

# The combination of health anxiety and somatic symptoms: a prospective predictor of healthcare usage in primary care

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**Abstract** Extant research provides equivocal conclusions if the combined presentation of health anxiety with severe somatic symptoms confers risk for greater future primary care usage. The present study further examined the combination of health anxiety and somatic symptoms as a predictor of healthcare usage in primary care. Using a prospective longitudinal design, a large sample ( $N = 530$ ) of patients presenting for treatment at a community health center completed self-report measures assessing health anxiety and somatic symptom severity. A medical record review at the time of questionnaire administration and 1 year following that administration was completed to assess the frequency of medical visits during the preceding and subsequent year. As expected, the interactive effect between health anxiety and somatic symptom severity predicted greater subsequent year medical visits. Covariates included preceding year medical visits, sociodemographic variables, body mass index, smoking status, and depressive symptom severity. Simple effects indicated that health anxiety predicted greater subsequent year medical visits when coupled with relatively severe, but not mild, somatic symptoms. Assessing health anxiety and somatic symptom severity in primary care settings could be important for identifying individuals at risk for future frequent healthcare visits and who may benefit from intervention.

**Keywords** Longitudinal · Health anxiety · Medical utilization · Primary care · Somatic symptoms

## Introduction

Health anxiety—defined broadly as the wide range of worry people can have about their health (Asmundson & Taylor, 2005)—is a common and costly presentation in primary care. Nearly 20% of patients attending medical clinics report severe health anxiety (Tyrer et al., 2011) and there is a 41–78% increase in primary care service utilization among patients with severe health anxiety (Fink et al., 2010). Within the fifth edition of the *Diagnostic and Statistical Manual for Mental Disorders* (DSM-5; American Psychiatric Association, 2013), health anxiety is a primary symptom of two psychological disorders—somatic symptom disorder and illness anxiety disorder, respectively. The symptom presentation of somatic symptom disorder primarily consists of health anxiety and severe somatic symptoms, whereas the symptom presentation of illness anxiety disorder primarily consists of health anxiety and either no or mild somatic symptoms (APA, 2013).

Preliminary research has examined differences in the presentation and associated characteristics of those two disorders (Bailer et al., 2016; Newby et al., 2017). One consistent finding is that somatic symptom disorder may be marked by greater utilization of medical care relative to illness anxiety disorder. For example, Bailer et al. (2016) found that somatic symptom disorder is associated with a greater number of doctors consulted than illness anxiety disorder. Moreover, Newby et al. (2017) found that somatic symptom disorder is associated with a greater number of attended medical appointments than illness anxiety disorder. Both studies sampled participants attending cognitive-

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behavioral therapy (CBT) and, thus, study findings may not generalize to primary care patients. Nonetheless, based upon the findings and the symptom makeup of the two disorders, it is possible the presentation of health anxiety *with* elevated somatic symptoms is particularly important to attend to within primary care settings in an effort to reduce the overutilization services. Such a possibility would be informative, as there are calls to identify potential high utilizers of primary care services who may benefit from intervention (Fisher & Dickinson, 2014).

Unfortunately, the extant literature does not allow for firm conclusions to be drawn regarding the combined impact of health anxiety and elevated somatic symptom severity on primary care service utilization. For example, Barsky et al. (2001) found that primary care patients scoring high on measures of health anxiety and somatic symptom severity had greater healthcare utilization during the following year than a group of patients scoring low on those variables. Barsky et al.'s examination is limited in that the researchers created a dichotomized group of low versus high scorers, respectively, by summing health anxiety and somatic symptom severity scores into a composite. This data analytic method did not allow for an examination as to how health anxiety may differentially relate to healthcare utilization based upon the degree of somatic symptom severity. Addressing this limitation, Creed (2011) separately assessed health anxiety and somatic symptom severity among patients attending an outpatient clinic. Study results indicated a *trending* effect, when adjusting for the number of visits during the prior year, of greater medical visits over the following six months among patients endorsing elevated health anxiety and somatic symptom severity compared to a high health anxiety alone group. The groups were defined using dichotomized study variables.

