

Obsessive–Compulsive Symptoms and Body Checking in Women and Men

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Abstract The present study examined the association between obsessive–compulsive symptoms and body checking behavior in a non-clinical sample of women and men. We also examined whether perfectionism and negative affect would account for a significant proportion of the variance in that association. Participants ($n = 303$; 45% women) completed measures of obsessive–compulsive symptoms, perfectionism, negative affect, body checking, and body dissatisfaction. Obsessive–compulsive symptoms were significantly correlated with body checking even after controlling for perfectionism. Path analyses showed that negative affect fully mediated the relation between obsessive–compulsive symptoms and body checking in women, but only partially mediated the relation in men. Finally, body checking was positively associated with body dissatisfaction, even when controlling for all other variables. Our findings highlight the importance of examining perfectionism and negative affect when considering the association between obsessive–compulsive symptoms and body image concerns, and also suggest an important role for body checking in these associations.

Keywords Obsessive–compulsive symptoms · Body checking · Body dissatisfaction · Perfectionism · Negative affect

Introduction

Comorbidity is often observed between eating disorders (ED) and obsessive–compulsive disorder (OCD). For example, Kaye et al. (2004) reported a 41% life-time prevalence of OCD in a large sample ($n = 672$) of eating disorder patients. Self-reports of OCD symptoms are also highly correlated with measures of eating pathology and body image concerns among clinical samples (Finzi-Dottan and Zubery 2009; Jimenez-Murcia et al. 2007) and among non-clinical samples (Roberts 2006). In many cases, OCD occurs prior to the onset of the eating disorder, suggesting that OCD might be a risk factor for eating disorders (Thornton and Russell 1997). Overall, there is strong evidence of a connection between eating pathology and obsessive–compulsive symptoms. Understanding the nature of this association may be important in identifying common risk factors or shared maintaining factors.

Past research in this domain has generally examined comorbidity among psychiatric diagnoses, or has examined correlations between obsessive–compulsive symptoms and self-reports of eating pathology and body dissatisfaction. A behavioral feature of body image concerns that might be particularly relevant in the context of obsessive–compulsive symptoms is body checking. Cognitive-behavioral theories of OCD (e.g., Salkovskis 1985) suggest that compulsions, such as checking, occur in response to obsessions and are negatively reinforced by a brief reduction in anxiety. Frequent checking of one's body weight and body size is also commonly observed among eating disorder patients and among individuals who are highly concerned with their body weight, shape, and size. Researchers have found that self-reported body checking is associated with higher levels of body dissatisfaction and more pathological eating attitudes and behaviors (Reas

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et al. 2002). As with compulsions in OCD, such body checking can be seen as a means of reducing anxiety about one's body (Swinbourne and Touyz 2007). A paradoxical consequence of increased attention to one's body, however, can be increased body dissatisfaction (Williamson et al. 1999), and body checking may thereby serve to maintain eating pathology. In support of that hypothesis, a recent experimental study found that body checking resulted in increased body dissatisfaction (Smeets et al. 2011).

A personality characteristic that has received considerable attention as a possible common dispositional tendency that underlies both OCD and EDs is perfectionism (Altman and Shankman 2009). Perfectionism is associated with eating pathology and body dissatisfaction in both clinical (Bulik et al. 2003) and non-clinical samples (Minarik and Ahrens 1996; Pearson and Gleaves 2006), and there is some evidence to suggest that perfectionism might be a premorbid predictor of eating disorders (Bardone-Cone et al. 2007). Relatives of ED patients exhibit higher levels of perfectionism than relatives of non-eating-disordered controls, suggesting that perfectionism might be a predisposing factor (Lilenfeld et al. 2000). Perfectionism is also viewed as a core feature of OCD, and research has indeed shown that higher perfectionism is associated with higher levels of obsessive–compulsive symptoms in clinical and non-clinical samples (Antony et al. 1998b; Frost et al. 1990; Frost and Steketee 1997). Given the accumulation of research evidence implicating perfectionism in both obsessive–compulsive and eating pathology, it is worth determining whether the association between obsessive–compulsive symptoms and eating pathology would hold when controlling for levels of perfectionism.

