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ORIGINAL ARTICLE

A cross-sectional investigation of autogenous and reactive obsessions and associated cognitive and symptom correlates in China

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Abstract Categorizing clinical obsessions as either autogenous or reactive, a model that has been supported by several studies, may represent a parsimonious approach to characterizing individuals with obsessive-compulsive disorder (OCD). However, most published studies on autogenous and reactive obsessions have been carried out with participants in highly developed nations (e.g., United States, Australia). No studies have been carried out in less developed countries, such as China. It was hypothesized that the nature of autogenous and reactive obsessions and their correlates would generalize to China. This cross-sectional study incorporated three groups from China: a college student sample (N = 1,701), a clinical sample of patients with OCD (N =158), and a clinical control group of patients with anxiety disorder other than OCD (N = 88). Confirmatory factor analysis provided support for the autogenous and reactive model of obsessions in a Chinese sample. The results also showed that autogenous and reactive obsessions demonstrated a pattern of associations with cognitive and symptom correlates (e.g., obsessive beliefs, traditional OCD subtype themes) that were comparable to those found in previous research. The current study supports the autogenous and reactive obsessions model of OCD and its correlates in China, providing additional evidence for the cultural invariance of the model.

PALABRAS CLAVE
Trastorno obsesivo-compulsivo;
Obsesiones autógenas;

Resumen La categorización de las obsesiones clínicas, autógenas o reactivas, modelo que ha sido apoyado por diversos estudios, puede representar un enfoque parsimonioso para caracterizar individuos con trastorno obsesivo-compulsivo (TOC). Sin embargo, la mayoría de estos estudios se ha llevado a cabo con participantes de países altamente desarrollados (por ejemplo,

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Obsesiones reactivas;
China;
Encuesta transversal

Estados Unidos o Australia). Ningún estudio se realizó en países menos desarrollados como China. Se hipotetiza que la naturaleza de las obsesiones autógenas y reactivas, así como sus correlatos, es generalizable a China. Este estudio transversal incluye tres grupos: una muestra de estudiantes universitarios (*N* = 1.701), una muestra clínica de pacientes con TOC (*N* = 158) y un grupo control clínico de pacientes con trastornos de ansiedad distintos del TOC (*N* = 88). El análisis factorial confirmatorio apoyó el modelo autógeno y reactivo de las obsesiones en población china. Las obsesiones autógenas y reactivas mostraron un patrón de asociaciones con correlatos cognitivos (por ejemplo, creencias obsesivas) comparables al encontrado en la investigación previa. El presente estudio apoya el modelo de obsesiones autógenas y reactivas del TOC y sus correlatos en China, proporcionando evidencia adicional para la invariancia cultural del modelo.

Obsessive-compulsive disorder (OCD) is characterized by obsessions and compulsions, the former of which refer to persistent and intrusive images, thoughts, ideas, or impulses that cause distress or impairment (American Psychiatric Association [APA], 2013). Compulsions can be either observable (e.g., checking) or mental (e.g., praying) and are intended to neutralize or alleviate the distress caused by obsessions. Factor and cluster analyses have simplified OCD symptom subtypes into three, four, or five factors (Abramowitz, Franklin, Schwartz, & Furr, 2003; Baer, 1994; Calamari, Wiegartz, & Janeck, 1999; Leckman et al., 1997; Mataix-Cols, Rauch, Manzo, Jenike, & Baer, 1999; Sans, Hernández-Martínez, Muñoz, García, & Trallero, 2012), with common factors including contamination/washing, hoarding/collecting, doubting/checking, and aggressive, sexual, and religious obsessions. These symptom subtypes provide a straightforward way of categorizing individuals with OCD for clinical and research purposes, and this approach to subtyping has been helpful in predicting OCD severity (e.g., Moreso, Hernández-Martínez, Val, & Sans, 2013) and response to treatment (e.g., Abramowitz et al., 2003). However, another conceptualization, based on autogenous and reactive obsessions, may represent a more parsimonious approach to carving nature at its joints compared to the symptom cluster models, as well as for stimulating research on the functions of these behaviors and increasing understanding of the relation between obsessions and compulsions (Starcevic et al., 2011).

