

Dimensional and categorical approaches to hypochondriasis

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ABSTRACT

Background. The DSM-IV definition of hypochondriasis is contrasted with hypochondriacal dimensions as provided by the Whiteley Index (WI) and Illness Attitude Scales (IAS).

Methods. Exploratory factor analysis was conducted on self-report data from 570 patients with mental and psychophysiological disorders. Of these, 319 were additionally diagnosed according to DSM-IV by structured interviews.

Results. The three 'classic' factors of the WI labelled disease phobia, somatic symptoms and disease conviction were confirmed. The IAS consisted of two dimensions indicating health anxiety and illness behaviour. The overall scores of both instruments were highly correlated (0.80). Optimal cut-off points for case identification yielded sensitivity/specificity rates of 71/80% (WI) and 72/79% (IAS). The IAS was superior to the WI when patients with hypochondriacal disorder were to be discriminated from non-hypochondriacal somatizers. Largest group differences were found for scales related to affective components (health anxieties), smallest for illness behaviours. Affective components of hypochondriasis explained more variance of diagnostic group membership than somatization symptoms. The subscales of disease phobia (WI) and health anxiety (IAS) were most sensitive to treatment-related changes.

Conclusions. The self-rating scales are valid for screening, case definition and dimensional assessment of hypochondriacal disorder, including the differentiation between hypochondriasis and somatization. The existence of distinguishable affective and cognitive components was confirmed.

INTRODUCTION

Hypochondriasis is an old clinical concept referring to health anxieties and inadequate beliefs of suffering from serious medical disease. The roots of this diagnosis can be followed back to the Greek physician Hippocrates. Today there is growing knowledge about the underlying pathophysiological and psychological mechanisms. New research suggests that health anxieties may be linked to selective attention on body sensations (Haenen *et al.* 1996; Steptoe & Noll, 1997), misinterpretation of somatic symptoms

(Hitchcock & Mathews, 1992; Rief *et al.* 1998), low tolerance of bodily discomfort (Pauli *et al.* 1993; Lautenbacher *et al.* 1998), reduced physiological habituation (Rief & Auer, 2000), inadequate health norms (Barsky *et al.* 1993) and difficult doctor–patient communications (Lin *et al.* 1991; Hahn *et al.* 1996). Many of these factors have been incorporated into comprehensive models of hypochondriacal disorder (e.g. Barsky, 1996; Salkovskis & Warwick, 2001) which serve as a platform for psychiatric and cognitive-behavioural interventions.

The nosological status of hypochondriasis as a circumscribed mental disorder is defined by the current classification systems DSM-IV and ICD-10. Both locate hypochondriacal disorder within the section of the somatoform disorders,

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although symptoms of anxiety and fears similar to those in panic or phobic disorders may be prominent in the clinical picture. Therefore, the exact borders between hypochondriasis and anxiety are still under debate (Salkovskis & Clark 1993; Barsky *et al.* 1994; Fava *et al.* 2001). However, both diagnostic systems provide rather similar definitions of hypochondriacal disorder which indicates a high level of international consensus. DSM-IV describes the core hypochondriacal symptom as 'preoccupation with fears of having, or the idea that one has, a serious disease based on the person's misinterpretation of bodily symptoms' (American Psychiatric Association, 1994). ICD-10 presents a comparable definition, although only the cognitive ('a persistent belief' concerning the presence of a serious physical disease) and no affective component is explicitly mentioned (World Health Organization, 1993). Both systems require that: (i) no medical findings may have confirmed the patients' fears/beliefs; (ii) medical reassurance is not accepted; (iii) the condition has lasted for at least 6 months; (iv) distress or impairments have developed due to the symptoms; and (v) the beliefs are not of delusional-type (although 'poor insight' may additionally be specified by DSM-IV).

More differentiated attempts to characterize hypochondriasis have been undertaken by researchers who developed self-rating scales. Such scales have the advantage that a larger number of potentially relevant features can be considered, such as typical emotional reactions, interpretations, attitudes or frequent behaviours. A 'classic' scale of hypochondriasis is the Whiteley Index (WI) developed by Pilowsky and co-workers some 30 years ago (see Pilowsky, 1967). It was based on multiple descriptions given by the staff of a hospital for patients considered as hypochondriacal. The instrument consists of only 14 items from which three dimensions labelled disease phobia, somatic preoccupation and disease conviction can be determined. Pilowsky's scale is still today one of the most widely used hypochondriasis scales. Another well known questionnaire is the Illness Attitude Scales (IAS), proposed by Kellner and colleagues (Kellner, 1981, 1986; Kellner *et al.* 1987; see also Fava & Grandi, 1991) after many years of investigating and treating hypochondriacal patients. The IAS was constructed to

include nine clinical *a priori* scales, although a re-analysis by Speckens *et al.* (1996a) has separated only two factors describing 'health anxiety' and 'illness behaviour'. A new scale related to cognitive-behavioural concepts of hypochondriasis was developed by our group (Rief *et al.* 1998), called the Cognitions About Body And Health Questionnaire (CABAH). This instrument evaluates whether patients tend to catastrophize their bodily sensations, are oversensitive towards autonomic sensations, tend to consider their body as weak and have low tolerance for physical discomfort. We have shown that these dimensions differentiate between patient groups with and without somatoform disorders (Rief *et al.* 1998).