Negative affect can also be important to understanding the connections among perfectionism, obsessive–compulsive symptoms, and disordered eating, but there is only limited evidence for these associations in the research literature. For example, only one study with a group of eating disorder patients has shown that obsessive–compulsive symptoms were significantly correlated with body image disturbance, and that this association held when controlling for depression and anxiety (Finzi-Dottan and Zubery 2009). With respect to perfectionism, Minarik and Ahrens (1996) found that perfectionism was associated with eating pathology, depression, and anxiety, but they did not examine the possible mediating effects of negative affect in explaining the association between perfectionism and eating pathology. Bardone-Cone (2007), however, did find that self-oriented perfectionism (having excessively high personal standards) accounted for unique variance in bulimic symptoms even after controlling for negative affect; in contrast, socially oriented perfectionism (believing that others hold excessively high standards for oneself) did not. Although there is some initial indication that

perfectionism and obsessive–compulsive symptoms predict body image concerns and eating pathology even when controlling for negative affect, none of these studies have specifically tested the associations among these factors in a mediational model.

Most of the research in this domain has been limited to examining the associations among perfectionism, obsessive–compulsive symptoms, and eating pathology in female samples. However, researchers are increasingly recognizing the importance of body image concerns and eating pathology among men as well (Pope et al. 2000). Determining whether the predictors of eating pathology are the same for women and men can be useful in helping explain any group differences. The few extant studies that have included male participants have produced mixed results. For example, Woodside et al. (2004) found that men with eating disorders had lower scores than women with eating disorders on certain dimensions of perfectionism. In contrast, Joiner et al. (2000) found that men with chronic bulimic symptoms had higher perfectionism scores than did women with chronic bulimic symptoms. Finally, Bardone-Cone et al. (2008) found that socially prescribed perfectionism accounted for unique variance in body image concerns for women but not for men when controlling for other variables such as thin-ideal internalization. Thus, further research is still needed to clarify the relation between eating pathology and perfectionism among men, and also to explore the connections with obsessive–compulsive symptoms as this association has not yet been examined among men.

The Present Study

The purpose of this study was to examine the associations among perfectionism, obsessive–compulsive symptoms, and body checking in a non-clinical sample of women and men. Research with non-clinical samples is important because of the high rates of body image concerns and disordered eating, and because these studies can help identify precursors to clinical eating disorders (Bardone-Cone 2007). First, we predicted that perfectionism and obsessive–compulsive symptoms would be positively associated with body checking, and that body checking would be associated with higher body dissatisfaction. Second, we examined whether controlling for perfectionism would diminish the association between obsessive–compulsive symptoms and body checking. Third, we examined whether negative affect would mediate the association between perfectionism and body checking, and the association between obsessive–compulsive symptoms and body checking. Fourth, we examined whether the pattern of associations would be similar for women and for men. Because past research has produced mixed results, we have no firm predictions for objectives two, three, and four.

Method

Participants

Participants were undergraduate students in a third-year psychology class at a large Australian university, as well as a group of community volunteers that were recruited by those students. Because there were more female students than males students in the class, female students each recruited two male acquaintances and male students each recruited two female acquaintances for the study. Thus, the ratio of community volunteers to students was approximately 2:1. The total sample consisted of 321 individuals (142 women, 178 men, 1 unspecified). The mean age for women was 24.56 years (range = 18–64) and the mean age for men was 26.45 years (range = 18–66). The mean BMI for women was 22.26 (range = 17–34) and the mean BMI for men was 24.01 (range = 17–36). Differences between the student and community samples could not be assessed because the surveys were completed anonymously. All participants completed the surveys voluntarily and received no compensation for taking part in the study. This study was approved by the University's ethics committee.

Materials and Procedure

Participants completed a questionnaire packet that included the following measures.

Obsessive–Compulsive Inventory-Revised (OCI-R; Foa et al. 2002)

The OCI-R was included as a gold-standard self-report measure of OCD symptoms. This measure includes 18-items comprising six subscales (washing, checking, obsessing, hoarding, neutralizing, and ordering). The OCI-R also provides a total scale score, which was used in the present study. Each item is rated on a 5-point scale asking participants to indicate how much each of the identified experiences had distressed or bothered them over the past month (0 = *Not at all*, 4 = *Extremely*). Higher scores indicate a greater degree of obsessive–compulsive symptoms. Cronbach's alpha for the total scale was .89.