According to Lee and Kwon (2003), autogenous and reactive obsessions can be differentiated by stimuli that evoke them, how they are experienced, and their content and perceived consequences. Autogenous obsessions are not typically preceded by an identifiable stimulus and instead come into consciousness abruptly. They are experienced as "out of the blue" and often include sexual or aggressive thoughts or urges, such as killing a baby. These obsessions are also ego-dystonic in nature, meaning they are inconsistent with the self and are experienced as aversive and immoral. Common OCD manifestations associated with autogenous obsessions include ego-dystonic impulses (Lee, Lee, Kim, Kwon, & Telch, 2005; Moulding, Kyrios, Doron, & Nedeljkovic, 2007) and unwanted thoughts (Lee & Kwon, 2003).

On the other hand, reactive obsessions are more commonly evoked by an identifiable stimulus. Instead of coming into consciousness abruptly, reactive obsessions are experienced as being tied to a realistic and rational threat, such as contamination, accidents, or mistakes (Lee & Kwon, 2003). They are less ego-dystonic in nature (although not as ego-syntonic as worry [Lee et al., 2005]), meaning that the individual perceives the thoughts as more logical and reality-based compared to autogenous obsessions, although they are disruptive and persistent. Whereas a person with autogenous obsessions would consider the content of the obsessions to be aversive and not particularly rational, a person with reactive obsessions may consider the obsessions to be more rational. Common themes of reactive obsessions include contamination concerns and checking symptoms (Belloch, Morillo, & Garcia-Soriano, 2007; Lee et al., 2005; Moulding et al., 2007; but see Lee & Telch, 2010, and Lee, Yost, & Telch, 2009, for alternative findings).

An important concern has been raised about the model of autogenous and reactive obsessions-the model may undermine the heterogeneity of obsessions within the autogenous and reactive categories. For example, differences between aggressive, religious, and sexual obsessions may not be as readily recognized when using the autogenous and reactive obsession model, as these obsessions would be similarly classified as autogenous (Siev, Steketee, Fama, & Wilhelm, 2011). Despite this valid concern, this model of obsessions has been supported by several studies (Belloch et al., 2007; Besiroglu, Agargun, Ozbebit, & Aydin, 2006; Lee & Telch, 2005, 2010; Lee et al., 2009; Moulding et al., 2007; Yap, Mogan, & Kyrios, 2012). Indeed, some research suggests biological differences underlying autogenous and reactive obsessions (Besiroglu et al., 2011), as well as differential treatment effectiveness for individuals with autogenous versus reactive obsessions (e.g., Belloch, Cabedo, Carrio, & Larsson, 2010). These biological and treatment outcome differences between autogenous and reactive obsessions signal the need for further research on this model of OCD heterogeneity.

Certain correlates or features of OCD can also help distinguish autogenous and reactive obsessions. Individuals with reactive obsessions tend to be perfectionistic, intolerant of uncertainty, and prone to overestimate threat (Belloch et al., 2010; Moulding et al., 2007), all of which have been highlighted as cognitive correlates of OCD (Obsessive Compulsive Cognitions Work Group [OCCWG], 1997). Similarly, autogenous obsessions tend to be highly

associated with a need to control thoughts, as well as higher ratings of thought importance (Lee & Kwon, 2003). Reactive obsessions, however, are associated with higher levels of responsibility, or feelings that catastrophic events are one's fault and that one is accountable for the well-being of others (Lee & Kwon, 2003).

The existing literature on autogenous and reactive obsessions is limited in at least one regard. Based on the United Nations' Human Development Index (United Nations Development Programme, 2013), which is a way to characterize the economic and social development of countries, most published studies on autogenous and reactive obsessions have been carried out with participants in *Very High Human Development* countries (i.e., United States [e.g., Lee et al., 2005], Australia [e.g., Moulding et al., 2007], South Korea [e.g., Lee & Kwon, 2003), and Spain [e.g., Belloch et al., 2007]), while one set of studies has been carried out in a country with *High Human Development* (i.e., Turkey [Besiroglu et al., 2006]). No studies have been carried out in less developed countries, such as China. Although more traditional models of OCD symptom subtypes (e.g., checking) seem appropriate in China (Chasson, Tang, Gray, Sun, & Wang, 2012; Peng, Yang, Miao, Jing, & Chan, 2011; Zhong, Qin, & Cai, 2006), autogenous and reactive obsessions have never been tested in that country, which reports the largest national population with nearly 20% of the world's people as of 2010 (United Nations Department of Economic and Social Affairs, Population Division, 2012). Further confirming the culture-invariance of the autogenous and reactive obsessions model and testing its correlates requires use of participants from outside of well-developed countries. Indeed, lending support for the existence of autogenous and reactive obsessions and their correlates in such a large and impactful region would be an important step in demonstrating the robustness of the model. To this end, we collected data from various groups of Chinese participants-college students, patients with OCD, and a control group of patients with anxiety disorders other than OCD. We hypothesized that the nature of autogenous and reactive obsessions and their correlates, as characterized in the research literature using more developed countries, would generalize to China. Demonstrating this generalization to China would lend support to the universality of the model and have implications for OCD research and treatment in this most populated nation.

