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Patterns of Hypochondriasis : A Principal Components Analysis

By G. N. BIANCHI

Introduction

Hypochondriasis, though recognized as common and important, has not been accorded the study that its ubiquity and prominence might be thought to require. It is not long since anecdotes and uncontrolled observations masqueraded as knowledge.

The ensuing impasse derives in particular from the failure of investigators to define and sub-define hypochondriasis. It seems plain that 'only after everyone understands what is being referred to by the term will it be possible to consider what hypochondriasis is, what brings it about, how it is to be treated and what its relationship to other psychopathological manifestations may be' (Wolf, 1966). Further, as Grinker *et al.* (1968) have observed, we are in 'an era when clinical diagnosis and classifications are derogated, diagnostic skills atrophying and the life-history of psychiatric entities of no great concern'. When these interests were more esteemed, computers and the appropriate programs that can put order into masses of observations were not available.

Methodology

In the course of a study of depression (Kiloh *et al.*, 1972), 235 psychiatric in-patients of the Prince Henry Hospital Psychiatric Unit, Sydney, were examined by the author and other workers. About one-half of the 235 were diagnosed as having a depressive illness. One or more of the symptoms of disease phobia, disease conviction, somatic preoccupation and psychogenic pain were complained of by 135 patients; 17 of these 135 had schizophrenic or organically based conditions, and these were excluded to avoid clouding of the factor structure. This left 118 patients, 40 men and 78 women.

The psychiatric interview became structured after a free-flowing period, and usually lasted about 50 minutes. The patients' actual replies were scored, except for judgemental items, which by definition required an opinion. Relatives were interviewed by a social worker, and any extra information was considered by the team of three psychiatrists; judgements were altered if justified by the new evidence. One psychiatrist did all the interviews, and the other two made their ratings from the taped record. The author was the sole assessor of the hypochondriacal status, and only he scored the replies to the hypochondriacal interview (Bianchi, 1971a). This part usually took some 45 minutes.

Only 24 variables were selected for analysis from the hundreds available (Appendix I). This was to decrease 'noise' and to aid interpretation of the components. Even this number would be considered too many by some who recommend for principal component analyses that there should be approximately ten times as many patients as the number of variables (Nunnally, 1967).

Most of these variables were chosen for this analysis because they differentiated the various forms of hypochondriasis from their control groups. Complete data were not available for a few patients, and so a correlation matrix allowing for missing data was formed. This is available on request. This matrix was analysed by the principal components method. The components extracted and rotated (varimax) were those with latent roots above unity. (The unrotated components are shown in Appendix II).

Results

Tables I–III summarize the findings.

Table I shows the means and standard deviations of the variables. Sex is excluded (it is variable number 7).

Table II displays the results of a principal components analysis with varimax rotation.

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TABLE I

Means and standard deviations of the variables and the sample size (N) contributing

Variable	Mean	Standard deviation	N
1. Disease phobia ..	0·33	0·59	118
2. Disease conviction ..	0·18	0·55	118
3. Somatic preoccupation	0·81	0·89	118
4. Psychogenic pain ..	1·36	0·85	118
5. Dysmorphic beliefs ..	0·62	0·85	118
6. Hypochondriacal personality	0·38	0·67	118
8. Age	42·50	16·10	118
9. Depression E.V. ..	5·05	5·36	118
10. Suicidal E.V.	4·86	2·75	118
11. Anxiety E.V.	11·00	4·66	118
12. Habit change E.V. ..	9·32	3·72	118
13. Agitation	1·47	1·92	118
14. Paranoid feelings ..	0·58	1·24	118
15. Pain tolerance ..	102·79	24·59	90
16. Sensation threshold ..	28·78	6·60	90
17. E.P.I. lie score ..	4·66	2·16	114
18. Inhibition of anger ..	1·00	1·00	108
19. Poor paternal personality	1·19	1·77	118
20. Life defeats	0·81	0·81	108
21. Maternal oversolicitude	0·51	0·84	108
22. 'Unnecessary' operations	0·37	0·61	108
23. Excess of family illness	0·85	0·78	108
24. Poor prognosis ..	1·22	0·96	114

The components are arranged from left to right in descending order of variance magnitude.