There is broad agreement that categorical and dimensional approaches do not contradict each other, but rather have their specific purposes and advantages. However, for the case of hypochondriasis, little is known about the equivalence of the different diagnostic methods. We are not aware of studies investigating whether the current classificational definitions are sufficiently comprehensive. Therefore we administered the WI, IAS and CABAH in large samples of patients with thoroughly diagnosed DSM-IV mental disorders. We will first analyse the factorial structure of the WI and IAS and compare both scales with respect to the subscales and intercorrelations. In the second step, we will examine the diagnostic congruence between dimensional and categorical diagnostic findings, and a final analysis will deal with the question of whether the scales and subscales are sensitive to changes of hypochondriacal symptomatology during the course of behavioural medical treatment (categorical diagnoses are usually not applicable for this purpose).

METHOD

General procedure

We studied two samples of patients with mental and psychophysiological disorders. Sample 1 consists of 570 subjects who completed a set of questionnaires including the WI and IAS. These data were used to evaluate the psychometric properties of these instruments. Sample 2 is a subsample of 319 patients who were examined more intensively using structured face-to-face interviews to obtain diagnoses according to

DSM-IV. These data allowed the detailed comparison of the diagnostic results from the dimensional (questionnaire) and categorical (interview) approaches.

All patients were on the waiting list or admitted for treatment at the Roseneck Center for Behavioural Medicine, a research-orientated hospital affiliated with the Medical Faculty of the University of Munich. As a regular German tertiary care hospital, it provides in-patient treatments for various mental and psychophysiological disorders and is open to the general population, irrespective of social and vocational status. Patients are usually referred if there is a complex co-morbidity of physical and psychological symptoms, in cases of chronicity and whenever adequate out-patient treatment facilities are regionally lacking. Treatment includes cognitive-behavioural therapy (CBT) plus indicated psychiatric and other medical interventions. As described in earlier studies (e.g. Hiller *et al.* 1997), somatoform disorders are particularly prevalent in patients referred to the Roseneck Center. Serious physical conditions that could explain the somatic symptoms in the long-term course are extremely rare.

Sample 1

The 570 patients of this sample were consecutive treatment candidates who completed the questionnaires soon after their first contact with the Roseneck Center. They were selected when there was evidence of unexplained physical symptoms from the letters of the referring clinicians, available medical records or the personal reports of the patients' themselves. We excluded patients who sought treatment for eating disorders or chronic tinnitus because those groups were treated in other specialized departments. Our sample consisted of 355 women (62.3%) and 215 men (37.7%), their mean age was 45.1 years (s.d. = 10.5) with a range between 18 and 76 years.

Sample 2

These 319 patients were selected from all patients who reported medically unexplained somatic symptoms on the initial questionnaires. Exclusion criteria were schizophrenia and related disorders, primary substance dependence and clear organic disease. The diagnostic examination took place shortly after admission and included self- plus clinician-administered instru-

ments as well as a thorough medical examination. Two hundred and ten of these patients were female (65.8%), 109 male (34.2%), and the mean age was 46.0 years (s.d. = 11.0) with a range between 19 and 72 years.

DSM-IV status and group definition

Sample 2 was systematically diagnosed according to DSM-IV criteria. Two clinically experienced psychologists were trained to use the Structured Clinical Interview (SCID, First *et al.* 1997). The first 10 patients per interviewer were diagnosed using the SCID. Afterwards, the equivalent International Diagnostic Checklists (IDCL; Hiller *et al.* 1990, 1996) were employed to simplify the diagnostic procedure but guarantee a high level of diagnostic reliability. The IDCL are interview-guided checklists recommended by the World Health Organization (Janca & Hiller, 1996).

A syndrome of medically unexplained somatic complaints or health anxieties was found in 192 patients (60.2%). Bodily complaints were considered clinically relevant only if they were severe enough to cause the person to take medicine, see a physician, or change his or her lifestyle. According to our research questions, we defined the following subgroups.

Group I

Sixty-nine patients met the criteria of current hypochondriacal disorder.

