

# *Development and validation of the Morphing Fear Questionnaire (MFQ)*

Article

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Development and validation of the Morphing Fear Questionnaire (MFQ)

For Peer Review

### Abstract

Morphing fears (also called transformation obsessions) involve concerns that a person may become contaminated by and acquire undesirable characteristics of others. These symptoms are found in patients with OCD and are thought to be related to mental contamination. Given the high levels of distress and interference morphing fears can cause, a reliable and valid assessment measure is needed. This article describes the development and evaluation of the Morphing Fear Questionnaire (MFQ), a 13-item measure designed to assess for the presence and severity of morphing fears. A sample of 900 participants took part in the research. Of these, 140 reported having a current diagnosis of OCD (SR-OCD) and 760 reported never having had OCD (N-OCD; of whom 24 reported a diagnosis of an anxiety disorder and 23 reported a diagnosis of depression). Factor structure, reliability, and construct and criterion-related validity were investigated. Exploratory and confirmatory factor analyses supported a one-factor structure replicable across the N-OCD and SR-OCD group. The MFQ was found to have high internal consistency and good temporal stability, and showed significantly greater associations with convergent measures (assessing obsessive-compulsive symptoms, mental contamination, thought-action fusion and magical thinking) than with divergent measures (assessing depression and anxiety). Moreover, the MFQ successfully discriminated between the SR-OCD sample and the N-OCD group, anxiety disorder sample, and depression sample. These findings suggest that the MFQ has sound psychometric properties and that it can be used to assess morphing fear. Clinical implications are discussed.

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4 *Key Practitioner Message:*  
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- 6 - Little remains known about morphing fears, but it is an important area of  
7 investigation due to symptoms being highly distressing and often debilitating  
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11 - Because morphing fears commonly present as obscure symptoms, they may  
12 not be recognised as a type of OCD  
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14  
15 - The MFQ is a robust measure with clinical utility; it can facilitate  
16 recognition and assessment of morphing fears  
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18  
19 - The MFQ will allow for further investigations of the prevalence, correlates  
20 and treatment outcomes of morphing fears.  
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26 *Key words:* morphing fear, transformation obsessions, mental contamination,  
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28 obsessive-compulsive disorder, assessment, psychometric scale  
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4 Contamination concerns and washing compulsions are the most common  
5  
6 features of obsessive-compulsive disorder (OCD), occurring in 27–55% of people with  
7  
8 the disorder (Calamari et al., 2004; Foa & Kozak, 1995; Rachman, 2004; Rachman &  
9  
10 Hodgson, 1980; Rasmussen & Eisen, 1992). In addition to the familiar construct of  
11  
12 contamination fears elicited by physical contact with a contaminant, it has been  
13  
14 suggested there exists “mental contamination” (Rachman, 1994, 2004, 2006). Mental  
15  
16 contamination refers to feelings of internal or psychological dirtiness and urges to  
17  
18 wash which arise in the absence of direct contact with a noxious substance, or  
19  
20 following contact with something others would not deem contaminating. Mental  
21  
22 contamination has been suggested to take a variety of forms, including a fear of  
23  
24 “morphing”. Morphing fears involve a fear of change of one’s personal self through  
25  
26 being tainted by or acquiring undesirable mental, physical or social characteristics of  
27  
28 others (Rachman, 2006). Morphing fears have also been referred to as “transformation  
29  
30 obsessions” (Volz & Heyman, 2007) and “emotional contamination” (Hevia, 2009).  
31  
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35 Morphing fears can be evoked with or without physical contact and can lead to  
36  
37 avoidance of touching, being in the vicinity of, looking at, hearing, or thinking about  
38  
39 “undesirable” people due to fear of becoming contaminated by them and acquiring  
40  
41 their unwanted traits (Rachman, 2006). In extreme instances, patients are afraid of  
42  
43 transforming into this undesirable person or, in the case of children, also an animal or  
44  
45 thing (Volz & Heyman, 2007). Patients may avoid a specific person or a particular  
46  
47 group of people considered inferior or undesirable by the sufferer or society. These  
48  
49 feared individuals have included those of low status; certain ethnic groups; people  
50  
51 with mental illnesses, addictions, physical defects or other undesirable attributes (e.g.  
52  
53 obesity); those considered incompetent, unpopular, or eccentric; and those who are  
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55 unfortunate (e.g. unlucky, homeless), immoral or “bad” (Coughtrey, Shafran, Lee, &  
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4 Rachman, 2013; Hevia, 2009; Rachman, 2006; S. Rachman, personal communication,  
5  
6 19 October, 2009; Volz & Heyman, 2007). These distressing symptoms can cause  
7  
8 avoidance (e.g. of the feared person's airstream, of uttering words containing the first  
9  
10 letter of the person's name), neutralising (e.g. touching "purifying" objects),  
11  
12 discarding possessions, overt washing behaviours, mental cleansing, and thought  
13  
14 suppression, in addition to checking and reassurance seeking behaviours to ensure the  
15  
16 sufferer is not becoming like someone else (Hevia, 2009; Rachman, 2006; Volz &  
17  
18 Heyman, 2007).  
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21  
22 One specific clinical example is presented in Zysk, Shafran and Williams  
23  
24 (2015) in which "James", a young adult man with an unstable sense of self held beliefs  
25  
26 he was vulnerable to his intelligence, morals and emotional state being eroded or  
27  
28 changed (e.g. becoming superstitious, sexist and insecure) and to being changed in his  
29  
30 appearance (e.g. becoming less attractive). Additionally, the patient feared others  
31  
32 could pick up his own qualities, for instance that he would infect others with his low  
33  
34 mood. James believed such changes could occur through physical contact, proximity  
35  
36 or an infected atmosphere. He engaged in avoidance behaviour and compulsions that  
37  
38 were geared at stopping him from changing, such as hand-washing and repetition of  
39  
40 facts.  
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43  
44 Due to the fact that morphing fears commonly present as obscure symptoms,  
45  
46 they may not be recognised as a type of OCD. It is reported that morphing fear is  
47  
48 sometimes misdiagnosed as psychosis (Volz & Heyman, 2007); however, it is  
49  
50 proposed to be a subtype of OCD because: sufferers are not delusional and can  
51  
52 acknowledge their fear is irrational at some point of their psychopathology (e.g. when  
53  
54 the threat is not imminent); thoughts about transformation are recurrent, intrusive and  
55  
56 unpleasant, causing anxiety and distress; attempts are made to resist the fearful  
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4 thoughts; sufferers perform repetitive behaviours to prevent the feared change;  
5  
6 morphing fear co-occurs with or involves a history of contamination fears and OCD;  
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8  
9 and contact with a feared person can lead to feelings of contamination and urges to  
10  
11 wash or neutralise (cf. American Psychiatric Association [APA], 2013; Rachman,  
12  
13 2006). Patients commonly interpret this threat as fear of becoming contaminated and  
14  
15 fundamentally changed by others, bearing close resemblance to mental contamination.  
16

