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Psychological correlates of bronchial asthma in young adults: The cognitive orientation approach

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Abstract

A large body of studies showed emotional, psychopathological and personality correlates of asthma but failed to identify a specific psychological type and specific sources of stress for asthma. The purpose was to identify psychological correlates specific to asthma that would unravel characteristic sources of stress. The study was done in the framework of the cognitive orientation theory which assumes that cognitive contents and processes affect physiological processes. The subjects were 34 asthma patients (7 yrs mean duration) and 43 matched controls (mean age 22-23 yrs). All subjects were administered a questionnaire assessing beliefs of 4 types (goals, norms, self and general) referring to 19 themes identified in pretests as relevant. The results showed that there is a set of beliefs characterizing asthma patients in terms of all belief types and themes (e.g., obsessive-compulsive, ambition, perfection) that enabled identifying asthma patients significantly by means of a stepwise discriminant analysis. The findings show that there is a characteristic asthma type and specific sources of stress dependent on stress-generating themes (e.g., not expressing anger, fear of rejection) and conflicts (i.e., striving for closeness to others vs withdrawal from others, behaving in conformity with commitments vs rejecting all in favor of personal freedom, and a discrepancy between view of self and of others).

Asthma is a chronic inflammatory disease with recurrent episodes of airflow obstruction, which is widespread but variable and usually reversible. It is characterized by a tendency of the bronchial tree to respond by bronchoconstriction, excessive secretion to different stimuli and edema [1]. The major symptoms are wheezing, difficult breathing, chest tightness and coughing that sometimes can be severe or even fatal [2]. It is a prevalent disease, which occurs in about 6% of the population, and affects people of all age groups, particularly those under 30. According to Global Burden of Disease Study [3] 324 million people worldwide live with asthma. Despite improved treatment modalities there has been a steady increase in the morbidity and mortality associated with asthma over the past decade [4].

The precise etiology of asthma is unknown. Infectious organisms, immunologic abnormalities, genetic, environmental as well as psychological factors were mentioned as likely to play a role in its etiology [5].

Asthma is one of the first diseases whose psychological background was explored. The early studies were psychoanalytically oriented, and suggested a triple basis for asthma: an emotional component (mainly anxiety and latent aggressiveness), a personality component (i.e., insecurity, lack of self-confidence, egocentricity, and a dependency conflict between fear of closeness and fear of separation), and a psychopathological component (neuroticism, a compulsive personality disorder, and susceptibility to stress), all fostered and activated by overprotective but ambivalent parents [6-8].

Later research focused on many of these early insights

about asthma. Thus, in regard to emotions, studies indicate that as compared to healthy controls, asthma patients tend to report higher levels of depression, anxiety and hostility [9-12], have inhibited hostility [13] or covert aggression [14], are more emotionally unstable [15], have lower emotional control [12], and tend to respond with asthma attacks to strong emotional stimuli in general [16,17]. Updated large scale surveys have confirmed the relation of asthma with depression and anxiety [18-20].

In the psychopathological domain, studies found that as compared with healthy controls asthmatics have more psychopathology in general [21], especially in women [22], more somatization and obsession-compulsion [10], a higher frequency of anxiety disorders, higher neuroticism [23], manifested in neurotic constriction, excessive dependency on the mother, sexual disturbances, irrational fears and guilt feelings [14], and disturbances in self-esteem and fears[24]. As compared with neurotics, they have a stronger superego and more emotional stability [25]. However, they seem to share the neurotic tendency with other chronic patients .

In regard to personality, asthmatics differ from healthy controls in scoring higher on superego strength, sophistication, guilt proneness and self-sentiment [26], submissiveness [27], inhibition [14] (even as compared to neurotics [27], tough-mindedness, radicalism [27] and need of approval [12]. In comparison to other chronic patients they are less dominant and more intropunitive [13]. Some studies found that asthmatics tend to be involved in intra-psychic conflicts (often involving repression) [28-31]. However, on the whole they did not seem to conform to any specific type [32]. Also the relation of asthma to stress is still unclear. On the one hand, there is evidence that asthma is affected by stress, that stress in early childhood increases the chances for asthma development [33], that exposure to active stressors and to some degree also passive stressors is associated with an increase in sympathetic nervous system responses, cortisol, and inflammatory reactions [34], that chronic and toxic stress exacerbate asthma [35], and that asthma attacks were related to posttraumatic symptoms in Katrina hurricane survivors [36]. But on the other hand, studies showed that asthmatics did not differ from healthy controls in stress susceptibility, for example during the Gulf war [37], and that asthma is only weakly related to perceived stress ([38], to neighborhood stress [39], and not at all to stress perception and frequency of stressors [40,41].