Group II

One hundred and twenty-three patients did not have hypochondriacal disorder but unexplained medically symptoms qualifying for another diagnosis from the section of the somatoform disorders. These were 39 cases of somatization disorder (SD), 34 of somatization syndrome (SSI-8), 45 of pain disorder and five of conversion disorder. SSI is an abbreviation of 'Somatic Symptom Index', a term introduced by Escobar *et al.* (1989, 1998) and evaluated by us (Hiller *et al.* 1995) to define a broader group of somatizing patients which is useful in addition to the narrow concept of SD. Although the SSI originally required only four lifetime somatic symptoms for men and six for women (so-called SSI-4,6), we considered a minimum of eight symptoms (SSI-8) as necessary. Escobar's SSI-

Table 1. Comparison of the three groups

	Hypochondriacal disorder N (%)	Somatoform disorder N (%)	Clinical controls N (%)
Female	40 (58.0)	90 (73.2)	80 (63.0)
Mean age, years	46.3 (s.d. = 9.9)	46.6 (s.d. = 10.6)	45.3 (s.d. = 11.9)
Major depression (with or without dysthymia)	50 (72.5)	77 (62.6)	84 (66.1)
Dysthymia (without major depression)	5 (7.2)	10 (8.1)	5 (3.9)
Panic disorder (with or without agoraphobia)	21 (30.4)	20 (16.3)	25 (19.7)
Generalized anxiety disorder	11 (15.9)	10 (8.1)	10 (7.9)
Agoraphobia (without panic disorder)	8 (11.6)	17 (13.8)	21 (16.5)
Social phobia	20 (29.0)	35 (28.5)	35 (27.6)
Specific phobia	11 (15.9)	13 (10.6)	8 (6.3)
Obsessive-compulsive disorder	5 (7.2)	4 (3.3)	5 (3.9)
Alcohol or drug dependence	13 (18.8)	24 (19.5)	15 (11.8)
Anorexia or bulimia nervosa	0	2 (1.6)	1 (0.8)

Note: all comparisons were not significant at the 5% level.
All values are numbers (and percentages) unless stated otherwise.

4.6 was derived from the former DSM-III classification where a different number of symptoms were defined for men and women, but it tends to be overinclusive when applied to the current DSM-IV system.

Group III

The remaining 127 patients not diagnosed as either hypochondriacal or somatoform served as a clinical control group. Most of them suffered from depressive or anxiety disorders. Their diagnostic profile can be seen from Table 1 which also provides a comparison of the clinical characteristics and co-morbidity profiles of all three groups. There were no differences of statistical significance. Of the patients in the hypochondriacal group, 45 (65.2%) met the criteria of an additional diagnosis from the somatoform disorders section. These were 17 cases of somatization disorder (SD), 20 of somatization syndrome (SSI-8) and eight of pain disorder.

Measures related to hypochondriasis and somatoform disorders

WI and IAS were translated into German by two independent and experienced clinicians, both fluent in English and German. The questions were then re-translated and carefully compared in order to achieve maximum congruence. Original and translated versions were additionally reviewed by two other bilingual and bicultural colleagues of our staff. The final German versions were judged by all translators

to have satisfactory linguistic equivalence with the English originals. The scales can shortly be characterized as follows.

WI

We used the 14-item version with dichotomic answer categories (true/false). The German version has been validated and showed a factor structure comparable with the original English form (Pilowsky, 1967; Rief *et al.* 1994). The test-retest reliability of the WI was 0.83 in a previous study (Rief *et al.* 1995).

IAS

The instrument consists of 29 items. Nine clinically constructed scales, not derived from factor analysis, with three items per scale had been defined by Kellner (1981, 1986). The statements can be rated on five-point Likert scales ranging from 'no' through 'sometimes' to 'most of the time'. Kellner defined the scales as follows: W, worry about illness (e.g. 'Are you worried that you might get a serious illness in the future?'); CP, concerns about pain (e.g. 'If you have a pain, are you concerned that it may be caused by a serious illness?'); HH, health habits (e.g. 'Do you examine your body to find out whether there is something wrong?'); HB, hypochondriacal beliefs (e.g. 'Do you believe that you have an illness, but the doctors have not diagnosed it correctly?'); Th, thanatophobia (e.g. 'Are you afraid of news which reminds you of death, such as funerals or obituary notices?'); DP, disease phobia (e.g. 'Are you worried that

you may have cancer?'); BP, bodily preoccupation (e.g. 'When you read or hear about an illness, do you get symptoms similar to those of the illness?'); TE, treatment experiences (e.g. 'How often do you see a doctor?'); ES, effects of symptoms (e.g. 'Do your bodily symptoms stop you from working?').

CABAH

This instrument is an extension and elaboration of the 10-item Somatosensory Amplification Scale proposed by Barsky *et al.* (1990). It refers to dysfunctional attitudes and beliefs that were found typical for patients with somatoform disorders (Rief *et al.* 1998). Thirty-one statements are to be answered on four-point scales (completely right, mostly right, mostly wrong, completely wrong). The CABAH comprises the following scales: (i) catastrophizing interpretation of bodily complaints (e.g. 'the most common reason for discomfort is a serious disease'); (ii) autonomic sensations (e.g. 'I often feel my heart beating because my circulatory system is very sensitive'); (iii) bodily weakness (e.g. 'after physical exertion I often have a feeling of being weak'); (iv) intolerance of bodily complaints (e.g. 'if something is wrong with my bodily sensations, it upsets me at once'); (v) health habits (e.g. 'I am always careful to live really healthily'). The internal consistency of the CABAH was 0.90 in a clinical sample of 493 inpatients and the first four scales discriminated between somatoform and non-somatoform patients (Rief *et al.* 1998).