Although it can be customary to dichotomize study variables for analysis, dichotomizing continuous indicators for analysis is generally not recommended because, among other limitations, a reduction in statistical power (Preacher et al., 2005). Pursuant to this point, health anxiety and somatic symptom severity appear best conceptualized dimensionally (e.g., Ferguson, 2009; Jasper et al., 2012). Addressing the analytic limitation of dichotomizing health anxiety and somatic symptom severity in prior research (Barsky et al., 2001; Creed, 2011), Tomenson et al. (2012) examined if the interaction between health anxiety and somatic symptom severity predicted following year healthcare visits among primary care patients. Tomenson et al. assessed health anxiety and somatic symptom severity dimensionally and controlled for preceding year healthcare visits. Tomenson et al. found an interactive effect; however, simple effects unexpectedly indicated that health anxiety only significantly predicted future healthcare visits

when coupled with lower, relative to higher, somatic symptom severity. There was only a trending effect for health anxiety predicting visits at higher somatic symptom severity. Overall, Tomenson et al.'s findings surprisingly indicate that health anxiety coupled with *less* somatic symptom severity is particularly relevant to understanding increased primary care utilization.

In sum, existing research provides equivocal conclusions regarding the combined presentation of elevated health anxiety and somatic symptom severity in relation to primary care usage. Further examining this combined symptom presentation is important, as Tomenson et al. (2012) opined that assessing both health anxiety and somatic symptom severity in primary care settings may be important for identifying individuals at particular risk for subsequent frequent healthcare visits. Filling that gap, the present study examined the interaction between health anxiety and somatic symptom severity predicting future year visits at a primary care clinic using a prospective longitudinal design.<sup>1</sup> Along with controlling for past year visits, sociodemographic variables, and medical morbidity (e.g., Barsky et al., 2001; Tomenson et al., 2012), multivariate analyses controlled for the effects of prior year depressive symptom severity (e.g., Bock et al., 2014), excess body weight (e.g., Renehan & Buchan, 2014), and smoking status (e.g., Bertakis & Azari, 2006). Study predictions followed the pattern of findings from Bailer et al. (2016), Barsky et al. (2001), Creed (2011), and Newby et al. (2017), such that health anxiety would predict greater future primary care visits when coupled with severe, relative to mild, somatic symptoms.

## Method

### Participants

The initial sample consisted of 538 adults presenting for treatment at a community health center in a moderately sized ( $\approx$  125,000 residents) southern U.S. city. Of the 538 participants recruited, there were subsequent year medical record data available for all but seven participants ( $N = 531$ , 98.7% of initial sample). Those 531 participants were used in subsequent analyses. The average age was 45.3 ( $SD = 17.3$ , range 18–90) years and the sample was primarily female (76.8%). Among the sample, 181 (34.1%) self-identified as Black, 176 (33.1%) as non-Hispanic

<sup>1</sup> Whereas including previous levels of a criterion variable as a covariate in multivariate analyses substantively reduces the magnitude of the effect of a predictor variable, controlling for stability effects represents a gold standard for longitudinal designs (e.g., Adachi & Willoughby, 2015). As such, stability effects were included in the multivariate analyses in the present study.

White, 170 (32.0%) as Latino, three (0.6%) as Asian, and one (0.2%) as “other.”

## Measures

### *Whiteley Index (WI; Pilowsky, 1967)*

Following both Barsky et al. (2001) and Tomenson et al. (2012), the WI was used to assess health anxiety. Welch et al. (2009) recommended using a 5-point rating scale (ranging from 1 to 5) instead of the original true/false response option and also recommended using a revised 6-item version of the WI (i.e., WI-6; Asmundson et al., 2008) that is more factorially stable than the original 14-item version of the WI. Subsequent factor analytic work of the WI-6 suggests the items are composed of a strong general health anxiety factor and two specific factors (assessing health worry and bodily/somatic preoccupation, respectively) that account for relatively little unique variance in WI-6 item scores beyond the general factor (Fergus et al., 2018). Following from those findings and the lack of specific predictions regarding the resulting WI-6 subscale scores, a total WI-6 score was used in the present study. The WI-6 ( $M = 16.05$ ,  $SD = 6.72$ ) showed good internal consistency (Cronbach's  $\alpha = .82$ ).

### *Patient Health Questionnaire-15 (PHQ-15; Kroenke et al., 2002)*

The PHQ-15 is a 15-item measure assessing somatic symptom severity over the past month using a 3-point scale (ranging from 0 to 2). There is one PHQ-15 item (i.e., *menstrual cramps or other problems with your periods*) that is used in the scoring of female, but not male, respondents. The PHQ-15 is considered a preferred measure of somatic symptom severity, particularly in primary care settings where the measure accounts for > 90% of somatic symptoms seen in those settings (Kroenke, 2007). The PHQ-15 ( $M = 11.90$ ,  $SD = 6.10$ ) showed adequate internal consistency in this study ( $\alpha = .82$ ).