Method

Sample

The study was cross-sectional in design and contained three different groups, which were recruited simultaneously during a three-year period. The college student sample (i.e., CS group) consisted of 1,701 students (847 males, 816 females, 38 unspecified; *M* age = 20.57±1.65; age range = 18-26 years) from Weifang Medical University in the Shandong Province, as well as from Xinzhou Normal University and Shanxi Normal University in Shanxi Province. The clinical sample was divided into two groups. The first group included patients with OCD (i.e., OCD group) as their most severe problem and consisted of 158 participants (89 males, 67 females, 2 unspecified) with an age range of 18-62 years (*M* age = 28.81±9.47). Comorbidity in the OCD group included 5% (*n* = 8) with major depressive disorder, 3% (*n* = 5) with generalized anxiety disorder, 1% (*n* = 2) with social anxiety disorder, and less than 1% (*n* = 1) with a tic disorder. The second group included patients with any anxiety disorder other than OCD as their most severe problem (i.e., Anxiety group) and was made up of those with generalized anxiety disorder (32.9%), panic disorder (26.5%), social phobia (30.6%), and anxiety disorder not otherwise specified (10%). The Anxiety group consisted of 88 patients (37 males, 49 females, 2 unspecified) with an age range between 19 and 70 years (*M* age = 32.63±11.82). Primary OCD and anxiety diagnoses were made by staff psychiatrists using the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV; DiNardo, Brown, & Barlow, 1994). We excluded participants with a diagnosis of current substance abuse or a lifetime history of developmental or psychotic disorders.

Instruments

- The Revised Obsessional Intrusions inventory (ROII) Part I (Purdon & Clark, 1993, 1994). The ROII (Part I) is a 52-item self-report questionnaire for measuring the frequency of the specific intrusive thoughts, images, and impulses on a 0-6 Likert scale (with higher scores reflecting higher frequency). This instrument was selected because of its precedent for measuring autogenous and reactive obsessions (e.g., Lee & Kwon, 2003), as well as because of its strong psychometric properties. The English version of the ROII has adequate reliability and validity as a measure of intrusive thoughts (Purdon & Clark, 1993, 1994). For a brief list of the ROII item themes, please see Table 1. The English version of ROII was translated into Chinese by one of the authors (JW) and her students and back-translated by a professional bilingual translator. The back-translated English version was reviewed by the senior author (GSC) and his students in order to verify the accuracy of the translation. Final edits were then made to the Chinese version based on feedback.
- The Chinese Padua Inventory (PI; Zhong et al., 2006). A self-report measure of traditional OCD subtypes, the Chinese version of the PI replicated the same structure as the English version (Sanavio, 1988), except it resulted in a shorter scale (48 total items instead of 60). Higher scores indicate higher severity of OCD and subtypes. Factor analyses yielded a four-factor structure that characterizes obsessive and compulsive subscales: *Mental Control, Impulses, Contamination,* and *Checking*. This instrument was selected for the current study because of its favorable psychometric properties. The Chinese variant of the measure has demonstrated good internal consistency (α = .96) and test-retest reliability (*r* = .87; Zhong et al., 2006).
- Chinese Obsessive Beliefs Questionnaire (C-OBQ; Sun, Wang, Sun, Dong, & Chasson, in press). Based on the revised Obsessive Beliefs Questionnaire (Obsessive Compulsive Cognitions Working Group [OCCWG], 2005), the C-OBQ is a 30-item self-report scale measuring three OCD belief domains, although slightly different ones than the English version: Perfectionism/Certainty (P/C; e.g.,

Table 1 Number of items, and Cronbach's a for parcels of ROII items for college students (CS group) and OCD group.