17  
18 Two types of cognitive errors may be related to morphing fear: thought-action  
19  
20 fusion (TAF) and magical thinking. TAF is a cognitive bias commonly observed in  
21  
22 people with OCD (Emmelkamp & Aardema, 1999; Gwilliam, Wells, & Cartwright-  
23  
24 Hatton, 2004; Rachman, Thordarson, Shafran, & Woody, 1995; Shafran, Thordarson,  
25  
26 & Rachman, 1996) and anxiety disorders (Abramowitz, Whiteside, Lynam, & Kalsy,  
27  
28 2003; Rassin, Diepstraten, Merckelbach, & Muris, 2001; Rassin, Merckelbach, Muris,  
29  
30 & Schmidt, 2001). TAF involves two components: the belief that having negative  
31  
32 thoughts and impulses is morally akin to carrying out these acts (moral type), and that  
33  
34 thinking about a negative event makes it more likely to occur (likelihood type)  
35  
36 (Shafran et al., 1996). Pertinently, TAF has been shown to be highly associated with  
37  
38 mental contamination (Radomsky, Rachman, Shafran, Coughtrey, & Barber, 2014).  
39  
40 Magical thinking involves unscientific beliefs about causation held by an individual  
41  
42 that are not culturally endorsed (Chapman, Chapman, & Miller, 1982; Eckblad &  
43  
44 Chapman, 1983). Unlike with TAF, magical ideation is a broader concept that does not  
45  
46 solely pertain to the belief that one's thoughts have the power to influence events  
47  
48 (Berle & Starcevic, 2005). While magical thinking is most often attributed as an  
49  
50 indicator of schizotypy (Bolton, Dearsley, Madronal-Luque, & Baron-Cohen; 2002;  
51  
52 Chapman, Chapman, Kwapil, Eckblad, & Zinser, 1994; Eckblad & Chapman, 1983),  
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54 Einstein and Menzies (2004a, 2004b, 2006) suggest that magical thinking is also a  
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4 common feature of OCD, and patients with OCD report more magical ideation than  
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6 patients with anxiety disorders. Fear of morphing is similar to magical thinking  
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8 because it is based on impossible events (unscientifically-grounded transference of  
9  
10 qualities).

11  
12 Little remains known about the manifestation, phenomenology, correlates and  
13  
14 prevalence of adult morphing fears, and symptoms are not widely recognised by  
15  
16 mental health practitioners. The availability of a robust measure of morphing fears  
17  
18 would be useful for further research into this understudied phenomenon and in clinical  
19  
20 practice. The aim of the current study was thusly to develop and validate such a  
21  
22 measure (called the Morphing Fear Questionnaire; MFQ) to assess for fears, thoughts,  
23  
24 and behaviours related to morphing. Based on theory and previous research it was  
25  
26 hypothesised that i) people reporting a diagnosis of OCD will score higher on the  
27  
28 MFQ than the control non-OCD population, those with a self-reported anxiety  
29  
30 disorder, and those with self-reported depression; and ii) the MFQ will correlate more  
31  
32 strongly with symptoms of OCD, mental contamination, thought-action fusion, and  
33  
34 magical thinking than with symptoms of anxiety and depression.  
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### 39 **Method**

#### 40 **Ethics**

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42 The study received ethical approval from the University of Reading  
43  
44 (2010/60/RS; 2009/156/RS) and the Berkshire NHS Research Ethics Committee  
45  
46 (07/Q1602/71; 10/H0505/61).  
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#### 50 **Preliminary questionnaire development**

51  
52 A preliminary morphing fear questionnaire was designed and tested in a pilot  
53  
54 study using data from 328 participants (mean age = 28.52 years,  $SD = 8.17$ , 63%  
55  
56 female; cf. Zysk, 2013). This helped shape the development of the second version of  
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4 the measure which is reported in the current paper. The preliminary measure was  
5  
6 composed following research into theoretical views of morphing fears; reviewing all  
7  
8 available known literature, case studies, posts by sufferers on online forums; listening  
9  
10 to past interviews conducted with morphing-fearful patients; and speaking with  
11  
12 therapists who have previously encountered patients with these symptoms. The  
13  
14 preliminary measure was designed following recommendations for scale development  
15  
16 (e.g. Furr, 2011; Rust & Golombok, 2009) and comprised of a 36-item pool which  
17  
18 assessed for morphing-related concerns. Positive items (acquisition of positive  
19  
20 characteristics) were included in order to assess their relevance to morphing  
21  
22 obsessions.  
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26 Participants' written responses indicated that 17 items were being consistently  
27  
28 misinterpreted and were therefore removed. The 19-item preliminary measure had  
29  
30 acceptable internal reliability (Cronbach's  $\alpha = 0.75$ ) and showed initial evidence of  
31  
32 criterion-related validity in its ability to discriminate between OC and non-OC groups,  
33  
34 and convergent validity in its significant strong positive relationship with the  
35  
36 Obsessional Compulsive Inventory Short Version ( $r = .50$ ; Foa et al., 2002) and the  
37  
38 Vancouver Obsessional Compulsive Inventory for Mental Contamination ( $r = .57$ ;  
39  
40 Rachman, 2006). In addition, it showed a significant moderate positive association  
41  
42 with both the Thought-Action Fusion Scale ( $r = .39$ ; Shafran, Thordarson, &  
43  
44 Rachman, 1996) and the Magical Ideation Scale ( $r = .43$ ; Eckblad & Chapman, 1983).  
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### 48 **Item reduction**

49  
50 The final MFQ was based on items of the preliminary measure, some of which  
51  
52 were altered to ensure clarity, specificity, non-redundancy, and relevance. In  
53  
54 particular, pairs of items that had similar wording and were highly correlated ( $r > .45$ ;  
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56 Abramowitz, Huppert, Cohen, Tolin, & Cahill, 2002; Rapee, Craske, Brown, &  
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4 Barlow, 1996) were considered redundant, and items with the lower corrected item-  
5  
6 total correlation were removed. Positive items showed low corrected item-total  
7  
8 correlation and, as theory suggests morphing symptoms should be conceptualised as a  
9  
10 type of OCD which is characterised by *unwanted* and *distressing* thoughts, it was  
11  
12 thought that negative morphing fears would be of more relevance in clinical  
13  
14 assessment and only these were retained. An item was added to assess fear of losing  
15  
16 parts of oneself (referred to as “reverse morphing”).  
17

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19  
20 The final MFQ comprises 13 items. No reverse-scored items are used. Statement  
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22 choices are scored from 0 (*not at all*) to 4 (*very much*); the range of scores therefore  
23  
24 lies between 0 and 52. Respondents are asked to provide a short explanation or  
25  
26 specific example for any two questions with which they agree *much* or *very much*. The  
27  
28 measure takes 2–4 minutes to complete.  
29

### 30 31 **Participants**

32  
33 A control sample was recruited from the general population through  
34  
35 informational posters, flyers, and emails around the university and community.  
36  
37 Emailed individuals and contacts of the primary investigator were asked to pass along  
38  
39 the study information to others with an aim of snowball sampling. Psychology  
40  
41 undergraduates recruited through an online research panel completed the study for  
42  
43 course credit ( $n = 105$ ). A sample of people with a self-reported current diagnosis of  
44  
45 OCD was collected through distributing study information at national OCD charity  
46  
47 events and to OCD support groups, and through placing advertisements on support  
48  
49 group websites. Information was also given to mental health practitioners and  
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51 distributed at a conference for mental health professionals to be circulated to OCD  
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53 patients.  
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4 The participant pool was made up of 900 adults with a mean age of 30.02 ( $SD =$   
5 10.29, range: 18–73, 64.8% female). Participants were mainly from the UK (80.8%),  
6  
7 but the sample included respondents from other parts of Europe ( $n = 31$ ), North  
8  
9 America ( $n = 119$ ; of these, 92 were from Canada), Oceania ( $n = 7$ ), Africa ( $n = 7$ ),  
10  
11 Asia ( $n = 5$ ), and the Middle East ( $n = 3$ ). Of the 873 who answered the ethnicity  
12  
13 question, the large majority identified themselves as white ( $n = 767$ , 78.8%), 52 as  
14  
15 Asian, 12 black, 29 mixed race, and 13 other ethnicity. Over half of the sample  
16  
17 (53.7%) was not religious, 43.2% identified with a religion (of these, 78.7% were  
18  
19 Christian), and the remainder (3.1%) did not respond to this question.  
20  
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24 Seven hundred and sixty (84.4%) respondents reported never having had OCD  
25  
26 (N-OCD: mean age = 29.35,  $SD = 9.89$ , range: 18–67, 64.1% female). The majority of  
27  
28 this sample (85.3%) scored below the cut-score (i.e.  $\leq 21$ ) on the Obsessive  
29  
30 Compulsive Inventory – Short Version (OCI-R, Foa et al., 2002), indicating a sample  
31  
32 unlikely to suffer from OCD. Of the N-OCD group, 24 self-reported having a current  
33  
34 diagnosis of an anxiety disorder (SR-A; mean age = 28.25,  $SD = 7.48$ , range: 18–52,  
35  
36 75.0% female), and 23 self-reported having a current diagnosis of major depression  
37  
38 (SR-D; mean age = 28.43,  $SD = 9.27$ , range: 19–52, 60.9% female). The SR-A group  
39  
40 had a significantly higher mean score on the Beck Anxiety Inventory (Beck & Steer,  
41  
42 1990;  $M = 16.36$ ,  $SD = 12.09$ ) than did those not reporting an anxiety disorder ( $M =$   
43  
44  $7.95$ ,  $SD = 8.24$ ,  $t(13.58) = -2.57$ ,  $p = .023$ ,  $r = .57$ ), and the SR-D group had a  
45  
46 significantly higher mean score on the Beck Depression Inventory–II (Beck, Steer &  
47  
48 Brown, 1996;  $M = 22.71$ ,  $SD = 20.50$ ) than did those not reporting depression ( $M =$   
49  
50  $9.94$ ,  $SD = 9.11$ ,  $t(307) = -3.53$ ,  $p < .001$ ,  $r = .20$ ) in those who completed these  
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measures.

