



Regular Article

Parental rearing and personality traits as predictors for adolescents with obsessive–compulsive disorder (OCD)

Yafeng Zhang¹, Wei Tian², Chao Wang² , Bin Guo³, Guangcan Yan², Hui Yin¹, Zuoming Zhang¹, Yuchun Tao¹, Yixin Liu¹, Quan Zhou¹ and Limin Wang¹ 

¹Department of Health Education, School of Health Management, Harbin Medical University, Harbin, China; ²Department of Biostatistics, School of Public Health, Harbin Medical University, Harbin, China and ³Department of Humanities and Social Sciences, Harbin Medical University (Daqing), Daqing, China

Abstract

We aim to determine the correlation between parental rearing, personality traits, and obsessive–compulsive disorder (OCD) in different quantiles. In particular, we created an intermediary effect model in which parental rearing affects OCD through personality traits. All predictors were measured at the time of the survey, comprising parental rearing (paternal rearing and maternal rearing), demographics (grade and gender), and personality traits (neuroticism, extroversion, and psychoticism). These results suggest that (a) paternal emotional warmth was negatively correlated with OCD at the 0.40–0.80 quantile, while maternal emotional warmth was positively correlated with the OCD at the 0.45–0.69 quantile. (b) The correlation between negative parental rearing and OCD ranged from the 0.67 to 0.95 quantile for paternal punishment, 0.14–0.82 quantile for paternal overprotection, 0.05–0.36 and >0.50 quantile for maternal over-intervention and overprotection, and 0.08–0.88 quantile for maternal rejection. (c) Extroversion, neuroticism, and psychoticism were not only associated with OCD in a particular quantile but also mediated between parental rearing (namely parental emotional warmth, paternal punishment, paternal overprotection, maternal rejection, maternal over-intervention, and overprotection) and OCD. These findings provide targets for early interventions of OCD to improve the form of family education and personality traits and warrant validation.

Keywords: obsessive–compulsive disorder, parental rearing, personality traits, quantile regression, structural equation model

(Received 3 November 2019; revised 8 July 2020; accepted 10 July 2020)

Introduction

Obsessive–compulsive disorder (OCD) is a common chronic mental disorder defined as repetitive behaviors or mental acts that the individual feels driven to perform in response to an obsession, according to rigid rules, or to achieve a sense of completeness (Stein et al., 2016). OCD is characterized by repetitive and intrusive thoughts, urges, images or fears (obsessions) and repetitive behaviors or mental acts (compulsions) (Brakoulias et al., 2019). OCD is also a common psychiatric disorder with an estimated prevalence of 1%–2% and the lifetime prevalence of OCD is 1%–3%. Approximately 50%–60% of the patients with OCD had an age of onset in childhood or adolescence (Geller, 2006; Nissen et al., 2017; Park, Storch, Pinto, & Lewin, 2016). Because of the incomplete development of adolescent cognitive functions, OCD can cause significant and impaired functioning in a wide range of domains in children and adolescents, including school functioning, peer and family relationships, and daily household living (Lavell, Farrell, Waters, & Cadman, 2016; Torp et al., 2015). Also, OCD not only brings anxiety and painful

feelings to teenagers but can be seriously disabling (Brakoulias et al., 2017; Nissen & Parner, 2018). Therefore, it is important to accurately measure the predictors and mechanisms of OCD in adolescents. Not only that, but we also measure family factors and personality traits that affect adolescent OCD. In addition to using logistic regression to report the statistical association between the three, quantile regression is also used to better understand the nuances of these associations.

There is accumulating evidence that parenting and family environment may influence the development of OCD (Wilcox et al., 2008). Especially in the context of Chinese education, parental rearing has a great influence on their children. Parental rearing is generally divided into positive rearing (emotional warmth) and negative rearing (rejection, controlling, over-intervention, and overprotection). It was found that the lack of parental emotional warmth, parental rejection, severe punishment, increased parental control, and overprotection were significantly correlated with the OCD of adolescents (Brander, Pérez-Vigil, Larsson, & Mataix-Cols, 2016; Lennertz et al., 2010). Family studies have also shown that children with the hoarding subtype of OCD, in particular, report a lack of parental emotional warmth (Alonso et al., 2004; Cath, van Grootheest, Willemsen, van Oppen, & Boomsma, 2008). In negative parental rearing, families with parental rejection and overprotection (Alonso et al., 2004; Ehiobuche, 1988), parental controlling and manipulation (Aycicegi, Harris, & Dinn, 2002), parental

Author for Correspondence: Limin Wang, School of Health Management, Harbin Medical University, No.157 Baojian Road, Harbin, 150081, China; E-mail: wanglimin2008@163.com.

Cite this article: Zhang Y et al (2022). Parental rearing and personality traits as predictors for adolescents with obsessive–compulsive disorder (OCD). *Development and Psychopathology* 34, 387–394. <https://doi.org/10.1017/S095457942000108X>

overprotection (Abedi & Vostanis, 2010) and parental over-intervention (Smári, Martinsson, & Einarsson, 2010) scored higher in adolescent OCD.

It is well established that patients with OCD frequently meet criteria for personality disorders, and OCD patients showed a more specific pattern of personality pathology (Wu, Clark, & Watson, 2006). Some studies have suggested that OCD is a constellation of maladaptive personality traits, which represents one of the most common personality disorders in the general population (Fineberg et al., 2015). Research has also found that personality traits have been implicated in OCD and may influence treatment outcomes in children/adolescents with OCD (Nissen & Parner, 2018). Individuals with a higher OCD score would be high in competence, order, dutifulness, achievement-striving, self-discipline, and deliberation from the conscientiousness domain; high in anxiety and low in impulsivity (from neuroticism); low in openness to feelings, actions, ideas, and values; low in warmth and excitement seeking (from extraversion) (Samuel, Riddell, Lynam, Miller, & Widiger, 2012). Studies using the five factors of personality to characterize the general and maladaptive personality traits and their relation to OCD found that children and adolescents with high OCD scores were characterized by elevated neuroticism and lower extraversion scores (Aelterman, De Clercq, De Bolle, & De Fruyt, 2011; Samuel et al., 2012).

