388.
- Twohig, M.P., Hayes, S.C., and Masuda, A. (May 2004). Acceptance and Commitment Therapy as a Treatment for OCD and OCD Spectrum Disorders. Paper presented at the Paper presented at the annual meeting of the Association for Behavior Analysis in Boston, MA.
- Vyse, S. A. (1997). *Believing in magic: The psychology of superstition*. Oxford: Oxford University Press.
- Wells, A. (1997). *Cognitive therapy of anxiety disorders: A practice manual and conceptual guide*. London: Wiley.
- Wells, A., & Papageorgiou, C. (1998). Relationships between worry, obsessive–compulsive symptoms and meta-cognitive beliefs. *Behaviour Research and Therapy*, *36*, 899–913.
- White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, *66*, 297–331.
- Wilkinson, E. J., & Camove, A. S. (1992). Anxiety and desire for control. *New Zealand Journal of Psychology*, *21*, 71–73.
- Wise, S. L., Roos, L. L., Leland, V. L., Oats, R. G., & McCrann, T. O. (1996). The development and validation of a scale measuring desire for control on examinations. *Educational and Psychological Measurement*, *56*, 710–718.
- Wiseman, R., & Watt, C. (2004). Measuring superstitious belief: Why lucky charms matter. *Personality and Individual Differences*, *37*, 1533–1541.
- Wolfgang, A. K., Zenker, S. I., & Viscusi, T. (1984). Control motivation and the illusion of control in betting on dice. *The Journal of Psychology*, *116*, 67–72.
- Wolfradt, U. (1997). Dissociative experiences, trait anxiety and paranormal beliefs. *Personality and Individual Differences*, *23*, 15–19.
- Woolley, J. D. (1997). Thinking about fantasy: Are children fundamentally different thinkers and believers from adults? *Child Development*, *68*, 991–1011.
- Zebb, B. J., & Moore, M. C. (2003). Superstitiousness and perceived anxiety control as predictors of psychological distress. *Journal of Anxiety Disorders*, *17*, 115–130.
- Zusne, L., & Jones, W. H. (1989). *Anomalistic psychology: A study of magical thinking* (2nd ed.). Hillsdale, New Jersey: Lawrence Erlbaum.