Factor I accounts for 10·8 per cent of the variance and factor VIII for 6·6 per cent.

In Table III the components have a simplified format and only the highest loadings are included.

Because old people selectively forget some early life experiences, age was partialled out of the correlation matrix and a new principal components analysis performed. Likewise E.P.I. Lie Score was partialled out and then both age and E.P.I. Lie Score together. Factor VII was the only one of the eight components rotated that changed much with the partialling out, for it was the only one dependent on proper recall of slightly opprobrious details (see Table IV).

It is interesting to see how disease phobia comes into closer association with such 'forgettable' variables when the cloaks of old age and high Lie Score are removed.

DISCUSSION

The chief components relating to hypochondriasis are seen to be:

1. An inhibition of anger—maternal oversolicitude component ('programmed augmentation' leading to disease phobia).

2. An anxiety component ('current augmentation' leading to disease phobia).

3. A psychogenic pain—somatic preoccupation component (stronger among females).

4. A somatic preoccupation—hypochondriacal personality component (stronger among males).

5. A disease conviction or disordered cognition component.

There is an age-agitation constellation in which disease conviction obtains a small factor saturation, and there is one of high pain tolerance and high sensation threshold in which disease phobia and much family illness are at the opposite pole. An interesting component not associated with hypochondriasis is an environmental load—suicidal proneness combination (No. V).

The disease phobia components

The disease phobia structure associated with maternal oversolicitude, inhibition of anger, poor paternal personality and low scoring on the suicidal index (No. VII) was the principal one requiring Eysenck Personality Inventory Lie Score and/or age to be partialled out from the correlation matrix. Disease phobia was the hypochondriacal symptom most often preceded by early life events that excessive conformists are wont to disown or that the aged are prone to forget. The technique of partialling out represents one way of decreasing the hazards of retrospection (Table IV).

This disease phobia dimension can be viewed as demonstrating 'programmed augmentation'. The term 'augmentation' has been taken from the work of Petrie (1967) who conceptualized people in terms of their tendency to augment or to reduce stimuli. It has been shown elsewhere (Bianchi, 1971b) that the disease phobics can be

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TABLE II

Principal components analysis with varimax rotation of components with latent roots above unity

	Principal components							
	I	II	III	IV	V	VI	VII	VIII
1. Disease phobia	07	−01	−56	−08	−20	−20	−27	−24
2. Disease conviction	−31	−11	−05	−67	−31	−04	−14	−19
3. Somatic preoccupation	−06	−45	−13	−27	−16	56	−13	22
4. Psychogenic pain	18	−64	−02	−19	−06	12	09	−02
5. Dysmorphic beliefs	01	−17	−38	−01	03	−07	−37	47
6. Hypochondriacal personality	−08	−00	−08	−02	14	77	−19	−09
7. Sex (+ = male)	15	48	12	−08	−20	54	33	06
8. Age	−81	01	−02	03	−12	23	01	10
9. Depression E.V.	−27	11	−54	−28	35	−30	−10	03
10. Suicidal E.V.	38	22	08	04	47	−26	27	−16
11. Anxiety E.V.	−07	01	−76	02	13	10	04	07
12. Habit change E.V.	−57	01	−43	−18	05	−11	14	−17
13. Agitation	−78	19	−08	−08	−04	−14	−08	−16
14. Paranoid feelings	−10	08	−12	−75	13	09	16	−03
15. Pain tolerance	06	01	07	09	−00	−01	19	83
16. Sensation threshold	−51	36	29	06	16	17	−02	51
17. E.P.I. lie score	−48	−24	40	−03	−14	04	−42	10
18. Inhibition of anger	−12	01	−00	18	05	14	−71	−13
19. Poor paternal personality	11	11	−18	04	67	19	−30	05
20. Life defeats	04	−31	−03	−16	73	−06	09	05
21. Maternal oversolicitude	24	11	−16	−50	00	−01	−54	−02
22. 'Unnecessary' operations	02	−73	09	09	12	−06	−07	−01
23. Much family illness	−19	−38	−08	05	41	38	12	−39
24. Poor prognosis	11	−32	14	−54	22	09	12	04
Percentage of variance	10·8	8·6	8·0	7·8	7·7	7·3	7·0	6·6

Decimal points omitted. Males were scored 1 and females 0.

understood as augmenters. 'Programmed' refers to the premorbid influences which predispose subjects to fears that they have a disease. 'Current' alludes to the here-and-now determinants of disease phobia, the principal one being anxiety (No. III).