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4 One hundred and forty participants (15.6%) self-reported having a current  
5 diagnosis of OCD (SR-OCD; mean age = 33.62,  $SD = 11.63$ , range: 18–73, 68.6%  
6 female). The majority (84.3%) scored above the cut-score (i.e. > 21) on the OCI-R,  
7  
8 indicating a sample likely to suffer with OCD.  
9  
10

### 11 12 13 **Measures**

14  
15 *Morphing Fear Questionnaire* (MFQ). As described above.  
16

17  
18 *Vancouver Obsessional Compulsive Inventory - Mental Contamination Scale* (VOCI-  
19 MC; Rachman, 2006). This measure consists of 20 items assessing the presence of  
20 mental contamination. Items are rated on a 5-point Likert scale from 0 (*not at all*) to 4  
21 (*very much*). Radomsky et al. (2014) have shown the VOCI-MC has excellent internal  
22 consistency (Cronbach's  $\alpha = .93-.97$ ), good discriminant validity between those with  
23 contamination OCD and other groups, good convergent validity with the  
24 contamination subscale of the VOCI (cf. Thordarson et al., 2004), and good divergent  
25 validity with symptoms of depression on the BDI-II (Beck, Steer, & Brown, 1996). It  
26 has shown a one-factor structure both in clinical and non-clinical samples, and  
27 adequate temporal stability (Melli, Carraresi, Stopani, Radomsky & Bulli, 2015). In  
28 the present study internal consistency was excellent for both the N-OCD and SR-OCD  
29 subgroups ( $.94 \leq \alpha \leq .96$ ).  
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45 *Obsessional Compulsive Inventory - Short Version* (OCI-R; Foa et al., 2002). The  
46 OCI-R assesses OCD symptomatology and severity using 18 items from 6 subscales  
47 that are rated on a 5-point Likert scale from 0 (*not at all distressed/bothered*) to 4  
48 (*extremely distressed/bothered*). The measure is reported to have good to excellent  
49 internal consistency, temporal stability, and convergent validity (e.g. washing  
50 subscale: Cronbach's  $\alpha = .86$ ;  $r_s = .86$ ; strong correlation with Rachman and  
51 Hodgson's 1980 Maudsley Obsessive-Compulsive Inventory washing subscale,  $r_s =$   
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4 .78, respectively). For the present study, the internal consistency for the OCI-R was  
5  
6 very good in both the N-OCD and SR-OCD samples (Cronbach's  $\alpha = .89$  and  $.86$ ,  
7  
8 respectively).

9  
10 *Thought-Action Fusion Scale* (TAF Scale; Shafran et al., 1996). This 19-item scale is  
11  
12 used to assess aspects of TAF. Participants rate how much they agree or disagree with  
13  
14 statements on a 5-point Likert scale ranging from 0 (*disagree strongly*) to 4 (*agree*  
15  
16 *strongly*). The scale has shown very good internal consistency (Cronbach's  $\alpha =$   
17  
18  $.85-.96$ ; Rassin, Merckelbach, et al., 2001; Shafran et al., 1996), but poor temporal  
19  
20 stability ( $r = .52$ ; Rassin, Merckelbach, et al., 2001). TAF scores have been found to  
21  
22 positively correlate with measures of OC symptoms, and the scale is able to  
23  
24 discriminate between clinical and non-clinical samples (Rassin, Merckelbach, et al.,  
25  
26 2001; Shafran et al., 1996). In the present study internal consistency was excellent in  
27  
28 both the N-OCD and SR-OCD groups (Cronbach's  $\alpha = .93$  and  $.95$ , respectively).  
29  
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31  
32 *Magical Ideation Scale* (MIS; Eckblad & Chapman, 1983). This 30-item true-false  
33  
34 scale is the most widely used instrument to assess magical thinking (Kingdon, Egan, &  
35  
36 Rees, 2012). Seven items are reverse coded. The MIS has demonstrated good internal  
37  
38 consistency (Cronbach's  $\alpha = .78-.92$ ) and test-retest reliability ( $r = .80-.82$ ; Chapman  
39  
40 et al., 1982). In the present study internal consistency was also very good in both  
41  
42 samples ( $.80 \leq \alpha \leq .86$ ).  
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45  
46 *Beck Anxiety Inventory* (BAI; Beck & Steer, 1990). The BAI lists 21 cognitive,  
47  
48 somatic and behavioural symptoms of anxiety. Participants rate their symptom  
49  
50 severity for each of these items using a 4-point scale ranging from 0 (*not at all*) to 3  
51  
52 (*severely, I could barely stand it*). The BAI has shown excellent internal consistency  
53  
54 (Cronbach's  $\alpha = .94$ ) and acceptable test-retest reliability ( $r = .67$ ; Fydrich, Dowdall,  
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4 & Chambless, 1992), and is widely used in a variety of clinical and research contexts.  
5  
6 In the present study internal consistency was also excellent in both samples ( $\alpha = .92$ ).  
7  
8 *Beck Depression Inventory–II* (BDI-II; Beck et al., 1996). The 21-item self-report  
9  
10 questionnaire assesses the presence and severity of the affective, cognitive,  
11  
12 motivational, psychomotor, and vegetative components of depression. Items are scored  
13  
14 from 0 (*absent*) to 3 (*severe*). It has shown excellent internal consistency (Cronbach's  
15  
16  $\alpha = .91$ ) and test-retest reliability ( $r = .93$ ), and is one of the most widely used  
17  
18 measures for assessing depression in research and clinical practise. In the present study  
19  
20 internal consistency was also excellent in both samples ( $.93 \leq \alpha \leq .94$ ).  
21  
22  
23

### 24 Procedure

25  
26 The questionnaires were made available online using a secure web-based survey  
27  
28 programme, and in paper format for those who requested it ( $n = 11$ ). The MFQ was  
29  
30 always presented first, and the other scales used for testing relationships with other  
31  
32 constructs were administered in counterbalanced fashion to control for order and  
33  
34 sequence effects. The questionnaires took approximately 45 minutes to complete, and  
35  
36 support options and a written debrief of the research aims were provided upon  
37  
38 completion. Participants could remain anonymous in the study. Participants who left  
39  
40 their contact details were invited by email to complete the MFQ again at a later date to  
41  
42 test temporal stability of scores. Eighty-four participants (25 SR-OCD) completed the  
43  
44 MFQ a second time approximately after an 18 month interval.  
45  
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47