Screening for somatoform symptoms (SOMS)

The SOMS is a questionnaire listing all physical symptoms and criteria relevant for somatoform disorders according to the definitions of DSM-IV and ICD-10. There exist trait and state versions relating to the past 2 years and the past 7 days, respectively. The trait version allows for a categorical classification, while the state version provides a dimensional measure of somatization severity. Patients are instructed to report physical symptoms that cause significant personal distress and for which doctors had not found sufficient explanation. The SOMS includes 53 symptoms from the DSM-IV/ICD-10 lists. Reliability and validity studies were carried out with good results (Rief *et al.* 1997). In the present study, the patients received the trait

version at the initial assessment (where one point is scored for each symptom reported) and the state versions at subsequent points of measurement (where each item is additionally rated on a four-point scale between: 1, mild distress due to the symptom; and 4, severe distress).

Statistical methods

Exploratory principal-component analysis with subsequent varimax-rotation was used to evaluate the dimensions of the WI and IAS. The relationship between diagnostic results from interview and questionnaire were analysed by means of sensitivity (the probability of a positive test result symptom given that the disorder is present) and specificity (the probability of a negative test results given that the disorder is not present). Analyses of variance and Student's *t* tests were used to compare group means and χ^2 analyses for categorical variables. The α significance level was conventionally set to 0.05.

RESULTS

Dimensions of the WI

Factor analysis of the WI revealed four factors with eigenvalues ≥ 1.0 explaining 55.3% of the variance. The three first factors were similar to the three 'classic' scales proposed by Pilowsky (1967) and almost identical to our prior analysis with an independent sample (Rief *et al.* 1994), although Speckens *et al.* (1996a) had extracted only one global factor. Table 2 shows that factor I ('disease phobia') comprises six items, factor II ('somatic symptoms') three items and factor III ('disease conviction') four items. Item 13 was counted for factor I although its loading in our present analysis was slightly < 0.40 . However, the corresponding value in our prior analysis had been 0.50 and it seemed meaningful from a clinical perspective to consider this item as part of the disease phobia scale. Item 3 was the only item loading substantially on the fourth factor but not on any of the other factors. It is therefore counted only for the WI total score. Reliability analysis revealed Cronbach α values as follows: disease phobia, 0.76; somatic symptoms, 0.68; disease conviction, 0.52; WI total, 0.80.

It is also indicated in Table 2 whether the individual items were able to discriminate be-

Table 2. *Whiteley Index*

Items	Factor†	Loadings‡
1 Do you often worry about the possibility that you have got a serious illness?	I**	0.71 (0.82)
2 Are you bothered by many aches and pains?	II	0.79 (0.80)
3 Do you find that you are often aware of various things happening in your body?	—	—
4 Do you worry a lot about your health?	I**	0.68 (0.74)
5 Do you often have the symptoms of very serious illnesses?	II**	0.62 (0.53)
6 If a disease is brought to your attention (through the radio, television, newspapers or someone you know) do you worry about getting it yourself?	I**	0.59 (0.71)
7 If you feel ill and someone tells you that you are looking better, do you become annoyed?	III	0.79 (0.46)
8 Do you find that you are bothered by many different symptoms?	II	0.74 (0.73)
9 Is it difficult for you to forget about yourself and think about all sorts of other things?	III**	0.47 (0.67)
10 Is it hard for you to believe the doctor when he tells you there is nothing for you to worry about?	III**	0.41 (0.70)
11 Do you get the feeling that people are not taking your illness seriously enough?	III**	0.61 (0.54)
12 Do you think that you worry about your health more than most people?	I**	0.57 (0.66)
13 Do you think there is something seriously wrong with your body?	I**	0.39 (0.50)
14 Are you afraid of illness?	I**	0.72 (0.69)

† I, Disease phobia (accounting for 29.9% of the variance); II, somatic symptoms (9.5% variance); III, disease conviction (8.2% variance); ** indicates that hypochondriacal and non-hypochondriacal patients differed on individual item level with $P < 0.01$.

‡ Factor loadings from our prior analysis in an independent sample are given in parentheses (see Rief *et al.* 1994).

tween hypochondriacal and non-hypochondriacal patients of Sample 2. We found significant differences for all but four items. One is the ambiguous item 3 (see above), two belong to the somatic symptoms scale (items 2 and 8) and one to the disease conviction scale (item 7). A more detailed analysis showed that non-hypochondriacal somatizers of group II agreed significantly more often to items 2 and 8 than the control patients of group III. When only hypochondriacal and non-somatoform control patients were compared, a clear discrimination resulted for both items (all $P < 0.01$). These findings confirm that the WI is a well differentiating scale for hypochondriacal conditions, although items 3 and 7 are candidates to be excluded because of insufficient item discrimination and items 2 and 8 are equally sensitive to both hypochondriasis and non-hypochondriacal somatization.