No. VIII—a 'tolerant of pain' dimension—includes disease phobia. The loading of disease phobia changes from −0·24 to −0·31 when age is partialled out. The revised loadings are: pain tolerance (0·82), sensation threshold (0·59), much family illness (−0·41), dysmorphic beliefs (0·36) and disease phobia (−0·31).

These three components provide an overview of disease phobia and indicate its roots. No. III concerns the current clinical state; No. VII comprises the types of upbringing and personality attributes; No. VIII reveals the experimental associations. In a paper on 'the origins of disease phobia', Bianchi (1971b) has outlined a theoretical model, based upon correlational evidence obtained from a different sample of patients, that inter-relates the forces favouring development of disease phobia. The model is reproduced in Fig. 1.

The three aspects of disease phobia make approximately equal contributions to the variance, and together account for around 22 per cent of it. The dysmorphic beliefs item travels with disease phobia *except* on the 'tolerant of pain' component. The exception is No. VIII, and it suggests that a disease phobic person with much family illness has a low pain tolerance and a low sensation threshold. There is thus an aspect of dysmorphic belief that brings it into relationship with high pain tolerance and high sensation threshold. Some people who have an image of themselves as ugly are of masochistic, self-reviling and martyric bent, and one wonders if

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TABLE III

Simplified format of the principal components analysis with varimax rotation

I		II	
Age	81	'Unnecessary' operations	73
Agitation	78	Psychogenic pain	64
Habit change E.V.	57	Sex—female	48
Sensation threshold	51	Somatic preoccupation	45
E.P.I. lie score	48	Much family illness	38
Suicidal E.V.	−38	Sensation threshold	−36
Disease conviction	31	Poor prognosis	32
		Life defeats	31

III		IV	
Anxiety E.V.	76	Paranoid feelings	75
Disease phobia	56	Disease conviction	67
Depression E.V.	54	Poor prognosis	54
Habit change E.V.	43	Maternal oversolicitude	50
E.P.I. lie score	−40	Depression E.V.	28
Dysmorphic beliefs	38		
Sensation threshold	−29		

V		VI	
Life defeats	73	Hypochondriacal P.M.P.	77
Poor paternal personality	67	Somatic preoccupation	56
Suicidal E.V.	47	Sex—male	54
Much family illness	41	Much family illness	38
Depression E.V.	35	Depression E.V.	−30
Disease conviction	−31		

VII		VIII	
Inhibition of anger	71	Pain tolerance	83
Maternal oversolicitude	54	Sensation threshold	51
E.P.I. lie score	42	Dysmorphic beliefs	47
Dysmorphic beliefs	37	Much family illness	−39
Sex—female	33	Disease phobia	−24
Poor paternal personality	30		
Suicidal E.V.	−27		
Disease phobia	27		

E.P.I. = Eysenck Personality Inventory; P.M.P. = Premorbid personality; E.V. = Eigenvector. Decimal points omitted.

this accounts for dysmorphic beliefs parting company with disease phobia.

The two somatic preoccupation components

One pertains more to females (No. II) and the other more to males (No. VI). Together they contribute about 16 per cent to the variance.

A typical patient scoring high on the former could be described as: a woman burdened by life and by the spectacle of much family illness; she has a low sensation threshold and experiences her body as painful and troubled; she is the recipient of much so-called 'unnecessary' surgery, and tends to remain chronically unwell, resembling the chronic hysteric of Perley and Guze (1962).