### *Medical record review*

A medical record review assessed clinic visits over the preceding year and the subsequent year from the time of questionnaire administration. Those timeframes were chosen following Tomenson et al. (2012). The medical record review also assessed body mass index (BMI; weight in kilograms divided by height in meters squared), smoking status at time of questionnaire administration, and medical morbidity using the Charlson Comorbidity Index (CCI; Charlson et al., 1987). The medical record review assessed

the severity of depression using responses from the PHQ-2 (Kroenke et al., 2003), a 2-item screening measure for depression. Kroenke et al. (2003) identified a cutoff score of 3 or greater on the PHQ-2 as indicating possibly clinically severe depressive symptoms. We had access to whether participants had a score of 3 or greater on the PHQ-2 within the past 12 months at the time of questionnaire administration.

## Procedure

An institutional review board serving the local medical community approved the research. Participants were consecutively enrolled. A research assistant approached prospective participants in waiting rooms, where the study purpose was briefly described. Interested prospective participants met with a research assistant individually and, after obtaining written informed consent, participants completed study measures individually in the waiting room. The second and third author trained and supervised research assistants on the study protocol. All participants stated that English was their preferred language for communication. Participants were entered into a raffle to have a chance ( $\approx 10\%$ ) of winning a \$20 gift card. Participants consented to have a research team member complete a medical record review both at the time of questionnaire administration and 1 year following that administration. The community health center uses an electronic medical record system. Research assistants were trained on accessing and extracting data from the electronic medical record, while being provided with standardized written instructions to follow for each data extraction.

## Results

### Preliminary analyses

The mean number of subsequent year medical visits was 6.64 ( $SD = 5.98$ , range 0–60). The medical visit scores initially were transformed into standardized scores to examine possible outlying scores. Whereas standardized values of scores > 3.0 in magnitude can be expected in samples > 100 (Mertler & Vannatta, 2005), there was one case with a standardized value > 4.0 in magnitude (i.e., 8.28, 60 subsequent year medical visits). This case was considered an outlier and was removed from subsequent analyses, resulting in an analyzed sample of 530 participants. Raw (count) scores were used for the subsequent analyses.

There was a small amount of missing data among the study variables (< 3% of the respective data points) and those data points were missing at random (Little's

$\chi^2_{(90)} = 103.53, p = .156$ ). Given the low level and pattern of the missing data, expectation maximization (EM) was used to address missing data (Enders, 2010). Intercorrelations among the study variables are presented in Table 1. There were generally small interrelations among the predictors, with health anxiety and somatic symptom severity sharing a moderate correlation. Whereas past year medical visits shared a moderate-to-large correlation with subsequent year medical visits, the other predictors generally shared small correlations with subsequent year medical visits.

### Prospective prediction of subsequent year medical visits

Moderated regression was used to examine the predicted interactive effect between health anxiety and somatic symptom severity. Because the criterion variable (i.e., subsequent year medical visits) was a count variable, Poisson regression was used (Dawson, 2014). The health anxiety and somatic symptom severity variables were mean-centered and the interaction was calculated as the product of those centered variables. Regression results are presented in Table 2. Greater past year medical visits, higher BMI, and greater somatic symptom severity predicted greater subsequent year medical visits. As predicted, the main effect of somatic symptom severity was qualified by an interaction with health anxiety. Simple regression equations (simple effects) were used to further investigate the significant interaction term (Dawson, 2014). Simple effects followed Dawson's (2014) recommendations via re-running the regression models while examining the predictive power of health anxiety at low ( $-1 SD$  from the mean PHQ-15 score) versus high ( $+1 SD$  from the mean

PHQ-15 score) somatic symptom severity scores. Of note, based upon the sample mean PHQ-15 score,  $\pm 1 SD$  from the mean PHQ-15 score were at values consistent with mild and severe somatic symptom severity, respectively (Kroenke et al., 2002). Simple effects indicated that health anxiety predicted greater subsequent year medical visits at high ( $B = .011, SE = .004, \text{Wald } \chi^2_{(1)} = 8.95, p = .003$ ), but not low ( $B = .001, SE = .005, \text{Wald } \chi^2_{(1)} = 0.03, p = .871$ ), somatic symptom severity.

