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Examining the Beliefs that Contribute to Mental Contamination

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Introduction

Obsessive–compulsive disorder (OCD) affects roughly 2.5% of the general population [1]. An anxiety–based disorder, OCD is characterized by persistent, intrusive, and distressing obsessions (thoughts, impulses, or images) or compulsions (repetitive, excessive behaviours or mental acts) [1]. Similar to the U.S., nationwide prevalence of OCD in Japan is approximately 2% [2]. In one study, researchers administered the Yale–Brown Obsessive Compulsive Scale (Y–BOCS) symptom checklist [3] to 343 Japanese patients with OCD to examine whether symptom dimensions were stable across cultures. They found that the OCD symptom structure has substantial transcultural stability across Western and Eastern cultures [4]. Fear of contamination features prominently in approximately half of all cases of OCD [5] e.g., 'I avoid using public toilets because I am afraid of disease or contamination'). In generally, these feelings of dirtiness may be evoked by contact with a contaminant or dirt. However, there is also another type of contamination that may be experienced without physical contact with a contaminant [6,7]. This phenomenon, first identified by Rachman [8], is called mental contamination (e.g., 'When I recall certain events, it leaves me feeling dirty'; 'I wash my hands after doing something I feel is morally wrong.'). It has been defined as the experience of contamination–related feelings of dirtiness in the absence of direct physical contact with a contaminant [6,7,9,10]. The feelings of dirtiness can be evoked or revived by memories, repugnant thoughts, or images. In addition, they are accompanied by negative emotions (e.g., distress, revulsion, disgust, shame, guilt, and anxiety) and a strong urge to clean [9]. Mental contamination is thought to be common; in a study of 177 people with OCD symptoms, 46% of them experienced mental contamination, and it was highly correlated with severity of OCD [11-14].Fairbrother and Rachman [6] found that the feeling of mental contamination may be evoked, for example, by simply imagining certain events, and has also been found to be prominent in victims of sexual assault and in patients with Post Traumatic Stress Disorders (PTSD). They indicated that 60% of female participants who reported an unwanted sexual experience showed evidence that they had experienced at least one index of mental contamination, and that feelings of mental contamination can be related to PTSD symptoms. Some experimental research has found that feelings of mental contamination can be induced without physical contact. The non-consensual kiss paradigm has been used in non-clinical populations.For example, the imagined occurrence of a non–consensual kiss from a man is a sufficient condition to evoke subjective reports of mental contamination for non-clinical female participants [9,11,12]. In study of Elliott and Radomsky [12], female undergraduate students listened to an audio recording and imagined that they were a) sharing a consensual kiss with a man described as moral, b) sharing a consensual kiss with a man described as immoral, c) receiving a forced non-consensual kiss from a man described as moral, or d) receiving a forced non-consensual kiss from a man described as immoral. The results indicated that a non-consensual kiss evoked greater feelings of mental contamination than a consensual kiss. In particular, participants who imagined a non-consensual kiss from a man described as either moral or immoral reported the greatest feelings of mental contamination, whereas participants who imagined a consensual kiss from a man described as moral reported the least. Rachman, Radomsky, Elliott, and Zysk [13] reported the possibility that the feeling of mental contamination evoke for not only female sexual victims but also male perpetrators. In their experiment [13], male participants were asked to vividly imagine kissing a girl without her consent (e.g., The male participants betray a close friend and the friend's shy young sister. Despite being asked by the friend to look after his young sister, the male participants give her an unwilling kiss). The participants reported mental contamination when they were asked to imagine unwilling kiss with their friend's young sister. The study also indicated that the magnitude of the mental contamination was boosted by the introduction of a betrayal element.