The male version also involves a 'noisy' body and the upsetting evidence of much family illness, but instead of being surgery-prone the male is seen more clearly as a hypochondriacal personality. Perhaps he visits the doctors seeking

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TABLE IV

The disease phobic factor of 'programmed augmentation'

Variable	None P.O.	Age P.O.	Lie P.O.	Age and lie P.O.
Inhibition of anger ..	71	51	69	64
Maternal oversolicitude	54	61	42	56
Dysmorphic beliefs ..	37	58	46	51
Sex—female	33	27	27	31
Poor paternal personality	30	33	37	42
Suicidal E.V.	−27	−44	−35	−37
Disease phobia ..	27	47	45	46

Decimal points omitted. P.O. = partialled out.

similar solace, but his anatomy being what it is surgery is not such an easy recourse for the baffled doctor. The patient is a health-conscious, self-medicating physician to himself.

The disease conviction component

The other possible hypochondriacal dimension is that of disease conviction (No. IV). Besides having disease delusions the patients with high loadings on this would have disordered cognitions of the paranoid type. As children they would have been babied and overprotected and as part of the current illness would have a hopeless depression of poor prognosis.

Component or syndrome?

Components refer to relationships between rating items, not between individuals. It is only *by default* that they reflect groupings of patients, that is, a syndrome; otherwise they do not. A component can represent a syndrome when the raw scores of its constituent variables have a markedly non-normal distribution (Maxwell, 1972).

If it becomes apparent that patients with a high score on a particular component are poorly classified using orthodox nosology it is reasonable to suggest that the particular component describes a syndrome, especially if it accords with clinical judgement.

It is proposed that at least one of the components fits this situation, namely, the female 'somatic preoccupation—psychogenic pain—"unnecessary" operations' amalgam. Its other loadings are for much family illness, low sensation threshold, poor prognosis and life defeats. Clinicians are familiar with patients who have high scores on this component as treatment problems, and yet they find it difficult to append a psychiatric diagnosis. Perley and Guze (1962) call it 'chronic hysteria', though because hysteria is such an overworked term it would seem preferable to use the diagnosis of hypochondriacal neurosis.

The other components obtained probably do not represent separate disease entities but signify dimensions of hypochondriasis. Those scoring high on these dimensions are usually readily classifiable. For example, those scoring high on the disease conviction component mostly have an endogenous depression, and those scoring high on the disease phobic components commonly have an anxiety neurosis.

SUMMARY

The patterns of hypochondriasis have been examined by a principal components analysis of data concerning 24 historical, clinical and experimental variables obtained from 118 psychiatric in-patients. They had one or more of the symptoms, disease phobia, disease conviction, bodily preoccupation and psychogenic pain. Varimax rotation produced eight com-

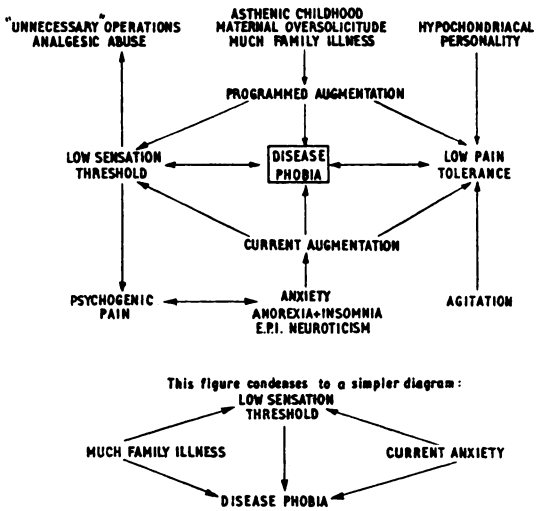


FIG. 1.—Augmentation and disease phobia. A theoretical model based upon correlation evidence.

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ponents with latent roots above unity. Five are configurations of hypochondriasis, and all are clinically meaningful.

At least one probably represents a distinct hypochondriacal syndrome, the component with its highest loadings on 'unnecessary' operations, psychogenic pain, somatic preoccupation and being female. Its other sizeable loadings are on much family illness, low sensation threshold, poor prognosis and life defeats. Much family illness is an important variable. Men with somatic preoccupation also have a loading on it, but in males a hypochondriacal premorbid personality takes the place that a history of 'unnecessary' operations occupies in the female syndrome.