Dimensions of the IAS

Factor analysis was also conducted on all 27 Likert-scaled items of the IAS. Seven factors with eigenvalues ≥ 1.0 resulted explaining 61.4% of the variance. Factors V–VII had only one or two high loading items and were not interpretable. Factor IV was defined by items 23–25 describing health care utilization and factor III was equivalent to Kellner's Tanatophobia scale (items 13–15). However, factor IV

merged with factor II and factor III merged with factor I in solutions with fewer extracted components. These two major factors were highly similar to the 'health anxiety' (factor I) and the 'illness behaviour' scale (factor II) described by Speckens *et al.* (1996a). We therefore decided to interpret this two-factor solution for which the corresponding items and factor loadings are summarized in Table 3. Health anxiety consists of 17 items and illness behaviour of 6 items. All factor-related items discriminated between hypochondriacal and non-hypochondriacal patients except items 24, 25 and 27–29. However, to maintain congruence with the findings of Speckens *et al.* we continued to consider these items for the calculation of the illness behaviour scale.

Reliability analysis for the IAS resulted in Cronbach α values as follows: health anxiety, 0.92; illness behaviour, 0.75; IAS total, 0.90. Thus, the IAS is somewhat more reliable than the WI on scale as well as total score level. This is most likely due to the larger number of items and the more differentiated scaling method of the IAS.

Similarities and differences between both instruments

WI and IAS total scores were highly correlated with $r = 0.80$. The WI total score had correla-

Table 3. *Illness Attitude Scales*

Items	Factor†	Loadings
1 Do you worry about your health?	I**	0.63
2 Are you worried that you may get a serious illness in the future?	I**	0.76
3 Does the thought of a serious illness scare you?	I**	0.74
4 If you have a pain, are you concerned that it may be caused by a serious illness?	I**	0.76
5 If a pain lasts for a week or more, do you see a physician?	—	—
6 If a pain lasts a week or more, do you believe that you have a serious illness?	I**	0.70
7 Do you avoid habits that may be harmful to you such as smoking?	—	—
8 Do you avoid foods that may not be healthy?	—	—
9 Do you examine your body to find out whether there is something wrong?	I**	0.44
10 Do you believe that you have a physical disease but the doctors have not diagnosed it correctly?	I**	0.44
11 When your doctor tells you that you have no physical disease, do you refuse to believe him?	—	—
12 When you have been told by a doctor what he found, do you soon begin to believe that you may have developed a new illness?	I**	0.71
13 Are you afraid of news which reminds you of death (such as funerals or obituary notices)?	I**	0.62
14 Does the thought of death scare you?	I**	0.64
15 Are you afraid that you may die soon?	I**	0.77
16 Are you afraid that you may have cancer?	I**	0.70
17 Are you afraid that you may have heart disease?	I**	0.59
18 Are you afraid that you may have another serious illness?	I**	0.62
19 When you read or hear about an illness, do you get symptoms similar to those of the illness?	I**	0.61
20 When you notice a sensation in your body, do you find it difficult to think of something else?	I**	0.59
21 When you feel a sensation in your body, do you worry about it?	I**	0.66
23 How often do you see a doctor?	II*	0.60
24 How many different doctors, chiropractors, or other healers have you seen in the past year?	II	0.49
25 How often have you been treated during the past year? (e.g., drugs, change of drugs, surgery, etc.)	II	0.51
27 Do your bodily symptoms stop you from working?	II	0.70
28 Do your bodily symptoms stop you from concentrating on what you are doing?	II	0.72
29 Do your bodily symptoms stop you from enjoying yourself?	II	0.70

† I, Health anxiety; II, illness behaviour; asterisks indicate that hypochondriacal and non-hypochondriacal patients differed on individual item level with * $P < 0.05$ or ** $P < 0.01$ (two-tailed tests).

Note: Item 22 was not considered because it is coded dichotomous ('Has your doctor told you that you have an illness now? - Yes/No' and item 26 was not considered because it is qualitatively additional to item 25 ('If yes, what were the treatments?').

