Anxiety control and metacognitive beliefs mediate the relationship between inflated responsibility and obsessive compulsive symptoms

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Abstract

Research has indicated that beliefs about inflated responsibility, beliefs about perceived control over anxiety-related events and reactions (anxiety control) and metacognitive beliefs about the need to control thoughts are associated with obsessive compulsive symptoms. In the current study we tested a mediation model of the interactions between these variables in predicting obsessive compulsive symptoms. Thirty-seven individuals with obsessive compulsive disorder and 31 controls completed the following self-report instruments: the Responsibility Attitude Scale, the Anxiety Control Scale, the Beliefs about Need to Control Thoughts sub-scale of the Metacognitions Questionnaire 30, and the Padua Inventory. Mann-Whitney U tests revealed that participants in the clinical group scored significantly higher than those in the non-clinical group on all variables. In the mediation model we found that the relationship between beliefs about inflated responsibility and obsessive compulsive symptoms was fully mediated by anxiety control and beliefs about the need to control thoughts. These findings provide support for the significant role played by beliefs about control in predicting the severity of obsessive compulsive symptoms.

1. Introduction

One of the pillars of the cognitive model of obsessive compulsive disorder (OCD) assumes that intrusive ideas of contamination, guilt and other typically obsessive doubts are catastrophically misinterpreted as intrinsically "true" (Frost and Steketee, 2002). For individuals affected with OCD, thinking about contamination automatically means being contaminated. Given that non clinical individuals also experience mental intrusions and do not interpret them catastrophically, such misinterpretations are pivotal for the development of the OCD (Rachman and de Silva, 1978; Salkovskis, 1985). In turn, catastrophic misinterpretations often lead to an intense use of thought-control strategies that paradoxically increase the frequency of intrusions ultimately resulting in fully developed OCD symptomatology (Clark and Purdon, 1993; de Silva and Rachman, 1992; Salkovskis, 1985).

An individual's inflated sense of responsibility (Salkovskis, 1985), described as a person's tendency to believe that they may be pivotally responsible for causing or failing to prevent harm to themselves or others, has been identified as one of the key beliefs driving obsessive misinterpretations of intrusive thoughts. Indeed the inflated sense of responsibility has been linked to the development of patterns of response that include attempts to neutralize the mental and fearful intrusions of "un-responsibility" (interpreted as moral equivalents of carrying out un-responsible actions) and reduce the distress caused by them (Rachman, 1997; Shafran et al., 1996; Salkovskis et al., 2000). From a broader cognitive viewpoint, individuals with OCD hold the belief that harm is always preventable and people are morally responsible when they fail to prevent harm.

Adrian Wells (2000) has argued that a different set of beliefs from beliefs about inflated responsibility may be crucial in understanding the development of maladaptive

response patterns in OCD. He argues that metacognitive beliefs about need to control thoughts (e.g. "I need to control my thoughts at all times") give rise to an 'inflation' of the importance of the occurrence of intrusions which may be misinterpreted as indicating loss of self-control and lead to invoke rituals as a means of achieving, albeit temporarily, a degree of mental control.

Recent studies have shown that beliefs about the need to control thoughts do contribute to obsessional symptoms independently of beliefs about inflated responsibility, perfectionism and other types of anxious disturbance (Myers and Wells, 2005; Myers et al., 2008). Beliefs about the need to control thoughts are metacognitive due to the fact that they can be considered beliefs about intrusions. They represent a core element in the metacognitive model of OCD (Fisher and Wells, 2008).

It is noteworthy that the construct of beliefs about the need to control thoughts described in the metacognitive model of OCD has parallels with the broader construct of beliefs about perceived control over anxiety-related events and reactions, defined as 'anxiety control' (Rapee et al., 1996). Anxiety control distinguishes external and internal distinction stimuli to be controlled: external threat such as difficult or scary situations and internal anxiety reactions such as heart palpitations and feelings of panic. Anxiety control has been shown to be relevant across a range of anxiety disorders (Rapee et al., 1996; Ruggiero et al., 2012).

No research, to date, has explored the relative contribution of anxiety control and beliefs about the need to control thoughts in predicting obsessive compulsive symptoms. We set about investigating this by: (1) exploring whether beliefs about inflated responsibility, anxiety control and beliefs about the need to control thoughts would differ between clinical and non-clinical participants; and (2) testing a model, in

the combined participant samples, in which beliefs about inflated responsibility would predict anxiety control and beliefs about the need to control thoughts, which in turn would predict obsessive compulsive symptoms.