There are at least two patterns of disease phobia; one described as illustrating 'programmed augmentation' and one 'current augmentation'. In the latter, disease phobia travels with current anxiety, depression and habit change. The word 'programmed' alludes to the conjectured influence of maternal oversolicitude, poor paternal personality and inhibited aggression as a pre-existing trait. (Much family illness exerts *its* 'programming' influence on subsequent disease phobia indirectly via the pain tolerance and the sensation threshold, as is evident in component No. VIII).

There is a disease conviction dimension, and it too has kinship with maternal oversolicitude. Its loadings on paranoid feelings as well as on disease delusions suggest that it is a disordered cognition grouping.

Coda

The appropriate selection of a manageable number of variables for the analysis were perforce guided by the preceding results of the case-control study. This dependence, however, does not detract from the usefulness of such mathematical techniques as principal components analysis in allowing a broader comprehension of 'what hypochondriasis is, what brings it about . . . and what its relationship to other psychopathological relationships may be'.

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APPENDIX I

Variables and Method of Scoring

Twelve items were scored 0, 1, 2 or *3*.

Zero indicates a 'no' answer or absence in the case of judgemental items. *One* was used for replies such as 'sometimes' and 'a little', or as indicative of mild, some, a little though certainly present in the case of judgemental items. A 'yes' answer was scored *two* and for judgemental items a *two* was scored if the item was present in a substantial amount. *Three* was reserved

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for strongly affirmative replies or to signify a great amount of or very strongly present.

0, 1, 2, 3 items

Disease phobia here means a persistent unfounded *fear* of suffering from a physical disease, with some doubt remaining despite examination and reassurance.

Disease conviction was considered present when the patient was *convinced* that he had a disease or bodily disorder in the face of strong evidence to the contrary.

Somatic preoccupation was assessed as present when the patient had a *plethora of symptoms* without an organic basis, typically many aches and pains and other forms of undue bodily awareness.

Psychogenic pain was defined as pain which is independent of peripheral stimulation or of damage to the nervous system and due to emotional factors, or else pain in which any peripheral change such as muscle tension is a consequence of emotional factors (Merskey and Spear, 1967).

The choice and definition of the items disease phobia, disease conviction and somatic preoccupation are influenced by the factor-analytic study of Pilowsky (1967). He submitted a questionnaire to a mixed hypochondriacal group of psychiatric patients and obtained factors interpreted as these aspects of hypochondriasis. The symptom of psychogenic pain is often present as a substrate in hypochondriasis and so it was included.

Dysmorphophobia was not of primary interest though some think of it as a type of hypochondriasis. One item concerning *dysmorphic beliefs* was taken from the inventory devised by Beck *et al.* (1961). In this the patient assents to one of the four statements:

I don't feel I look any worse than I used to (scores 0)

I am worried that I am looking old or unattractive (scores 1)

I feel that there are permanent changes in my appearance and they make me look unattractive (scores 2)

I feel that I am ugly or repulsive looking (scores 3).

Hypochondriacal personality refers to the disease-concerned, food-faddish people and not to the over-athletic or to the body-building narcissists. It is based on premorbid traits.

Inhibition of anger. The relevant question is 'Do you keep your angry aggressive feelings to yourself, bottling them up inside?'

Life defeats. 'Have you suffered a large number of defeats, humiliations or other unpleasant experiences?'

Maternal oversolicitude. 'Were you babied, molly-coddled and overprotected to a later age than is usual?'

'*Unnecessary*' *operations* is a judgemental item and implies an absence of organic pathology. A typical patient to whom a score of *one* was allotted would have a history that went something like 'various abdominal pains for several years culminated on one occasion in removal of an appendix which was not inflamed.' Hysterectomy for mild or persistent abdominal discomfort and some menstrual irregularity and 'heavy' bleeding would also receive a score of *one*. A score of *two* would require two such operations and a score of *three* would be reserved for the polysurgical patient (Wahl and Golden, 1966). 'Unnecessary' in the present instance is not to be equated with unethical.

Much family illness. 'Have your relatives and loved ones had a lot of illness and ill-health?'

This item incorporates an element of judgement, but at this stage the hypochondriacal classification is unknown, and the interviewer is 'blind'.

Poor prognosis. This refers to the mental health at six months after discharge.