### 48 Results

#### 49 Gender and Religiousness Differences

50  
51 There were no significant differences in total scores on the MFQ between men  
52  
53 ( $M = 1.70$ ,  $SD = 2.74$ ) and women ( $M = 1.84$ ,  $SD = 3.57$ ) reporting never having had  
54  
55 OCD,  $t(758) = -.55$ ,  $p = .584$ ,  $r = .02$ ; and men ( $M = 9.39$ ,  $SD = 10.89$ ) and women ( $M$   
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4 = 6.76,  $SD = 8.31$ ) self-reporting current OCD,  $t(138) = 1.57, p = .119, r = .13$ . There  
5  
6 was a significant difference in total MFQ scores between those who are religious ( $M =$   
7  
8 2.15,  $SD = 3.67$ ) and those who are not ( $M = 1.50, SD = 2.91$ ) who reported never  
9  
10 having had OCD,  $t(584.96) = -2.62, p = .009, r = .11$ . In the self-reported current  
11  
12 OCD group the difference between those who are religious ( $M = 7.94, SD = 9.92$ ) and  
13  
14 those who are not ( $M = 6.38, SD = 8.03$ ) was not significant,  $t(125) = -.95, p = .342, r$   
15  
16 = .08.  
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### 19 **Factor structure analyses**

20  
21  
22 The factor structure of the MFQ was initially investigated through a cross-  
23  
24 validation procedure on the N-OCD data. This sample was randomly divided into two  
25  
26 sub-groups using the SPSS 18.0 “random sample of cases” function with the sub-  
27  
28 group size set at “approximately 50%”. An exploratory (common) factor analysis  
29  
30 (EFA) was carried out using data from one sub-group ( $n = 379$ ); a set of measurement  
31  
32 models was then specified and a confirmatory factor analysis (CFA) was performed  
33  
34 using data from the second sub-group ( $n = 381$ ).  
35  
36

37  
38 Since a substantial number of items in both subgroups showed values of  
39  
40 skewness and kurtosis that fell outside the  $[-1; +1]$  range recommended by Muthén  
41  
42 and Kaplan (1985) for using maximum likelihood estimator (see Table 1), factor  
43  
44 analyses were performed in Mplus 6.1 using the mean and variance adjusted weighted  
45  
46 least squares estimator (WLSMV, Muthén, du Toit, & Spisic, 1997). When using  
47  
48 WLSMV estimator, Mplus 6.1 provides fit indices for EFA analogous to those of  
49  
50 CFA, i.e., the Tucker-Lewis Index (TLI) the Comparative Fit Index (CFI) and the  
51  
52 Root Mean Square Error of Approximation (RMSEA). Following Marsh, Hau, and  
53  
54 Wen (2004), values  $\geq .90$  were considered as acceptable and  $\geq .95$  as optimal for the  
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4 TLI and the CFI, and values  $\leq .08$  as acceptable and  $\leq .06$  as optimal for the RMSEA.  
5  
6 The use of multiple indices provides a conservative and reliable evaluation of model  
7  
8 fit relative to the use of a single-fit index. A change in CFI of less than .01 (Chen,  
9  
10 2007; Cheung & Rensvold, 2001) or a change in RMSEA of less than .015 (Chen,  
11  
12 2007) would provide evidence for a more parsimonious model, and this was  
13  
14 considered in the analyses.  
15  
16

### 17 18 **Exploratory factor analyses** 19

20  
21 The Keyser-Meyer-Olkin (KMO) measure of the sampling adequacy was .89,  
22  
23 indicating that the correlation matrix was suitable for factor analysis (Kaiser, 1974).  
24  
25 Bartlett's test of sphericity (Bartlett, 1954) was significant, which also suggested that  
26  
27 factor analysis was suitable.  
28

29  
30 The issue of determining the number of factors to extract was determined by  
31  
32 performing dimensionality analyses on the polychoric correlation matrix of MFQ  
33  
34 items through Minimum Average Partial correlation statistic (MAP; Velicer, 1976)  
35  
36 and parallel analysis (PA) with optimal implementation (Timmerman & Lorenzo-  
37  
38 Seva, 2011). On the basis of the recommendations of Buja and Eyuboglu (1992), PA  
39  
40 was performed on 1000 random correlation matrices obtained through permutation of  
41  
42 the raw data and following Longman, Cota, Holden, and Fekken (1989) both the mean  
43  
44 eigenvalues and the 95th percentile eigenvalues were considered. These analyses were  
45  
46 performed with FACTOR8 (Lorenzo-Seva & Ferrando, 2006). PA suggested the  
47  
48 extraction of only one factor both when mean percentile was considered and when  
49  
50 95th percentile was considered. MAP reached its lowest value at one factor (.032,  
51  
52 .043, .113, .351, .999). Taken together, these results suggested the one factor solution  
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54 was most appropriate.  
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4 EFA was performed on the first sub-group ( $n = 379$ ) with the number of factors  
5 to extract set to 1. Following the criteria stated above, the one-factor solution showed  
6 excellent fit indices (CFI = .97, TLI = .96, RMSEA = .05) and all the items  
7 substantially (i.e.,  $\geq .63$ ) loaded on the first factor, as shown in Table 1.  
8  
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13 **[INSERT TABLE 1 ABOUT HERE]**  
14

### 15 16 **Confirmatory factor analyses**

17  
18 CFA was then used on the second sub-group of the N-OCD sample ( $n = 381$ ).  
19 Consistently with the EFA results, the one-factor model showed an excellent fit (CFI =  
20 .97, TLI = .97, RMSEA = .04). The same measurement model for the MFQ was tested  
21 on the SR-OCD group ( $n = 140$ ). In this clinical sample, the fit indices for the one-  
22 factor model indicated once again an excellent fit (CFI = .98, TLI = .98, RMSEA =  
23 .06). In summary, the results of the CFAs showed that the one-factor solution met all  
24 the criteria for an optimal fit.  
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### 35 **Item analysis and reliability**

36  
37 Table 1 also displays the results of item analyses in both groups. The minimum  
38 requirement for internal consistency (Kline, 1993) was met; high Cronbach's alphas  
39 indicated good reliability in the N-OCD ( $\alpha = .81$ ) and excellent reliability in the  
40 SR-OCD ( $\alpha = .90$ ) groups. Corrected item-total correlations were never smaller than  
41 .40 in either group, and mean inter-item correlations were .30 in the N-OCD group and  
42 .39 in the SR-OCD group which are considered adequate values for narrow constructs  
43 (Clark & Watson, 1995). In no case was the alpha-if-item-deleted higher than the  
44 computed alpha, suggesting that all items contribute to the internal consistency of the  
45 scales.  
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4 As previously stated, eighty-four participants completed the retest after an 18  
5  
6 month interval. At the first administration, the mean MFQ score for this sample was  
7  
8 4.25 ( $SD = 6.32$ , range: 0–26). At the retest, the mean score was 3.88 ( $SD = 6.97$ ,  
9  
10 range: 0–41). Test-retest reliability was good ( $r = .73$ ,  $p < .001$ ), particularly  
11  
12 considering the long time frame. The mean scores of the first and second  
13  
14 administration were compared with paired-samples  $t$ -test and there was no significant  
15  
16 difference found, indicating good temporal stability of the scale.  
17  
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### 19 **Construct validity**