Item grouping	Items	α (CS group)	α (OCD group)
1. While driving	1-5	0.83	0.93
2. While seeing sharp knives	6-7	0.79	0.77
3. When standing at some high places	8-10	0.72	0.83
4. When close to the railway	11-13	0.81	0.89
5. Hurting others	14-17	0.88	0.90
6. Hurting family and friends	18-21	0.84	0.91
7. Causing a public scene	25-28	0.79	0.90
8. Impulsive damage	29-34	0.91	0.94
9. Sexual acts	35-40	0.87	0.86
10. Sexual acts/nakedness	41-44	0.87	0.88
11. Doubt/mistake	22-24	0.83	0.88
12. Disease/contamination	45-49	0.86	0.89
13. Order/dirt	50-52	0.88	0.86

Note. *N* of CS group = 1,701; *N* of OCD group = 158.

"Things should be perfect according to my own standards"), Importance of Thoughts/Responsibility (I/R; e.g., "Having a bad thought is morally no different than doing a bad deed"), and Overestimation of Threat (T; e.g., "Even ordinary experiences in my life are full of risk."). The C-OBQ demonstrated adequate internal consistency reliability, test-retest reliability, construct validity, and criterion-related validity (Sun et al., in press). Higher scores indicate stronger OCD beliefs. This measure was selected because it remains, to our knowledge, the only validated Chinese measure of OCD beliefs.

- Center for Epidemiologic Studies Depression Scale (CES-D; Zhang et al., 2010). Based on the English variant (Radloff, 1977), the Chinese version of the CES-D is a 20-item questionnaire used to assess the degree of depressive symptoms. It requests a response on a 1-4 scale (higher scores indicate more depressive severity), and the total score ranges from 20 to 80. This instrument was used in the current study because of its strong psychometric properties. The Chinese version has high internal consistency, acceptable test-retest reliability, and good validity (Cheung & Bagley, 1998; Zhang et al., 2010).

Procedure

Individuals in the CS group were recruited from introductory psychology courses at the three aforementioned universities and received course credit for the participation. They were administered a questionnaire packet in groups, which took approximately 30 to 40 minutes to complete. Clinical participants were invited during their treatment intake or were recruited via flyers placed in the outpatient psychiatric clinics of Weifang People Hospital, Beijing Huilongguan Hospital, and Shanghai Gaide OCD Research Center. The clinical patients were administered the ADIS-IV by a psychiatrist and then completed the set of questionnaires in the clinical setting in a non-group format. All participants were provided a brief description of the purpose of the study before providing written informed consent, which was on the first page of the questionnaire packet. Clinical and student participants were permitted to ask questions of the experimenters as needed. Data were collected with approval from a formal ethics committee of Weifang Medical University, Xinzhou Normal University, and Shanxi Normal University. Clinical participants completed the questionnaires on a voluntary basis without an explicit incentive-a common approach to collecting data in China. Participant anonymity and confidentiality were guaranteed.

Data analysis

For confirming the model of autogenous and reactive obsessions, we carried out confirmatory factor analysis (CFA) with the CS and OCD samples using item parcels. The use of item parcels in structural equation modeling procedures has a number of advantages, including improving reliability, enhancing variable distributions, and resulting in the estimation of fewer model parameters, thus improving model fit (Holt, 2004; Little, Cunningham, Shahar, & Widaman, 2002). Items on the ROII have a structure consisting of sentence stems (e.g., "while driving, I have had unacceptable thoughts of:") followed by a series of items related to that stem. Thus, the ROII contains 52 items that belong to 13 item-subgroups. The means of these 13 domains were used to form the 13 parcels of items, thus placing similar items within each parcel (Hall, Snell, & Foust, 1999; Holt, 2004). The parcels all had acceptable internal reliability (see Table 1) consistent with requirements of unidimensionality (Little et al., 2002).