However, the evidence indicates not only that there are emotional, psychopathological and personality correlates of asthma, but also that psychological factors are involved in the course of disease. For example, asthma severity, even intubation, is affected by psychological factors, e.g., more severe asthma is related to higher extraversion, more optimism, under-estimation of asthma severity, higher self reports of anxiety, depression, hostility, anger, fear and disgust [12,42-44]; asthmatics who evaluate their disease as more severe differ psychologically from those who evaluate it as less severe (e.g., they are less gregarious, less trusting, have less self-esteem) [44]; marked psychological conflict

situations serve as releasers of asthma attacks [30] as well as specific psychological events, such as disappointments in interpersonal relations or career [45]. Of particular importance is the heightened emotional reactivity of asthmatics [15,46] which may also account for the findings that anxiety and depression may contribute to elicitation of asthma [47], heightened emotionality may lead to its exacerbation [16], and fear and emotional lability may enhance its intractability [48]. Not surprisingly, asthma is improved by psychotherapy [49]. However, some of the most salient findings concerning asthmatics, such as their tendencies for anxiety and depression were found to apply to other categories of patients too [50].

On the whole, the studies have not provided answers to the following central questions especially emphasized in the NHLBI Workshop Summary on Stress and Asthma [51], namely, is there a particular type of asthma patient responsive to stress, and, what are the characteristics of the specific stressors to which asthmatics are particularly sensitive. The studies about the psychological correlates of asthma could not provide cues for answers because the findings are unrelated to each other, stem from different theoretical frameworks or none, are anchored in general categories of psychological constructs rather than in variables attuned specifically to the context of asthma, and were not designed to uncover sources of stress characteristic for asthma. Thus, the major purpose of the present study was to identify psychological correlates specific to asthma patients that could provide a coherent image, relevant especially for unravelling diverse sources of stress characteristic specifically for the asthma patient.

The cognitive orientation approach

For attaining this purpose, the study was done within the framework of the cognitive orientation theory of physiopathology [52]. Its major tenet is that cognitive contents and processes affect physiological processes relevant for disease and health. These health-relevant cognitive contents and processes constitute an integral part of the background conditions promoting disease and health and are disease specific.

The cognitive contents relevant for a specific disorder are identified by means of a standard interviewing procedure focused on sequential clarification of meanings [53]. Thus, starting with the key terms stating the general meaning of the disease for the patient (e.g., breathing difficulty, wheezing), the patient is asked to communicate the meaning of each of these key terms, and then in turn the meaning of each of these communications. For example, if the patient states that the disease meant to him or her "to feel pressured" he/she is then asked in turn to express the meaning of "to feel pressured" and says "afraid of what others will think of me", and when asked about the meaning of the latter says "maintaining a facade as if all were normal and fine". The meanings stated in the fourth stage of questioning by the majority of pretest subjects are identified as "themes" likely to be characteristic for the studied disorder (e.g., "maintaining a facade...").

The themes extracted from the guided interviewing of the

pretest subjects are considered as hypotheses that have to be examined in an empirical setup. The standard procedure is that the themes are operationalized in terms of four belief types: beliefs about self (i.e., how the person views oneself, one's tendencies, habits, history etc.), beliefs about goals (i.e., what actions, states, events the person would like or not like in the future), beliefs about rules and norms (i.e., what the person considers as desirable, required permitted or not), and general beliefs (i.e., how the person views others and reality, what he/she consider to be true or not in general).

Each theme is expressed in terms of beliefs of the four types. The beliefs are presented in questionnaire form to subjects who are asked to express to what extent they accept each belief. The sums of beliefs endorsed by the subject in each of the four types of belief are considered as constituting together a vector reflecting the psychological-motivational understructure relevant for the specific disorder. For a specific disorder to occur, at least 3 of the belief types are expected to orient toward it (namely, have sufficiently high scores or higher than in the control group). The hypotheses about the themes and the belief types are examined in a study that consists essentially in comparing the frequency of endorsing the beliefs - and hence, the themes and belief types - by patients with the particular disorder and an adequate control group.

A body of studies showed specific sets of themes and structures of scores on belief types characteristic for particular disorders, such as, diabetes mellitus, coronary heart disease, or gynecological infections [54-59].

Objectives

Accordingly, this study was designed to identify a set of themes which, when assessed in the form of a questionnaire in terms of the four types of beliefs, would distinguish between asthma patients and healthy controls. It was expected that identifying the cognitive structures of themes and belief types specific for asthma patients would enable a deeper insight into the psychological aspects of the disease which could play a role in its elicitation, maintenance and effects.