20  
21 It was predicted that the MFQ score would be more strongly correlated with the  
22  
23 OCI-R, VOICI-MC, TAF and MIS (convergent measures), than with the BDI-II and  
24  
25 BAI (divergent measures). As shown in Table 2, convergent correlations ranged from  
26  
27 .46 to .52 in the N-OCD group, and from .45 to .66 in the SR-OCD group, whereas  
28  
29 discriminant correlations ranged from .27 to .32 in the N-OCD group, and from .27 to  
30  
31 .34 in the SR-OCD group. As expected, MFQ scores in both samples were  
32  
33 significantly more strongly correlated with symptoms of OCD, mental contamination,  
34  
35 thought-action fusion and magical thinking, than with depression and anxiety;  $z$   
36  
37 contrast tests (Westen & Rosenthal, 2003) showed significant differences between  
38  
39 convergent and divergent measures both in N-OCD ( $z = 8.43$ ,  $p < .001$ ) and SR-OCD  
40  
41 ( $z = 4.14$ ,  $p < .001$ ) groups. These results indicate that the scale has excellent construct  
42  
43 validity.  
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48 **[INSERT TABLE 2 ABOUT HERE]**

### 49 **Criterion-related validity**

50  
51 An independent samples  $t$ -test showed the SR-OCD group had a significantly  
52  
53 higher mean score ( $M = 7.59$ ,  $SD = 9.24$ ) on the MFQ than the N-OCD group ( $M =$   
54  
55 1.79,  $SD = 1.79$ ),  $t(145.58) = -7.34$ ,  $p < .001$ , and this was a large effect ( $r = .52$ ). A  
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4 one-way ANOVA was performed comparing mean MFQ scores of the SR-OCD group  
5  
6 with those from the N-OCD group reporting an anxiety disorder in the absence of  
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8 depression ( $M = 2.71$ ,  $SD = 3.52$ ), and those reporting depression in the absence of  
9  
10 anxiety ( $M = 1.30$ ,  $SD = 3.96$ ). A significant main effect of group was found,  $F(2, 184)$   
11  
12  $= 8.19$ ,  $p < .001$ ,  $r = .29$ . Games-Howell post-hoc comparisons indicated that the SR-  
13  
14 OCD group scored significantly higher than both the SR-A and the SR-D groups (both  
15  
16  $ps < .001$ ). In combination, the ability of the MFQ to discriminate between the  
17  
18 SR-OCD and other groups provides evidence towards its criterion-related validity.  
19  
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### 21 22 Discussion

23  
24 The Morphing Fear Questionnaire was developed to enable assessment of  
25  
26 morphing fears, as previously no such measure existed. The results reported here  
27  
28 suggest that the MFQ is a unidimensional, reliable and valid assessment of morphing  
29  
30 fears. The MFQ has shown high internal consistency and good temporal stability,  
31  
32 evidencing reliability over a long time period. The MFQ can successfully discriminate  
33  
34 between those reporting a current diagnosis of OCD and those reporting never having  
35  
36 had such a diagnosis, lending support towards criterion-related validity. Significant  
37  
38 differences between scores on the MFQ of the sub-samples reporting OCD, anxiety,  
39  
40 and depression provided evidence that morphing fears are more relevant to OCD than  
41  
42 to anxiety and depressive disorders. Furthermore, high MFQ scores were found to be  
43  
44 more closely associated with high scores on the OCI-R and VOCI-MC measures, than  
45  
46 with the BAI and BDI-II. The co-occurrence of morphing fears, obsessive-compulsive  
47  
48 symptoms, and mental contamination suggest that these symptoms may be related.  
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51  
52 Morphing fears were also found to be associated with magical thinking and  
53  
54 thought-action fusion. This finding offers some support for the hypothesis that fear of  
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56 morphing is linked with cognitive biases and magical ideation that are characteristic of  
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4 OCD. While magical thinking is commonly attributed as an indicator of schizotypy  
5  
6 and in this study morphing fears were correlated with magical thinking, it should be  
7  
8 noted that this does not necessarily mean that morphing fears are linked with  
9  
10 psychosis. Other authors have hypothesised that these traits are distinct constructs (cf.  
11  
12 Rachman, 2006; Volz & Heyman, 2007). When not under current threat, sufferers do  
13  
14 not believe morphing is physically possible and thereby these fears are distinct from  
15  
16 delusions.  
17

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19  
20 Previous research using non-clinical samples has shown positive associations  
21  
22 between religiosity and thought-action fusion (Abramowitz, Deacon, Woods, & Tolin,  
23  
24 2004; Berman, Abramowitz, Pardue & Wheaton, 2010; Rassin & Koster, 2003; Sica,  
25  
26 Norvara, & Sanavio, 2002; Siev & Cohen, 2007) and large group differences in levels  
27  
28 of magical thinking between those who identify with religion and those who do not  
29  
30 (Caldwell-Harris, Wilson, LoTempio & Beit-Hallahmi, 2011). Given the current  
31  
32 findings that morphing fears are associated with thought-action fusion and magical  
33  
34 thinking, it is not surprising higher levels of morphing fears were found in the  
35  
36 religious group of those without OCD. These cognitive biases have been particularly  
37  
38 evident in Christians (Rassin & Koster, 2003; Siev & Cohen, 2007) which made up a  
39  
40 large proportion (32.5%) of the non-OCD sample in the current study. There were no  
41  
42 differences found in morphing fears between religious and non-religious groups in  
43  
44 those reporting OCD. The reason why the OCD group may be different from the non-  
45  
46 OCD group in terms of MFQ scores may be explained by the large variation in the  
47  
48 OCD group and relatively smaller sample size. Further research will be required to  
49  
50 ascertain whether the larger variability of MFQ scores in the OCD group has masked  
51  
52 any difference in morphing fears that could be explained by religiousness.  
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4 There are a number of clinical implications of the current research. The finding  
5 that morphing fear may be related to OCD and mental contamination is consistent with  
6 Rachman's (2006) hypothesis that morphing fear is a form of mental contamination.  
7  
8 Patients with mental contamination should be routinely assessed for the presence of  
9 morphing fears using this measure. Once identified, it is suggested that patients with  
10 morphing fears receive a modified form of cognitive behaviour therapy for mental  
11 contamination as described elsewhere (cf. Coughtrey et al., 2013; Rachman,  
12 Coughtrey, Shafran & Radomsky, 2014). Such treatment would involve a range of  
13 behavioural experiments to gather evidence relevant to the fear.  
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24 The main limitation of this study is that the clinical samples were based on  
25 participants' self-report of a current diagnosis rather than a clinical diagnosis *per se*.  
26 Thus, a non-OCD-reporting and analogue self-reporting OCD sample was used for  
27 testing of the measure's factor structure, reliability and validity. Furthermore, although  
28 the test-retest reliability was found to be very good, especially considering the long  
29 mean time interval (18 months), this long time frame was simultaneously a limitation  
30 in the current study as test-retest score differences may not be entirely based on  
31 instrument unreliability.  
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42 Future research should establish a cut-off score to identify clinically relevant  
43 morphing-fearful patients. In addition to using a cut-off score, the authors recommend  
44 an extreme score (4) on a single item or a high score (3) on two or more items may  
45 warrant follow-up since morphing fear symptoms can be highly specific (e.g. reverse  
46 morphing may be the primary concern). Future research should test the sensitivity and  
47 specificity of the scale to allow confident use of the measure for identification of  
48 morphing fears and evaluation of treatment progress and outcome. Testing the  
49 discriminant validity between the MFQ and measures of psychosis proneness is  
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4 suggested. Further research recommendations using the MFQ include investigations of  
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6 clinical correlates of morphing fears and into the adult prevalence of these symptoms.  
7  
8 While morphing fears are thought to be relatively rare in adults, these symptoms have  
9  
10 recently been found to be endorsed by up to 10.1% of youth with diagnosed primary  
11  
12 OCD (Monzani et al., 2015; Volz & Heyman, 2007).  
13  
14

15 In conclusion, the 13-item Morphing Fear Questionnaire is a self-report  
16  
17 measure designed to assess whether and to what extent adults experience fears of  
18  
19 acquiring characteristics of others and experiencing fundamental changes to or losing  
20  
21 parts of their core selves. This measure has shown evidence of reliability and validity,  
22  
23 and can be used to screen for morphing fears in patients with OCD. It is hoped the  
24  
25 availability of a morphing fear assessment will also help prevent misdiagnosis and  
26  
27 promote further research of this phenomenon. The MFQ is quick to administer and  
28  
29 score, and is available for clinical and research use free from the authors.  
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37  
38  
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40  
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### 46 **References**