A large number of empirical studies have shown that, on the one hand, parental rearing and personality traits are correlated with OCD in adolescents. Their limitations are, however, that they only report the average effect of correlation and ignore the differences in OCD at different levels – OCD levels vary substantially not only by different parental rearing but also under the same parental rearing. There is reason to believe that parental rearing and personality traits may be particularly weaker or have more potent correlates at different levels of OCD. For instance, neuroticism may exist strongly in the range of severe OCD but also may be present even in the absence of OCD. Therefore, to measure the range of correlation between OCD and these relative factors, we can take targeted intervention and improvement measures. In this context, this study used quantile regression methods to reexamine the established parental rearing and relative personality trait factors for OCD and to provide evidence to guide future research in the area. On the other hand, a study found that parental behavior, especially concerning the ability to express affection and emotional warmth and avoid excessive protection, control, and criticism, seems to be important in the development of a healthy personality (Alonso et al., 2004). Chen et al. (2017) found that parental rearing is related to a variety of psychopathology, including general personality characteristics. Research suggested that parental rearing, as an environmental factor, can also affect children's personality characteristics, especially dysfunctional rearing, which can make children prone to psychiatric disorders in their later life (Oshino, Suzuki, Ishii, & Otani, 2007). According to the literature, parental rearing affects the healthy development of children's personality and leads to behavioral problems (Ijeoma, 2016). However, the associations by which parental rearing influences the development of personality traits in adolescent, and hence the generation of OCD, are unknown. To address these questions, we used the structural equation model method to clarify the mechanism. Consequently, the present study hypothesized that (a) parental rearing and personality traits act as predictors of differing magnitude at varying levels of OCD, and (b) different parental rearing may further affect adolescent OCD through indirect effects of different personality traits.

Method

Participants and procedures

This study comprises multiple cross-sectional studies. A total of 3438 middle school students in four schools selected in a district of Harbin city, China were invited to participate in the study from the years 1999, 2006, 2009, and 2016. The study's design includes two stages. First of all, four schools that had different academic rankings, based on the quality of teaching and learning outcomes, were randomly selected in the district of Harbin. Then in the second stage, cluster sampling was conducted by grades. In Grades 7 to 11 (except Grade 9), two classes were selected from each grade, and eight classes were selected from each school so that 32 classes of students formed the sample. The four investigations were conducted using the above-mentioned investigation procedures. The effective response sample was 3345 participants, and the effective rate was 97.2%. All 3345 participants (aged 12 to 20 years) were middle school students (52.2% of female students and 47.8% of male students). Grade 9 students were excluded because they were preparing for their entrance examinations. Students who did not receive permission from their parents or their parents did not submit their consent were also excluded from the study. Although the survey period was over 16 years, but every survey followed a strict investigation procedure to complete. This study was approved by the Ethics Committee of Harbin Medical University.

Psychometric assessment

Participants were requested to provide demographic information and complete three self-report questionnaires. Symptom Checklist-90-Revision (SCL-90-R). SCL-90-R, also known as Hopkin's Symptom Checklist, is the most commonly used version compiled by Derogatis, Lipman, and Covi (1973). The SCL-90-R is a 90-item self-report measure that includes 10 psychological symptom factors. The 10-item OCD subscale was extracted from the SCL-90-R. All items were rated on a 5-point Likert scale (1 = *Never*: no symptoms or problems; 2 = *Infrequently*: consciously have the symptoms, but the impact is slight; 3 = *Sometimes*: consciously have the symptoms, have a certain impact on their own; 4 = *Frequently*: consciously often have the symptoms, and the symptoms are moderate to severe; 5 = *Always*: the frequency and intensity of self-conscious symptoms are very serious, which has a profound impact on oneself). The higher the score on the OCD, the more serious it is. The SCL-90-R assesses respondents' feelings in the last two weeks. The reliability of SCL-90-R at four time points (1999, 2006, 2009, and 2016) was 0.95, 0.96, 0.96, and 0.96, respectively. The OCD subscale demonstrated strong psychometric properties and excellent internal consistency in the present study. Alpha coefficients for OCD at four time points was found to be 0.91, 0.93, 0.91, and 0.92 respectively. In this study, factor analysis was used to assess its construction validity, and factor loading was between 0.51 and 0.74.

Egna Minnen av Barndoms Uppfostran (EMBU)

The EMBU scale was developed by Prerris in 1980 to assess one's memory of parental rearing and consists of four replicate dimensions: rejection, emotional warmth, overprotection, and favoritism – reduced from 11 aspects of parental behavior and attitudes: father rearing (emotional warmth, F1; punitive, F2; over-involved, F3; favoritism, F4; rejection, F5; overprotection, F6) and mother rearing (emotional warmth, M1; over-involved

and overprotection, M2; rejection, M3; punitive, M4; favoritism, M5). Parental favoritism was considered unsuited to China's conditions and excluded. It is a self-report scale composed of 66 items. Participants rated how well each of the items described their parental attitudes and behaviors on a 4-point Likert-type scale ranging from never (1) to always (4). The EMBU scale has been widely used in China for its reliability and validity. In this study, it was found that the coefficient of internal consistency in paternal rearing and maternal rearing were 0.87 and 0.79, respectively, and each factor loading was greater than 0.77 and 0.86, respectively.