Finally, it will be noted that many studies of asthma used participants ranging widely in age, say, from 15 to 71 [60], 15 to 54 [14], or 5 to 34 [42]. There is however evidence that the etiological, clinical and even psychosocial correlates of asthma may differ to some extent in childhood, adulthood and old age. For example, individuals who got asthma up to the age of 16 were neurotic as children, and those who got it between the ages 17 to 27 least often suffered from depression or obsession [61-65]. In order to attain greater coherence and specificity in the findings we limited this study to young adults.

Method

Participants

Two groups of subjects participated in the study. The experimental group consisted of 34 asthma patients who were followed up at the Chest and Allergy Clinic of the in a hospital in the center of Tel-Aviv and who had been diagnosed as having bronchial asthma (according to ATS criteria). The control group included 43 individuals matched to the experimental group in the major demographic characteristics. Both groups were in the age range of 18 to 32 years. Table 1 presents demographic information about the 2 groups. The two groups did not differ significantly on the basic demographic features.

Table 1: Demographic information about the samples.

Variables	Experimental Group	Control Group
Number	34	43
Gender Men	20	16
Women	14	27
Age Mean (yrs)	22.30	23.0
SD	2.99	2.1
Education Mean (yrs)	13.1	13.86
SD	0.65	0.98
Duration of Mean (yrs)	7.25	
Disease SD	2.35	

Instruments

Each group was administered two questionnaires. One was a Background Information Questionnaire which included questions about demographic and medical variables (e.g., symptoms of asthma, disease duration). The other was The Cognitive Orientation Questionnaire of Asthma (CO-AST) which was designed to assess the cognitive contents - belief types, themes and conflicts - characteristic for asthma. It was constructed in line with the standard procedure for CO questionnaires [53] which consists in interviewing pretest subjects about the personal meanings related to their disease. In the interview the subject is asked repeatedly, usually 3 times consecutively, to communicate the meanings of his or her response. The themes selected for the CO-AST questionnaire were the meanings mentioned by the majority of the pretest subjects (n=15) at the end-points of the response sequences. The themes identified in pretests and included in the CO-AST questionnaire are presented in Table 2, in the form of a brief label and one of the beliefs used for assessing it in the CO-AST questionnaire.

The CO-AST questionnaire included 4 parts, one for each type of belief, administered together in random order. One part was devoted to beliefs about self (n=27, e.g., "Order and cleanliness are very important to me"), another to beliefs about goals (n=17, e.g., "I would like everything around me to be always in perfect order and cleanliness"), a third part to beliefs about rules and norms (e.g., n=17, e.g., "One ought to avoid disorder and a mess at all costs"), and one to general beliefs (n=16, e.g., "It is impossible to feel at ease and function well without order and cleanliness"). Each part was preceded by instructions appropriate for the type of belief assessed in that part. For example, in the part devoted to beliefs about self the subject was instructed to respond in accordance with what is true about herself/himself, and in the part devoted to norm

03

Table 2: List of themes and examples of beliefs assessing them in the CO-AST questionnaire.

Themes	Examples of Beliefs
(1) Close relations to one's family	One should maintain close & warm relations with one's parents all life long
(2) Avoiding tensions at home	I control myself and overlook a lot in order to avoid tension and friction in the family
(3) Realism	I am a realistic and reasonable person - I take notice of reality possibilities reality and of my
(4) Order and cleanliness	I would like everything around me to be always in perfect order & cleanliness
(5) Not expressing anger	When someone irritates me, I try to control myself & shut it up within me.
(6) Striving for perfection	One should try to do things so that each detail is as it should be
(7) Not wasting time	It is forbidden to waste time
(8) Rejecting uncertainty	I feel very comfortable when there is order and clear routine
(9) Fear of rejection	To be accepted by everyone
(10) Indifference to, not caring about rejection from others	I am easily offended (reverse)
(11) Ambition	I demand from myself to succeed highly in everything I do
(12) Dominating others	It irritates me insted if someone (in the family or at work) says or does something different from what I said or decided
(13) Rejecting commitment	One should try to live without any commitments or demands from others
(14) Maintaining a facade that all is well	I have no special problems, with me everthing is fine
(15) Independence	One should be completely independent
(16) Rejecting help from others	I like others to instruct me and watch over what I do (reverse)
(17) Placing high demands upon oneself	I carry out what is required of me even if it is difficult
(18) Pro commitments & overload (tasks & responsibilities)	An overload of requirements may create stress because one does not know how to cope with it
(19) Avoiding bodily expression	When I think about something related to the body (like food or pain) I can physically feel it (reverse)

beliefs, the subject was instructed to respond in accordance with what he or she considered as desirable, as ought or should be. The beliefs were presented in the form of single statements to which the subjects were requested to respond by checking 1 of 4 response alternatives: Very true, True, Not true, Not at all true, scored 4 to 1, respectively, whereby some beliefs were phased in reverse.

