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ASSESSING HEALTH CONCERNS*

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ABSTRACT

Individual variability in concern about health plays a role in health-relevant cognition and behavior. Our research examined the latent structure of health concerns in two samples, one a young and healthy college sample and the other an older sample of medical outpatients. In both samples, health concerns reflected two underlying components: (a) fear and worry about health and (b) tendency to report problems. Correlations between these components and several individual difference variables theoretically linked to the experience of health concerns provided evidence of concurrent validity. The implications of the separability of reporting a health problem and worrying about its meaning are discussed, and recommendations for future research are offered.

People vary a great deal in their concern about health. Some individuals feel relatively invulnerable to disease, but others view themselves as fragile and sickly even when there is apparently nothing wrong with them. This variability in health concern is of interest because it plays a role in the tendency to engage in adaptive

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health protective behaviors [1, 2]. Moreover, exaggerated health concerns can cause considerable emotional distress.

People who manifest exaggerated concern with their health may be labeled *hypochondriacs*, but it is naive to assume that all individuals who are *not* hypochondriacs share the same low level of health concerns all the time [3]. Barsky and Klerman have proposed the term *somatic style* to denote an expected variability in this domain across individuals, with those showing relatively high preoccupation with health having an *amplifying somatic style* [4]. This perspective promotes a dimensional rather than a categorical view of individual variability in degree of concern about health.

Investigators have explored various predictors of discrete health-relevant behaviors among non-hypochondriacs. For example, Barsky [4, 5] and Mechanic [6] have viewed the expression of bodily complaints from a cognitive social learning perspective, and have suggested that a number of measurable factors in an individual's life determine such outcomes as negative health appraisal and treatment seeking. For instance, the tendency to focus attention on the self rather than the environment has been associated with both symptom reporting [7] and with the tendency to develop illness- and disease-related schemas to explain bodily sensations [4]. Research in this area has been designed to reveal correlates and determinants of selected health behaviors, however, rather than examining the latent structure of health cognitions in normal samples.[1]

ASSESSING HEALTH CONCERNS

If hypochondriasis is taken to represent the most extreme form of non-psychotic health concern, it makes sense to use it as a starting point for understanding the nature of these concerns. There are several measures of hypochondriasis in the literature, but they appear to vary in their emphasis on the experience of physical symptoms on the one hand, and fear and worry about illness on the other [8]. For example, the MMPI-Hypochondriasis scale [9] focuses on physical symptoms, whereas the Illness Attitude Scales [8] and the Illness Behavior Questionnaire [10] focus more on fears and worries about illness. To meet diagnostic criteria for hypochondriasis, both physical symptoms and the fear of disease must be present [3]. Thus, the assumption is that it is possible to have one without the other. This makes intuitive sense in that one can fear having a particular illness without currently experiencing its symptoms and vice versa.

[1] We are aware of the significant body of research by Becker, Bishop, Croyle, Jemmott, Leventhal, Turk, and others on illness representations. Our concept of *health concern* is more general, however, and refers to the degree to which individuals view themselves as having current or potential health problems and/or being worried about them. Whether this is antecedent, consequent, or epiphenomenal to individuals' more specific representations of illness and illness threat is an empirical question.

Barsky, Wyshak, and Klerman attempted to operationalize the DSM-III criteria in medical outpatients using a combination of existing measures [11]. Their data indicated a "cluster of anxious-phobic symptoms, a focus on bodily sensations, and a particular cognitive set about disease" [11, p. 499]. These findings suggest that health concerns expressed as physical symptoms, and as distressing cognitions and affective states tend to co-occur, but Barsky et al. did not examine the latent structure of the measures they chose.

Thus, it remains an empirical question whether the experience of symptoms and fear and worry about illness are separable constructs in a non-hypochondriacal sample, or whether some other factorial structure more clearly describes the nature of health concerns in such individuals. The primary purpose of the studies presented here is to examine the latent structure of health concerns (operationalized with a group of three well-known hypochondriasis and illness attitude measures) in non-hypochondriacal samples in order to assess the validity of the two-factor model that has been suggested by others.

Possible Correlates

In a dimensional view of health concerns, it is assumed that certain individuals differences will covary with worry about illness and symptom reporting. Some of these correlates are expected to be:

1. *Attention.* Attention plays a role in the experience of physical symptoms [7]. The more an individual's attention is engaged by external stimuli, the less attention is presumed available for processing internal stimuli such as sensations and emotions [12]. Use of the self-environment distinction to examine allocation of attention is basic to this paradigm [13, 14].

2. *History.* Social modeling may also play a role in health concerns [4-6]. Living in a family or cultural setting where physical complaints and worry about illness are common is presumed to lead to the development of schemas that cause the individual to perceive illness readily, and to express concern about it. Evidence for this intuitively appealing model is sketchy and equivocal [8, 15]. In a similar vein, extensive past history of illness should correlate with current levels of health concern.