In order to confirm the validity of the two-factor model of obsessions, we separately performed CFA from the CS group (N = 1,701) and OCD group (N = 158). An alternative one-factor model was tested with CFA in order to compare its fit indices with those of the two-factor model proposed in the current study. Adequate fit was based on a non-significant test of model χ^2, Comparative Fit Index (CFI) > .90, Normed Fit Index (NFI) > .90, Non-Normed Fit Index (NNFI) >.90 and a Standardized Root Mean Squared Residual (SRMR) < .08 (Hu & Bentler, 1999).

Four sets of hierarchical regression analyses were performed with OCD group data to examine the relations between autogenous/reactive obsessions and OCD symptoms

and beliefs, while controlling for variance due to depressed mood—two regression models for autogenous obsessions and two for reactive obsessions. Each of the pairs consisted of one set for PI subscales as predictors and one set for C-OBQ subscales as predictors. Each of the four hierarchical regression analyses was carried out in two steps. In the first step, scores from the CES-D were entered into the model to control for the severity of depression. In the second step, a block of either PI or C-OBQ predictors was entered.

In addition, one-way ANCOVA was performed to compare the ROII and its subscale scores across the three groups (i.e., CS, OCD and Anxiety group), while controlling for variance due to age and depressed mood. Another set of ANCOVA analyses were conducted to compare the three C-OBQ subscales, as well as PI total and subscales, across the following subgroups within the OCD patient sample, while controlling for depressed mood: participants who predominantly endorsed autogenous obsessions (AO) (n = 25), reactive obsessions (RO) (n = 25), or both types of obsessions at approximately the same level (i.e., Mixed) (n= 18). The predominant obsessions subtype was based on a cutoff of the top 27% on each subscale on the ROII, such that those in the upper 27% on the autogenous obsession subscale were in the AO group, upper 27% on the reactive obsession subscale were in the RO group, and those in the upper 27% on both subscales were in the Mixed group. The magnitude of 27% is often selected at each extreme of a distribution to yield upper and lower groups, which is very useful to maximize within-group sample size for group comparisons (Preacher, Rucker, MacCallum, & Nicewander, 2005).

Results

Descriptive statistics

Descriptive data for groups and the total sample can be found in Tables 2 and 3.

Testing the model of autogenous and reactive obsessions

A two-factor model in the CS group and OCD group based on autogenous and reactive obsessions demonstrated good fit

Table 2 Descriptive statistics and group differences between OCD, Anxiety Group, and College Students.

	Age	CES-D	ROII	Autogenous Score	Reactive Score
OCD *M (SD)*	28.81(9.47)	46.35(11.89)	41.79(47.90)	26.22(42.84)	15.56(12.01)
AG *M (SD)*	32.63(11.82)	45.75(11.75)	23.59(28.92)	16.82(24.40)	6.76(6.55)
CS *M (SD)*	20.57(1.65)	31.59(8.15)	16.99(25.26)	9.82(19.91)	7.17(7.66)
F	540.84**	290.39**	31.94**	26.71**	31.93**
η^2	.38	.23	.04	.03	.04
Post hoc	AG>OCD>CS	OCD, AG>CS	OCD>AG, CS	OCD>AG>CS	OCD>CS, AG

Note. OCD: OCD group (N = 158); AG: AG group (N = 88); CS: CS group (N = 1,701); CES-D = total score of CES-D; ROII = total score of ROII; Post hoc = post hoc comparisons; In order to test the difference of ROII, autogenous scores and reactive scores among CS, OCD and AG groups, one-way ANCOVA was run controlling for age and depression.
** $p < .01$.

Table 3 Descriptive statistics and AO, RO, Mixed group differences on the three C-OBQ subscales and Padua Inventory total and subscales.

	Total	AO	RO	Mixed	F	η^2	Post hoc
	M(SD)	*M(SD)*	*M(SD)*	*M(SD)*			
I/R	40.45(16.65)	46.29(2.98)	40.15(3.00)	54.82(3.65)	4.74*	.13	Mix> RO
P/C	45.38(12.51)	46.73(2.06)	50.35(2.08)	51.93(2.53)	1.45	—	—
T	29.20(11.69)	33.80(9.83)	29.40(11.67)	41.41(9.26)	5.49**	.15	Mix>AO,RO
PI	53.33(31.80)	55.40(20.78)	70.28(23.94)	95.76(19.59)	18.10**	.37	Mix>RO>AO
Con.	11.28(10.32)	6.72(5.93)	23.12(11.74)	17.59(8.30)	21.67**	.41	RO>Mix> AO
Check.	4.92(4.48)	4.65(3.87)	6.04(4.82)	9.31(4.35)	5.17**	.15	Mix>RO, AO
Men.	30.46(16.90)	33.20(13.04)	35.84(15.40)	49.65(9.50)	7.69**	.20	Mix>RO, AO
Imp.	7.16(8.47)	11.20(8.35)	5.28(5.10)	19.76(8.94)	17.05**	.35	Mix>AO>RO