Body Checking Questionnaire (BCQ; Reas et al. 2002)

The BCQ was included in order to assess body checking, which is one of the key constructs of interest. The BCQ is a 23-item measure assessing the extent to which individuals regularly check the size and shape of their bodies, and includes subscales assessing overall appearance, body

parts, and idiosyncratic checking, as well as a total scale score. The total scale score was used in the present study. Each item is rated on a 5-point scale (1 = *Never*, 5 = *Very often*), with higher scores indicating a greater degree of body checking. Cronbach's alpha for the total scale was .94.

Multidimensional Perfectionism Inventory (MPI; Frost et al. 1990)

Two subscales of the MPI were included to assess the dimensions of perfectionism that have been consistently associated with eating pathology and with obsessive–compulsive symptoms: Concern over Mistakes (CM; 9 items) and Doubts about Actions (DA; 4 items). These dimensions also form a key part of what has been referred to as *maladaptive perfectionism* (Frost et al. 1993). Each item is rated on a 5-point scale (1 = *Strongly disagree*, 5 = *Strongly agree*), with higher scores reflecting a greater degree of perfectionism. Cronbach's alpha was .87 for the CM subscale and .73 for the DA subscale. Because these subscales were highly correlated ($r = .52$, $P < .001$), they were combined into a single index of perfectionism.

Depression, Anxiety, and Stress Scales (DASS; Lovibond and Lovibond 1995)

The DASS was included as a reliable measure of negative affect that possesses good external validity (Antony et al. 1998a). The DASS is a 21-item self-report measure that includes subscales assessing depression, anxiety, and stress. The total negative affect score was used in the present study. For each item, participants indicate on a 4-point scale the extent to which they have experienced a particular affective state over the past week (0 = *Did not apply to me at all*, 3 = *Applied to me very much, or most of the time*). Higher scores indicate greater negative affect. Cronbach's alpha for the total scale was .91.

Body Dissatisfaction Subscale of the Eating Disorder Inventory (EDI-BD; Garner et al. 1983)

The EDI-BD is one of the most widely used measures of body dissatisfaction and has demonstrated sound psychometric properties (Garner et al. 1983). The scale consists of nine items, each of which is rated on a 6-point scale (1 = *Never*, 6 = *Always*),¹ with higher scores indicating greater body dissatisfaction. Cronbach's alpha was .90.

¹ Due to an administrative error, an unlabelled seventh response option was included for the EDI-BD. Only a small number of participants selected this response option for any item (fewer than 3% of responses across all items), and a response of 7 was therefore recoded as a response of 6 (*Always*). This recoded variable was

Participants also indicated their age, and their height and weight, which were used to calculate their BMI.

Data Analysis

Prior to conducting the primary analyses, data were screened for missing data and for multivariate outliers. Respondents who failed to complete at least one of the key measures were omitted from all analyses ($n = 13$). For multi-item scales, missing values were replaced with the series mean. Multivariate outliers were identified by calculating the Mahalanobis distance for the complete set of predictors; cases exceeding the critical chi-square value were omitted from all further analyses ($n = 5$; Tabachnick and Fidell 2007). The final sample included 303 participants (136 women, 167 men), and all analyses reported below are based on this final sample. Data were also tested for normality, and only one variable showed any degree of non-normality: Body checking scores for men were positively skewed (1.64) and showed positive kurtosis (2.85). Re-analysis of the data using log-transformed scores produced identical results, and the analyses reported below are therefore based on untransformed scores.

Sex differences in age, BMI, perfectionism, OCI-R scores, negative affect, body checking, and body dissatisfaction were assessed using t tests. Regression analyses were used to assess whether OCI-R scores predicted body checking when controlling for perfectionism. Path analysis was used to simultaneously model the associations among the variables, using AMOS (Version 18.0). Indices of model fit included χ^2 (non-significant values indicate an adequate model); Normed Fit Index (NFI; values above .95 indicate good fit); Comparative Fit Index (CFI; values above .90 indicate good fit); Root Mean Square Error of Approximation (RMSEA; values less than .05 indicate good fit); and Standardized Root Mean Square Residual (SRMR; values less than .08 indicate good fit; see Klein 2005). An identical model was tested for women and for men, and the equality of the models was evaluated by comparing the unconstrained model (in which all paths were free to vary) to a constrained model in which the paths were constrained to be equal across the models for women and men. A non-significant chi-square difference indicates that the model fits equally well for both groups (Klein 2005).