3. *Negative mood.* Both epidemiological [15-18] and theoretical [19-21] considerations suggest links between depression and health concern. Epidemiological data suggest that hypochondriasis, for example, often appears in constellation with and secondary to other forms of psychopathology, especially depression [22]. In an exploration of depression, Pyszczynski and Greenberg have provided evidence that internal focus of attention is the mechanism by which reactive unipolar depression is initiated, maintained, and even worsened [20]. Focus of attention may explain the observed co-occurrence of hypochondriasis and depression, and thus play a role at many points along the continuum of health concerns [12].

Negative affect, a central component of depression, may be associated with health concerns even in individuals who are neither depressed nor hypochondriacal. Negative mood has been demonstrated to affect individual's perceptions of personal risk of disease [23, 24]. Thus, negative mood may lead to feelings of vulnerability that influence levels of health concern by making the likelihood of illness seem greater.

A second purpose of the present investigations is to provide an examination of the intercorrelations among self-focused attention, personal and family medical history, negative mood, and health concerns.

Overview of Present Studies

The studies described here are based on two samples, one a young, healthy undergraduate sample and the other an older, general medical outpatient sample. The undergraduate sample was used to examine the underlying structure of health concerns operationalized with a group of established measures of hypochondriasis and illness attitudes, and to explore the relationships among health concerns and focus of attention, personal and family medical history, and negative mood. The medical outpatient sample was used to confirm the latent structure derived from analyses of the data from the undergraduates. We expected positive correlations between some forms of health concern and self-focused attention, personal and family health history, and negative mood.

STUDY 1

The purpose of Study 1 was to examine the factor structure of the hypochondriasis and illness attitude measures in a healthy, non-hypochondriacal sample, and to explore correlations with other individual difference variables. We chose for examination three of the major assessment instruments in this area. The published subscales for one of these instruments had not been empirically derived; therefore, we began by performing a principal components analysis on this measure. We then explored the factor structure of the measures as a group. We also explored the associations among these measures and a group of individual difference variables hypothesized to play a role in health concerns.

Method

Subjects

Subjects were 173 introductory psychology students, all of whom received course credit as their only compensation for participation. Subjects' participation was solicited via a sign requesting subjects for a "Thoughts and Attitudes" study. There was no indication that the study involved health issues. Fifty-eight percent of the subjects were male; 42 percent were female.

Measures

The following measures of hypochondriasis and illness attitudes were administered and are summarized in Table 1.

MMPI Hypochondriasis Scale [9] — The MMPI Hs subscale contains thirty-three items assessing the experience of physical symptoms, *not* the fear or conviction of disease [25]. Dahlstrom, Welsh, and Dahlstrom report that its test-retest reliability ranged from .80 to .90, but that a lower stability coefficient (.43) was obtained when psychiatric treatment intervened between test and retest [26].

Illness Attitude Scales [8] — The IAS is a twenty-nine-item instrument comprising nine a priori three-item subscales designed "to measure attitudes, fears, and beliefs associated with the psychopathology of hypochondriasis and that of abnormal illness behavior" [8, p. 206]. Two additional items assess the self-reported presence of current, diagnosed physical illness and the specific treatments received. As this description of the scale implies, items focus on cognitions and do not assess levels of symptom reporting. Most items are scored on 5-point Likert-type scales. Kellner cites his own unpublished data demonstrating that

Table 1. Hypochondriasis and Illness Attitude Scales

Scale	Published Subscales	Source
MMPI	Hypochondriasis (Hs)	[9]
Illness Attitude Scales (IAS)	Worry about illness Concern about pain Health habits Hypochondriacal beliefs Thanatophobia (fear of death) Disease phobia Bodily preoccupation Treatment experience Effects of symptoms	[8]
Illness Behavior Questionnaire (IBQ)	General hypochondriasis Disease conviction Psychological vs. somatic perception of illness Affective inhibition Affective disturbance Denial (of non-somatic problems) Irritability	[10]

certain subsets of these scales discriminated between hypochondriacal psychiatric patients and other, non-hypochondriacal populations (other psychiatric patients, family practice patients, and matched controls from an industrial setting [8]. Kellner reports test-retest reliability for seven of the nine scales, ranging from .62 to 1.0. When psychiatric treatment intervened between test and retest, correlations on three of these seven scales dropped to .24, .27, and .29.

Illness Behavior Questionnaire [10] — The IBQ is a sixty-two-item dichotomous scale with seven empirically-derived subscales assessing "inappropriate or maladaptive modes of responding to one's state of health" [10, p. 1]. The factor structure of this questionnaire has varied in different populations; a more recent analysis on a much larger sample than originally used suggested a six-factor solution that was quite similar to the original one [27]. We chose to use Pilowsky and Spence's seven factors to allow for maximum comparability of results [10]. Test-retest reliability for all seven subscales has been reported from .67 to .87. Several of the scales discriminated pain clinic patients from both general practice and psychiatric patient groups.[2] Table 2 lists the IBQ subscales and their items.