The above model is theoretically plausible because beliefs about inflated responsibility imply (but do no account for explicitly) the need to control both mental states and external actions. Indeed, it has already been argued that beliefs about inflated responsibility may be too general a construct to be considered as a basis for understanding the specific cognitive 'control' factors leading to obsessive-compulsive symptoms (Myers and Wells, 2005). In other words, the effect of infalted responsibility may be transmitted to obsessive-compulsive symptoms but through more specific constructs directly related to anxiety control and beleifs about the need to control thoughts. This view is in line with the recent and growing focus on transdiagnostic conceptualisations of emotional distress in which perceived control plays a core and mediating role in predicting anxiety symptoms (Boisseau et al., 2010; Hayes, 2002; Wells, 2000).

2. Methods

2.1. Participants

Two groups of participants were recruited to the study. The clinical group comprised of 36 participants (22 females; mean age 34.08 ± 9.92 years) meeting diagnostic criteria for OCD (Diagnostic and Statistical Manual of Mental Disorders, 4th ed., text rev.; American Psychiatric Association, 2000). Additional criteria for inclusion in the study were a minimum age of 18 years, and adequate written language abilities. The sample was recruited from a population that was undergoing initial assessment for

cognitive therapy delivered in the clinical centre of the Cognitive Psychotherapy School directed by the first author. The diagnosis of OCD was made using the Italian version of SCID-I (First et al., 1997; Mazzi et al, 2000). Diagnostic interviews were conducted by psychologists trained in cognitive therapy and in delivering psychometric assessments, including the SCID.

Average illness duration was 4.81 ± 1.28 years with the sample consisting of 12 checkers, 11 doubters, 4 sinners, and 9 washers. Twenty nine participants were taking a selective serotonine reuptake inhibitor, i.e. fluoxetine 40-80 mg, fluvoxamine 250-300 mg or sertraline 100-150 mg. Ten participants showed comorbidity with dysthymia, 16 with social phobia, and 7 with general anxiety disorder. All participants were Caucasian. Eleven had obtained graduate or post-graduate education at University and worked, while 8 were students on a in higher education course. The remaining 17 participants had specialist qualifications and worked. Ninenteen participants were married or had a relationship and children, 12 were married or had a relationship without children, and 5 were single.

Thirty-one participants (23 females; mean age 38.68 ± 14.25 years) without OCD were recruited as control participants matching gender, age, ethnicity, education. Fifteen participants were students in post-graduate higher education while 16 were recruited from a population of qualified nurses in a General Psychiatry Department in Milan, Italy. Sixteen were married or had a relationship with children, 11 were married or had a relationship without children, and 4 were single. The SCID-I was used to verify that the control participants did not meet criteria for OCD or any other clinical disorder.

2.2. Self-Report Instruments

The Padua Inventory (PI; Sanavio, 1988) is a 39-item self-report instrument to assess obsessions and compulsions. We used the revised version produced by Washington State University (PI-WSUR; Burns et al., 1996). Statements included regard fear of contamination (e.g., "I avoid using public toilets because I am afraid if disease and contamination"), checking (e.g., "I have to do things several times before I think they are properly done") and impulses/thoughts about harm (e.g., "At certain moments, I am tempted to tear off my clothes in public"). Responses are required on a 5-point scale ranging from 0 ("not at all") to 4 ("very much") according to the degree of disturbance caused by the thought or behavior. The PI-WSUR is more focused on obsessive symptoms than previous version of the PI and reduces the overlap with other measures of anxiety. In addition, it has shown to possess good internal consistency and test-retest reliability as well as the ability to discriminate between OCD and non-OCD individuals (Burns et al., 1996). In the current sample, the internal consistency was alpha = .95. Although the PI includes several subscales regarding specific OCD symptoms, we preferred to focus on the total score in order to have only one outcome variable and reduce the possibility of Type I error in view of the moderate sample sizes employed. We used the Italian versions of the instrument prepared by Sanavio himself (Sanavio, personal communication, 2013).