Cougle, Lee, Horowitz, Wolitzky–Taylor, and Telch [15] developed the mental pollution questionnaire (MPQ) that assesses of mental contamination, which has confirmed adequate factorial and psychometric properties using undergraduates sample [15]. The MPQ is Likert type of scale and has eight items and two subscales: 'Washing', assessing the washing behaviour by which individuals may attempt to relieve their distress, and 'Ideation', which assesses sense of inward contamination. MPQ scores were significantly associated with symptoms of OCD (e.g., washing–compulsion) and cognition theoretically related to inflated responsibility [16] and thought–action fusion [17]. Their study showed that the MPQ is a reliable and valid measure of mental contamination, or feelings of internal dirtiness. In Japan, Ishikawa, Kobori, and Shimizu [18] also developed a Japanese version of mental pollution questionnaire (MPQ–J).

Cognitive models for anxiety disorders suggest the importance of interpretations, appraisals, and beliefs that increase subjective sense of anxiety and motivate safety–seeking behaviours [7,10,16,19]. For example, Salkovskis [19] has proposed that an inflated sense of responsibility for harm to oneself or other people may connect to unwanted intrusive thoughts (including images and/or impulses) and compulsions. Cognitive components have also been investigated in studies about mental contamination. Radomsky and Elliott [20] assessed three cognitive appraisals and feeling of mental contamination with an in vivo task (imagining a non–consensual kiss). They found that participant's appraisals of negative events—their perception of personal responsibility, perception of immorality, and perceived violation—could consistently and significantly predict feelings of mental contamination after controlling symptoms of physical contamination fears (e.g. 'I avoid using public toilets because I am afraid of disease or contamination') and general sensitivities, such as anxiety sensitivity. Cougle et al. [15] also found that mental contamination was related to inflated responsibility [16]. This findings

mean the possibility that individuals with inflated responsibility beliefs often appraisals a responsibility for the self when they encounter an unwanted sexual experience, and the beliefs would be working the vulnerability for the feeling of mental contamination. In Asian culture, Ishikawa, Kobori, and Shimizu [21] using Japanese sample also indicated that hierarchical regression analyses showed that beliefs related to responsibility and morality made unique contributions to mental contamination.

Mental contamination may relate not only to the beliefs about responsibility and morality but also to low self–esteem, because the low self–esteem is vulnerability of perceived violation that is predictor of mental contamination [20]. For example, Kuppens, Van Mechelen, Smits, De Boeck, and Ceulemans [22] investigated the relationship between low self–esteem and situations that involve violation, and indicated that participants with low self–esteem ascribed greater unfairness to and expressed more negative emotions toward the person who violated them than did participants with high self–esteem. Thus, individuals who have chronically low self–esteem are likely to feel that they were treated more disrespectfully and unfairly, and then conclude that they have been violated when they meet the violator or remember the negative events [22]. These thoughts may trigger feelings of mental contamination. Actually, Coughtrey, Shafran, and Lee [23] suggested that addressing low self–esteem was important in the treatment for mental contamination. Their case series presented that some cognitive–behavioural techniques to improve low self–esteem were effective to reduce mental contamination. Thus, there is a possibility that low self–esteem is vulnerability of mental contamination. However, it has been not studied that low self–esteem is vulnerable factor for the feeling of mental contamination.

Purpose of the Present Study

The purpose of this study was to investigate the beliefs that are vulnerable factor for the feelings of mental contamination as measured by MPQ–J. In other words, we test the hypothesis that beliefs related to responsibility, morality, and low self–esteem predict feelings of mental contamination as measured by the MPQ–J after controlling symptoms of physical contamination fears (i.e., contact contamination fears), depression, and anxiety, as well as personality traits.

Methods

Participants

This study was approved by the ethics committee of, the Graduate School of Medicine, Chiba University. Information about this study was provided through handouts and oral presentations given in lecture rooms at the university sites. Interested students were asked to contact the researchers, and those who did received and completed the questionnaire. Two hundred and four Japanese undergraduates (66.34% female) enrolled in Japanese universities participated in this study (age range: 18–28; M=20.64, SD=4.09). All participants reported that they did not have any clinical history of mental disorder, head injury, central nervous system diseases, or substance abuse. All participants completed questionnaire battery in approximately 30 min.