- 47  
48  
49  
50 Abramowitz, J. S., Deacon, B. J., Woods, C. M., Tolin, D. F. (2004). Association  
51 between protestant religiosity and obsessive-compulsive symptoms and  
52 cognitions. *Depression and Anxiety*, 20(2), 70-76. doi:10.1002/da.20021  
53  
54  
55 Abramowitz, J. S., Huppert, J. D., Cohen, A. B., Tolin, D. F., & Cahill, S. P. (2002). Religious  
56 Obsessions and Compulsions in a non-clinical sample: The Penn Inventory of  
57 Scrupulosity. *Behaviour Research and Therapy*, 40, 825-838.  
58 doi:10.1016/j.janxdis.2006.02.001  
59  
60



- 1  
2  
3  
4 Abramowitz, J. S., Whiteside, S., Lynam, D., & Kalsy, S. (2003). Is thought-action fusion  
5 specific to obsessive-compulsive disorder? A mediating role of negative affect.  
6 *Behaviour Research and Therapy*, *41*, 1069–1079. doi:10.1016/S0005-7967(02)00243-  
7 7
- 8  
9 American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental*  
10 *disorders* (4th ed., text rev.). Washington, DC: American Psychiatric Association.
- 11  
12 American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental*  
13 *Disorders*, 5<sup>th</sup> Edition. Washington, DC: American Psychiatric Association.
- 14  
15 Antony, M. A., Orsillo, S. M., & Roemer, L. (Eds.) (2001). *Practitioner's guide to empirically*  
16 *based measures of anxiety*. New York: Kluwer Academic/Plenum Publishers.
- 17  
18 Bartlett, M. S. (1954). A note on the multiplying factors for various chi square  
19 approximations. *Journal of Royal Statistical Society*, *16*(Series B), 296-298.
- 20  
21 Beck, A. T., & Steer, R. A. (1990). *Beck Anxiety Inventory manual*. San Antonio, TX: The  
22 Psychological Corporation.
- 23  
24 Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for the Beck Depression Inventory-*  
25 *II*. San Antonio, TX: Psychological Corporation.
- 26  
27 Berle, D., & Starcevic, V. (2005). Thought-action fusion: review of the literature and future  
28 directions. *Clinical Psychology Review*, *25*(3), 263-284. doi:10.1016/j.cpr.2004.12.001
- 29  
30 Berman, N. C., Abramowitz, J. S., Pardue, C. M., & Wheaton, M. G. (2010). The relationship  
31 between religion and thought–action fusion: Use of an in vivo paradigm. *Behaviour*  
32 *Research and Therapy*, *48*(7), 670–674. doi:10.1016/j.brat.2010.03.021
- 33  
34 Bolton, D., Dearsley, P., Madronal-Luque, R., & Baron-Cohen, S. (2002). Magical thinking in  
35 childhood and adolescents: development and relation to obsessive compulsion. *British*  
36 *Journal of Developmental Psychology*, *20*, 479–494. doi:10.1348/026151002760390819
- 37  
38 Brown, T. A., Di Nardo, P., & Barlow, D. H. (1994). *Anxiety disorders interview schedule*  
39 *adult version (ADIS-IV): Client interview schedule*. Oxford: Oxford University Press.
- 40  
41 Brown, T. A., Di Nardo, P. A., Lehman, C. L., & Campbell, L. A. (2001). Reliability of DSM-  
42 IV anxiety and mood disorders: Implications for the classification of emotional  
43 disorders. *Journal of Abnormal Psychology*, *110*, 49–58. doi:10.1037/0021-  
44 843X.110.1.49
- 45  
46 Buja, A., & Eyuboglu, N. (1992). Remarks on parallel analysis. *Multivariate Behavioral*  
47 *Research*, *27*, 509-540. doi:10.1207/s15327906mbr2704\_2
- 48  
49 Caldwell-Harris, C. L., Wilson, A. L., LoTempio, E., & Beit-Hallahmi, B. (2011). Exploring  
50 the atheist personality: well-being, awe, and magical thinking in atheists, Buddhists, and  
51 Christians. *Mental Health, Religion & Culture*, *14*(7), 659-672.  
52 doi:10.1080/13674676.2010.509847
- 53  
54 Calamari, J. E., Weigartz, P. S., Riemann, B. C., Cohen, R. J., Greer, A., Jacobi, D.M., ...  
55 Carmin, C. (2004). Obsessive-compulsive disorder subtypes: an attempted replication  
56 and extension of a symptom-based taxonomy. *Behaviour Research and Therapy*, *42*,  
57 647–70. doi:10.1016/S0005-7967(03)00173-6
- 58  
59 Chapman, L. J., Chapman, J. P., Kwapil, T. R., Eckblad, M. & Zinser, M. C. (1994). Putatively  
60 psychosis-prone subjects 10 years later. *Journal of Abnormal Psychology*, *103*(2), 171–  
183. doi:10.1037/0021-843X.103.2.171

- 1  
2  
3  
4 Chapman, L. J., Chapman, J. P., & Miller, E. N. (1982). Reliabilities and intercorrelations of  
5 eight measures of proneness to psychosis. *Journal of Consulting and Clinical*  
6 *Psychology, 50*(2), 187-195. doi:10.1037/0022-006X.50.2.187  
7  
8 Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance.  
9 *Structural Equation Modeling, 14*, 464-504. doi:10.1080/10705510701301834  
10  
11 Cheung, G. W., & Rensvold, R. B. (2001). The effects of model parsimony and sampling error  
12 on the fit of structural equation models. *Organizational Research Methods, 4*, 236-264.  
13 doi:10.1177/109442810143004  
14  
15 Clark, L. A., & Watson, D. (1995). Constructing validity: Basic issues in scale development.  
16 *Psychological Assessment, 7*, 309-319. doi:10.1037/1040-3590.7.3.309  
17  
18 Coughtrey A. E., Shafran, S., Lee, M., & Rachman, S. J. (2013). The Treatment of Mental  
19 Contamination: A Case Series. *Cognitive and Behavioural Practice, 20*(2), 221-231.  
20 doi:10.1016/j.cbpra.2012.07.002  
21  
22 Eckblad M., & Chapman, L. J. (1983). Magical Ideation as an indicator of schizotypy. *Journal*  
23 *of Consulting and Clinical Psychology, 51*(2), 215-225. doi:10.1037/0022-  
24 006X.51.2.215  
25  
26 Einstein, D. A., & Menzies, R. G. (2004a). The presence of magical thinking in obsessive  
27 compulsive disorder. *Behaviour Research and Therapy, 42*, 539-549.  
28 doi:10.1016/S0005-7967(03)00160-8  
29  
30 Einstein, D. A. & Menzies, R. G. (2004b). Role of magical thinking in Obsessive-Compulsive  
31 symptoms in an undergraduate sample. *Depression and Anxiety, 19*, 174-179.  
32 doi:10.1002/da.20005  
33  
34 Einstein, D. A., Menzies, R. G. (2006). Magical Thinking in Obsessive-Compulsive Disorder,  
35 Panic Disorder and the General Community. *Behavioural and Cognitive Psychotherapy,*  
36 *34*(3), 351-357. doi:10.1017/S1352465806002864  
37  
38 Emmelkamp, P. M. G., & Aardema, F. (1999). Metacognition, specific obsessive-compulsive  
39 beliefs and obsessive-compulsive behavior. *Clinical Psychology and Psychotherapy, 6*,  
40 139-145. doi:10.1002/(SICI)1099-0879(199905)6:2<139::AID-CPP194>3.0.CO;2-9  
41  
42 Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P.  
43 M. (2002). The Obsessive-Compulsive Inventory: Development and Validation of a  
44 short version. *Psychological Assessment, 14*(4), 485-496. doi:10.1037/1040-  
45 3590.14.4.485  
46  
47 Foa, E. B., & Kozak, M. J. (1995). DSM-IV Field Trial: Obsessive-Compulsive Disorder.  
48 *American Journal of Psychiatry, 152*, 90-96.  
49  
50 Furr, R. M. (2011). *Scale Construction and Psychometrics for Social and Personality*  
51 *Psychology*. London, UK: Sage Publications.  
52  
53 Fydrich, T., Dowdall, D., & Chambless, D. L. (1992). Reliability and validity of the Beck  
54 Anxiety Inventory. *Journal of Anxiety Disorders, 6*(1), 55-61. doi:10.1016/0887-  
55 6185(92)90026-4  
56  
57 Gwilliam, P., Wells, A., & Cartwright-Hatton, S. (2004). Does meta-cognition or  
58 responsibility predict obsessive-compulsive symptoms: a test of the metacognitive  
59 model. *Clinical Psychology & Psychotherapy, 11*(2), 137-144. doi:10.1002/cpp.402  
60  
61 Hevia, C. (2009). Emotional Contamination: A Lesser Known Subtype of OCD. *OCD*  
62 *Newsletter, 23*(4), 10-12.