The scoring was computed so that the higher the score the stronger the motivational tendency promoting asthma. Each subject got 4 scores, 1 for each belief type, and a CO score (a summative index score representing the number of belief types in which the subject scored above the group's mean). In addition, we also considered the scores (a) for each of the 19 themes; (b) for 6 conflicts (defined as pairs of conflicting themes) selected as those most contradictory on the basis of judgements by 5 psychologists who evaluated the degree of contradiction in each pair of themes when joined; and (c) for 6 gaps (in absolute terms) between the scores of the 4 belief types (e.g., Beliefs about Self minus General Beliefs, etc.). Themes were expected to shed light on the specific contents characteristic for asthma, whereas conflicts and gaps were

expected to provide insight into potentialities for conflicts to which asthmatics may be prone.

Overall reliability of the CO-AST questionnaire in terms of Cronbach's alpha was 0.93 (reliabilities for the four belief types separately ranged from .73 for general beliefs to .85 for beliefs about self). All belief types were interrelated positively and significantly (Table 3).

Table 3: Intercorrelations between the 4 types of belief

Types of Belief	Self Beliefs	Norm Beliefs	General Beliefs	Goal Beliefs	CO
Score					
Self Beliefs	-----	.68****	.67****	.62****	.73****
Norm Beliefs		-----	.80****	.76****	.86****
General Beliefs			-----	.69****	.81****
				-----	.78****

****: p < 0.0000

Procedure

The patients were consecutive asthma patients who addressed the clinic for Lung and Allergy Diseases and whose characteristics corresponded to the inclusion criteria of the sample (i.e., age and sufficient knowledge of Hebrew to be able to respond to the questionnaires). The study was approved by the hospital's ethics committee. The majority of those addressed (89.47%) consented to participate. The subjects were administered the questionnaires and completed them in the course of their visit to the clinic. All those who got the questionnaires completed them. Medical information was provided by the physician with the patients' consent. The healthy controls were individuals recruited among students and the medical personnel, matched in major demographic characteristics to the patients. They were free of any asthma complaints in the present or the past, according to their personal reports. All statistical analyses were done with the SPSS-25 program.

Results

Control analyses

Preliminary control analyses were carried out in order to assess the potential contribution of gender and age. The means for men and women and for older and younger subjects (defined in terms of the median) of all variables assessed by the CO-AST (n=39) were compared within each group (of patients and controls). There were only three significant results for gender (all in the control group - whereby men scored higher on one type of belief, one theme and one conflict) but these results constitute 7.7% of the comparisons in the group and hence do not deviate significantly from the 5% expected by chance. There were no significant differences for age, possibly because of the limited age range used in the study. Therefore, gender and age were not considered in further analyses.

The structure of the CO-AST

For the purpose of better characterizing the CO-AST which

was the major tool of the study we factor analyzed it, once with the belief types as basic variables, and once with the themes as basic variables. The factor analysis of the four belief types yielded one factor only (eigenvalue=3.116), accounting for 77.9% of the total variance, on which all four belief types had high saturations in the following descending order: Beliefs about norms (.92), general beliefs (.90), goal beliefs (.87), and self beliefs (.83). This finding indicates that in the case of the CO-AST all four belief types converge in assessing the same universe of contents.

The factor analysis of the themes revealed a more complex structure (Table 4). The themes defined five factors each of which may be identified as representing a specific kind of contents. The first and most prominent factor (accounting for about 38% of the variance) represents, on the one hand, a cluster focused on obsessive-compulsive tendencies (i.e., not wasting time, order and cleanliness, striving for perfection, rejecting uncertainty) and, on the other hand, a cluster focused on maintaining good relations with one's family (e.g., relations with family, avoiding tension at home, avoiding expressions of anger, worrying about rejection from others). The two clusters may be associated more than on the purely methodological level. The second factor represents clearly achievement orientation (e.g., ambition, commitments, striving for perfection). The third factor stands for withdrawal from others emphasizing self-sufficiency (e.g., independence, rejecting help). The fourth and the fifth are small factors, whereby the former represents self-discipline (i.e., high demands from oneself, avoiding bodily expression) and the latter distancing oneself from others emphasizing defiance (i.e., rejecting commitments, not caring about rejection from others).

Comparing asthmatics and controls in terms of belief types

Belief types are the major aspect of the CO-AST questionnaire in which the two groups were compared. Table 5 presents the mean scores and comparisons of the 4 belief types in the two groups. It shows that, as expected, asthma patients scored significantly higher than the healthy controls on all 4 belief types as well as the CO score which represents the number of belief types in which the subjects scored above the group's mean. The mean CO score shows that asthma patients had on the average almost 3 belief types supporting motivationally the disease, whereas the healthy controls had not even 1.