The following personality measures were also administered:

Self-Consciousness Scale [28] — The Public and Private Self-Consciousness subscales of this measure were used to assess dispositional focus of attention. These subscales comprise seventeen items scored on 5-point Likert-type scales. They assess subjects' concerns with how they are viewed by others (public self-consciousness) compared to the degree to which they focus on themselves and show relatively more awareness of their own inner experience (private self-consciousness). The items on this scale are cognitively oriented and do not refer to awareness of body states. Fenigstein et al. reported test-retest reliabilities of .84 for private self-consciousness and .79 for public self-consciousness [28]. Adequate construct and discriminant validity have been demonstrated for this subscale [29-31].

Personal Health History — A standard health history form was obtained from a university health center. This form provided a list of twenty diseases or disease categories for subjects to endorse if they had experienced any of those illnesses. Scoring was based on the sum of items subjects endorsed. This instrument was used as a measure of the individual's background with regard to personal illness experiences.

Family Health History — The same standard health history form including a section dealing with reporting illness in parents, siblings, and grandparents was

[2] Wording on some of the items on this scale had to be modified for this study to apply to a non-clinical, American undergraduate sample; these revisions were retained for the cross-validation sample.

Table 2. Illness Behavior Questionnaire (IBQ) Factors

Affective Disturbance
12. Do you have trouble with your nerves?
18. Do you find that you get anxious easily?
47. Do you find that you get sad easily?
54. Do you often find that you get depressed?
59. Is it hard for you to relax?

Affective Inhibition
22. *Can you express your personal feelings easily to other people?
36. When you are angry, do you tend to bottle up your feelings?
53. Do you prefer to keep your feelings to yourself?
58. *Is it easy for you to let people know when you are cross with them?
62. Is it hard for you to show people your personal feelings?

Denial
27. *Except for your illness, do you have any problems in your life?
31. *Do you have any financial problems?
43. *Do you have any family problems?
55. Would all your worries be over if you were physically healthy?
60. *Do you have personal worries which are not caused by physical illness?

Disease Conviction
2. Do you think there is something seriously wrong with your body?
3. Does your illness interfere with your life a great deal?
7. *If the doctor told you that he could find nothing wrong with you would you believe him?
10. Do you find that you are often aware of various things happening in your body?
35. *Are you sleeping well?
41. Do you find that you are bothered by many different symptoms?

General Hypochondriasis
9. If you feel ill and someone tells you that you are looking better, do you become annoyed?
20. Are you more sensitive to pain than other people?
21. Are you afraid of illness?
24. Do you think that you worry about your health more than most people?
29. Do you find that you get jealous of other people's good health?
30. Do you ever have silly thoughts about your health which you can't get out of your mind, no matter how hard you try?
32. Are you upset by the way people take your illness?
37. Do you often think that you might suddenly fall ill?
38. If a disease is brought to your attention (through the radio, television, newspapers or someone you know) do you worry about getting it yourself?

Irritability
4. *Are you easy to get along with when you are ill?
17. Does your illness affect the way you get on with your family or friends a great deal?
51. Do you find that you get angry easily?
56. Are you more irritable towards other people?
61. Do you often find that you lose patience with other people?

Psychological vs. Somatic Perception of Illness
11. Do you ever think of your illness as a punishment for something you have done wrong in the past?
16. *Are you bothered by many pains and aches?
44. Do you think there is something the matter with your mind?
46. *Is your bad health the biggest difficulty of your life?
57. Do you think that your symptoms may be caused by worry?

Note: * indicates reverse scoring.
Source: Ref. 10.

used. This section listed twelve diseases or disease categories; scoring was based on the sum of items subjects endorsed. This form was used as a rough measure of the individual's background with regard to family illness experiences.

Multiple Affect Adjective Checklist [32] — The MAACL is a sixty-nine-item adjective checklist on which subjects endorse entries describing how they feel at present. Two general factors, dysphoria and positive affect/sensation seeking were computed in this study as a measure of mood [33]. In a study involving eight different populations, coefficient alpha for dysphoria ranged from .83 to .95 and for positive affect it ranged from .87 to .93 [34].

Procedure

Subjects completed the measures in groups of about twenty. When they arrived at the laboratory, they were given a consent form to sign. After consent was obtained, subjects took about 45 minutes to one hour to complete the questionnaires. After debriefing, subjects' questions were answered and permission to re-contact them for possible follow-up studies was solicited.