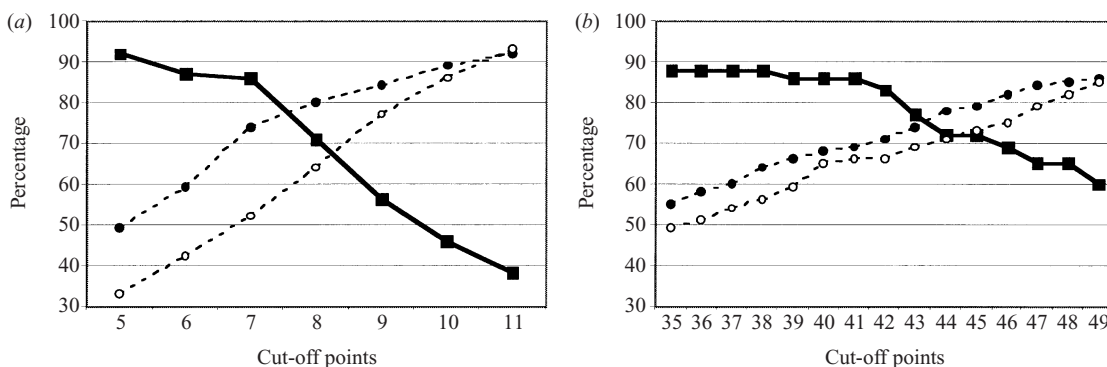


FIG. 1. Diagnostic value of: (a) Whiteley Index; and (b) Illness Attitude Scales. (■, Sensitivity; ●, specificity for hypochondriasis v. non-somatizers; ○, specificity for hypochondriasis v. other somatizers.)

tions > 0.70 with all subscales except IAS illness behaviour. The IAS total score correlated ≥ 0.80 with WI disease phobia and IAS health anxiety but < 0.60 with all other subscales. While the WI disease phobia scale and the IAS health anxiety scale seem to be highly similar with $r = 0.81$, the IAS illness behaviour scale was only moderately correlated with all other scales (all

$r_s < 0.50$). This indicates that illness behaviours are represented only in the IAS and not in the WI.

On the other hand, bodily complaints as measured by the WI somatic symptoms scale and inadequate beliefs as represented by the WI disease conviction scale had no clearly corresponding scales in the IAS (all $r_s < 0.50$). It

Table 4. Comparison of measures of hypochondriasis between the three groups

	I Hypochondriacal disorder Mean (s.d.)	II Somatoform disorder Mean (s.d.)	III Clinical controls Mean (s.d.)	Contrasting	
				I v. III Effect sizes†	I v. II
WI-I: Disease phobia	4.7 (1.5)	2.7 (1.9)	2.3 (1.9)	29**	23**
WI-II: Somatic symptoms	1.9 (1.1)	1.8 (1.1)	0.9 (1.1)	15**	—
WI-III: Disease conviction	2.1 (1.3)	1.2 (1.0)	1.2 (1.2)	12**	15**
WI total	9.2 (3.1)	6.2 (3.1)	4.9 (3.4)	28**	18**
IAS-I: Health anxiety	36.3 (12.3)	20.0 (12.0)	19.7 (12.0)	30**	29**
IAS-II: Illness behaviour	15.2 (4.2)	15.9 (4.2)	13.2 (4.6)	4**	—
IAS total	51.7 (15.0)	35.9 (13.5)	32.9 (14.4)	28**	23**
CABAH-I: Catastrophizing	18.4 (7.9)	14.7 (6.8)	13.9 (6.8)	8**	6**
CABAH-II: Autonomic sensations	6.8 (2.8)	5.4 (3.1)	4.9 (2.4)	12**	5**
CABAH-III: Bodily weakness	10.7 (4.4)	9.6 (3.7)	8.7 (3.6)	6**	2*
CABAH-IV: Intolerance of complaints	6.1 (2.2)	4.0 (2.3)	4.0 (2.5)	15**	17**
CABAH-V: Health habits	5.4 (2.0)	5.6 (1.9)	5.3 (2.0)	—	—
CABAH total	47.4 (14.2)	38.9 (12.5)	36.8 (12.5)	13**	9**
SOMS trait	18.4 (7.5)	15.8 (7.1)	12.4 (7.4)	13**	3*
SOMS state	42.9 (26.3)	35.4 (22.0)	25.3 (18.1)	14**	2*

† Percentage amount of common variance between group membership and each dependent variable (the values correspond to r^2 using one dichotomous variable for group membership).

* $P < 0.05$; ** $P < 0.01$ (based on two-tailed t tests comparing group means).

can therefore be concluded that only the health phobia/health anxiety scales are congruent while the other subscales are specific to each instrument.

Diagnostic value of the scales

The ability to discriminate between hypochondriacal and non-hypochondriacal patients was evaluated using sensitivity/specificity analysis. Fig. 1 shows a graphical summary of these results. A series of sensitivity/specificity values were computed according to a systematic variation of cut-off points splitting the sample into hypochondriacs (defined as those patients at the cut-off point or above) *v.* non-hypochondriacs (those below cut-off). Sensitivity is high when low cut-offs are chosen because most patients diagnosed as DSM-IV hypochondriasis are then correctly identified by the questionnaires. In contrary, high specificity corresponds with high cut-off scores which cause a greater proportion of patients fall into the non-hypochondriacal range and lead to a more accurate identification of patients not classified as DSM-IV hypochondriasis. Thus, the optimal cut-off point represents a combination of maximum sensitivity and specificity.