Eysenck Personality Questionnaire-Revised (EPQ-R)

EPQ-R was officially released by British psychologist H. J. Eysenck, S. B. G. Eysenck, and Paul Barret (Eysenck, Eysenck, & Barrett, 1985). EPQ consists of 88 items including adult questionnaires (for children aged 16 and over) and children questionnaires (for children aged 7–15), based on a three-factor model including neuroticism (N dimension), extroversion (E dimension), psychoticism (P dimension), and the lie scale (L dimension). The participants answered “yes” or “no” and scored the rough score of each scale according to the scoring keys of E, N, P, and L in the manual. They then get a standard T score taken into account for their gender and age. The higher the score of each dimension, the more inclined it is tantamount to this personality trait. The L scale was excluded from the study because it measured the subjects' concealment, hypo tropism, or self-concealment, and as a stable character function itself. EPQ has been proved to have good validity and reliability standards in further studies (Xiuqin et al., 2010). Total Cronbach's coefficient alpha of the adult and child questionnaires in this study were 0.88 and 0.86, respectively.

Statistical analysis

Given that only 2.8% of individuals ($n = 93$) had missing data on the survey, we excluded those individuals. The data were coded in Epidata and analyzed using Statistical Analysis System (SAS) software (version 9.3). SAS software was used for correlation, linear regression, and quantile regression analysis. AMOS (version 21.0) software was devoted to the construction and fitting of the structural equation model. $p < .05$ was considered significant.

Results

Pearson correlation analysis of variables between parental rearing, personality traits, and OCD are listed in Table 1. Overall, parental rearing was related to OCD, among which F1 and M1 were negatively correlated with OCD, with a correlation of -0.13 and -0.07 . A significant positive correlation was found between other negative parental rearing and OCD, with a range of correlation of 0.20 – 0.34 . The correlations of N, P, and OCD were 0.52 and 0.27 , respectively, while the correlation of E and OCD was not significant. Then multiple linear regression analysis (Enter regression method), was conducted to identify that the factors existing in parental rearing and personality traits could significantly predict OCD after controlling for grade, survey years and sex in the model (Table 2). The analysis showed that F1, F2, F6, M1, M2, M3, E, N, and P were significantly linked with OCD scores, while F3, F5, and M4 were not significant for predictive OCD.

To further analyze the correlation of parental rearing and personality traits on OCD and provide more data and information, this study used the method of quantile regression to analyze the

Table 1. Pearson correlations between obsessive-compulsive disorder (OCD), parental rearing and personality traits variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1.F1	1												
2.F2	-.11**	1											
3.F3	.17**	.54**	1										
4.F5	-.08**	.68**	.56**	1									
5.F6	.24**	.43**	.58**	.49**	1								
6.M1	.75**	-.15**	.05	-.14**	.10**	1							
7.M2	.03	.38**	.58**	.42**	.52**	.13**	1						
8.M3	-.22**	.50**	.37**	.61**	.35**	-.20**	.60**	1					
9.M4	-.16**	.60**	.31**	.44**	.26**	-.13**	.53**	.69**	1				
10.E	.21**	-.03	.04	-.05**	-.02	.24**	.07**	-.01	.01	1			
11.N	-.20**	.23**	.19**	.27**	.25**	-.16**	.30**	.33**	.24**	-.07**	1		
12.P	-.16**	.18**	.13**	.17**	.11**	-.15**	.17**	.24**	.19**	.07**	.27**	1	
13.OCD	-.13**	.23**	.20**	.26**	.24**	-.07**	.32**	.34**	.25**	-.00	.52**	.27**	1

Note: F1 = paternal rearing, emotional warmth; F2 = punitive; F3 = over-involved; F4 = overprotection; F5 = rejection; F6 = over-involved and overprotection; M1 = maternal rearing, emotional warmth; M2 = over-involved and overprotection; M3 = rejection; M4 = punitive; E = extroversion; N = neuroticism; P = psychoticism; OCD = obsessive-compulsive disorder.
* $p < .01$, ** $p < .001$.

Table 2. Regression results predicting the youth obsessive-compulsive disorder (OCD)

Variables	<i>B</i>	<i>SE</i>	Beta	<i>T</i>	<i>p</i> value
F1	-.004	.001	-.060	-2.517	.012
F2	.007	.003	.055	2.356	.019
F3	-.002	.003	-.016	-.739	.460
F5	-.006	.006	-.025	-1.086	.278
F6	.016	.004	.073	3.663	<.001
M1	.003	.001	.045	1.942	.052
M2	.005	.002	.064	2.706	.007
M3	.018	.004	.112	4.652	<.001
M4	-.001	.004	-.008	-.358	.720
E	-.002	.001	-.048	-3.146	.002
N	.025	.001	.427	27.330	<.001
P	.004	.001	.080	5.251	<.001

Note: Although the *p* value of M1 was 0.52, we still brought into the M1 independent variable in the model.

prediction of OCD of variables in the 0.05–0.95 quantile (Figure 1). The results showed that F1 was only negatively correlated with OCD at the quantile of 0.40–0.80. Also, the association of OCD and F2 was found to be significant at the 0.67–0.95 quantile. However, F3 and F5 were not correlated with the OCD in the QR model. And the correlation of OCD and F6 was significant at the 0.14–0.82 quantile. In the analysis of the regression coefficient between maternal rearing and OCD, it was found that M1 was positively correlated with the OCD at the 0.45–0.69 quantile. M2 had a positive effect on OCD at 0.05–0.36 and >0.50 quantiles. M3 was positively correlated with the OCD at the 0.08–0.88 quantile. There was no correlation between M4 and OCD on the entire quantile. In addition, N and P were positively correlated with OCD in the entire quantile and the above 0.25 quantile, while E was negatively correlated with OCD in the above 0.52 quantile.