Table 6 presents the results of a stepwise discriminant analysis with the 4 belief types as predictors and membership in one of the two groups - asthmatics or controls - as the dependent variable. Prediction is defined as classifying the subjects, on the basis of their scores in the 4 belief types, into the group to which they actually belong. The overall correct group classification was 83.12%, which is 33% above the 50% based on chance expectation (the result is highly significant, Critical Ratio=4.358, p < .001). Notably, prediction of membership in the healthy group (correct in 88.4%) was significantly better than in the asthmatic group (correct in 76.5%; Critical Ratio=1.94, p<.05). The two belief types that fulfilled the largest role as predictors were primarily self beliefs, followed by goals beliefs.

Table 4: Results of factor analysis of the themes in the AST-CO questionnaire (Varimax rotation after Kaiser normalization).

Themes	Fac I	Fac II	Fac III	Fac IV	Fac V
T1. Rel. to family	0.72				
T2. Avoiding tensions	0.73				
T3. Realism		0.6			
T4. Order & cleanliness	0.78				
T5. Not express anger	0.62				
T6. Perfection	0.62	0.51			
T7. Not waste time	0.82				
T8. Not uncertainty	0.77				
T9. Fear of rejection	0.61				
T10. Not care about rejection					0.52
T11. Ambition		0.81			
T12. Dominating others	0.6				
T13. Rejecting commitment					0.55
T15. Independence			0.74		
T16. Rejecting help			0.74		
T17. High demands of self				0.61	
T18. Pro commitments		0.72			
T19. No bodily expression				0.77	
Eigenvalue	7.23	2.14	1.27	1.14	1.03
Per cent of variance	38.1	11.2	6.7	6	5.4

Note: The numbers represent the saturations of the variables. Only saturations >.50 are presented.

Table 5: Means, standard deviations and mean comparisons of scores of the four belief types in asthma patients and healthy controls Beliefs.

Beliefs	Asthma Patients		Healthy Controls		t-test
	Mean	SD	Mean	SD	
Self beliefs	3.02	0.26	2.66	0.22	6.66****
Norm beliefs	2.81	0.27	2.51	0.22	5.43****
General beliefs	2.7	0.31	2.41	0.19	4.76****
Goal beliefs	2.99	0.32	2.66	0.26	5.10****
CO score	2.79	1.41	0.91	1.25	6.22****

Note: CO score represents the number of belief types with scores above the group's mean.
**** p < .0000

Notably both types of beliefs are the more personal ones in contrast to the relatively impersonal beliefs types general and norms.

Comparing asthmatics and controls in terms of themes

Finer-grained analyses were carried out in order to gain deeper insight into the findings. The first of these analyses focused on the themes which provided the contents of the CO-AST questionnaire. The themes are of interest because they may shed light on the concrete issues preoccupying subjects of the studied group. Table 7 presents the mean scores and comparisons of the 19 themes in the two groups. It shows that asthmatics scored significantly higher than the healthy controls on all 19 themes. Even when we consider that in line with Bonferroni criteria for 20 comparisons the

required probability for the .05 level is .003, the results for all themes except one pass the criteria, and only the results for theme 2 have to be interpreted with caution. On the average, each asthmatic patient scored high (above the group's mean) on 12.15 themes, as compared to 5.74 in the healthy controls group, namely, less than half the number in the asthma group.

A stepwise discriminant analysis with the themes as independent variables and the two groups of asthmatics and controls as dependent variables showed that the per cent of correct group classification was 92.21% which exceeds by 42.21% the 50% expected by chance (Critical Ratio=5.782, p<.001) (Table 6). As in the analysis with belief types as predictors, the result for predicting membership in the healthy group was somewhat better (correct in 95.3%) than in the asthmatic group (correct in 88.2%; the difference between the per cents is not significant). The themes that fulfilled the largest role as predictors (i.e., the first six themes with highest coefficients) were primarily those representing the cluster focused on "maintaining peace in the family" (see Factor I) (T1. Close relations with one's family; T2. Avoiding tensions at home; and T10. Fear of rejection) and those representing self-discipline (see Factor IV) (T18. Pro commitments and overload; T19. Avoiding bodily expression).

Comparing asthmatics and controls in terms of conflicts and discrepancies between between belief scores

A second finer-grained analysis focused on conflicts. Conflicts were defined as endorsement of two contrasting themes and were assessed in terms of the summed score for the two themes. Six pairs of conflicting themes were identified in our material by almost full consensus by 5 judges (psychologists) asked to evaluate the degree of contradiction in

Table 7: Means, standard deviations and mean comparisons of scores of the 19 themes in asthma patients and healthy controls.