Measures

Mental contamination Japanese version of Mental Pollution Questionnaire (MPQ–J [18]) was used to assess of mental contamination. MPQ–J is an eight–item self–report questionnaire. Respondents a represented with several statements and are asked to rate agreement on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). The MPQ–J has two empirically supported subscales. The washing rituals subscale assesses washing rituals performed in response to perceived mental contamination ('I wash my hands when I feel guilty'). The inward contamination subscale pertains to a sense of inward contamination not linked to washing behaviours ('When I recall certain events, it leaves me feeling dirty.'). The reliability and validity of the MPQ–J were verified by Ishikawa, Kobori, and Shimizu [18].

Depression: The Beck Depression Inventory version 2 (BDI–II) [24] is a 21–item self–report measure designed to assess symptoms of major depression. We used the Japanese version of BDI–II [25] to measure the depressive symptoms of participants. The reliability and validity of the Japanese version were verified by Kojima et al. [25].

Anxiety: The Beck Anxiety Inventory (BAI), created by Beck, Epstein, Brown, and Steer [26], is a multiple–choice self–report inventory used to measure anxiety symptoms. The BAI consists of 21 questions about whether the subject has felt anxiety symptoms, such as numbness, hot and cold sweats, or feelings of dread, in the past week. We used the following procedure to develop a Japanese translation. The first and second authors translated the scale into Japanese; an independent translator, who is a native speaker of English and psychologist, completed a back–translation; and the first author and the third author, who is a bilingual psychologist, compared both versions and amended the Japanese version.

Fear of contact contamination: The Obsessive–Compulsive Inventory [27] is a 36–item self–report measure designed to assess symptoms of fear of physical contact contamination *(e.g. 'I avoid using public toilets because I am afraid of disease or contamination').* We used the washing–compulsion subscale (OCI–washing) to measure fear of contact contamination (i.e., ordinary sense of dirtiness). It consists of eight questions about how much the subject has engaged in obsessive washing behaviour in recent weeks. The OCI was translated into Japanese, and the reliability and validity of the Japanese version were verified by Ishikawa, Kobori, and Shimizu [28].

Personality traits: The Japanese version of the Substance Use Risk Profile Scale (SURPS–J) assesses four dimensions of personality linked to different motivations for drug use and abuse [29]. The original version of SURPS was created by Woicik, Stewart, Pihl, and Conrod [30]. The first trait (anxiety sensitivity: AS) refers to the fear of symptoms of psychical arousal (e.g., feeling dizzy [31]), and the second (hopelessness) is identified as a risk factor for developing depression [32]. The third trait (impulsivity) involves difficulties in the regulation of behavioural responses [33]. Finally, the fourth trait (sensation–seeking: SS) is characterized by the desire for intense and novel experiences [34].

Responsibility: The Responsibility Attitudes Scale (RAS) [16] is a 26–item instrument used to assess cognition about inflated responsibility. Such statements as 'I often feel responsible for things that go wrong' are rated on a seven–point Likert–type scale (1=totally disagree to 7=totally agree). Salkovskis et al. [16] found the RAS to possess good reliability and validity. RAS was translated into Japanese, and the reliability and validity of the Japanese version were verified by Ishikawa, Kobori, Ikota and Shimizu [35].

Morality: The Contingencies of Self–Worth Scale [36] consists of 35 items in seven subscales and assesses seven domains on which people are likely to state their self–worth. Among the subscales, the virtue

scale, which consists of five items, measures an individual's sense of worth for virtue and morality (e.g., 'Whenever I follow my moral principles, my sense of self–respect gets a boost', 'I couldn't respect myself if I didn't live up to a moral code'). We used the virtue scale to measure moral standards. All subscales had high internal consistency and were distinct from other personality measures [36]. We used the following procedure to develop a Japanese translation. The first and second authors translated the scale into Japanese; an independent translator, who is a native speaker of English and psychologist, completed a back–translation; and the first author and third author who is bilingual psychologist compared both versions and amended the Japanese version.