According to relevant theoretical research and regression analysis results, a structural equation model (SEM) of parental rearing indirectly affecting OCD through neuroticism, psychoticism and extroversion personality is established. The path relationship and model parameters of the SEM are presented in Figure 2. The mediating effect refers to the full mediation effect. The results showed that different parental rearing can indirectly impact OCD through E, N, and P personality, and the squared multiple correlations of OCD had a value of 0.27. Tables 3–5, respectively, described the goodness-of-fit statistics, standardized total effects and the significance test of mediation effects of the SEM model.

Discussion

Through these results, we extend several interesting findings that differed from previous studies and clarified the mechanism by which parental rearing influences OCD through personality traits. In this population-based study, we found that the same paternal and maternal rearing differed in magnitude based on levels of OCD. There is a correlation between parental rearing within a specific range of OCD, but F3, F5, and M4 are not significant. The personality traits, especially neuroticism, are more related

to OCD. The effects found using quantile regression showed specific associations between predictors and OCD at different levels. Importantly, it is found that parental rearing affects the path relationship of OCD through personality traits and confirmed the mediating effect.

The study also confirmed the different effects of parental emotional warmth on OCD in adolescents. The quantile regression results showed that paternal emotional warmth was negatively correlated with OCD at the level of the 0.40–0.80 quantile, while maternal emotional warmth was only positively connected with the OCD in the 0.45–0.69 quantile. Chen, Liu, and Li (2000) have pointed out that children are more likely to turn to mothers for emotional support, physical need, and help in dealing with problems of daily life, while paternal emotional warmth allows children to explore their environments and thus may be linked to the development of feelings of security, confidence, trust, and positive orientation towards others. Lennertz *et al.* (2010) also found only paternal warmth could predict symmetry and order of OCD. Thus, children seem to need more emotional warmth from their fathers when they experience emotional distress similar to OCD. Moreover, quantile regression results also clarified the correlation range between them. In the SEM, our results might suggest that parental emotional warmth is conducive to their children's formation of self-confidence, self-esteem, and extroversion personality characteristics, as well as the generation of positive emotions (Sun, Li, Buys, Storch, & Wang, 2014), which has beneficial effects on their children's OCD.

We found that paternal punitive rearing was a significant effect on OCD over 0.67 quantiles, while it is striking that, in the entire sample, the relationship was found only for paternal, not maternal. When mothers adopt punitive rearing, children may focus on specific methods, such as washing and checking, to avoid reprimands about undesirable outcomes. However, paternal punitive rearing is described as overcautious, demanding, and perfectionistic, which creates high expectations in children and is therefore associated with OCD (Aycicegi *et al.*, 2002). SEM results also show that paternal punitive rearing may lead to suspicious, indifferent, and stubborn psychological traits (psychoticism) and thus is closely related to the development of OCD (duRivage *et al.*, 2015). Meanwhile, OCD patients also show high sensitivity to punitive parenting through personality features (Fullana *et al.*, 2004a).

Compared to paternal rejection, maternal rejection seems to have a greater impact on children's OCD. Our finding showed that paternal rejection rearing was not significantly correlated with OCD, while maternal rejection was correlated with OCD at the 0.08–0.88 quantile. A systematic review of risk factors for OCD found that parental rejection was associated with OCD (Brander *et al.*, 2016). Parental rejection includes unfair treatment and punishment, shaming, and blaming (Lennertz *et al.*, 2010). Thus, children feel inferior to others, and parental rejection makes children express demanding, critical, compulsive checking, cleaning, and perfectionistic (Ehiobuche, 1988). Furthermore, maternal rejection rearing may lead to emotional instability and abnormal behavior of adolescents, and then induce OCD. Further studies are needed to examine the role of maternal rejection than paternal rejection in the development of childhood OCD.

Paternal overprotection, maternal overprotection, and over-intervention not only directly affect OCD but also have a path relationship that affects OCD through personality traits. Paternal over-intervention was not associated with the development of OCD.