Note. AO = group of those with predominantly AO obsessions; RO = group of those with predominantly RO obsessions; Mixed = group of those with both types of obsessions at approximated the same level; I/R = Importance of Thoughts/Responsibility subscale of C-OBQ; P/C = Perfectionism/Certainty Subscale of C-OBQ; T = Overestimation of Threat subscale of C-OBQ; PI = Padua Inventory; Con. = Contamination subscale of Padua Inventory; Check. = Checking subscale of Padua Inventory; Men. = Mental Control subscale of Padua Inventory; Imp. = Impulses subscale of Padua Inventory; n of AO group = 25; n of RO group = 25; n of Mixed group = 18; Post hoc = post hoc comparisons; one-way ANCOVA was run among AO, RO and Mixed group controlling for depression.
* $p < .05$, ** $p < .01$.

Table 4 Fit indices for confirmatory factor analyses.

Model	Sample	df	χ^2	NNFI	CFI	NFI	SRMR	$r_{autogenous.reactive}$
Two-factor	CS	64	1658.58**	.95	.96	.96	.049	.73**
Two-factor	OCD	64	195.30**	.96	.96	.95	.051	.42**
One-factor	CS	71	10648.19**	.69	.71	.71	.44	
One-factor	OCD	71	1158.17**	.70	.77	.71	.47	

Note. CS: CS group (N = 1,701); OCD: OCD group (N = 158); CFI: Comparative Fit Index; NFI: Normed Fit Index; NNFI: Non-Normed Fit Index; SRMR: Standardized Root Mean Squared Residual.
** $p < .01$.

Table 5 Hierarchical liner regression analysis on autogenous obsession and reactive obsession with CES-D and PI subscales and C-OBQ subscales.

	Autogenous obsessions				Reactive obsessions			
	ΔR^2	β	*df*	*F* or *t*	ΔR^2	β	*df*	*F* or *t*
Step1								
CES-D	.056		1, 139	8.30**	.042		1, 139	6.15*
Step2	.464		4, 135	32.6***	.429		4, 135	27.42***
PI-Mental Control		−.02	135	−0.25		.10	135	1.09
PI-Impulse		.81	135	10.58***		.03	135	0.35
PI-Contamination		−.16	135	−2.50*		.48	135	6.93***
PI-Checking		−.10	135	−1.269		.23	135	2.73**
Step1								
CES-D	.050		1, 146	7.68*	.033		1, 146	5.04*
Step2	.141		3, 143	8.28***	.096		3, 143	5.24**
C-OBQ-I/R		.28	143	2.49*		−.12	143	−1.02
C-OBQ-P/C		−.24	143	−2.51*		.25	143	2.49*
C-OBQ-T		.28	143	2.46*		.19	143	1.60

Note. ΔR^2 = Change in R^2; β = standardized regression weights; CES-D = total score of CES-D; C-OBQ-I/R = Importance of Thoughts/Responsibility subscale of C-OBQ; C-OBQ-P/C = Perfectionism/Certainty Subscale of C-OBQ; C-OBQ-T = Overestimation of Threat subscale of C-OBQ; PI-Contamination = Contamination subscale of Padua Inventory; PI-Checking = Checking subscale of Padua Inventory; PI-Mental Control. = Mental Control subscale of Padua Inventory; PI-Impulse = Impulses subscale of Padua Inventory; N = 158 (OCD group only).
* p < .05; ** p < .01; *** p < .001.