Footnote 1 continued
correlated .998 with the scale using raw scores, and the results were identical when either version of the measure was used.

Results

Descriptive Statistics

Table 1 presents the means and standard deviations for each of the variables, comparing women and men. Women and men did not differ in their mean age, but men had significantly higher BMIs than women. Women and men did not differ in perfectionism, OCI-R scores, or negative affect. Women, however, scored significantly higher than men on measures of body checking and body dissatisfaction.

Table 2 shows the bivariate correlations among the variables included in the path model, separately for women and men. Of note, perfectionism and OCI-R scores were positively correlated with body checking. Body checking was positively correlated with body dissatisfaction. Finally, negative affect was positively correlated with perfectionism, OCI-R scores, body checking, and body dissatisfaction. The pattern of correlations was the same for women and men, and all correlations remained highly significant when controlling for age and for BMI.

Regression Analyses

Multiple regression analyses were used to determine whether OCI-R scores significantly predicted body

Table 1 Means (SD) for women and men for demographic variables and variables included in the path model

	Women	Men	<i>P</i>	<i>d</i>
Age	24.64 (9.57)	26.27 (10.70)	.17	0.16
BMI	22.35 (3.34)	23.91 (3.70)	<.001	0.44
Perfectionism	32.82 (10.39)	31.41 (8.47)	.20	0.15
OCI-R	15.40 (10.67)	15.36 (10.99)	.97	0.00
Negative affect	28.72 (20.26)	25.94 (18.79)	.22	0.14
Body checking	46.30 (15.16)	32.69 (9.52)	<.001	1.12
Body dissatisfaction	34.97 (11.04)	24.65 (8.33)	<.001	1.08

Table 2 Bivariate correlations among the variables included in the path model

	1	2	3	4	5
1. Perfectionism	–	.50**	.41**	.31**	.25*
2. OCI-R	.48**	–	.48**	.53**	.29**
3. DASS total	.57**	.53**	–	.39**	.38**
4. Body checking	.38**	.35**	.41**	–	.40**
5. Body dissatisfaction	.35**	.24*	.36**	.56**	–

Values above the diagonal represent correlations for men; values below the diagonal represent correlations for women

* $P < .01$; ** $P < .001$

checking when controlling for perfectionism. These analyses were conducted separately for women and for men. For women, the overall model was significant, $F(2, 133) = 14.30, P < .001$, explaining 18% of the variance in body checking, and both perfectionism ($\beta = .27, P = .003$) and OCI-R scores ($\beta = .22, P = .02$) were significant independent predictors. For men, the overall model was also significant, $F(2, 164) = 31.71, P < .001$, explaining 28% of the variance in body checking: OCI-R scores ($\beta = .50, P < .001$) was a significant independent predictor, but perfectionism ($\beta = .06, P = .45$) was not.