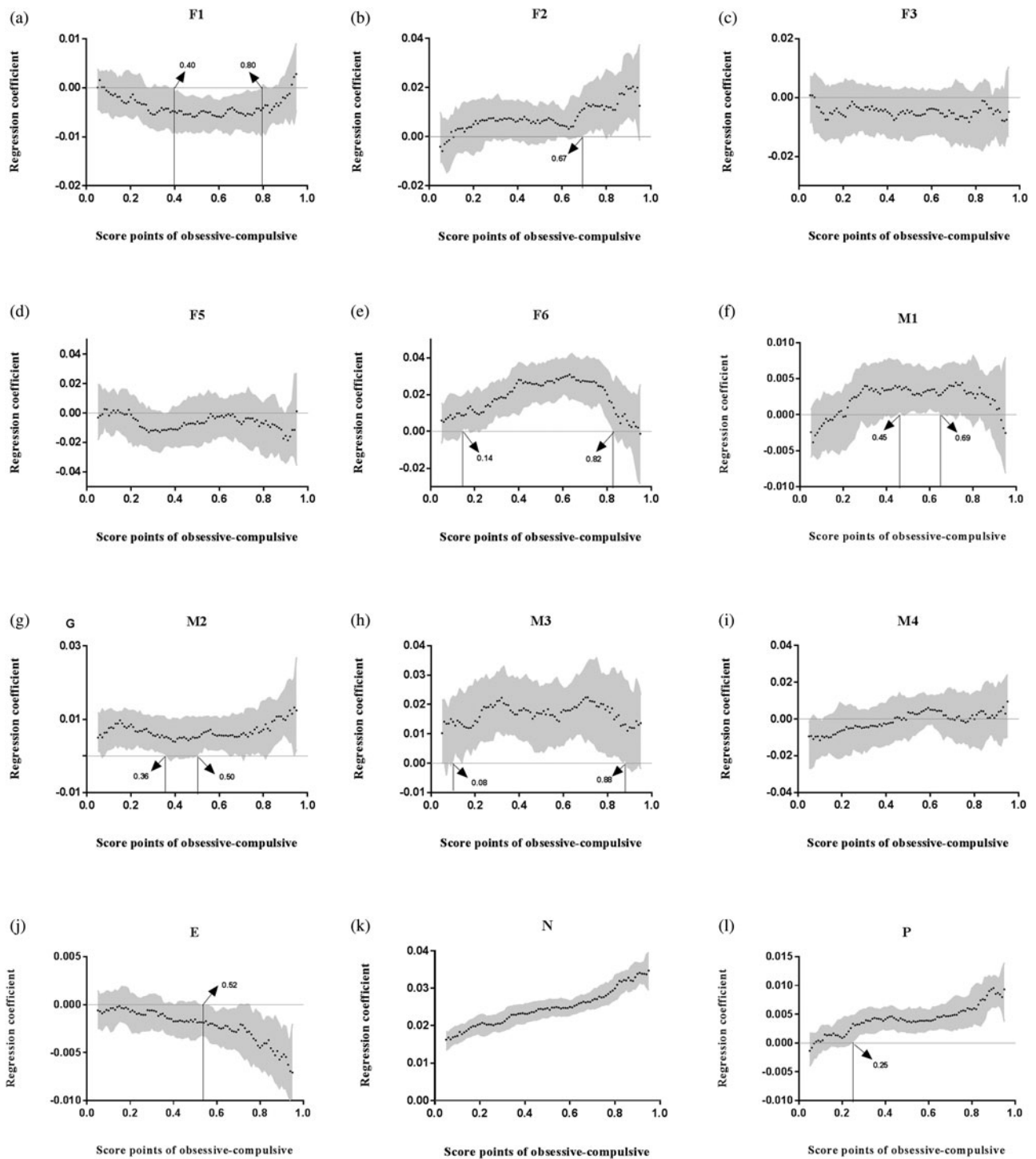


Figure 1. Quantile regressions predicting obsessive-compulsive disorder (OCD) at the 0.05–0.95 quantile. The Y-axis represents the regression coefficients of independent variables at different quantile, and the X-axis is the quantile interval of 0.05–0.95. The black solid horizontal line represents =0, black dots represent the estimated coefficients and the grey area represents 95%CI of the corresponding parameters. All estimations were adjusted for grades, sex, and survey years.

Previous studies have indicated that parental overprotection and over-interference will easily lead to overdependence, increase in anxiety, and low self-esteem as well as the development of social skills (Yoshida, Taga, Matsumoto, & Fukui, 2005). However, this study only found the role of parental overprotection and did not find the correlation between parental over-interference and OCD, which clarified the misunderstanding. As children grow older to reach puberty, the contradiction between the development

of their self-image and paternal overprotection, the resulting anxiety, and low self-esteem may be the important factors for the occurrence of OCD (Yoshida et al., 2005). However, to cope with anxiety and low self-esteem, adolescents will develop morbid personality, which to some extent exacerbates the occurrence of OCD (Aycicegi et al., 2002). The finding of the present study of the significant effect of perceived maternal overprotection in the prediction of OCD is consistent with the findings in the

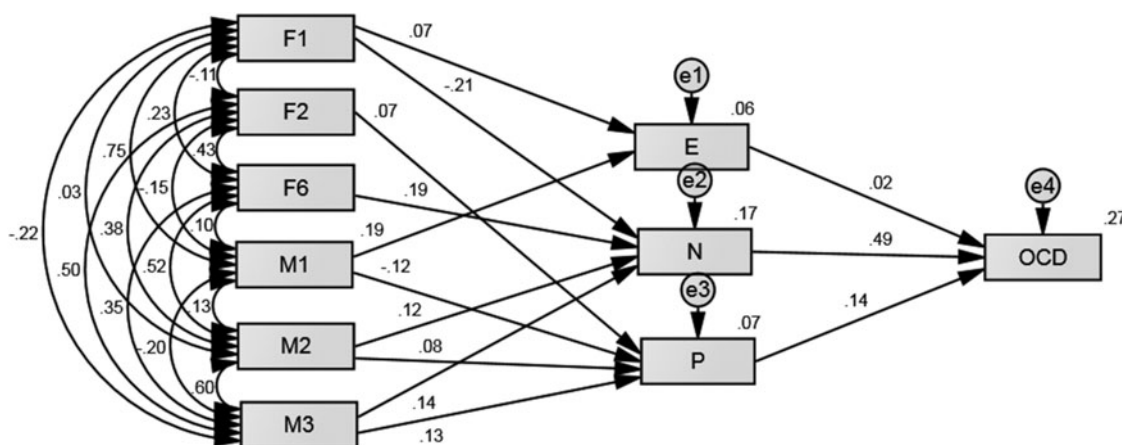


Figure 2. Parental rearing through personality traits influence the structural equation model of obsessive-compulsive disorder (OCD). The error terms were described by e1, e2, e3, and e4. The mediating effect refers to the full mediation effect.