- 1  
2  
3  
4 Kingdon, B., Egan, S. J., & Rees, C. S. (2012). The Illusory Beliefs Inventory: A new measure  
5 of magical thinking in obsessive compulsive disorder. *Behavioural and Cognitive*  
6 *Psychotherapy*, 40, 39-53. doi:10.1017/S1352465811000245  
7  
8 Kline, P. (1993). *The Handbook of Psychological Testing*. London, Routledge.  
9  
10 Longman, R. S., Cota, A. A., Holden, R. R. & Fekken, G. C. (1989). A regression equation for  
11 the parallel analysis criterion in principal components analysis: Mean and 95th  
12 percentile eigenvalues. *Multivariate Behavioral Research*, 24, 59-69.  
13 doi:10.1207/s15327906mbr2401\_4  
14  
15 Lorenzo-Seva, U. & Ferrando, P. J. (2006). FACTOR: A computer program to fit the  
16 exploratory factor analysis model. *Behavior Research Methods Instruments &*  
17 *Computers*, 38(1), 88-91. doi:10.3758/BF03192753  
18  
19 Marsh, H. W., Hau, K.T. & Wen, Z., (2004). In search of golden rules: Comment on  
20 hypothesis testing approaches to setting cutoff values for fit indexes and dangers in  
21 overgeneralising Hu & Bentler's (1999) findings. *Structural Equation Modelling*, 11,  
22 320-341. doi:10.1207/s15328007sem1103\_2  
23  
24 Melli, G., Carraresi, C., Stopani, E., Radomsky, A., & Bulli, F. (2015). Factor structure and  
25 temporal stability of the Vancouver Obsessional Compulsive Inventory – Mental  
26 Contamination Scale (VOCI-MC) and psychometric properties of its Italian version.  
27 *Comprehensive Psychiatry*, 58, 198–204. doi:10.1016/j.comppsy.2014.12.017  
28  
29 Muthén, B. & Kaplan D. (1985). A comparison of some methodologies for the factor analysis  
30 of non-normal Likert variables. *British Journal of Mathematical and Statistical*  
31 *Psychology*, 38, 171-189. doi:10.1111/j.2044-8317.1985.tb00832.x  
32  
33 Muthén B. O., du Toit S. H. C., & Spisic D. (1997). *Robust inference using weighted least*  
34 *squares and quadratic estimating equations in latent variable modeling with*  
35 *categorical and continuous outcomes*. Unpublished manuscript, University of  
36 California, Los Angeles.  
37  
38 Monzani, B., Jassi, A., Heyman, I., Turner, C., Volz, C., & Krebs, G. (2015). Transformation  
39 obsessions in paediatric obsessive-compulsive disorder: Clinical characteristics and  
40 treatment response to cognitive behaviour therapy. *Journal of Behavior Therapy and*  
41 *Experimental Psychiatry*, 48, 75-81. doi:10.1016/j.jbtep.2015.02.004  
42  
43 Olatunji, B. O., Sawchuk, C. N., Lohr, J. M., & de Jong, P. J. (2004). Disgust domains in the  
44 prediction of contamination fear. *Behaviour Research and Therapy*, 42, 93–104.  
45 doi:10.1016/S0005-7967(03)00102-5  
46  
47 Rachman, S. J. (1994). Pollution of the mind. *Behaviour Research and Therapy*, 32, 311–314.  
48 doi:10.1016/0005-7967(94)90127-9  
49  
50 Rachman, S. J. (2004). Fear of Contamination. *Behaviour Research and Therapy*, 42, 1227–  
51 1255. doi:10.1016/j.brat.2003.10.009  
52  
53 Rachman, S. J. (2006). *The fear of contamination: Assessment and treatment*. Oxford: Oxford  
54 University Press.  
55  
56 Rachman, S. J. Coughtrey, A. E., Shafran, R. & Radomsky, A. S. (2014). *Oxford Guide to the*  
57 *Treatment of Mental Contamination*. Oxford: Oxford University Press.  
58 doi:10.1093/med:psych/9780198727248.001.0001  
59  
60 Rachman, S. J., & de Silva, P. (1978). Normal and abnormal obsessions. *Behaviour Research*  
*and Therapy*, 16, 233-248. doi:10.1016/0005-7967(78)90022-0

- 1  
2  
3  
4 Rachman, S. J., & Hodgson, R. J. (1980). *Obsessions and compulsions*. Englewood Cliffs, NJ:  
5 Prentice Hall.
- 6  
7 Rachman, S. J., Thordarson, D. S., Shafran, R., & Woody, S. R. (1995). Perceived  
8 Responsibility: Structure and Significance. *Behaviour Research and Therapy*, 33, 779–  
9 784. doi:10.1016/0005-7967(95)00016-Q
- 10  
11 Radomsky, A. S., Rachman, S. J., Shafran, R., Coughtrey, A. E., & Barber, K. C. (2014). The  
12 nature and assessment of mental contamination: A psychometric analysis. *Journal of*  
13 *Obsessive-Compulsive and Related Disorders*, 3, 181-187.  
14 doi:10.1016/j.jocrd.2013.08.003
- 15  
16 Rapee, R. M., Craske, M. G., Brown, T. A., & Barlow, D. H. (1996). Measurement of  
17 perceived control over anxiety-related events. *Behavior Therapy*, 27, 279-291.  
18 doi:10.1016/S0005-7894(96)80018-9
- 19  
20 Rasmussen, S. A., & Eisen, J. L. (1992). The epidemiology and differential diagnosis of  
21 obsessive compulsive disorder. *Journal of Clinical Psychiatry*, 53, 4-10.  
22 doi:10.1007/978-3-642-77608-3\_1
- 23  
24 Rassin, E., Diepstraten, P., Merckelbach, H., & Muris, P. (2001). Thought-action fusion and  
25 thought suppression in obsessive-compulsive disorder. *Behaviour Research and*  
26 *Therapy*, 39, 757–764. doi:10.1016/S0005-7967(00)00051-6
- 27  
28 Rassin, E., & Koster, E. (2003). The correlation between thought–action fusion and religiosity  
29 in a normal sample. *Behaviour Research and Therapy*, 41, 361–368.  
30 doi:10.1016/S0005-7967(02)00096-7
- 31  
32 Rassin, E., Merckelbach, H., Muris, P., & Schmidt, H. (2001). The thought-action fusion  
33 scale: Further evidence for its reliability and validity. *Behaviour Research and Therapy*,  
34 39, 537–544. doi:10.1016/S0005-7967(00)00031-0
- 35  
36 Rust, J. & Golombok, S. (2009). *Modern Psychometrics* (3rd Edition). London: Taylor and  
37 Francis.
- 38  
39 Shafran, R., Thordarson, D. S., & Rachman, S. J. (1996). Thought-action fusion in obsessive-  
40 compulsive disorder. *Journal of Anxiety Disorders*, 10, 379–391. doi:10.1016/0887-  
41 6185(96)00018-7
- 42  
43 Sica, C., Norvara, C., & Sanavio, E. (2002). Religiousness and obsessive-compulsive  
44 cognitions and symptoms in an Italian population. *Behaviour Research and Therapy*,  
45 40, 813–823. doi:10.1016/S0005-7967(01)00120-6
- 46  
47 Siev, J. & Cohen, A. B. (2007). Is thought–action fusion related to religiosity? Differences  
48 between Christians and Jews. *Behaviour Research and Therapy*, 45(4), 829–837.  
49 doi:10.1016/j.brat.2006.05.001
- 50  
51 Taylor, S. (1998). Assessment of Obsessive Compulsive Disorder. In R. P. Swinson, M. M.  
52 Antony, S. Rachman, & M. A. Ritscher (Eds.), *Obsessive-Compulsive Disorder: Theory,*  
53 *Research and Treatment*. New York, NY: Guildford Press.
- 54  
55 Thordarson, D. S., Radomsky, A. S., Rachman, S. J., Shafran, R., Sawchuk, C. N., &  
56 Hakstian, A. R. (2004). The Vancouver Obsessional Compulsive Inventory (VOCI).  
57 *Behaviour Research and Therapy*, 42, 1289–1314. doi:10.1016/j.brat.2003.08.007
- 58  
59 Timmerman, M. E., & Lorenzo-Seva, U. (2011). Dimensionality Assessment of Ordered  
60 Polytomous Items with Parallel Analysis. *Psychological Methods*, 16, 209-220.  
doi:10.1037/a0023353