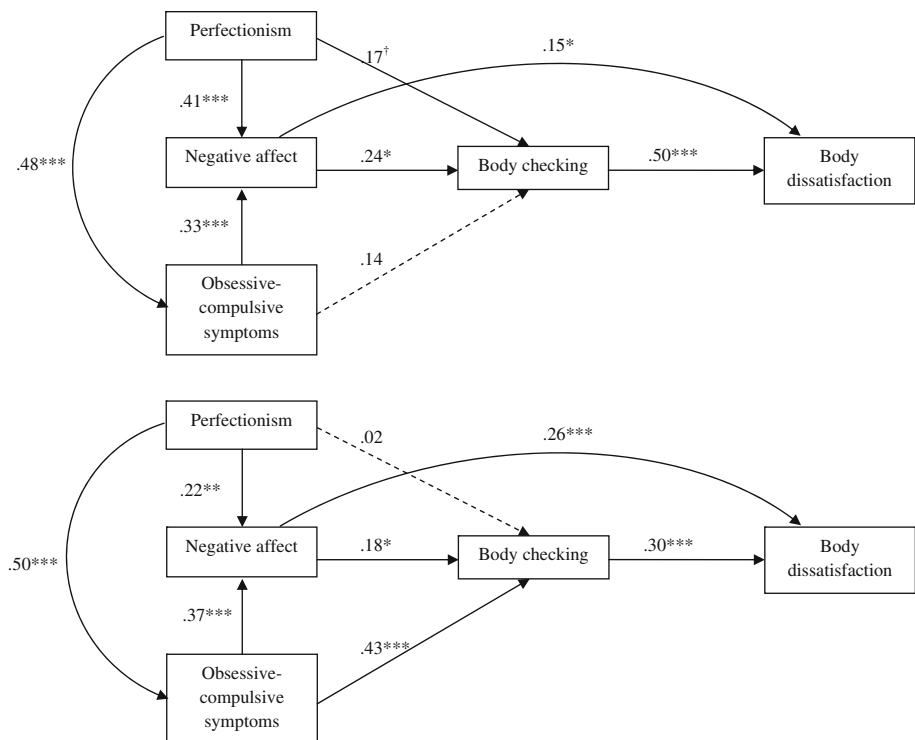
Path Analyses

Path analysis was used to test the hypothesis that negative affect would mediate the relation between perfectionism and body checking, and between OCI-R scores and body checking, and also to test the hypothesis that the pattern of associations among the variables would be similar for women and for men. In light of the observed bivariate associations between perfectionism and OCI-R scores, and between negative affect and body dissatisfaction (both of which are consistent with past research; e.g., Frost et al. 1990; Ricciardelli and McCabe 2001), these direct paths were added to the models as well. Figure 1 shows the path models including standardized path coefficients, separately for women (top half of the figure) and for men (bottom half of the figure). Solid lines represent significant paths, and dashed lines represent hypothesized paths that did not reach

statistical significance in the analyses. The overall model fit was good for both women, $\chi^2(2) = 2.17, P = .34$, NFI = .989, CFI = .999, RMSEA = .025, SRMR = .020, and for men, $\chi^2(2) = 0.70, P = .71$, NFI = .997, CFI = 1.000, RMSEA = .000, SRMR = .013. The chi-square difference revealed that the model fit equally well for women and for men, $\chi^2_{diff}(8) = 10.55, P = .23$. Results showed that negative affect mediated the association between perfectionism/OCI-R scores and body checking. For women, negative affect provided the only significant direct effect on body checking, but there were significant indirect effects of both perfectionism ($\beta_{indirect} = .20, P = .001$) and OCI-R scores ($\beta_{indirect} = .08, P = .009$) on body checking. For men, both negative affect and OCI-R scores provided significant direct effects on body checking, and there were also significant indirect effects of perfectionism ($\beta_{indirect} = .29, P = .001$) and OCI-R scores ($\beta_{indirect} = .07, P = .013$) on body checking.

Providing additional support for the association between body checking and body dissatisfaction is the finding that body checking significantly predicted body dissatisfaction even when controlling for all other variables in the model ($\beta_{women} = .50, P < .001$; $\beta_{men} = .30, P < .001$). An alternate model was also tested in which the order of the body checking and body dissatisfaction variables was reversed in the model, such that body dissatisfaction predicted body checking. Although the association between body dissatisfaction and body checking remained significant in this reverse model, the overall model was a slightly

Fig. 1 Path model predicting body dissatisfaction for women (top half of figure) and men (bottom half of figure). Values represent standardized path coefficients ($^\dagger P < .10, *P < .05, **P < .01, ***P < .001$)



worse fit for women ($\chi^2 = 4.37$, $P = .11$, $NFI = .978$, $CFI = .987$, $RMSEA = .094$, $SRMR = .034$) and a much worse fit for men ($\chi^2 = 29.29$, $P < .001$, $NFI = .854$, $CFI = .857$, $RMSEA = .287$, $SRMR = .086$).

Discussion

The present study adds to the literature on perfectionism, obsessive–compulsive symptoms, and body image concerns in several ways. First, we examined body checking as a behavioral feature of body image concerns that might be particularly relevant in the context of obsessive–compulsive symptoms. Consistent with our hypothesis, both perfectionism and obsessive–compulsive symptoms showed significant bivariate associations with body checking. Furthermore, the association between obsessive–compulsive symptoms and body checking remained significant when controlling for perfectionism. We did find, however, that negative affect mediated the association between perfectionism and body checking, and also mediated the association between obsessive–compulsive symptoms and body checking. For women, negative affect fully mediated these associations, which is inconsistent with the findings of some past studies (e.g., Bardone-Cone 2007; Finzi-Dottan and Zubery 2009). For men, however, the direct association between obsessive–compulsive symptoms and body checking remained significant.