Table 3. The goodness-of-fit indices of obsessive-compulsive disorder (OCD) structural equation model

	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
Goodness-of-fit indices	3.443	0.997	0.983	0.997	0.998	0.989	0.998	0.027
Fit criteria	<5	>0.90	>0.90	>0.90	>0.90	>0.90	>0.90	<0.08
Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

CMIN/DF = relative chi-square / degree of freedom; GFI = goodness of fit index; AGFI = adjusted goodness-of-fit index; NFI = normed fit index; TLI = Tucker-Lewis index; CFI = comparative fit index; RMSEA = root mean square error of approximation.

Table 4. Standardized total effects of the obsessive-compulsive disorder (OCD) structural equation model

Variables	Total effects on OCD	Total effects on E	Total effects on N	Total effects on P
F1	-0.104	0.071	-0.215	0.000
F2	0.010	0.000	0.000	0.068
F6	0.092	0.000	0.188	0.000
M1	-0.013	0.190	0.000	-0.119
M2	0.087	0.000	0.139	0.133
M3	0.071	0.000	0.124	0.077
E	0.019			
N	0.489			
P	0.143			

Note: The total mediating effect refers to the full mediation effect.

Table 5. The significance test of mediation effects

Path relationship	Estimate (95%CI)	Path processing
F1-E-OCD	0.069 (0.008, 0.130)	Significance, save
F1-N-OCD	-0.173 (-0.207, -0.140)	Significance, save
F1-P-OCD	-0.050 (-0.108, 0.009)	No significance, delete
F2-P-OCD	0.295 (0.209, 0.380)	Significance, save
F6-E-OCD	-0.065 (-0.225, 0.094)	No significance, delete
F6-N-OCD	0.302 (0.183, 0.422)	Significance, save
M1-E-OCD	0.182 (0.122, 0.243)	Significance, save
M1-P-OCD	-0.090 (-0.148, -0.031)	Significance, save
M2-E-OCD	0.047 (-0.010, 0.104)	No significance, delete
M2-N-OCD	0.556 (0.500, 0.611)	Significance, save
M2-P-OCD	0.396 (0.343, 0.450)	Significance, save
M3-N-OCD	-0.241 (-0.320, -0.162)	Significance, save
M3-P-OCD	-0.318 (-0.399, -0.237)	Significance, save

literature(Haciomeroglu & Karanci, 2013). We also found that maternal overprotection and over-intervention may act as a vulnerability factor more specifically related to OCD through neuroticism and psychoticism. Overprotection and over-intervention in parental rearing may lead the child to perceive the world as threatening, dangerous, but at the same time controllable, and the child may perceive themselves as incompetent to deal with such danger (Haciomeroglu & Karanci, 2013). As their roles and self-image change during adolescence, they develop morbid personality traits that lead to an OCD diagnosis. Pathway relationships contribute to the explanation of “to what extent” and “how” perceived parental

overprotection and over-intervention leads to the development of OCD.

Results show that neuroticism is the most important personality factor affecting OCD. In addition, psychoticism and extraversion personality traits are also correlated with compulsive symptoms in different quantile ranges. A considerable body of

research has also indicated that extraversion and neuroticism are positively associated with OCD (Boerema et al., 2019; LaSalle-Ricci et al., 2006; Wu et al., 2006). Neuroticism, the tendency to experience increased vulnerability to stress and negative emotions, has been associated with various types of psychopathology (Hezel & Hooley, 2014). Extraversion measures the preference for interpersonal interaction, activity, the need for stimulation, and the ability to experience joy. Low levels of extraversion, such as being less outgoing or talkative, lacking energy, and failing to generate enthusiasm, reduced engagement and enjoyment for activities (Wu et al., 2006). Psychoticism is associated with impulsiveness and novelty seeking, and is considered the strongest predictor of the presence of an OCD diagnosis because of its merciless and antisocial personality traits (Fullana et al., 2004b). As described by psychodynamic theory, OCD and personality traits were linked closely, and OCD patients showed a more specific pattern of personality pathology (Wu et al., 2006). The study clarifies the differential association between neuroticism, psychoticism, extroversion personality traits, and OCD scores.

The current study is subject to several limitations. Firstly, although the OCD subscale of SCL-90 cannot be considered as a diagnostic tool that covers all various obsessions and compulsions, it can be used as a proxy for a screening of OCD in children and adolescents for research purposes. Secondly, the study used retrospective self-report measures of parental rearing rather than direct questioning of parents to investigate parenting attitudes and direct observations. Thirdly, the four cross-sectional surveys took place at intervals over 16 years, and we included the survey years as covariant into the model, but the OCD may be disturbed by social development. Finally, we should note that the quantile regression and structural equation models are two methods. Future research is needed to demonstrate whether parental rearing still influences the presence of OCD through personality characteristics in different quantiles.

Taken together, knowing psychosocial factors may facilitate treatment and contribute to the development of intervention strategies for at-risk children. Our results provide evidence from a new perspective that the improvement of specific parental rearing and personality traits is particularly effective for the development of OCD in adolescents. It has a positive effect on family education and the cultivation of children's healthy personality, so it is necessary to conduct further investigations to determine the observed causal relationship and potential mechanism.

Acknowledgments. We want to thank Ms Lin Lin for her help in preparing and administering all four surveys. The authors are also thankful for the active cooperation and support from Qingxia Zhao, Pengfei Gu, Xiuzhen Ma, Chuanren Na, Guang Yang, and Hong Zhu.

Funding Statement. This work was supported by the Humanities and Social Sciences Research and Planning Fund of the Ministry of Education of China [grant number 15YJAZH073].

Conflicts of Interest. None.