The Responsibility Attitude Scale (RAS; Salkovskis et al., 2000) is a 26-item self-report instrument, designed to assess an inflated sense of responsibility and guilty feelings (e.g., "I often feel responsible for things which go wrong" or "I must protect others from harm"). Each item is rated on 7-point scale according to how much the subject agrees or disagrees with specific statements. In a validation study by Salkovskis et al. (2000) the total score demonstrated strong internal consistency and high test-retest

reliability and a significant correlation with OCD diagnosis (Salkovskis et al., 2000). In the current sample, the internal consistency was alpha = .94. We used the Italian translation by Mancini, D'Olimpio, and D'Ercole (2001).

The Anxiety Control Questionnaire – Revised (ACQ-R; Brown et al., 2004) is a 15-item shortened revision of a self-report instrument of the perceived control over anxiety-related events and reactions. The original Anxiety Control Questionnaire (ACQ; Rapee et al., 1996) comprises 30 items and assesses the perception of control over emotional reactions (e.g., "My emotions seem to have a life of their own") and external threats (e.g., "I am usually able to avoid threat quite easily"). This self-report instrument attributes lower scores to individuals with lower perceptions of control and provides a total score based on two or three subscales, depending on different studies. Participants respond on a 6-point Likert Scale. The 15-item shortened and revised ACQ was based on additional studies in a large clinical sample and confirmed a higher-order model of perceived control corresponding to a single second-order factor that subsumes the two or three subscales. This has shown good internal consistency and high test-retest reliability (Brown et al., 2004). Therefore, we restricted our analysis to the ACQ-R total score because the psychometric properties of the total score are better than those of the subscales (Zebb and Moore, 1999). The total score has demonstrated strong internal consistency and high test-retest reliability as well as the ability to discriminate between anxious and non-anxious individuals (Rapee et al., 1996). For the Italian sample, an Italian translation of the scale was developed by author G. M. R. The Italian version of the ACQ-R was then back-translated into English by a native English speaker who was not familiar with the self-report instrument. The original authors of the ACQ compared the original version and the back-translated version of ACQ-R and did not find

meaningful differences (Ronald Rapee, personal communication, 2009). In the current sample, the internal consistency was alpha = .65.

Metacognitions Questionnaire 30 - Beliefs about the Need to Control Thoughts (MCQ-30-BNCT). 'Beliefs about the need to control thoughts' is a subscale of the Metacognitions Questionnaire-30 (MCQ-30; Wells and Cartwright-Hatton, 2004) that is directly relevant to OCD (Wells, 2000). The MCQ-30 is a self-report instrument which measures five metacognitive domains theorized by Wells and has been found to possess excellent psychometric properties (Spada et al., 2008). Items are scored on a 4-point Likert scale and are focused on beliefs about the need to control thoughts (e.g., "If I could not control my thought, I would not be able to function"). We used the Italian translation of the MCQ-30 published by Wells in 2000 (pp. 327-333). This subscale has shown good internal consistency, high test-retest reliability, a significant correlation with measures of OCD and general anxiety disorder (Wells and Cartwright-Hatton, 2004). In the current sample, the internal consistency was alpha = .73.

2.3. Procedure

The study design was cross-sectional and aimed at assessing the mediation effects of cognitive and metacognitive factors on OCD symptoms. Ethics approval for the study was granted from the research institute where the first author works. The study was described to participants as an investigation of the role of cognition in the experience of obsessional thinking. All participants were informed that data provided in the study would be treated with the strictest confidence and that participation in the research project was entirely voluntary. Following a brief introduction to the project and

the granting of informed consent participants were instructed, both verbally and in written form, to complete the self-report instruments. The order in which the self-report instruments were completed by the participants was: PI, ACQ-R, MCQ-30-BNCT and RAS. We used the macro developed by Preacher and Hayes (2008a, 2008b) in order to test the mediation model. All participants were debriefed following completion and scoring of the self-report instruments.

3. Results

3.1. Data configuration and tests of difference

Examinations of skewness and kurtosis, as well as tests of normality, revealed that the distributions of the experimental variables were non-normal. As a consequence, a series of Mann Whitney U tests were conducted to identify significant differences between the clinical and non-clinical groups across the experimental variables (see Table 1). These analyses revealed that participants in the clinical group scored significantly higher than those in the non-clinical group on all variables.