Self–esteem: We used the Rosenberg Self–Esteem Scale [37] to measure of the self–esteem. The Japanese version of the scale (RSE–J) consists of ten questions about self–esteem and was translated by Mimura and Griffiths [38]. Such statements as 'I feel that I'm a person of worth, at least on an equal plane with others' are rated on a five–point Likert–type scale (1=totally disagree to 5=totally agree). The reliability and validity of RSE–J were confirmed by Uchida and Ueno [39].

Results

Mean, standard deviation, and internal consistency (α) of the measurements

The mean of MPQ–J total score was 19.06 (7.89) for females (n=136) and 17.95 (6.44) for males (n=68). There was no significant difference between female and male participants for the overall test (t (202)=1.09, p=.21) or for MPQ–Ideation (t (202)=1.31, p=.14) and MPQ–Washing (t (202)=1.55, p =.19).

The mean, SD, and internal consistency (α) of the measurements are presented in Table 1.

	Mean	SD	α
MPQ-J	18.88	7.54	.80
MPQ-Washing	6.86	3.82	.78
MPQ-Ideation	12.02	5.40	.81
OCI-Washing	4.91	5.46	.82
BDI	12.38	8.46	.81
BAI	15.09	11.72	.86
Hopeless	16.51	3.75	.67
AS	11.70	2.92	.65
Imp	11.71	2.38	.59
SS	13.19	3.87	.68
RAS-J	101.77	23.30	.90
Virtue	40.12	11.38	.76
RSE-J	22.52	4.75	.83

Table 1: Mean, standard deviation and internal consistency (α) of the measurements (n=204). (Note: MPQ–J=Japanese version of the Mental Pollution Questionnaire; MPQ–Washing=Subscale of MPQ for hand washing; MPQ–Ideation=Subscale of MPQ for thoughts of pollution; BDI=Beck Depression Inventory version 2; BAI=Beck Anxiety Inventory; OCI–Washing=Washing subscale of the Obsessive Compulsive Inventory; RSE–J=Rosenberg Self–Esteem Scale.)

Correlations among each variable

The results of inter–correlation among MPQ–J, BAI, BDI, OCI–washing, personality traits (hopelessness, AS, sensation seeking, impulsivity) and beliefs (RAS, virtue and RSE–J) are presented in Table 2.

Consistent with our predictions, MPQ–washing was significantly correlated with MPQ–Ideation, BAI, BDI, OCI–washing, anxiety sensitivity, sensation seeking, RAS, virtue, and RSE, Then, MPQ–Ideation was significantly correlated with MPQ–washing, BAI, BDI, OCI–washing, hopelessness, anxiety sensitivity, RAS, and RSE.

	MPQ–J	MPQ-Washing	MPQ-Ideation
MPQ–J	-	.74**	.88**
MPQ-Washing	.74**	-	.32**

MPQ-Ideation	.88**	.32**	-
BDI	.38**	.20*	.44**
BAI	.49**	.32**	.47**
OCI-Washing	.41**	.53**	.19**
Hopeless	.12	-.01	.17*
AS	.42**	.36**	.34**
Imp	.16*	.13	.13
SS	.12	.15*	.12
RAS	.53**	.23**	.44**
RSE	-.30**	-.29**	-.34**
Virtue	.19*	.39*	.02

Table 2: Correlations for each variable. (Note: MPQ–J=Japanese version of the Mental Pollution Questionnaire; MPQ–Ideation=Subscale of MPQ–J; MPQ–Washing=Subscale of MPQ–J; BDI=Beck Depression Inventory version 2; BAI=Beck Anxiety Inventory; OCI–Washing=Washing subscale of Obsessive Compulsive Inventory. * p < .05. ** p < .01.)

Hierarchical regression analysis structure

Finally, we examined whether the beliefs would show incremental validity and explain further variance in both subscales of MPQ–J beyond contact contamination fear, depression, anxiety, and personality traits.