### Discussion

The present study further examined if the combined presentation of health anxiety and relatively severe somatic symptom severity predicted future primary care service utilization. Methodological limitations and equivocal study findings from prior studies (Barsky et al., 2001; Creed, 2011; Tomenson et al., 2012) limited conclusions being drawn about such a possibility. It was expected that the interactive effect between health anxiety and somatic symptom severity would predict greater prospective year medical visits at a primary care clinic. The expected interactive effect was found, with simple effects indicating that health anxiety only predicted future year medical visits when coupled with relatively severe, versus mild, somatic symptoms.

The present analyses statistically controlled for a number of relevant covariates, including preceding year medical visits. Controlling for such stability effects represents a gold standard in longitudinal research (Adachi & Willoughby, 2015). The interactive effect between health anxiety and somatic symptoms severity was small in magnitude, although it is important to note that accounting

**Table 1** Study variable intercorrelations

Variable	1	2	3	4	5	6	7	8	9	10
1. Past year visits	–									
2. Age	.08	–								
3. Sex	.18**	–.17**	–							
4. Race/ethnicity	–.05	–.18**	.04	–						
5. Smoking status	–.03	–.10*	–.03	–.19**	–					
6. Body Mass Index	.13**	.06	.12**	.06	–.13**	–				
7. Charlson Comorbidity Index	.16**	.49**	–.06	–.07	.07	.02	–			
8. Patient Health Questionnaire-2	.15**	.05	.01	.02	.02	–.02	.06	–		
9. Whiteley Index-6	.14**	.10*	–.01	.05	.07	.11*	.23**	.14**	–	
10. Patient Health Questionnaire-15	.16**	.04	.16**	–.04	.06	.14**	.08	.19**	.56**	–
11. Subsequent year visits	.44**	.04	.11**	–.01	.02	.11*	.11*	.10*	.15**	.17**

$N = 530$ . \*\* $p < .01$ ; \* $p < .05$  (two-tailed). Sex (dummy-coded: 0 = men, 1 = women), race/ethnicity (dummy-coded: self-identifying White = 0, ethnoracial minority = 1), smoking status (dummy-coded: no current use = 0, current use = 1), and depression severity (dummy-coded: 0 = did not screen positive, 1 = screened positive)

**Table 2** Regression analysis examining predictors of subsequent year medical visits

	Subsequent year medical visits			
	<i>b</i>	<i>SE</i>	Wald $\chi^2$	<i>p</i>
Past year medical visits	.060	.003	400.68	< .001
Age	< .000	.001	0.13	.720
Sex	.087	.046	3.62	.057
Race/ethnicity	.032	.038	0.74	.390
Smoking status	.060	.039	2.44	.119
Body Mass Index	.004	.002	5.01	.025
Charlson Comorbidity Index	.015	.010	2.22	.136
Patient Health Questionnaire-2	.068	.045	2.27	.132
Whiteley Index-6 (WI-6)	.006	.003	3.39	.066
Patient Health Questionnaire-15 (PHQ-15)	.009	.004	7.24	.007
WI-6 x PHQ-15	.001	< .001	3.99	.046

*N* = 530. *df* = 1 for all  $\chi^2$  values. Sex (dummy-coded: 0 = men, 1 = women), race/ethnicity (dummy-coded: self-identifying White = 0, ethnoracial minority = 1), smoking status (dummy-coded: no current use = 0, current use = 1), and depression severity (dummy-coded: 0 = did not screen positive, 1 = screened positive)

for stability effects substantively attenuates associations between a predictor and outcome. Adachi and Willoughby (2015) note that small effects in autoregressive longitudinal research are likely meaningful when the stability effect is relatively robust in magnitude. The stability effect among preceding and subsequent year medical visits in the present study was moderate-to-large in magnitude. The magnitude of that stability effect would suggest that a small longitudinal effect of a predictor is likely expected, particularly when considered in the context of findings that cross-sectional interactive effects of self-report measures typically only tend to evidence small effects (Aiken & West, 1991). With those considerations in mind, the interactive effect is viewed and interpreted as meaningful.