Results

Overview of Analyses

In the first phase of data analysis, we examined the Illness Attitude Scales more closely. Because the published IAS subscales had not been derived empirically and were intercorrelated, we performed a principal components analysis on just the IAS items, in an attempt to derive a subscale structure for this measure. In the second phase of analyses, we used these IAS subscales instead of the a priori ones listed in Table 1 to explore the factorial structure of the hypochondriasis and illness attitude measures as a group in a healthy sample, via principal components analysis. In the third phase of analyses, we examined the relationships between the various personality and health history measures and the hypochondriasis and illness attitude measures.

Phase one: IAS analysis — We performed a principal components analysis on 28 of the IAS Items.[3] Nine components had eigenvalues greater than one (5.91, 2.41, 1.98, 1.81, 1.47, 1.30, 1.16, 1.06, and 1.02). Based on their interpretability, we retained and rotated six components using the varimax procedure even though the scree criteria suggested that we extract fewer components. The criterion for interpreting a scale as loading on a given component was that the loading had to be greater than ± .45. If this value was reached on more than one component, the component with the higher loading was selected provided that the difference

[3] IAS item number 26 was not included in the analyses because it asks respondents to list the kinds of treatments they have received, as a follow-up to item number 25.

between the loadings was greater than .15. Table 3 summarizes the results of the principal components analysis.

This exploratory analysis of the IAS suggests that the items reflect a variety of discriminable aspects of illness attitudes, but not as many as Kellner's *a prior* arrangement suggested. These results are quite straightforward, as the retained and rotated components are easily interpretable.

Phase two: Factorial structure of the hypochondriasis and illness attitude scales — Scores from each of the six new, empirically-derived subscales of the IAS along with scores from the seven IBQ scales and the MMPI Hs scale were then subjected to a principal components analysis. Three components had eigenvalues greater than one (4.38, 1.59, and 1.22). Using criteria of both the scree plot of eigenvalues and interpretability, we retained and rotated two components using the varimax procedure.

The criterion for interpreting a scale as loading on a given component was that the loading had to be greater than ± .45. If this value was reached on more than one component, the component with the higher loading was selected provided that the difference between the loadings was greater than .15. The resulting components and scale loadings are shown in Table 4.

We labeled the first component *Fear and Worry about Health* and the second *Tendency to Report Problems.* There is a distinction between the kinds of distress indexed by the two components. The first has to do with worry and fear about one's physical integrity; scale items reflect a tendency to perceive the body as currently or potentially flawed. There is an associated tendency to engage in health protective behaviors and to allow for the possibility that symptoms and illnesses may have psychological (not strictly somatic) determinants. This component includes the following scales: IBQ General Hypochondriasis, IAS Worry and Fear, IAS Preoccupation with Meaning of Sensations, IAS Readiness to Perceive Disease, IAS Health Habits, and IBO Psychological vs. Somatic Perception of Illness. The Fear and Worry about Health component does not include current symptom complaints. In fact, the presence of the *Psychological versus Somatic Perception of Illness* subscale of the IBQ on the first component indicates the individual's tendency *not* to somatize and an ability to perceive that distress about the body could emanate from psychological sources.

In contrast, the second complaint, Tendency to Report Problems, is represented by complaints of a variety of symptoms, both somatic (e.g., fatigue, nausea, or pain) and non-somatic (e.g., sadness, anxiety, or financial problems), and a tendency to communicate complaints to health professionals. These scales are MMPI Hypochondriasis, IBQ Affective Disturbance (the tendency to complain about psychological symptoms), IAS Treatment Experience, and IBQ Denial. Thus, scales on this component reflect the individual's tendency to perceive and report problems, without an emphasis on the possible meaning or implications of the problems.

Table 3. Principal Components Analysis of the Illness Attitude Scales

Item (A Priori Subscale)	Loadings I	II	III	IV	V	VI
1. Do you worry about your health? (Worry about Illness)	.47	–.13	.25	.25	.25	.25
2. Are you worried that you may get a serious illness in the future? (Worry about Illness)	.74	.01	.16	.05	.22	.07
3. Does the thought of a serious illness scare you? (Worry about Illness)	.70	–.03	.29	.12	.13	–.13
4. If you have a pain, do you worry that it may be caused by serious illness? (Concern about Pain)	.47	–.05	.62	–.03	.10	.20
5. If a pain lasts for a week or more, do you see a physician? (Concern about Pain)	–.07	.12	.44	.43	.14	–.31
6. If a pain lasts a week or more, do you believe that you have a serious illness? (Concern about Pain)	.06	.13	.67	–.05	.08	.04
7. Do you avoid habits which may be harmful to you such as smoking? (Health Habits)	–.01	–.05	.03	–.15	.64	.10
8. Do you avoid foods which may not be healthy? (Health Habits)	–.01	–.02	.19	.01	.73	–.16
9. Do you examine your body to find whether there is something wrong? (Health Habits)	.16	.16	–.01	.07	.60	.18
10. Do you believe that you have a physical disease but the doctors have not diagnosed it correctly? (Hypochondriacal Beliefs)	–.02	.09	.29	.13	.20	.63
11. When your doctor tells you that you have no physical disease, do you refuse to believe him or her? (Hypochondriacal Beliefs)	.09	.28	–.02	.06	–.03	.55
12. When you have been told by a doctor what he or she has found, do you soon begin to believe that you may have developed a new illness? (Hypochondriacal Beliefs)	.03	.32	.21	–.16	.07	.19
13. Are you afraid of news which reminds you of death (such as funerals, obituary notices)? (Thanatophobia)	.65	.03	.08	.07	–.01	.10
14. Does the thought of death scare you? (Thanatophobia)	.71	.00	.19	–.02	–.10	–.17
15. Are you afraid that you may die soon? (Thanatophobia)	.76	.19	.09	–.02	–.11	–.01
16. Are you afraid that you may have cancer? (Disease Phobia)	.67	.25	.00	.03	.06	.25