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Insert Table 1 here

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3.2. Mediation multiple regression analysis

Data was from both groups was incorporated. Our reasoning for doing this was that although having a clinical and non-clinical group would be likely to over sample high and low ends of the range, it would also allow us to test mediation effects at both

clinical and non-clinical levels on the range of the proneness to obsessive compulsive symptoms. A potential problem of combining the two groups is that residuals of the scores of the dependent variable will not be normally distributed, which is a necessary condition for regression analyses (Cohen et al., 2003, pp. 137-141). However, the Kolmogorov-Smirnov test, Shapiro-Wilk test, and Normal Q-Q plot gave converging evidence that the distribution of residuals approximated normality.

Some of the independent variables explored in this study were correlated with each other (see Table 2) which may result, particularly for small sample sizes, in multicollinearity producing computational lack of precision in mediational regression models (Aiken and West, 1991). To quantify multicollinearity we measured the variance inflation factor (VIF). The VIF was 1.26 for beliefs about the need to control thoughts, 2.10 for anxiety control, and 2.21 for beliefs about inflated responsibility. No VIF was higher than 5, which is often regarded as indicative of problematic multicollinearity (Kutner et al., 2004).

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Insert Table 2 here

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In order to explicate mechanisms underlying relationships between beliefs about inflated responsibility, anxiety control, beliefs about the need to control thoughts, and obsessive compulsive symptoms, we used mediation multiple regression analysis (Baron and Kenny, 1986). The aim was to test the effect of the independent variable (beliefs about inflated responsibility) on the proposed mediators (anxiety control and

beliefs about the need to control thoughts), and, in turn on the dependent variable (obsessive compulsive symptoms). A bootstrapping method was used to assess the indirect effect (Kenny et al., 1998) with n=5000 bootstrap re-sample. Bootstrapping is a non-parametric procedure which produces an approximation of the sample distribution of the indirect effects. After the bootstrapping test we implemented a Sobel test (Sobel, 1982) in order to test the indirect effect in the sampling distribution.

Prior to estimating total mediation model, the models' effects were calculated separately by a series of linear regression analysis to evaluate the association between beliefs about inflated responsibility (predictor), anxiety control and beliefs about the need to control thoughts (mediators) and obsessive compulsive symptoms (the criterion).

Step 1: To test a Path c (Figure 1) we performed a linear regression analysis that showed beliefs about inflated responsibility (the predictor) was significantly related to obsessive compulsive symptoms (the criterion) (R^2= .52; β = .56, p = .01).

Step 2: To investigate Path a (Figure 1) we performed a linear regression analysis to examine the association between beliefs about inflated responsibility (the predictor) and anxiety control and beliefs about the need to control thoughts (the proposed mediators). The results indicated that beliefs about inflated responsibility was significantly associated with anxiety control (R^2= .58; β = .52, p <.01) and beliefs about the need to control thoughts (R^2= .55; β = .51, p <.01).

Step 3: A regression analysis was performed to observe Path b (Figure 1) in the model and to verify the association between anxiety control and beliefs about the need to control thoughts (the proposed mediator) and obsessive compulsive symptoms (the criterion). Results revealed that anxiety control and beliefs about the need to control

thoughts were significantly associated with obsessive compulsive symptoms (R^2_1= .50; R^2_2= .57; β_1 = .30, p <.05; β_2= .43, p <.05).

Step 4: Finally, we conducted a mediation test (Kenny et al., 1998) which revealed that relation between beliefs about inflated responsibility and obsessive compulsive symptoms was rendered non-significant (Path c'=β = .33 versus path c=β = .56) by the inclusion of anxiety control and beliefs about the need to control thoughts indicating the presence of a full mediation. In addition, bootstrapping and Sobel tests were used to confirm the mediation findings. The bootstrapped 95% confidence intervals with 5000 iterations were .05 to .39 (Preacher and Hayes, 2008) indicating the presence of mediation, and the Sobel test (1982) also confirmed the reduction in the relation between beliefs about inflated responsibility and obsessive compulsive symptoms when anxiety control and beliefs about the need to control thoughts were introduced into the model (Z = 3.91, p < .05).

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Insert Figure 1 here

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4. Discussion

The results support a model in which beliefs about inflated responsibility, as described by Salkovskis (1985), predict obsessive compulsive symptoms through the mediation of both anxiety control and beliefs about the need to control thoughts. These findings thus provide further support for 'control' models of OCD (Rapee et al., 1996;

Wells and Fisher, 2008) and emphasise how beliefs about control are of greater importance than the content of beliefs systems (e.g. beliefs about inflated responsibility) in predicting OCD.