The present findings diverge from Tomenson et al.'s (2012) findings that health anxiety more strongly predicts primary care usage when coupled with relatively mild somatic symptoms. The data analytic strategy used by Tomenson et al. paralleled the one used in the present study, as those researchers also completed a dimensional assessment of health anxiety and somatic symptom severity. Of note, Tomenson et al. reported that somatic symptom severity had a trending main effect predicting a *reduction* in future year primary care usage (i.e., a reported risk ratio of less than '1' for that variable). This unexpected pattern of findings from Tomenson et al. may suggest that their index of somatic symptom severity did not function in the intended manner. Tomenson et al. did not use the PHQ-15, which is considered a preferred measure of somatic symptom severity in primary care settings (Kroenke, 2007). Differences in the somatic symptom severity measure may thus be one tenable reason for the divergent pattern of findings. Nonetheless, the present results are in line with

Tomenson et al.'s assertion that assessing for health anxiety and somatic symptom severity could be important for identifying primary care patients at risk for subsequent frequent visits.

The present results are consistent with patterns of findings from Barsky et al. (2001) and Creed (2011) that the combination of health anxiety and somatic symptom severity is important for understanding primary care usage. The present results extend those prior findings by separately modeling the effects of health anxiety and somatic symptom severity to examine their synergistic effect, as well as by operationalizing the variables as continuous, rather than dichotomous, constructs. Health anxiety is a cardinal symptom of somatic symptom disorder and illness anxiety disorder, respectively (APA, 2013). Two studies examining correlates of these two disorders among outpatients attending CBT found that somatic symptom disorder is related to greater healthcare usage (Bailer et al., 2016; Newby et al., 2017). Although the present study cannot directly speak to those two disorders per se, study results are consistent somatic symptom disorder—marked by health anxiety and severe somatic symptoms—possibly relating to higher rates of primary care utilization than illness anxiety disorder. Future research should seek to directly examine that possibility.

We considered health anxiety and somatic symptom severity as precursors to medical utilization in accordance with prior studies. However, the study design precluded an examination as to prospective influences of medical utilization on those two variables. Future research completing multiple time point assessments of each construct will be important for elucidating if there exists bidirectional relationships. Although informative, the present results cannot

speak to potential explanations as to why the combination of health anxiety and heightened somatic symptom severity predicts greater healthcare utilization. One tenable mechanism could be health-related beliefs, such as catastrophic thinking, which have shown relevancy to connecting health anxiety and safety behaviors (Olatunji et al., 2011). Future research should seek to assess such potential mediating variables in longitudinal research.

The interactive effect was robust to the effects of several covariates, including the stability effect of medical visits; however, other possible relevant covariates were unassessed. Prior cross-sectional research suggests the association between health anxiety and medical utilization is not the result of shared variance with a number of variables unexamined in the present research that theoretically and empirically overlap with health anxiety (e.g., anxiety sensitivity, body vigilance, intolerance of uncertainty; Fergus & Valentiner, 2009). Nonetheless, those variables could be included as additional predictors of medical utilization in future longitudinal research. Research assistants received standardized instructions for data extraction through electronic medical records; however, the study procedure could have been strengthened through using multiple extractors for each record to allow for a quantification of agreement across extractors. The number of patients approached for participation was not assessed, which raises the possibility that patients who agreed to participate may have differed from patients who did not agree to participate. The present sample was recruited from a community health center and community health centers tend to treat individuals with major chronic conditions at higher rates than do other service providers (e.g., office-based physician practices; Shin et al., 2013). Major chronic conditions are associated with greater somatic symptom severity (Barsky et al., 2001) and, thus potentially not surprisingly, the present sample had a greater percentage of individuals scoring in the severe somatic symptom severity range on the PHQ-15 ( $\geq 15$ ) than other primary care samples [e.g.,  $\approx 33\%$  in the present study vs  $\approx 10\%$  found by Kroenke et al. (2002)]. Such considerations highlight potential idiosyncrasies of the present sample that may limit the generalizability of study findings. The generality of study findings would be supported through replication in other healthcare settings of interest, such as office-based physician settings.

Limitations notwithstanding, the present results add to existing research indicating the combined presentation of health anxiety and severe somatic symptoms is linked to greater primary care medical visits. The small sized effect underscores the importance of examining additional predictors of service utilization; however, the ability for the interaction of health anxiety and somatic symptom severity to predict greater utilization in a longitudinal study that accounted for stability effects is notable. Future research

continuing to support the relevance of health anxiety and somatic symptom severity to primary care utilization ultimately may support the routine screening of health anxiety and somatic symptom severity to aid in the reduction of associated burden (e.g., through referral for psychological intervention; Barsky and Ahern, 2004).

#### Compliance with ethical standards

**Conflict of interest** Thomas A. Fergus, Lance P. Kelley, and Jackson O. Griggs declare that they have no conflicts of interest.

**Human and animal rights and Informed consent** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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