Table 3. (Cont'd.)

Item (A Priori Subscale)	Loadings I	II	III	IV	V	VI
17. Are you afraid that you may have heart disease? (Disease Phobia)	.57	.22	−.09	−.08	.03	.29
18. Are you afraid that you may have another serious illness? (Disease Phobia)	.44	.25	−.12	.15	.38	−.06
19. When you read or hear about an illness, do you get symptoms similar to those of the illness? (Bodily Preoccupation)	.31	−.09	.17	−.17	.03	.50
20. When you notice a sensation in your body, do you find it difficult to think of something else? (Bodily Preoccupation)	.11	.25	.61	.05	.00	.19
21. When you feel a sensation in your body, do you worry about it? (Bodily Preoccupation)	.28	.14	.67	.08	.00	.00
22. Has your doctor told you that you have an illness now?	−.11	.37	−.05	.05	−.03	.35
23. How often do you see a doctor? (Treatment Experience)	.08	−.02	.08	.80	.07	.07
24. How many different doctors, chiropractors, or other healers have you seen in the past year? (Treatment Experience)	.02	−.01	.06	.78	−.07	.11
25. How often have you been treated during the past year? (Treatment Experience)*	.07	.21	−.11	.63	−.09	−.08
27. Do your bodily symptoms stop you from working? (Effects of Symptoms)	.19	.79	.05	.15	.05	.07
28. Do your bodily symptoms stop you from concentrating on what you are doing? (Effects of Symptoms)	.20	.83	.19	.07	.00	.01
29. Do you bodily symptoms stop you from enjoying yourself? (Effects of Symptoms)	.08	.78	.29	.05	.06	.09
Eigenvalues *Unrotated:*	5.91	2.41	1.98	1.81	1.47	1.30
Rotated:	4.27	2.67	2.45	2.10	1.72	1.68
Percentage of total variance	21	9	7	6	5	5

Note: Underscored numbers identify items interpreted as loading on each component. The criterion for interpreting an item as loading on a given component was that the loading had to be greater than ±.45. If this value was reached on more than one component, the item with the higher loading was selected provided that the difference between the loadings was greater than .15.

*Item 26 was not included in these analyses. It is a follow-up to item 25, and asks respondents to list the kinds of treatments they have received.

Table 4. Principal Components Analysis: Empirically-Derived Hypochondriasis and Illness Attitude Subscales

Subscale		Loadings I	Loadings II
IBQ General Hypochondriasis		<u>.80</u>	.23
IAS Worry and Fear		<u>.73</u>	.16
IAS Preoccupation with Meaning of Sensations		<u>.71</u>	.04
IAS Readiness to Perceive Disease		<u>.61</u>	.10
IAS Health Habits		<u>.51</u>	–.34
IBQ Psychological vs. Somatic Perception of Illness		<u>.50</u>	.06
IAS Effects of Symptoms		.47	.40
IBQ Disease Conviction		.45	.43
MMPI Hypochondriasis		.20	<u>.74</u>
IBQ Affective Disturbance		.40	<u>.67</u>
IBQ Irritability		.50	.52
IAS Treatment Experience		.07	<u>.52</u>
IBQ Affective Inhibition		–.01	.26
IBQ Denial		.04	<u>–.61</u>
Eigenvalues	Unrotated:	4.38	1.59
	Rotated:	3.30	2.91
Percentage of total variance		31	11

Note: Underscored numbers identify the scales interpreted as loading on each component (six on the first and four on the second). The criterion for interpreting a scale as loading on a given component was that the loading had to be greater than ±.45. If this value was reached on more than one component, the scale with the higher loading was selected provided that the difference between the loadings was greater than .15.

As a test of internal consistency, we computed Cronbach's coefficient alpha for each of the two components shown in Table 4. For Fear and Worry about Health, alpha was .86; for Tendency to Report Problems, alpha was .81.