References

- Abedi, M. R., & Vostanis, P. (2010). Evaluation of quality of life therapy for parents of children with obsessive-compulsive disorders in Iran. *European Child & Adolescent Psychiatry, 19*, 605–613. doi:10.1007/s00787-010-0098-4
- Aelterman, N., De Clercq, B., De Bolle, M., & De Fruyt, F. (2011). General and maladaptive personality dimensions in pediatric obsessive-compulsive symptoms. *Child Psychiatry & Human Development, 42*, 24–41. doi:10.1007/s10578-010-0199-9
- Alonso, P., Menchón, J. M., Mataix-Cols, D., Pifarré, J., Urretavizcaya, M., Crespo, J. M., ... Vallejo, J. (2004). Perceived parental rearing style in obsessive-compulsive disorder: Relation to symptom dimensions. *Psychiatry Research, 127*, 267–278. doi:10.1016/j.psychres.2001.12.002
- Aycicegi, A., Harris, C. L., & Dinn, W. M. (2002). Parenting style and obsessive-compulsive symptoms and personality traits in a student sample. *Clinical Psychology & Psychotherapy, 9*, 406–417. doi:10.1002/cpp.338
- Boerema, Y. E., de Boer, M. M., van Balkom, A. J. L. M., Eikelenboom, M., Visser, H. A., & van Oppen, P. (2019). Obsessive compulsive disorder with and without hoarding symptoms: Characterizing differences. *Journal of Affective Disorders, 246*, 652–658. doi:10.1016/j.jad.2018.12.115
- Brakoulias, V., Starcevic, V., Albert, U., Arumugham, S. S., Bailey, B. E., Belloch, A., ... Fineberg, N. A. (2019). Treatments used for obsessive-compulsive disorder—An international perspective. *Human Psychopharmacology: Clinical and Experimental, 34*, e2686. doi:10.1002/hup.2686
- Brakoulias, V., Starcevic, V., Belloch, A., Brown, C., Ferrao, Y. A., Fontenelle, L. F., ... Viswasam, K. (2017). Comorbidity, age of onset and suicidality in obsessive-compulsive disorder (OCD): An international collaboration. *Comprehensive Psychiatry, 76*, 79–86. doi:10.1016/j.comppsy.2017.04.002
- Brander, G., Pérez-Vigil, A., Larsson, H., & Mataix-Cols, D. (2016). Systematic review of environmental risk factors for Obsessive-Compulsive Disorder: A proposed roadmap from association to causation. *Neuroscience & Biobehavioral Reviews, 65*, 36–62. doi:10.1016/j.neubiorev.2016.03.011
- Cath, D. C., van Grootheest, D. S., Willemsen, G., van Oppen, P., & Boomsma, D. I. (2008). Environmental Factors in Obsessive-Compulsive Behavior: Evidence from Discordant and Concordant Monozygotic Twins. *Behavior Genetics, 38*, 108–120. doi:10.1007/s10519-007-9185-9
- Chen, D., Bienvenu, O. J., Krasnow, J., Wang, Y., Grados, M. A., Cullen, B., ... Samuels, J. (2017). Parental bonding and hoarding in obsessive-compulsive disorder. *Comprehensive Psychiatry, 73*, 43–52. doi:10.1016/j.comppsy.2016.11.004
- Chen, X., Liu, M., & Li, D. (2000). Parental warmth, control, and indulgence and their relations to adjustment in Chinese children: A longitudinal study. *Journal of Family Psychology, 14*, 401–419. doi:10.1037/0893-3200.14.3.401
- Derogatis, L. R., Lipman, R. S., & Covi, L. (1973). SCL-90: An outpatient psychiatric rating scale—preliminary report. *Psychopharmacology Bulletin, 9*, 13–28.
- duRivage, N., Keyes, K., Leray, E., Pez, O., Bitfoi, A., Koç, C., ... Kovess-Masfety, V. (2015). Parental use of corporal punishment in Europe: Intersection between public health and policy. *PLoS One, 10*, e0118059–e0118059. doi:10.1371/journal.pone.0118059
- Ehiohuche, I. (1988). Obsessive-compulsive neurosis in relation to parental child-rearing patterns amongst the Greek, Italian, and Anglo-Australian subjects. *Acta Psychiatrica Scandinavica, 78*, 115–120. doi:10.1111/j.1600-0447.1988.tb09009.x
- Eysenck, S. B. G., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6*, 21–29. doi:10.1016/0191-8869(85)90026-1
- Fineberg, N. A., Day, G. A., de Koenigswarter, N., Reghunandan, S., Kolli, S., Jefferies-Sewell, K., ... Laws, K. R. (2015). The neuropsychology of obsessive-compulsive personality disorder: A new analysis. *CNS Spectrums, 20*, 490–499. doi:10.1017/S1092852914000662
- Fullana, M. A., Mataix-Cols, D., Caseras, X., Alonso, P., Manuel Menchón, J., Vallejo, J., & Torrubia, R. (2004a). High sensitivity to punishment and low impulsivity in obsessive-compulsive patients with hoarding symptoms. *Psychiatry Research, 129*, 21–27. doi:10.1016/j.psychres.2004.02.017
- Fullana, M. À., Mataix-Cols, D., Trujillo, J. L., Caseras, X., Serrano, F., Alonso, P., ... Torrubia, R. (2004b). Personality characteristics in obsessive-compulsive disorder and individuals with subclinical obsessive-compulsive problems. *British Journal of Clinical Psychology, 43*, 387–398. doi:10.1348/0144665042388937
- Geller, D. A. (2006). Obsessive-compulsive and spectrum disorders in children and adolescents. *Psychiatric Clinics, 29*, 353–370. doi:10.1016/j.psc.2006.02.012
- Haciomeroglu, B., & Karanci, A. N. (2013). Perceived parental rearing behaviours, responsibility attitudes and life events as predictors of obsessive compulsive symptomatology: Test of a cognitive model. *Behavioural and Cognitive Psychotherapy, 42*, 641–652. doi:10.1017/S1352465813000581
- Hezel, D. M., & Hooley, J. M. (2014). Creativity, personality, and hoarding behavior. *Psychiatry Research, 220*, 322–327. doi:10.1016/j.psychres.2014.07.037