It can be seen from Fig. 1 that optimal discrimination for the WI can be reached if the 8-point cut-off is chosen. Seventy-one per cent of the hypochondriacal patients (sensitivity) and

80% of the non-somatizing controls (specificity) were then correctly identified. However, specificity was somewhat lower when the comparison was made between hypochondriacs (group I) and non-hypochondriacal somatizers (group II) since only 64% of these patients were correctly identified as non-hypochondriacal using the 8-point criterion (see Fig. 1). This situation had to be expected since hypochondriacal patients should differ clearly more from non-somatoform controls than from non-hypochondriacal somatizers. Forty-five points in the IAS (total score) yielded the optimal discrimination with a sensitivity of 72% and specificity rates of 79/73% (contrasted against the non-somatoform controls and against the non-hypochondriacal somatizers, respectively). Two conclusions can be drawn: first, both instruments are comparable in discriminating hypochondriacal (group I) from non-somatizing patients (group III), and secondly, the IAS yields better results than the WI when hypochondriacal (group I) and otherwise somatizing patients (group II) are to be discriminated from each other.

Group comparisons

Table 4 compares the three groups on all hypochondriacal and related measures. There were significant differences for all scales except CABAH-V (health habits). Hypochondriacal patients had significantly higher scores than the

non-somatizing controls on all other scales. When groups I and II were compared, differences were found for all measures except for somatic symptoms (WI-II) and illness behaviour (IAS-II). This seems to be congruent with the clinical assumption that these two subscales are equally relevant for both hypochondriacal as well as non-hypochondriacal somatizing patients.

The effect sizes given in Table 4 indicate that WI and IAS are the most powerful measures to identify hypochondriacal disorder. Although dysfunctional cognitions as assessed by the CABAH are likely to play a central role for the development and maintenance of hypochondriasis (Rief *et al.* 1998), they were less discriminative than the more descriptive dimensions of disease phobia and health anxiety. Comparing WI and IAS, group membership accounted for an equal amount of variance in both total scores (28%) when groups I and III were contrasted. Discrimination was similar, or even slightly better, with the WI disease phobia subscale (29%) and the IAS health anxiety subscale (30%). IAS illness behaviour did not contribute substantially to differentiate the hypochondriacal patients from both other groups (4% and less). The IAS health anxiety scale was similarly effective in discriminating hypochondriacal patients from somatizing as well as from control patients (29/30%). The number and severity of somatization symptoms (SOMS) differed between hypochondriacal and control patients, although less clearly than WI and IAS. There were only small effects for the SOMS between groups I and II. This is not surprising because the SOMS does not aim at differentiating hypochondriacal from non-hypochondriacal somatizing patients.

Relationship between hypochondriasis and somatization

Somatization (SOMS) correlated comparably with the WI and IAS total scores (SOMS-state: 0.45 and 0.47, respectively; SOMS-trait: both 0.39). On subscale level, we found a relatively high correlation for the WI somatic symptoms scale (0.47 with SOMS-state and 0.41 with SOMS-trait), which had to be expected from the contents of these scales. The SOMS-trait score correlated slightly higher with IAS health anxiety (0.36) than with IAS illness behaviour (0.29) and also slightly higher with WI disease phobia (0.31) than with WI disease conviction (0.26).

Evaluation of treatment effects

Three hundred and twelve (97.8%) of our patients from Sample 2 finished the treatment regularly and filled out the questionnaires once more shortly before discharge. Statistically significant improvements of the hypochondriacal patients were indicated by all WI and IAS subscales and total scales (< 0.05 for WI somatic symptoms, all other $P < 0.01$) except IAS illness behaviour ($P > 0.05$). We additionally computed the effect sizes for these pre-post comparisons using Cohen's (1977) *d*. Highest effect sizes resulted for WI disease phobia (0.77), WI total (0.66), IAS health anxiety (0.50) and IAS total (0.43), while the corresponding values for all remaining subscales were < 0.30 . These results indicate a generally good sensitivity of both instruments to assess treatment-related changes.

DISCUSSION

Hypochondriasis is a broad and multi-faceted field of clinical practice and research. Different approaches have been undertaken in the past to define its major characteristics as a distinct or co-morbid disorder. A generally accepted definition and valid instruments are needed to gain better comparability of findings. We believe that the broad and rather global definitions given by DSM-IV and ICD-10 may represent a useful common platform. However, it seems necessary to investigate whether additional criteria are necessary and how dimensional descriptions can be combined with the categorical approach.

In the present study, we employed two traditional scales of hypochondriasis. WI and IAS have been used for many years by numerous researchers and clinicians in different countries. Our results confirmed the known factorial structure of the WI (three scales) and identified two distinct dimensions of the IAS. Regarding the WI, scales I (disease phobia) and III (disease conviction) seem to reflect two core components of hypochondriasis, i.e. affective and cognitive. We found that both subscales were able to discriminate hypochondriacal patients from non-hypochondriacal somatizers as well as from non-somatiform clinical controls. However, the results were less satisfactory for scale II (somatic symptoms) which was not sensitive when hypochondriacal patients and other somatizers were

compared. One could conclude from these findings that only scales I and III of the WI should be used whenever the very specific hypochondriacal features and not the broader somatic symptoms are of interest. Another methodological weakness of the WI is the relatively low internal consistency of subscale III.