(see Table 4). However, the significant χ^2 test was inconsistent with evidence of adequate fit, likely because the χ^2 test is quite sensitive to large sample sizes (Kline, 2010). In the current sample, a one factor model failed to show adequate indices of goodness-of-fit in both the CS group and OCD group (see Table 4). As a check, analyses were repeated using non-parceled data. Two-factor model fit decreased slightly when using non-parceled data with the CS and OCD groups, but both the parceled and non-parceled approaches yielded adequate fit for the two-factor model. As a result, we have only reported results using the parceled approach (see Table 4).

Autogenous/reactive obsessions and symptoms of traditional obsessive-compulsive disorder subtypes

Results pertaining to autogenous obsession scores being regressed on depression and PI subscale scores can be found in Table 5. Using hierarchical linear regression, a block of the four PI subscales explained an additional 46.4% of the variance in autogenous obsessions after controlling for depression. Moreover, impulses emerged as the most potent predictor of autogenous obsessions. Higher levels of impulses were associated with more autogenous obsessions. Contamination also emerged as a statistically significant predictor, with higher levels associated with fewer autogenous obsessions.

A block of the four PI subscales explained an additional 42.9% of the variance in reactive obsessions after controlling for depression. Contamination emerged as the most potent predictor of reactive obsessions, but unlike findings with autogenous obsessions, higher levels of contamination difficulties were associated with more reactive obsessions. Checking also emerged as a statistically significant predictor of reactive obsessions, with more checking associated with more reactive obsessions. Regression results for reactive obsession scores and PI subscale scores can be found in Table 5.

Autogenous/reactive obsessions and obsessive-compulsive disorder beliefs

Results pertaining to autogenous obsession scores being regressed on depression and C-OBQ subscale scores can be found in Table 5. A block of the three C-OBQ subscales explained an additional 14.1% of the variance in autogenous obsessions after controlling for depression. The I/R, T and P/C subscales all emerged as statistically significant predictors of autogenous obsessions. Higher T and I/R beliefs, but lower P/C beliefs, were associated with more autogenous obsessions.

A block of the three C-OBQ subscales explained an additional 9.6% of the variance in reactive obsessions after controlling for depression. Only P/C emerged as a statistically significant predictor of reactive obsessions after controlling for the other C-OBQ subscales and depression. Higher P/C beliefs were associated with more reactive obsessions. Regression results for reactive obsession scores and C-OBQ subscale scores can be found in Table 5.

Group comparisons

There were significant differences across the three groups (i.e., CS, OCD, and anxiety group) on the ROII total and all subscales (see Table 3). The OCD group reported more autogenous obsessions than the anxiety and CS groups, and the anxiety group also reported more autogenous obsessions than the CS group. On the other hand, the CS and anxiety groups did not differ on reactive obsessions, but both reported significantly fewer reactive obsessions compared to the OCD group.

When grouping the OCD sample into predominant RO, AO, or mixed subtypes, statistically significant group differences emerged. Differences in the three C-OBQ subscales and PI total and subscales across the AO/RO/Mixed groups are presented in Table 4. Highlights of the group differences indicate two major findings. First, those in the RO group reported higher levels of contamination compared to the AO group, whereas those in the AO group reported higher levels of impulses compared to the RO group. Second, for many indices of OCD symptoms (i.e., checking, mental control, impulses, and PI total) and beliefs (i.e., I/R beliefs), the mixed presentation (i.e., having predominantly autogenous and reactive obsessions) seemed to be more severe than having just reactive or autogenous obsessions alone.

Discussion

The current study set out to further demonstrate the cultural invariance of the autogenous and reactive obsession model, as well as evaluate its correlates, in a sample of students, OCD patients, and anxiety patients in China. Evidence from the investigation supports the general hypothesis that patterns of findings regarding the model would generalize to a less developed but influential and large nation like China.

The patterns of results in this Chinese OCD sample were similar in many ways to what has been reported in the research literature. Reactive obsessions were associated with increased perfectionism beliefs and a need for certainty, findings that are consistent with previous research literature (Belloch et al., 2010; Moulding et al., 2007). As expected, those with predominant reactive obsessions-compared to those with predominant autogenous obsessions-scored significantly higher on an index of contamination symptoms. In addition, higher contamination symptoms predicted higher reactive obsession scores. Reactive obsessions were also significantly predicted by checking symptoms. These contamination and checking associations are consistent with findings in highly developed nations (Belloch et al., 2007; Lee et al., 2005; Moulding et al., 2007).