Phase three: Concurrent validity — Scores were computed for all subjects on the Fear and Worry about Health and Tendency to Report Problems components by standardizing and summing scores on the appropriate subscales as shown in Table 4. The correlation between the two components in this sample was .32. Scores on each component were then correlated with the individual difference variables shown in Table 5.

Table 5. Correlation Matrix for Component Scores with Focus of Attention, Personal and Family Health History, and Mood Variables

	Fear and Worry about Health	Tendency to Report Problems
Focus of Attention Variables		
Private Self-Consciousness	.19*	.15*
Public Self-Consciousness	.22***	.11
Background Variables		
Personal Health History	–.08	.22*
Family Health History	.05	.04
Mood Variables		
Dysphoria	.39***	.36***
Positive Affect	–.21**	–.16

*$p < .05$
**$p < .01$
***$p < .005$

Attention

Both Public and Private Self-consciousness scores showed low to moderate but significant correlations with Fear and Worry about Health scores. Private self-consciousness had a modest but significant correlation with Tendency to Report Problems.

History

Those subjects reporting more illness in their personal health histories were more likely to score high on Tendency to Report Problems. Personal health history was uncorrelated with Fear and Worry about Health. Family health history did not correlate with either component.

Negative Mood

Both Fear and Worry about Health and Tendency to Report Problems were positively correlated with Dysphoria and negatively correlated with Positive Affect.

Discussion

The Latent Structure of Health Concerns

Combining the empirically-derived subscales from all three hypochondriasis and illness attitude measures in one analysis produced a two-component solution that distinguished fear and worry about health from a tendency to report problems. Thus, it appears that in a young, healthy sample to report a physical symptom, for example, does not necessarily mean that one is worried about its implications for one's health. These are separable constructs. Although these two components show some covariation in this sample, their relationship is not nearly as strong as each factor's internal consistency. We reserve further discussion of the implications of this finding for the General Discussion.

Correlates of Health Concerns

The pattern of correlations among scores on these two components and the individual difference variables provides some support for a cognitive social learning view of health concerns. First, the finding that Private Self-Consciousness is related to Tendency to Report Problems is consistent with Pennebaker's program of research in this area [7].

Because the construct of public self-consciousness reflects a concern with self-presentation and impression management, it was not surprising to find that it was associated with Fear and Worry about Health. Scores on these scales may be influenced by a general concern with physical integrity, whether it is manifested as good health or a pleasing appearance. Illness is not socially attractive; individuals who are concerned with self-presentation should likewise be concerned about the possibility that their images may be threatened by weakness or disease. Further, self-focus may be linked with repeated appraisals of the self as falling short of the ideal in some domain (in this instance, health status [19, 20]).

Our data do not provide strong support for a link between self-reported personal and family health history and health concerns. The correlation between past personal illness and Tendency to Report Problems is consistent with the hypothesis that past illness predisposes one to perceive symptoms [8, 35, 36], perhaps by making illness-relevant schemas salient as potential explanations. Other expected correlations among these variables may have been attenuated due to the extremely low variability on the health history measures in this sample; few subjects reported substantial illness episodes in themselves or in their families.

Mood was reliably correlated with both components of health concerns. The Fear and Worry about Health component reflects a pessimistic concern about one's future physical integrity; such a negative view would be expected to covary with negative mood. This finding is consistent with prior research demonstrating that negative mood attenuates the usual optimistic bias for future health risks [23, 24]. Similarly, negative mood was associated with the Tendency to Report Problems component. This finding is also consistent with earlier reports in the literature [23, 37, 38]. Paralleling the correlations with negative mood were those for positive affect, with subjects reporting more pleasant moods less likely to manifest health concerns of either type.

Links between negative mood and the two components of health concerns raise the question of whether both forms of health concern are merely expressions of negative affectivity [39] or neuroticism [40-41]. Although not a trivial question, it was not the focus of our research. We would suggest, however, that even if the two forms of health concern that emerged from our analysis are related to a common construct such as the tendency to complain, such a finding would not negate the utility of distinguishing particular forms of health concerns in different individuals. Clinically, interventions directed at reducing distress from a particular form of exaggerated health concern may vary, depending on the manifestation of the concern. To the degree that our results demonstrate the discriminability of two forms of health concern, they contribute to efforts to derive clinical formulations for enhancing such concerns (to promote adoption of health protective behaviors) or reducing them (to relieve distress).

STUDY 2

The purpose of this study was to cross-validate in a different sample the structure derived from the analyses of the undergraduate data. Deriving the latent structure of the hypochondriasis and illness attitude measures on a group of healthy undergraduates might not yield results that would generalize to any other population. Cross-validation of the structure on a different sample addresses this question. The hypochondriasis and illness attitude measures were administered to medical clinic outpatients who were both older and less healthy than the undergraduates in Study 1. Data from these subjects were then analyzed via confirmatory factor analysis (CFA) to determine whether these data fit the model derived from the earlier analysis [42].