	MPQ–Washing			**MPQ–Ideation**		
	R2	ΔR2	B	R2	ΔR2	B
Step 1—Symptoms						
Age	0.29		0.04	0.23		0.04
gender			-0.09			0.06
BDI			-0.15			0.15
BAI			0.07			.23**
OCI_washing			.44***			-0.03
Step 2—Personality						
Hopelessness	0.34	.05**	0.01	0.25	.02**	-0.08
AS			.17*			0.07
Impulsivity,			-0.02			0.06
SS			0.07			-0.01
Step 3—Beliefs						
RAS	0.39	.05**	0.08	0.32	.07**	.24**
RSE-J			-.17*			-.19*
Virtue			.19**			0.07

Table 3: Results of hierarchical regression analysis. (Note. MPQ–J=Japanese version of the Mental Pollution Questionnaire; MPQ–Ideation=Subscale of MPQ–J; MPQ–Washing=Subscale of MPQ–J; BDI=Beck Depression Inventory; BAI=Beck Anxiety Inventory; OCI–

Washing=Washing subscale of Obsessive Compulsive Inventory*; AS=Anxiety Sensitivity; SS=Sensation–Seeking; RAS=Responsibility Attitude Scale;* RSE–J=Rosenberg Self–Esteem scale. *p<0.05. **p<0.01. **p<0.001.)

For this, we computed two hierarchical regression analyses. The first predicted MPQ–Washing, and second MPQ–Ideation. Each regression analysis was comprised of three steps. In step 1, age, gender (female=0, male=1), BDI, BAI and OCI–washing were entered as predictors. In step 2, personality traits (hopelessness, anxiety sensitivity, impulsivity, and sensation seeking) were entered. Finally, beliefs (RAS, RSE, and Virtue) were entered in step 3. These results are displayed in Table 3.

The results of the hierarchical regression analysis revealed that OCI–washing scores (β=.44, p<0.001) predicted MPQ–washing in step 1 (R^2=.29, F (5, 198)=17.81, p<0.001), and anxiety sensitivity (β=.17, p<0.05) showed a significant regression coefficient in step 2, while other personality scales did not (R^2=.34, F (4, 194)=13.18, p<0.001). In step 3, RSE (β=–.17, p<0.05), and Virtue (β=.19, p<0.01) made unique contributions to MPQ–washing, however RAS did not make a contribution to MPQ–Washing (R^2=.39, F (3, 191)=12.41, p<0.001).

In terms of MPQ–Ideation, BAI (β=.23, p < .01) predicted MPQ–ideation in step 1 (R^2=.23, F (5, 198)=13.39, p < .001), and personality trait variables did not show a significant regression coefficient in step 2 (R^2=.25, F (4, 194)=8.86, p < .001). RAS (β=.24, p < .01) and RSE (β=–.19, p < .05) made a unique contribution to MPQ–ideation, but virtue did not make a contribution to MPQ–ideation in step 3 (R^2=.32, F (3, 191)=8.88, p < .001).

Discussion

The main purpose of this study was to investigate the beliefs that are vulnerability of the feelings of mental contamination as measured by MPQ–J; we tested the hypothesis that beliefs related to responsibility, morality, and low self–esteem would predict feelings of mental contamination beyond the symptoms of contact contamination fears, depression, anxiety, and personality traits.

The findings of correlation analyses indicated both MPQ–J were associated with OCD symptoms (i.e., OCI–washing scale), depression, anxiety, and a cognition linked to OCD (i.e., responsibility attitude). These results indicated that the psychometric properties of the MPQ–J were verified. In addition, there was no significant difference between females and males on mean scores of MPQ–J. These results would support the notion of Rachman et al. [13] that feeling of mental contamination is found in males, as well as females.