Consistent with our hypothesis, body checking was associated with body dissatisfaction in the correlational analysis, and also predicted body dissatisfaction in the path analysis. These findings are consistent with the view that increased attention to one's body can have the paradoxical effect of increasing body dissatisfaction and maintaining eating pathology (Smeets et al., 2011; Williamson et al. 1999). Our data also suggest that there might be some degree of reciprocal influence among these two variables. Increased body dissatisfaction might lead to increased body checking as a means of reducing anxiety about one's body, but frequent checking might in turn increase body dissatisfaction. Future research using prospective and experimental designs is needed to identify the pattern of causality in these associations. For example, recent experimental work suggests that inducing participants to engage in body checking results in temporary increases in body dissatisfaction (Shafran et al. 2007; Smeets et al. 2011), but the reverse causal association has not yet been tested.

Because the present study included a reasonably large sample of women and men, we were able to examine whether the pattern of associations was similar for both groups. Consistent with previous research, women scored higher overall on measures of body checking and body dissatisfaction, but not on measures of perfectionism,

obsessive–compulsive symptoms, and negative affect. In addition, the pattern of associations among the variables was quite similar between women and men. This finding highlights the fact that there are certain predictors of body image concerns and disordered eating that can be relevant to women and men (e.g., Vartanian 2009). The main difference between women and men in the present study was that obsessive–compulsive symptoms had a significant direct effect on body checking for men, but not for women. This finding was somewhat unexpected because at least one study found that rates of comorbidity between OCD and EDs were higher for women than for men (Castle et al. 1995), although this might be primarily due to the relatively low base rate of eating disorders among men. It also possible that the difference between our findings and those of Castle et al. (1995) is due to differences in the specific dimensions of eating pathology that were assessed in these studies (i.e., body checking vs. diagnostic criteria for eating disorders). Additional research is needed to elucidate the reason for the observed sex difference, but the differences between women and men in the link between OCD symptoms and body checking underscore the need to continue to incorporate men in this type of research.

The primary limitation of the present study is that it was conducted with a non-clinical community sample, and so the results await replication with OCD patients and eating disordered samples. However, as noted by Bardone-Cone (2007), research on non-clinical samples in this domain is important given the high level of disordered eating and the potential for prevention and intervention. Furthermore, research involving non-clinical community samples of OCD (e.g., Fullana et al. 2009) supports the notion of a continuum between community volunteers and OCD patients (i.e., a dimensional basis of obsessions and compulsions). It therefore seems likely that the associations found in the current study between obsessive–compulsive symptoms and body checking may be stronger in a clinical sample. Another limitation of the present study was the reliance on self-report measures of the constructs of interest. It would be worthwhile for future research to replicate these associations using clinical interviews and behavioral observation.

The present findings have a number of implications. Understanding the nature of the association between OCD and eating pathology may be important in identifying common risk factors or shared maintaining factors. The present study found that characteristics such as perfectionism and negative affect were important components of the association between obsessive–compulsive symptoms and body image concerns. Other research (e.g., Enoch et al. 1998) has found that -1438 G/A polymorphism might contribute to a behavioral trait (e.g., perfectionism or

obsessionality) common to both anorexia nervosa and OCD, further emphasizing the importance of examining these characteristics in this domain of research. The current findings may also have important clinical implications, such as highlighting the importance of assessing for OCD symptoms, perfectionism, and negative affect when diagnosing or treating eating disorders. The association with OCD symptoms might be especially important among men, for whom OCD symptoms may drive increased body checking behavior and ultimately contribute to body dissatisfaction. Finally, this study provides further support for the importance of reducing body checking as a goal of behavioral therapy, as it appears to be a significant maintaining factor for body dissatisfaction and eating disorder symptoms. Although preliminary, findings from the current study are valuable in furthering our understanding of the links between dispositional tendencies, obsessive-compulsive symptoms and eating pathology, and how these associations may vary between women and men.

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