From a clinical viewpoint, the results of this work suggest that targeting beliefs about control may be useful in the treatment of OCD. In particular the clinician should aim to encourage and facilitate the patient in shifting their thinking to a position where they believe they are not responsible for any action or thought regarding which they have limited or no control over. To achieve this goal, metacognitive-based interventions would help focus on increasing the level of flexible control over attention, interrupting perseverative thinking (rumination and worry) related to intrusions, and questioning beliefs about the need to control thoughts (Wells, 2000). From an anxiety control perspective gaining knowledge about a patient's areas around which they have low perceived control would be useful. Such perceptions could then be targeted in treatment using cognitive-behavioural therapy techniques (Lang and McNiel, 2006). For example, if a patient strongly endorsed ''When I am frightened by something, there is generally nothing I can do'' a therapist could discuss whether this was a realistic assessment. The clinician may provide psycho-education on, for example, problem-solving strategies about ways to reduce objective sources of threat.

This study has some limitations which will have to be addressed by future research. Firstly, it relies solely on self-report data which is subject to errors in measurement. Secondly, a cross-sectional design was adopted which precludes causal inferences. Thirdly, demand characteristics and the small sample size may have affected outcomes. Finally, previous treatment may have exposed individuals to the identification and the exploration of the constructs investigated.

Directions for future research include ascertaining further the relative contribution of anxiety control and beliefs about the need to control thoughts in predicting OCD symptomatology. It would also be interesting to examine which of these two constructs is the best predictor of change in OCD symptoms during treatment and post-treatment.

In summary, this paper suggests that the three cognitive constructs examined (beliefs about inflated responsibility, anxiety control and beliefs about the need to control thoughts) which are predictive of OCD may be conceptually related within a more comprehensive model. In this integrated model, the effect of beliefs about inflated responsibility on obsessive compulsive symptoms is mediated by anxiety control and beliefs about the need to control thoughts.

References

Aiken, L. S., West, S. G., 1991. Multiple Regression: Testing and Interpreting Interactions. Sage, Newbury Park, CA.

American Psychiatric Association, 2000. Diagnostic and Statistical Manual of Mental Disorders (DSM IV), Fourth Edition, text rev. American Psychiatric Association, Washington, DC, USA.

Baron, R. M., Kenny, D. A., 1986. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology 51, 1173-1182.

Boisseau, C. L., Farchione, T. J., Fairholme, C. P., Ellard, K. K., Barlow, D. H., 2010. The Development of the Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders: A Case Study. Cognitive and Behavioral Practice 17, 102-113.

Brown, T. A., White, K. S., Forsyth, J. P., Barlow, D. H., 2004. The structure of perceived emotional control: Psychometric properties of a revised Anxiety Control Questionnaire. Behavior Therapy 35, 75-99.

Burns, G. L., Keortge, S. G., Formea, G. M., Sternberger, L. G., 1996. Revision of the Padua Inventory of obsessive compulsive disorder symptoms: distinctions between worry, obsessions, and compulsions. Behaviour Research and Therapy 34, 163-73.

Clark, D. A., Purdon, C., 1993. New perspectives for a cognitive theory of obsessions. Australian Psychologist 28, 161-167.

Clark, D. M., Wells, A., 1995. A cognitive model of social phobia. In: Heimberg, R., Liebowitz, M., Hope, D. A., Schneier, F. R. (Eds.), Social Phobia: Diagnosis, Assessment and Treatment. Guilford Press, New York, USA, pp. 69–93.

Cohen, J., Cohen, P., West, S. G., Aiken, L. S., 2003. Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. Lawrence Erlbaum, New Jersey, USA.

de Silva, P., Rachman, S., 1992. Obsessive-Compulsive Disorder: The Facts. Oxford University Press, Oxford, UK.

Dugas, M. J., Koerner, N., 2005. Cognitive-behavioral treatment for generalized anxiety disorder: current status and future directions. Journal of Cognitive Psychotherapy 19, 61-68.

First, M. B., Spitzer, R. L., Gibbon, M., Williams, J. B., 1997. Structured Clinical Interview for DSM-IV Axis I Disorders – Patient Edition (SCID-I/P, version 2.0, 4/97 revision). Biometrics Research Department, New York State Psychiatric Institute, 722 West 168th Street, New York, USA.