Themes	Asthma Patients		Healthy Controls		t-test
	Mean	SD	Mean	SD	
-T1. Close relations	2.8	0.44	2.50	0.32	3.30**
T2. Avoid tensions	2.82	0.56	2.57	0.36	2.27*
T3. Realism	3.34	0.52	2.94	0.48	3.48***
T4. Order & cleanliness	2.92	0.59	2.39	0.47	4.39****
T5. No anger expression	2.57	0.56	2.23	0.38	3.07**
T6. Perfection	3.04	0.45	2.73	0.50	2.75**
T7. Not waste time	3.11	0.55	2.76	0.43	3.16**
T8. Anti uncertainty	2.78	0.46	2.43	0.43	3.44***
T9. Fear of rejection	2.92	0.45	2.67	0.34	2.79**
T10. Indiffer. to rej.	2.78	0.56	2.47	0.40	2.72**
T11. Ambition	3.36	0.41	3.01	0.44	3.59***
T12. Dominating	2.95	0.31	2.67	0.30	4.02****
T13. Anti commitment	2.67	0.49	2.38	0.31	3.04**
T14. Maintain facade	2.67	0.37	2.39	0.40	3.14**
T15. Independence	3.07	0.52	2.77	0.39	2.95**
T16. Reject help	2.81	0.42	2.48	0.25	3.94****
T17. High demands	2.86	0.50	2.46	0.42	3.88****
T18. Pro commitments	2.98	0.32	2.68	0.42	4.66****
T19. No bodily expression	2.79	0.34	2.44	0.35	4.38****
No. of themes above mean	12.15	3.89	5.74	3.53	7.55****

Note: T = Theme. For the content of the themes see Table 2. * p < 0.05   ** p < 0.01 *** p < 0.001   **** p < 0.0000

each pair of themes. The pairs were: 'close relations with others' and 'dominating others'; 'close relations with others' and 'independence'; 'avoiding tension' and 'dominating others'; 'fear of rejection' and 'not caring about rejection'; 'rejecting commitments' and 'placing high demands on oneself'; 'rejecting commitments' and 'pro commitments'. Four of the 6 conflicts concern interpersonal relations particularly in the family, and 2 focus on undertaking commitments.

Table 8 shows that on all 6 conflicts asthmatics scored significantly higher than the healthy controls. Further, on the average each asthmatic subject scored high (above the group's mean) on 4.23 conflicts as compared with 1.58 in the controls group.

A stepwise discriminant function analysis with the conflicts as predictors and the 2 groups of asthmatics and controls as the dependent variable showed that the per cent of correct group classification was 84.42% which exceeds by 34.42% the 50% expected by chance (Critical Ratio=4.553, p<.001) (Table 7). Again, as in the analyses based on belief types and on themes, the result for predicting membership in the healthy group (correct in 88.4%) was somewhat better than in the asthmatic group (correct in 79.4%; the difference between the per cents is not significant). The following 3 conflicts fulfilled the major role as predictors: 'rejecting commitments' and 'placing high demands on oneself'; 'close relations with others' and 'dominating others'; and 'fear of rejection' and 'not caring

Table 6: Results of stepwise discriminant analyses with Cognitive Orientation scores as predictors and membership in the experimental or control group as dependent variable.

Predictors	Eigen value	Canon. Corr.	Wilks Lambda	Standardized Coefficients		% of Correct Classification
Belief types	0.66	0.63	.60****	Self	.77	83.12%
				Goals	.37	CR=4.358****
Themes	1.61	0.79	.38****	T19	.59	92.21%
				T19	.59	CR=5.782****
				T2	-.50	
				T18	.40	
				T10	.33	
				T1	.31	
				T13	.30	
				T12	.29	
				T16	.29	
				T17	.23	
Conflicts	0.82	0.67	.55****	C5	.54	84.42%
				C1	.53	CR=4.553****
				C4	.50	
Gaps	0.14	0.35	.88*	G1	.97	62.34%
				G3	.75	CR=1.544
				G2	-.62	

Note. Self = Beliefs about self, Goals = Beliefs about goals, T = Theme, C = Conflict, G = Gap, CR = Critical Ratio (the observed per cent is compared to that expected by chance, which in this case is 50%). For the list of themes see Table 2, for the list of conflicts see Table 8, for the list of gaps see Table 9. * p < .05   **** p < .0000

about rejection'. Notably, each of these conflicts delineates a specific and unique domain of conflict.