Method

Subjects

The cross-validation sample consisted of ninety-six medical outpatients and their companions at various clinics at a Veterans' Administration Medical Center. All individuals entering the designated clinic waiting areas were invited to participate. Prospective subjects were asked to complete a "survey about people's attitudes about health and illness in general." During the last four of the six days of data collection, the number of refusals was noted.[4] Of the seventy-six subjects solicited on those last four days, eighteen declined, yielding a response rate of 76

[4] Response rates were not tracked on the first two days of data collection.

percent. The mean age of this sample was sixty-one (*SD* = 11); 76 percent of the subjects were male and 24 percent were female. Participants were not compensated.

Measures

Based on the results of the exploratory analyses in Study 1, subjects completed the ten scales as indicated in the solution in Table 4 (IBQ General Hypochondriasis, IAS Worry and Fear, IAS Preoccupation with Meaning of Sensations, IAS Readiness to Perceive Disease, IAS Health Habits, IBQ Psychological vs. Somatic Perception of Illness, MMPI Hypochondriasis, IBQ Affective Disturbance, IAS Treatment Experience, and IBQ Denial). Questions were presented in random order. To simplify completion of the questionnaires, we used a 7-point Likert-type response format for all items.

Procedure

The individuals who agreed to participate signed a consent form and filled out their questionnaires in the clinic waiting area. Instructions were the same as with the undergraduate sample. When subjects completed the questionnaires, the investigator probed to see if the questionnaires had raised any concerns (none were reported), and answered any of the subjects' questions.

Results and Discussion

The covariance matrix of the 10 scales were submitted to the LISREL VI computer program for CFA using maximum likelihood estimation. In this procedure, the user specifies a factor structure to be compared with actual data. As can be seen in Table 6, we hypothesized a two-factor oblique model, in which six of the individual test subscales defined the first Fear and Worry about Health factor, and four defined the Tendency to Report Problems factor. Table 6 shows this input specification and resultant factor loadings.

The goodness-of-fit index indicated adequate fit for a two-factor model according to Bentler and Bonnett's heuristic (GFI = .90) [43]. For this model, $\chi^2(34) = 59.88$. The two factors were correlated, $r = .56$. A competing test of a one-factor model, however, yielded a lower GFI (.87). For the one-factor model, $\chi^2(35) = 75.79$. A chi-square difference test was used to determine the significance of the improvement in fit with two factors [44, 45]. In this test, the difference between the two chi-square statistics is evaluated for significance; degrees of freedom are determined by the difference in degrees of freedom for the two models. A significance test based on the difference indicated that the two-factor model provided a better fit than the one-factor model ($\chi^2(1) = 15.91, p < .005$).

As a test of internal consistency, we computed coefficient alpha for each of the two components. For the Fear and Worry about Health component, coefficient alpha was .88; for Tendency to Report Problems component, coefficient alpha was .89.

Table 6. CFA Factor Loadings

Subscales	Factor Loadings: Fear and Worry about Health	Factor Loadings: Tendency to Report Problems
IBQ General Hypochondriasis	.96	.00[a]
IAS Worry and Fear	.83	.00
IAS Preoccupation with Sensations	.71	.00
IAS Readiness to Perceive Disease	.65	.00
IAS Health Habits	−.02	.00
IBQ Psychological vs. Somatic Perception of Illness	.33	.00
MMPI Hypochondriasis	.00	.72
IBQ Affective Disturbance	.00	.78
IBQ Denial	.00	−.40
IAS Treatment Experience	.00	.34

[a]Loadings of .00 indicate fixed parameters.

Examination of the loadings (reported in Table 6) revealed that they were comparable in magnitude to those obtained in the undergraduate sample with one exception, the IBQ Health Habits scale. This scale was associated more strongly with Fear and Worry about Health in the undergraduate sample than in the outpatient sample. Specifically, tendencies to eat a healthy diet, avoid smoking, and examine one's body for signs of disease were more associated with Fear and Worry about Health in the younger sample than in the older, less healthy sample.

The results from Study 2 cross-validated the two-component model derived from the analyses on data from a healthy undergraduate sample in Study 1 in an older, less healthy sample of medical clinical outpatients. Confirmatory factor analysis indicated that the model was adequately reproduced by the data from this cross-validation sample. Although the two factors were correlated, a test of a one-factor model yielded a lower GFI value, suggesting that the two-factor model was more appropriate. Even in a sample of subjects who required outpatient medical treatment, the pattern of health concerns was substantially similar to the pattern obtained among undergraduates.

GENERAL DISCUSSION

These studies had two purposes: to explore the latent structure of health concerns in non-hypochondriacal samples and to examine relationships among health concerns and some personality variables hypothesized to covary with them.