- Ijeoma, J. A. (2016). Influence of child-rearing styles on personality trait of secondary school students in Nigeria. *Journal of Educational Policy and Entrepreneurial Research*, 3, 15–21.
- LaSalle-Ricci, V. H., Arnkoff, D. B., Glass, C. R., Crawley, S. A., Ronquillo, J. G., & Murphy, D. L. (2006). The hoarding dimension of OCD: Psychological comorbidity and the five-factor personality model. *Behaviour Research and Therapy*, 44, 1503–1512. doi:10.1016/j.brat.2005.11.009
- Lavell, C. H., Farrell, L. J., Waters, A. M., & Cadman, J. (2016). Predictors of treatment response to group cognitive behavioural therapy for pediatric obsessive-compulsive disorder. *Psychiatry Research*, 245, 186–193. doi:10.1016/j.psychres.2016.08.033
- Lennertz, L., Grabe, H. J., Ruhrmann, S., Rampacher, F., Vogeley, A., Schulze-Rauschenbach, S., ... Wagner, M. (2010). Perceived parental rearing in subjects with obsessive-compulsive disorder and their siblings. *Acta Psychiatrica Scandinavica*, 121, 280–288. doi:10.1111/j.1600-0447.2009.01469.x
- Nissen, J. B., & Parner, E. (2018). The importance of insight, avoidance behavior, not-just-right perception and personality traits in pediatric obsessive-compulsive disorder (OCD): A naturalistic clinical study. *Nordic Journal of Psychiatry*, 72, 489–496. doi:10.1080/08039488.2018.1486454
- Nissen, J., Powell, S., Koch, S. V., Crowley, J. J., Matthesen, M., Grice, D. E., ... Parner, E. (2017). Diagnostic validity of early-onset obsessive-compulsive disorder in the Danish Psychiatric Central Register: Findings from a cohort sample. *BMJ Open*, 7, e017172. doi:10.1136/bmjopen-2017-017172
- Oshino, S., Suzuki, A., Ishii, G., & Otani, K. (2007). Influences of parental rearing on the personality traits of healthy Japanese. *Comprehensive Psychiatry*, 48, 465–469. doi:10.1016/j.comppsy.2007.04.008
- Park, J. M., Storch, E. A., Pinto, A., & Lewin, A. B. (2016). Obsessive-compulsive personality traits in youth with obsessive-compulsive disorder. *Child Psychiatry & Human Development*, 47, 281–290. doi:10.1007/s10578-015-0565-8
- Samuel, D. B., Riddell, A. D. B., Lynam, D. R., Miller, J. D., & Widiger, T. A. (2012). A five-factor measure of obsessive-compulsive personality traits. *Journal of Personality Assessment*, 94, 456–465. doi:10.1080/00223891.2012.677885
- Smári, J., Martinsson, D. R., & Einarsson, H. (2010). Rearing practices and impulsivity/hyperactivity symptoms in relation to inflated responsibility and obsessive-compulsive symptoms. *Scandinavian Journal of Psychology*, 51, 392–397. doi:10.1111/j.1467-9450.2010.00819.x
- Stein, D. J., Kogan, C. S., Atmaca, M., Fineberg, N. A., Fontenelle, L. F., Grant, J. E., ... Reed, G. M. (2016). The classification of obsessive-compulsive and related disorders in the ICD-11. *Journal of Affective Disorders*, 190, 663–674. doi:10.1016/j.jad.2015.10.061
- Sun, J., Li, Z.-J., Buys, N. J., Storch, E. A., & Wang, J.-s. (2014). Obsessive-compulsive symptoms and personal disposition, family coherence and school environment in Chinese adolescents: A resilience approach. *Journal of Affective Disorders*, 168, 459–465. doi:10.1016/j.jad.2014.07.015
- Torp, N. C., Dahl, K., Skarphedinsson, G., Compton, S., Thomsen, P. H., Weidle, B., ... Ivarsson, T. (2015). Predictors associated with improved cognitive-behavioral therapy outcome in pediatric obsessive-compulsive disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 54, 200–207.e201. doi:10.1016/j.jaac.2014.12.007
- Wilcox, H. C., Grados, M., Samuels, J., Riddle, M. A., Bienvenu, O. J., Pinto, A., ... Nestadt, G. (2008). The association between parental bonding and obsessive compulsive disorder in offspring at high familial risk. *Journal of Affective Disorders*, 111, 31–39. doi:10.1016/j.jad.2008.01.025
- Wu, K. D., Clark, L. A., & Watson, D. (2006). Relations between obsessive-compulsive disorder and personality: Beyond Axis I–Axis II comorbidity. *Journal of Anxiety Disorders*, 20, 695–717. doi:10.1016/j.janxdis.2005.11.001
- Xiuqin, H., Huimin, Z., Mengchen, L., Jinan, W., Ying, Z., & Ran, T. (2010). Mental health, personality, and parental rearing styles of adolescents with internet addiction disorder. *Cyberpsychology, Behavior, and Social Networking*, 13, 401–406. doi:10.1089/cyber.2009.0222
- Yoshida, T., Taga, C., Matsumoto, Y., & Fukui, K. (2005). Paternal overprotection in obsessive-compulsive disorder and depression with obsessive traits. *Psychiatry and Clinical Neurosciences*, 59, 533–538. doi:10.1111/j.1440-1819.2005.01410.x