The two-factor solution obtained for the IAS is an impressively accurate replication of findings reported by Speckens *et al.* (1996*a*). There is no doubt for us that the nine *a priori* scales originally proposed by Kellner (1981, 1986) are not sufficiently supported through empirical evidence (with the possible exception of the Tanatophobia scale whose three items were grouped on a common factor of a more widespread factorial solution). The first IAS subscale, labelled health anxiety, includes 17 items describing typical emotional, cognitive and health-related behavioural features of hypochondriasis. This subscale was the best discriminating measure in our study, especially when the groups of hypochondriacal patients and non-hypochondriacal somatizers were to be separated from each other. In contrary, the second IAS scale, illness behaviour, did not differentiate well between any of our groups. If the contents of the six items relevant to this scale are re-considered (see Table 3), it becomes evident that only the frequency of different treatments (items 23–25) and some areas of impairment (items 27–29) are included. It seems plausible that characteristics such as these may be present not only in somatoform patients, but also in patients with other mental (and physical) disorders. A necessary task for the future would therefore be the development of a new instrument using items that describe more specifically the illness behaviours of hypochondriacal or somatizing patients.

Despite the advantages and disadvantages of both scales, our findings generally confirmed that the categorical diagnosis of hypochondriacal disorder and the dimensional approaches are highly congruent. Sensitivity and specificity rates were between 64 and 80%. The questionnaires may therefore be used for screening and preliminary case identification. As expected, hypochondriacal patients were better distinguishable from non-somatoform control patients than from non-hypochondriacal somatizers. Although some specific profiles of the WI and IAS

subscales became evident, the total scores of both instruments had a high correlation of 0.80, which indicates that the same construct is measured. We were also able to demonstrate that WI and IAS were sensitive to assess changes during treatment. This is an important property of dimensional scales and underlines their diagnostic value in addition to categorical diagnoses.

The relationship between categorical and dimensional measures of hypochondriasis has rarely been studied until today. Similar to our results, Speckens *et al.* (1996*b*) found that hypochondriacal disorder, as assessed according to the former DSM-III in general medical outpatients, was best discriminated by the IAS health anxiety scale (sensitivity 79%, specificity 84%) and the WI total score (87 and 72%, respectively). High WI scores were negatively associated with recovery 1 year later and IAS illness behaviour seemed to be predictive of the number of doctor visits. However, non-hypochondriacal somatization was not controlled and the authors did not assess co-morbidity with other mental disorders.

Our findings may have implications for the categorical definitions of hypochondriasis. DSM-IV is already differentiating between affective and cognitive components (preoccupation with fears or the idea of having a serious disease) which corresponds to the disease phobia and disease conviction scales of the WI. ICD-10, however, only considers the cognitive aspect (a persistent belief of having a disease) while neglecting the emotional dimension. We suggest that this should be corrected in the future.

In a recent article (Rief & Hiller, 1998), we have also recommended to consider some additional criteria for the categorical diagnosis of a somatoform disorders: (i) attentional processes (persistent focus on bodily processes); (ii) a tendency to misinterpret physical sensations as signs of a disease; (iii) persistent inadequate self-perceptions as weak and disabled; and (iv) abnormal illness behaviour (such as frequent doctor visits or avoidance of physical activities). Many of these features are also part of Barsky's (1992) concept of somatosensory amplification. Our CABAH scale I (catastrophizing) refers to misinterpretations of physical sensations and was found in the present study to differentiate between hypochondriacal patients and both

other groups. However, these group differences were smaller than those found for the WI and IAS. The situation is similar for CABAH scale III which describes self-perceptions of bodily weakness. While hypochondriacal patients reached higher scores on this scale than non-somatoform controls, there were no significant differences between hypochondriacal and somatizing patients. This finding suggests that self-perceptions of bodily weakness are generally typical for somatoform disorders and not only for hypochondriasis.

Based on these results we suggest that obligatory and optional characteristics should be differentiated. While health anxieties and body-related misinterpretations are core features of hypochondriasis, other more secondary characteristics may be used to specify subgroups. For example, not every hypochondriacal patient constantly disbelieves his or her doctor who reassures that no medical cause explaining the symptoms was found (as too strictly required by criterion C of ICD-10; see also Robbins & Kirmayer, 1996). A patient may think that the disease is probably not yet detectable or the worries may persist although he or she acknowledges that they are excessive or unreasonable. The presence or absence of such optional characteristics may influence the course and treatment of the disorder. Therefore, further empirical work is needed to determine specific patient profiles within the general concept of hypochondriacal disorder.

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