Discrepancies between the scores of the 4 belief types are another way of gaining insight into the potential for conflict of asthmatic patients. It complements the analysis in terms of conflicts between themes in being of a more formal nature. The discrepancies or gaps are computed as absolute differences between the mean scores of the belief types in each group. Comparing the mean gaps in the 2 groups shows that though all the mean gaps in the asthmatics' group were numerically higher than in the controls, only one gap - between beliefs about self and general beliefs - was significantly so (Table 9). The findings indicate that the mismatch between beliefs about self (namely, how I am, how I feel and what I think, in brief, my reality) and general beliefs (namely, how things are, what do people in general feel and think, in brief, reality 'out there') constitutes a domain of potential conflict characteristic for asthmatic patients. However, a stepwise discriminant function analysis with the gaps as predictors and membership in 1 of the 2 groups as the dependent variable did not yield significant results (Table 6).

Discussion

The findings showed that a cognitive orientation questionnaire assessing a specific set of themes in terms of

Table 8: Means, standard deviations and mean comparisons of scores of the six conflicts in asthma patients and healthy controls.

Conflicts	Asthma Patients		Healthy Controls		t-test
	Mean	SD	Mean	SD	
C1. T1 + T12	2.88	0.29	2.59	0.25	4.66****
C2. T1 + T15	2.93	0.33	2.63	0.21	4.51****
C3. T2 + T12	2.89	0.38	2.62	0.28	3.52***
C4. T9 + T10	2.85	0.31	2.57	0.22	4.52****
C5. T13 + T7	2.42	0.26	2.77	0.29	5.53****
C6. T13 + T18	2.83	0.32	2.53	0.18	4.83****
No. of conflicts above group's mean	4.23	1.50	1.58	1.38	8.05****

Note. C = Conflict; T = Theme. For the content of the themes defining the six conflicts see Table 2. *** p < .001   **** p < .0000

Table 9: Means, standard deviations and mean comparisons of scores of the six gaps between belief types in asthma patients and healthy controls.

Gaps	Asthma Patients		Healthy Controls		t-test
	Mean	SD	Mean	SD	
G1. Self - General	0.362	.245	0.261	.156	2.10*
G2. Self - Norms	0.245	.198	0.223	.160	0.52
G3. Self - Goals	0.252	.205	0.176	.154	1.86
G4. General - Norms	0.178	.146	0.164	.103	0.45
G5. General - Goals	0.332	.264	0.254	.177	1.48
G6. Norms - Goals	0.215	.211	0.188	.156	0.65
Mean gap	0.264	.211	0.211	.260	1.47
No. of gaps above group's mean	2.618	1.615	2.279	1.501	0.95

Note. G = Gap. * p < .05

4 belief types enables differentiating significantly between the asthmatics and the healthy controls. These findings support the conclusion that there is a cognitive orientation characteristic for asthma patients. It can be characterized in terms of belief types and of themes. In terms of belief types the cognitive orientation of asthma patients consists of the 4 belief types - about self, norms, goals and reality (general beliefs). However, beliefs about self and goals - which express primarily the personal approach - play a major role in differentiating asthmatics from the healthy controls. Notably, asthma patients differ from the controls not only in the scores for each belief type but also in the total number of belief types in which they score high (i.e., above the group's mean). This total number is about 3 belief types, which corresponds to the number necessary for forming a motivational predisposition supporting a given act of behavior. Hence, we may conclude that asthma patients endorse the full set of belief types characteristically necessary for supporting a motivational predisposition, in this case a predisposition for asthma.

In the control group we found hardly one belief type supporting asthma. Similarly, the number of themes characteristic for asthma was in the control group less than half the number in the asthma group (5.74 vs 12.15, i.e., 0.47) and the number of conflicts even less (1.58 vs 4.23, i.e., 0.37). In addition, the identification of the healthy controls was in general better than that of the asthmatics. Hence, we conclude that the motivational tendency underlying asthma is not a continuous variable but rather an all-or-none function.

In terms of themes, the cognitive orientation of asthma patients includes higher scores on all the 19 themes identified in the patients. These themes may be grouped into several clusters: (a) themes referring to self-control and discipline that include the obsessive-compulsive tendency (order and cleanliness, not wasting time, rejecting uncertainty; see Factor I) and self-discipline (placing high demands on oneself and no bodily expression; see Factor IV); (b) themes referring to achievement (ambition, striving for perfection; see Factor II); (c) themes referring to interpersonal relations, both in the positive sense of maintaining good relations with close persons, mainly family, (see Factor I) as well as in the negative sense of withdrawing from others on the basis of self-sufficiency (e.g., independence, rejecting help, see Factor III) or even defiance (i.e., rejecting commitments, not caring about rejection from others, see Factor V). The themes that are most characteristic and play the most prominent role in differentiating between asthmatics and healthy subjects are mainly from the two domains of self-discipline (Themes 17-19: high demands, commitments and avoiding bodily expression) and interpersonal relations, both closeness (Themes 2 & 9) and withdrawal (Themes 10, 12 & 16).