Regarding of inflated responsibility, consistent with our predictions, RAS made a unique contributions to MPQ–Ideation beyond the symptoms of contact contamination fears, depression, anxiety, and personality traits. Individuals with high responsibility attitude felt more responsible for negative occurrences (e.g., 'I often feel responsible for things that go wrong'), and this cognitive appraisal triggers the feeling of mental contamination. For example, when one experiences a feeling of responsibility or shame for participating in a situation deemed immoral, one will be more likely to experience these internal, emotionally charged feelings of dirtiness [10]. The present study also demonstrated that belief associated with a high moral standard, as evidenced by scores on the virtue scale, made a unique contribution to MPQ–washing scores after controlling for symptoms of contact contamination fears, depression, anxiety, and personality traits. Individuals with belief reflecting a high moral standard see offenders as immoral when remembering or encountering the negative events. This appraisal would trigger feelings of mental contamination. Thus, these findings in this study support the cognitive theory of mental contamination [10,20,21].

Self–esteem, as evidenced by scores on the RSE–J, made a negative contribution to MPQ–ideation and MPQ–washing. This result supports the hypothesis that the belief about low self–esteem is vulnerability for the feelings of mental contamination. The belief about low self–esteem would be related to perceived violation, which was explained by Ehlers and Clark [40-42] as concerning unfairness (e.g., 'Others have not treated me fairly'). Some studies indicated that the feeling of mental contamination can be predicted by perceived violation [10,20,21]. Individual with low self–esteem may often feel the feeling of violation for the negative situation, because they have beliefs such as, 'Others have not treated me fairly'. These appraisals based on low self–esteem would provoke the feeling of mental contamination. Furthermore, the case series of Coughtrey, Shafran, Lee, and Rachman [23] suggested issues of low self–esteem were particularly relevant when tackling beliefs about fear of morphing in mental contamination. Fear of morphing is one of the subtypes of mental contamination and defined that one might be tainted or changed by proximity to particular 'undesirable' people or classes of people (e.g., obese people or alcoholics) [10,23]. The fear of morphing may affect the greater feeling of dirtiness and washing urge. The fear of morphing would be particularly strongly associated with issues of low self–esteem, because individuals with low self–esteem have unstable self–identity and are vulnerable to fear of morphing [23]. However, it has been not evidenced that fear of morphing would be associated with issues of low self–esteem. Further studies are needed in order to clarify the relationships between fear of morphing in mental contamination and low self–esteem.

In conclusion, the findings of hierarchical regression analysis showed that beliefs related to responsibility, morality, and low self–esteem could predict feelings of mental contamination beyond the symptoms of contact contamination fears, depression, anxiety, and personality traits. This study using non-clinical sample presented the possibility that belief related to low self–esteem exacerbate feelings of mental contamination.

Clinical Implications, Limitations, and Implications for Future Work

Our findings support the notion that some cognitive behavioural techniques to change the meaning of beliefs are beneficial in reducing mental contamination in OCD [10,20,21,23]. Addressing belief of personal responsibility, perhaps through established methods [43-46] would have a strong effect on reducing feelings of mental contamination. It also would be beneficial in the intervention of patients with low self–esteem [47]. For example, Bennett–Levy et al. [48] demonstrated behavioural experiments to improve low self–esteem following sexual assault trauma. In this technique, at first, therapist and patient discussed target cognitions that exacerbate low self–esteem (e.g., 'After what happened to me, I am not worthy of a decent man'; 'I am ruined, spoiled, contaminated, and dirty'; 'others would also think I was ruined'). Then, therapist and patient planed behavioural experiments in order to test the validity of the patient's

cognition, and construct new adaptive beliefs. This cognitive behavioural technique would be effective to improve patient's low self-esteem and feeling of being contaminated such as 'I am ruined, spoiled, contaminated, and dirty' [48].

The use of a non–clinical sample limits the ability to draw conclusions regarding the relationship between mental contamination and cognitions. Although non–clinical samples are often used in OCD research and several studies have demonstrated commonalities between non–clinical and OCD samples in the characteristics of their obsessions, compulsions, and beliefs about intrusions [49], studies using the MPQ–J with clinical samples are needed.

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