In the current study, autogenous obsessions scores were positively related to the C-OBQ belief subscale that partially measures importance of thoughts. This finding is consistent with research outside of China (Belloch et al., 2010; Moulding et al., 2007). Autogenous obsessions were also linked with heightened OCD impulses and negatively correlated with contamination scores, as well as perfectionism and a need for certainty. Previous research has also demonstrated a positive association between the severity of OCD impulses and autogenous obsessions (Lee et al., 2005; Moulding et al., 2007). The negative association between contamination and autogenous obsessions, and the indirect relation between P/C and autogenous obsessions, were both opposite of the aforementioned findings found with reactive obsessions in the current study, demonstrating directional differences between autogenous and reactive obsessions. Although past research has not uncovered such opposing directional differences with autogenous obsessions, previous studies have demonstrated a null relation between autogenous obsessions and contamination, perfectionism, and intolerance of uncertainty (Moulding et al., 2007). Nonetheless, the pattern of opposite directional findings discriminate the two types of obsessions, supporting the validity of the autogenous and reactive model of obsessions.

One anomalous finding concerned scores on the Overestimation of Threat subscale of the C-OBQ. A previous study in an Australian sample indicated that more threat beliefs were associated with high reactive obsession scores, and such beliefs were unrelated to autogenous obsessions (Moulding et al., 2007). In the current study, however, regression analyses indicated that threat scores did not significantly predict reactive obsession scores, but it did positively predict autogenous obsession scores. It is unclear why patterns with threat scores did not generalize to a Chinese sample, but it is unlikely to be the result of a measurement issue. Items of the Threat factor of the C-OBQ overlap substantially with Responsibility/Threat items from the revised English version of the Obsessive Beliefs Questionnaire, as well as the Threat factor from the original English version of the Obsessive Beliefs Questionnaire (Sun et al., in press). That is, it is unlikely that the current study is measuring a considerably different construct, but perhaps there are subtle cultural differences. Individuals in China may perceive threat-based obsessions in a way that aligns better with characteristics of autogenous rather than

reactive obsessions. In China, it is possible that people experience threat-based obsessions as more "out of the blue," ego-dystonic, and abrupt compared to their non-Chinese counterparts. Further Chinese research that examines threat-based obsessions could help elucidate this curious finding.

One clear finding of the current study is that the group who presented with mixed obsessions reported higher levels of many OCD symptoms and beliefs, suggesting they were more severe than those who presented with autogenous or reactive obsessions alone. It is intuitive that participants who present largely with both autogenous and reactive obsessions would be more severe and demonstrate more OCD-related beliefs compared to people with autogenous or reactive obsessions alone, as individuals with both types of obsessions may experience unique negative effects from each. This explanation requires further research.

Findings from the current study must be considered in light of its limitations. The ADIS-IV was employed to identify participant diagnoses, but the Chinese version of this diagnostic tool has not been psychometrically validated. Nonetheless, the diagnoses were established using a direct translation of the English version of the ADIS-IV, which has demonstrated strong psychometric properties (DiNardo et al., 1994), and the diagnostic interviews were administered by experienced psychiatrists familiar with DSM-IV diagnostic criteria. As another potential limitation, a Chinese version of the ROII has not been psychometrically validated, although evidence from the current study alleviates some concerns about the properties of the scale, as the pattern of findings with autogenous and reactive obsessions in the current study largely mirror those findings found using the English version. A limitation of the study is that data were not collected on usage of medication and current and past psychotherapy. Future research would benefit from collecting this information and statistically controlling for its influence in the data analysis. Future research would also benefit from incorporating random selection of participants, as generalizability of the current study results cannot be guaranteed.

Despite these limitations, the current study supports the autogenous and reactive obsessions model of OCD and its correlates in a country characterized as *Medium Human Development*. These findings provide additional evidence for the cultural invariance of the model, but further international research is needed to demonstrate the validity of this model, including investigations in less developed countries. As autogenous and reactive obsessions may be associated with differing pathophysiology (Besiroglu et al., 2011), as well as differential treatment response (e.g., Belloch et al., 2010), identifying the robustness of this model and its correlates around the globe may provide new avenues for considering OCD etiology and treatment.

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