Fisher, P., Wells A., 2008. Metacognitive Therapy for Obsessive-Compulsive Disorder: A case series. Journal of Behavior Therapy and Experimental Psychiatry 39, 117-132.

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., Ladouceur, R., 1994. Why do people worry? Personality and Individual Differences 17, 791-802.

Frost, R. O., Steketee, G., 1997. Perfectionism in obsessive-compulsive disorder patients. Behaviour Research and Therapy 35, 291-296.

Frost, R. O., Marten, P., Lahart, C., Rosenblate, R., 1990. The dimensions of perfectionism. Cognitive Therapy and Research 14, 449-468.

Kenny, D.A., Kashy, D.A., Bolger N., 1998. Data analysis in social psychology. In: Gilbert, D., Fiske, S., Lindzey, G. , s.), The Handbook of Social Psychology. McGraw-Hill, Boston, MA, USA, pp. 233-265.

Lang, A. J., McNiel, D. E., 2006. Use of Anxiety Control Questionniare in psychiatric inpatients. Depression and Anxiety 23, 107-112.

Mancini, F., D'Olimpio, F., D'Ercole, E.S., 2001. Responsibility attitude, obsession and compulsion: A further support in a non clinical sample. Clinical Psychology and Psychotherapy 8, 274-281.

Mazzi, F., Morosini, P., De Girolamo, G., Bussetti, M., Guaraldi, G. P., 2000. SCID, Intervista Clinica Strutturata per il DSM-IV. Organizzazioni Speciali, Firenze, Italia.

Myers, S., Wells A., 2005. Obsessive-compulsive symptoms: the contributions of metacognitions and responsibility. Journal of Anxiety Disorders 19, 806-817.

Myers, S., Fisher, P., Wells, A., 2009. Metacognition and cognition as predictors of obsessive-compulsive symptoms: A prospective study. International Journal of Cognitive Therapy 2, 132-142.

Preacher, K. J., Hayes, A. F., 2008a. A SPSS Macro symptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior Research Methods 40, 879-891.

Preacher, K. J., Hayes, A. F., 2008b. A symptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior Research Methods 40, 879-891.

Rachman, S., 1997. A cognitive theory of obsessions. Behaviour Research and Therapy 35, 793-802.

Rachman, S., de Silva, P., 1978. Abnormal and normal obsessions. Behaviour Research and Therapy 16, 233-238.

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.

Ruggiero, G. M., Stapinski, L., Caselli, G., Fiore, F., Gallucci, M., Sassaroli, S., Rapee, R. M., 2012. Beliefs over control and meta-worry interact with the effect of intolerance of uncertainty on worry. Personality and Individual Differences 53, 224-230.

Salkovskis, P. M., Wroe, A.L., Gledhill, A., Morrison, N., Forrester, E., Richards, C., Reynolds, M., Thorpe, S., 2000. Responsibility attitudes and interpretations are characteristic of obsessive compulsive disorder. Behaviour Research and Therapy 38, 347-372.

Salkovskis, P. M., 1985. Obsessional-compulsive problems: a cognitive-behavioural analysis. Behaviour Research and Therapy 23, 571-583.

Sanavio, E., 1988. Obsession and compulsion: The Padua Inventory. Behaviour Research and Therapy 26, 169-177.

Shafran, R., Thordarson, D.S., Rachman, S., 1996. Thought-action fusion in obsessive compulsive disorder. Journal of Anxiety Disorders 10, 379-391.

Sobel, M., 1982. Asymptotic confidence intervals for indirect effects in structural equations models. In S. Leinhart (Ed.), Sociological Methodology. Jossey-Bass, San Francisco, USA, pp. 290-312.

Spada, M. M., Mohiyeddini, C., Wells, A., 2008. Measuring metacognitions associated with emotional distress: factor structure and predictive validity of the Metacognitions Questionnaire 30. Personality and Individual Differences 45, 238-242.

Wells, A., 2000. Disturbi Emozionali e Metacognizione. Trento, Italia: Erickson. Wells, A. (2004). Does meta-cognition or responsibility predict obsessive-compulsive symptoms: A test of the metacognitive model. Clinical Psychology and Psychotherapy 11, 137-144.