- 1  
2  
3  
4 Velicer, W. F. (1976). Determining the number of components from the matrix of partial  
5 correlations. *Psychometrika*, *41*, 321-327. doi:10.1007/BF02293557  
6  
7 Volz, C., & Heyman, I. (2007). Case series: Transformation obsession in young people with  
8 obsessive-compulsive disorder (OCD). *Journal of the American Academy of Child &*  
9 *Adolescent Psychiatry*, *46*(6), 766-772. doi:10.1097/chi.0b013e3180465a2e  
10  
11 Westen, D., & Rosenthal, R. (2003). Quantifying construct validity: Two simple measures.  
12 *Journal of Personality and Social Psychology*, *84*, 608-618. doi:10.1037/0022-  
13 3514.84.3.608  
14  
15 Zysk, E., (2013). *Aetiology, Phenomenology, Assessment and Treatment of Contamination*  
16 *Fears in Obsessive Compulsive Disorder*. Unpublished doctoral dissertation, University  
17 of Reading, Reading, UK.  
18  
19 Zysk, E., Shafran, R., & Williams, T. I. (2105). *A Single-Case Evaluation of the Treatment of*  
20 *Morphing Fears*. Manuscript in preparation.  
21  
22  
23  
24  
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Table 1. Item analyses of MFQ in the N-OCD ( $n = 760$ ) and SR-OCD ( $n = 140$ ) samples, and factor loadings based on the one-factor solution from the exploratory factor analysis ( $n = 379$ )

Item	<i>M</i>		<i>SD</i>		Range		SK		KU		$M_{rit}$		$\alpha$ w/o		Loading
	N-OCD	SR-OCD	N-OCD	SR-OCD	N-OCD	SR-OCD	N-OCD	SR-OCD	N-OCD	SR-OCD	N-OCD	SR-OCD	N-OCD	SR-OCD	
Seeing a disfigured person could increase the chance that I will become like that.	.07	.43	.31	.90	0-3	0-4	5.51	2.36	35.03	5.26	.40	.54	.81	.90	.70
If I wear an item of clothing of an immoral individual, I could become immoral myself.	.14	.58	.46	1.02	0-4	0-4	4.32	1.73	22.81	2.06	.41	.58	.80	.89	.65
I worry I can magically be transformed into someone or something else.	.08	.59	.38	1.19	0-4	0-4	6.09	1.96	44.02	2.55	.58	.69	.79	.89	.75
I perform repetitive physical or mental acts to prevent myself from changing into someone or something I do not wish to be.	.21	1.24	.57	1.53	0-4	0-4	3.27	.76	11.73	-1.01	.49	.68	.80	.89	.63
I would avoid walking in the airstream of a weird individual so I do not become like that person.	.09	.51	.39	.99	0-3	0-4	5.20	2.11	30.03	3.74	.50	.45	.80	.90	.66
When I behave like someone I strongly dislike, I fear that I might be turning into that particular person.	.56	.99	.84	1.22	0-4	0-4	1.54	.94	2.02	-.39	.50	.61	.81	.89	.76
Simply thinking about a person I would not wish to be can change me into that person.	.06	.46	.34	.87	0-4	0-4	7.76	2.02	70.50	3.81	.56	.69	.80	.89	.78
I can pick up mental illness by direct or indirect contact with mentally ill people.	.06	.31	.32	.74	0-4	0-3	6.67	2.44	56.11	5.16	.52	.49	.80	.90	.70
I check to ensure I am not turning into someone or something else.	.21	.71	.56	1.20	0-4	0-4	3.26	1.57	12.80	1.18	.50	.69	.80	.89	.68
I would avoid standing near a homeless person so I do not have the same fate.	.04	.28	.26	.74	0-3	0-4	8.53	2.96	81.52	8.64	.45	.60	.80	.89	.76
Saying the name of someone whom I fear or strongly dislike could make me become like that person.	.02	.32	.16	.70	0-3	0-3	12.23	2.24	77.91	4.30	.47	.74	.81	.89	.87
Others can pick up fragments of my character if I am not careful.	.23	.69	.62	1.19	0-4	0-4	3.26	1.58	12.26	1.17	.53	.55	.79	.90	.71
When near someone undesirable, I do magical things to protect me from becoming like that person.	.02	.48	.23	1.07	0-4	0-4	12.68	2.20	80.33	3.63	.55	.75	.80	.89	.99

Note: MFQ = Morphing Fear Questionnaire; N-OCD = Sample reporting never having had OCD; SR-OCD = Sample reporting current OCD; *M* = Mean; *SD* = Standard Deviation; SK = Skewness; KU = Kurtosis;  $M_{rit}$  = Mean corrected item-total correlation;  $\alpha$  w/o = Cronbach's alpha-if-item-deleted.

Table 2. Pearson's correlations between the MFQ and the OCI-R, VOICI-MC, BAI, BDI-II, TAF, and MIS for those reporting never having had OCD (N-OCD,  $n = 760$ ) and those reporting having current OCD (SR-OCD,  $n = 140$ )

Correlations with MFQ		
	N-OCD	SR-OCD
<b>Convergent measures</b>		
OCI-R	.48**	.49**
VOICI-MC	.52**	.46**
TAF	.46**	.45**
MIS	.46**	.66**
<b>Divergent measures</b>		
BAI	.27**	.34**
BDI-II	.32**	.27**

\*\* All one-tailed  $p$  values are  $< .005$ .

Note: MFQ = Morphing Fear Questionnaire; N-OCD = Sample reporting never having had OCD; SR-OCD = Sample reporting current OCD; OCI-R = Obsessive-Compulsive Inventory Revised; VOICI-MC = Vancouver Obsessive Compulsive Inventory – Mental Contamination; BAI = Beck Anxiety Inventory, BDI-II = Beck Depression Inventory; TAF = Thought Action Fusion scale; MIS = Magical Ideation Scale.

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