Exploration of the latent structure of the selected group of scales revealed that they may be usefully conceptualized as reflecting two underlying components: Fear and Worry about Health, and Tendency to Report Problems. This structure was then cross-validated by CFA with another sample. Even though the two samples were different in age and health status (younger, healthy undergraduates vs. older, medical outpatients and their companions), we found that their concerns about health cluster in similar ways.

The pattern of our results supports the notion of an underlying negative affective state giving rise to somatopsychic expressions of distress, a Tendency to Report Problems. However, this is distinguishable from worry and fear about either the meaning of the problems giving rise to the complaints or more general worry and fear about one's health. This finding is important for two reasons. First, the cross-validation of the underlying structure provides a foundation for further exploration of these measures in terms of their discriminant validity. Second, the separability of the reporting of problems (physical and otherwise) from worry and fear about one's health status indicates that they may be amenable to different interventions. The distinction between these two cognitive-perceptual processes is consistent with Leventhal's work which posits that health threats are evaluated along two parallel tracks, a lower-level one geared toward processing concrete aspects and another higher-level one addressing more abstract aspects such as meaning and affective valence [35, 46]. Thus, processing the sensory aspects of pain is different from wondering about the meaning of the pain. Similarly, reporting other kinds of problems (e.g., "I am anxious" or "I have financial difficulties") does not indicate what meaning these events have for the individual.

In a recent review, Cioffi examined the role of attentional strategies in somatic interpretation [47]. Her thoughtful conceptual analysis of the literature in this area emphasizes the importance of acknowledging not only the *direction* of somatic attention but also its *content*, between the experience of physical events per se and the psychological meaning the individual assigns to them. Cioffi argues that such a distinction is extremely useful in making sense of the seemingly inconsistent results of research on the effects of various attention and distraction techniques for managing responses to sensations. Our results support the validity of such an approach.

The difference in the size of the correlation between the two factors suggested in the analyses leads to the conclusion that Fear and Worry about Health and Tendency to Report Problems may covary in different ways in different populations. The *degree* to which different kinds of concerns are experienced may change in different groups. Some groups may report high scores on both; this would be the expected pattern among individuals who might be considered "hypochondriacal" and among a gravely ill medical population. Others might report low scores on both; these individuals would neither complain a lot nor show evidence of worry about their future physical well-being. One would expect this pattern among extremely well-adjusted and optimistic individuals. Still other groups might yield divergent results on the two factors. Individuals who have extensive complaints may be malingering or somatizing their distress. Others might worry a lot about the future but have few current complaints; this configuration may describe a *worried well* population. Table 7 presents a schematic representation of the possible combinations of scores on these two scales.

Two caveats regarding this schematic representation: A central concern for some psychologists is whether or not individuals expressing relatively exaggerated health concerns are truly physically ill or not. Our research does not propose to solve this problem. Rather, our four-cell representation simply suggests that the *structure* of health concerns may not vary when some kinds of physical illness are present; thus, the use of the "and/or" designation in some cells. Our data do not support the hypothesis that health concerns take on different structural characteristics in ill as opposed to well samples. We have examined only one such sample, however, so this conclusion is tentative.

A second caveat is that one cannot conclude from these studies that health concerns take this same form in true DSM-IIIR diagnosable hypochondriacs. Even if health concerns vary continuously in non-hypochondriacal samples (examination of the distributions of our data supports this hypothesis), there may be considerable discontinuity when these concepts are extended to psychopathological samples. Examination of the properties of these measures in psychiatric settings is needed to address this question.

Further cross-validation on different samples (both healthy, and medically and psychiatrically ill) should also allow considerable scale reduction, and facilitate the development of a more concise assessment instrument. Also needed are validity studies that indicate how well these measures can predict not only psychological distress but also behavioral indicators such as unwarranted visits to doctors and other medical professionals.

Table 7. Hypothetical Classification Scheme Based on Combinations of Scores

		Fear and Worry about Health	
		High	Low
Tendency to Report Problems	High	Hypochondriacal and/or Ill	Somatization and/or Ill
	Low	Disease Phobic or "Worried Well"	Healthy

The correlational data are consistent with theories suggesting that attentional factors and mood play a role in the development of health concerns. Examination of the relative contributions of these and other variable should be explored via regression or structural equation analyses. Further work is also needed to determine direction of causality.

Clinically, the findings of the present studies suggest that interventions directed at negative mood and self-focused attention should result in altered levels of health concern. Negative mood and self-awareness seem to be the most desirable targets for intervention. Moreover, given the stable correlations between dysphoric mood and both components of health concern, we should not be surprised to find high clinical co-morbidity of depression and various kinds of somatizing disturbances [12]. In a study of 250 healthy adults, of six different personality variables measured reliably, sad mood was the one most strongly associated with health preoccupation [48]. However, cross-validation in more psychologically-distressed samples and clinic populations is still needed.

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