Wells, A., 2008. Metacognitive Therapy for Anxiety and Depression. Guilford Press, New York, USA.

Wells, A., Cartwright-Hatton, S., 2004. A short form of the metacognitions questionnaire: Properties of the MCQ-30. Behaviour Research and Therapy 42, 385-396.

Zebb, B. J., Moore, M. C., 1999. Another look at the psychometric properties of the Anxiety Control Questionnaire. Behaviour Research and Therapy 37, 1091-1103.

Table 1: Descriptive statistics and Mann-Whitney U tests of the study variables

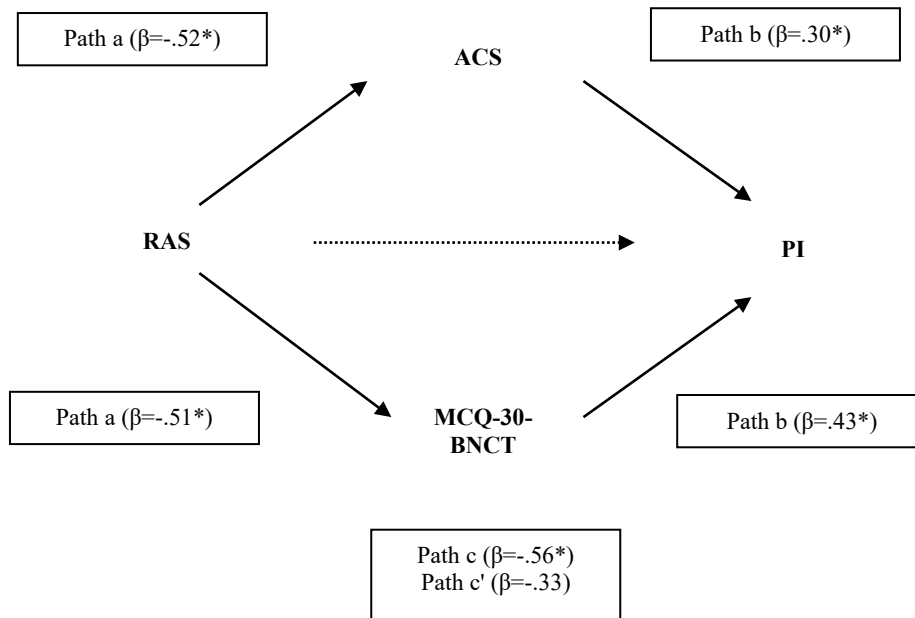|	Groups	N	Mean	Std. Deviation	U test	Effect Size r_Y
RAS	OCD group	37	4.56 [a]	0.98	0.122	0.680
	Control group	31	3.11	0.91		
ACQ-R	OCD group	37	38.92 [a]	7.20	0.401	0.666
	Control group	31	51.68	7.07		
MCQ-30-BNCT	OCD group	37	16.95 [a]	3.32	0.589	0.372
	Control group	31	13.94	4.14		

Note. RAS = Responsibility Attitude Scale; ACQ-R = Anxiety Control Questionnaire Revised; MCQ-30-BNCT = Metacognitions Questionnaire 30 – Beliefs about the Need to Control Thoughts; [a] Pairs significantly different from each other ($p \leq .05$) on the basis on Mann-Whitney U tests; Effect Size.

Table 2: Pearson Product-moment correlation analyses of the study variables (merged samples)

	RAS	ACQ	MQ	PADUA
RAS	--			
ACQ	-0.609**	--		
MCQ-30-BNCT	0.400**	0.354**	--	
PADUA	0.769**	-0.599**	0.485**	--

Note. RAS = Responsibility Attitude Scale; ACQ-R = Anxiety Control Questionnaire Revised; MCQ-30-BNCT = Metacognitions Questionnaire 30 – Beliefs about the Need to Control Thoughts; PI = Padua Inventory; n=68; *p<.05; **p<.01.

Figure 1: Mediation regression analysis showing the mediating role of control variables in the relationship between responsibility and obsessive compulsive symptoms

Note. RAS = Responsibility Attitude Scale; ACQ-R = Anxiety Control Questionnaire Revised; MCQ-30-BNCT = Metacognitions Questionnaire 30 – Beliefs about the Need to Control Thoughts; PI = Padua Inventory; n=68; *p<.05;**p<.01.