Zero equals stable,

one equals symptoms present but cause no incapacity,

two equals symptoms handicap and limit,

three equals symptoms disable and incapacitate.

Variables with 0–9 ratings

Three items *agitation*, *paranoid feelings*, and *poor paternal personality* are the pooled assessments of three psychiatrists each using a 0, 1, 2 or 3 system of scoring. The paranoid feelings were not commonly delusional. Poor personality of the patient's father indicates various admixtures of bad temper, frugality, obstinacy, cruelty, alcoholism and fecklessness.

The *Eysenck Personality Inventory lie score* has a different basis for its 0–9 scoring (Eysenck and Eysenck, 1964).

Continuous variables

Age (in years)

Sensation threshold (voltage)

Pain tolerance (voltage)

The test stimulus was a one-second electrical current delivered from a Grass S4 generator. The sensation threshold was that voltage at which the subject first felt the current and the pain tolerance was that level at which the patient demurred to any further increase. These two measurements are discussed more fully elsewhere (Bianchi, 1971a).

Scores on the principal components obtained from the patients' actual replies to questions were available for each subject. The questions with highest loadings on the particular unrotated component were as follows:

Depressive mood component

Do you feel life is not worth living?

Do you feel at the end of your rope?

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Do you feel hopeless?
Suicidal component
Have you tried suicide?
Have you thought of committing suicide?
Anxiety component
Do you feel tense much of the time?
Do you often feel jittery?
Are you often worried for no reason?
Habit change component
Have you lost your appetite lately?
Questions concerning initial insomnia, fitful sleep, early waking and loss of weight.

APPENDIX II

PRINCIPAL COMPONENTS ANALYSIS DISPLAYING *unrotated* COMPONENTS WITH LATENT ROOTS ABOVE UNITY*

	Principal components							
	I	II	III	IV	V	VI	VII	VIII
1. Disease phobia	38	−23	−10	−29	−43	−12	−05	19
2. Disease conviction	58	00	06	−49	27	00	17	−17
3. Somatic preoccupation	43	−21	56	−04	−15	29	13	17
4. Psychogenic pain	07	−46	44	−09	20	00	04	21
5. Dysmorphic beliefs	24	−14	03	27	−28	−13	52	15
6. Hypochondriacal personality	35	−10	28	09	−44	38	−35	−08
7. Sex (+ = male)	−20	27	02	−30	−24	65	−17	01
8. Age	58	53	10	20	13	11	−14	14
9. Depression E.V.	46	−20	−58	18	08	−05	21	01
10. Suicidal E.V.	−48	−29	−42	11	14	08	−14	−19
11. Anxiety E.V.	35	−25	−37	11	−28	09	05	45
12. Habit change E.V.	58	07	−38	00	24	−02	−11	24
13. Agitation	57	46	−27	05	23	−14	−14	−05
14. Paranoid feelings	38	−23	−20	−27	27	45	16	−19
15. Pain tolerance	−26	21	14	37	01	33	55	24
16. Sensation threshold	13	61	01	46	02	36	13	−19
17. E.P.I. lie score	36	34	47	17	14	−24	07	−29
18. Inhibition of anger	29	05	16	15	−46	−36	−08	−32
19. Poor paternal personality	10	−35	−21	48	−33	13	−07	−29
20. Life defeats	06	−54	−10	49	29	13	−03	−15
21. Maternal oversolicitude	27	−30	−07	−27	−29	−03	36	−42
22. 'Unnecessary' operations	05	−37	46	24	25	−29	−02	13
23. Excess of family illness	29	−37	14	24	11	10	−58	07
24. Poor prognosis	12	−42	19	−05	35	30	13	−19
Percentage of variance	12·8	11·0	8·8	7·2	6·9	6·6	6·0	4·7

Decimal points omitted. Males were scored 1 and females 0.

* Naturally the amount of variance extracted by the components is altered with rotation. Since the rotated components have been rearranged in descending order of variance magnitude unrotated factors I, II, and so on do not correspond to rotated factors I and II etc. The unrotated components corresponding to rotated components I, II, . . . to VIII are III, VI, V, II, IV, I, VIII, and VII respectively.

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