This list of themes indicates the important role that the conflict in regard to interpersonal relations plays in asthmatics. As could be expected, the results indicated several conflicts characteristic of the asthmatic group. Notably, of the 6 identified conflicts, 4 refer to interpersonal relations: striving for close relations vs dominating others (Themes 1 & 12), striving for close relations vs independence (Themes 1 &

15), avoiding tensions vs dominating others (Themes 2 & 12), fear of rejection vs indifference to rejection by others (Themes 9 & 10). The common element shared by these conflicts is the craving for intimate relations with others while endorsing attitudes and even behaviors that are apt to drive people away (e.g., dominating others, manifesting indifference to rejection by others, emphasizing independence).

The further two conflicts deal with commitments: pro commitments vs anti commitments (Themes 13 & 18), and placing high demands on oneself vs rejecting commitments (Themes 13 & 17). The element common to these two conflicts is the emphasis on personal freedom which clashes with the tendency to behave in conformity with the expected.

It is of interest to note that beyond these conflicts that are grounded in specific contents, asthmatics tend to get involved in inconsistencies between the way they view thmselves (what is true for them) and the way they view reality at large (what is true in general or for others). This incongruity may apply to any of the themes. Take, for example, avoiding tensions at home: the asthmatic may view this as important and crucial for himself but know that others, even in his or her own family do not share the same view. This incongruity as such may infuse tension into the relations the patient has with his or her family.

Notably, some themes and conflicts identified in our study as characteristic of asthma resemble findings about asthma mentioned by previous investigators. Thus, the conflicts in regard to interpersonal relations which are focused on striving for closeness vs withdrawal resemble the psychoanalytic observation about the conflict between fear of closeness and fear of separation [7]. The cluster of themes we found in the domain of obsession–compulsion may resemble the findings about neurosis, although our results are musch more specific. Further, the theme of 'not expressing anger' corresponds to the findings about the asthmatics' inhibited hostility [13], whereas the themes of withdrawal from others (Nos. 10, 15, 16) could correspond to the findings about aggression [44]. Our theme of 'dominating others' is similar to the finding of 'low submissiveness' [26]. The themes that refer to pro commitment and placing high demands on oneself (Themes 18 & 17) correspond to the findings about the high superego strength of asthmatics [27] while the theme (No. 13) that refers to rejection of commitment could correspond to the findings about the radicalism and tough–mindedness of asthmatics [27].

In sum, the larger number of themes identified in our study, their precise definitions and their grounding in a well–established theory make it likely that the list of our themes is more comprehensive and coherent than partial findings on different levels of generality, based on diverse instruments.

The comprehensiveness of our findings and their specificity provide answers to the two questions that have motivated the study. The first was whether there is a specific type of asthma patient. Previous investigators could not identify it. Our findings suggest that indeed there is a specific type. It consists of a specific set of well–defined motivational

constructs or themes organized in terms of 4 belief types constituting a vector characteristic for asthma patients, which we call the cognitive orientation of asthma. The importance of the cognitive orientation of asthma consists mainly in that it provides an answer to the second question which referred to the characteristics of the specific stressors to which asthmatics are particularly sensitive. Previous investigators could not identify the specific stressors [37,41]. Our findings provide guidelines for identifying likely sources of stress characteristic for asthma. One source is "theme anchored" and consists in endorsing specific themes likely to produce stress. Examples are the themes of 'avoiding tension' (No. 2), and 'fear of rejection' (No. 9), which may generate tension by sensitizing the patient to sources of tension or likely rejection; the pair of themes (No. 6, 17) focused on high achievements – perfection and placing high demands on oneself – which may generate tension by forcing the patient to strive for attaining very high standards; and the pair of themes (Nos. 5, 19) focused on curbing emotional and other bodily expression, which may generate tension by building up pent–up anger and other negative emotions.

A second potential source of stress is "conflict anchored" and consists in endorsing discrepant or clashing beliefs. The two major conflicts based on themes are the 'interpersonal conflict' focused on striving for closeness vs withdrawal (independence, dominating others, rejecting help, indifference to rejection), and the 'commitment conflict' focused on behaving according to rules, expectations and commitments vs rejecting all in favor of personal freedom. A further source of tension is the discrepancy between the view asthmatics have of their self and personal reality vs the view they have of others and reality at large. These diverse discrepancies in themes and beliefs suggest constant, pervasive, and powerful sources of stress that may endow many apparently innocent actions and states with tension for asthma patients. It is premature to conclude that the indicated sources of tension are risk factors for asthma. All that may at present be safely stated is that there is a cognitive orientation characteristic of asthma, that it refers to broad and basic domains of life – interpersonal relations, action, obsessive style – and that it includes specific and salient sources of stress. Further research will deal with the generality of the findings for other age groups and their interrelation with asthma attacks.

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