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Research article

# Factor analysis and reliability of the Illness Attitude Scales in senior medical students

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**ABSTRACT**

Illness behavior is influenced by subjective, social, and cultural factors and can vary from one person to another and even internally within the same individual, depending on the situation and the type of illness he or she needs to deal with. The Illness Attitude Scales (IAS) were designed by Robert Kellner to assess fears, negative beliefs, and attitudes related to hypochondriasis and abnormal behavior about illness, and it is a reliable tool for detecting them as it does not contain items related to symptoms that are characteristic of other psychiatric symptoms. Although the IAS is commonly used, only a few studies have investigated its factor structure, but no common factor solution has been found. The results of these studies differ, ranging from 2 to 5 factor solutions, as well as which items are assigned to the factors. Since factor analysis for the Greek translation has not been previously researched, we analyzed the factor structure in a Greek sample using exploratory factor analysis to reflect cultural nuances in health perceptions and illness behaviors and to enable meaningful comparisons with other populations. A mixed sample of senior medical students of the Athens Medical School (N = 163) completed the psychometric tool before attending the educational clinics. A percentage of 60.98% were women and 39.02% were men, and the average age of the sample was 23.84 years (SD = 1.67). Data were subjected to Maximum Likelihood Estimation and oblique rotation, which revealed a solution of seven factors: i) Worry about Illness after Pain Sensation, ii) Health Habits, iii) Effects of Symptoms, iv) Hypochondriac Beliefs, v) Thanatophobia, vi) Treatment Experiences, vii) Disease Phobia. The internal consistency of the factors, measured by Cronbach's alpha coefficient, achieved good to acceptable reliability: 0.86, 0.88, 0.68, 0.76, 0.73, 0.65, and 0.81, respectively. The results of the current study, although they cannot be generalized to the general population, provide information on medical students' attitudes towards illness and may pave the way for educational strategies and programs in medical school to improve the detection of negative beliefs and attitudes towards illness in medical students during clinical practice.

**KEYWORDS:** Fear of illness, hypochondriasis, illness behavior, health anxiety, thanatophobia, pain.

## Introduction

Issy Pilowsky introduced the term abnormal illness behavior,[1] arguing that our behavior towards illness is influenced by subjective, social, and cultural factors and can vary from one person to another and also internally, within the same person, depending on the situation and kind of illness they need to deal with. In addition, our behavior towards illness is also influenced by stigma, and more specifically by stigma about mental illness.[2,3]

The misinterpretation of physical symptoms based on preoccupation with a serious illness is called hypochondriasis. Hypochondriasis can be expressed via 4 symptoms: (i) worry or fear of a serious illness, (ii) worry or fear

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that persists after medical confirmation, (iii) worry or fear that significantly affects functionality, and (iv) symptoms persisting for more than 6 months.[4] Hypochondriasis has been replaced by Illness Anxiety Disorder and Body Dysmorphic Disorder in DSM-5, which describes hypochondriac symptoms more comprehensively and is clinically useful for the diagnosis of hypochondriasis.[5]

A measure that is proposed to tap hypochondriacal tendencies is the Illness Attitude Scales (IAS), a psychometric tool created by Robert Kellner[6] for the general assessment of fears, beliefs, and attitudes related to hypochondriasis and abnormal illness behavior, and it provides a validated, comprehensive measure of health anxiety, hypochondriacal concerns, and maladaptive illness behaviors, enabling targeted interventions and research into health-related psychological conditions. The Illness IAS consists of nine scales with three entries each, met on a five-point scale, as follows: (i) "Worry about Illness", (ii) "Concerns about pain", (iii) "Health Habits", (iv) "Hypochondriacal beliefs", (v) "Thanatophobia", (vi) "Nosophobia", (vii) "Bodily Preoccupations", (viii) "Treatment Experiences", (ix) "Effects of Symptoms". Two more questions on the IAS provide additional information (e.g., respondents identify illness and treatment, if available) but are not used for scoring.

Although the IAS is commonly used, only a few studies have investigated its factor structure; however, no common factor solution has been found. The results of these studies differ with regard to the number of factors, ranging from a 2-factor solution and ending up with a 5-factor solution, as well as the items assigned to the factors. In addition, in these studies, there were differences in the sample, clinically and culturally.[4–8] Almost all studies used Exploratory Factor Analysis, while only one submitted its structure to Confirmatory Factor Analysis.[9–14] Finally, their findings indicate that the structure of the IAS is less complex than that suggested by the initial author.[6]

As the literature review does not demonstrate a consensus on the results, it is established that the diversity of the factor structure is based on cultural differences and the sample. To date, the factor analysis has not been investigated in a sample of the Greek population. The research aim is to examine the factor structure of the questionnaire in a different population and investigate possible diverse findings in the literature.

To investigate our research goal, we used a sample of senior medical students from the Athens School of Medicine. It was considered useful to measure a tool that detects hypochondriasis in medical students who come into contact with the disease during their clinical practice and to assess their attitudes towards illness. During clinical practice, medical students are exposed systematically to diseases, symptom recognition, and correct diagnosis. When students learn about physical illnesses, they can interpret physical disorders as signs of serious illness.[15] The results may be used to generate educational strategies and interventions to detect hypochondriasis in medical students.

## Material and Method

### Participants

The data of a sample of 6th-year students of the Medical School of Athens (N=163) were used for exploratory factor analysis, of which 60.98% were women and 39.02% were men. The average age of the sample was 23.84 years (SD=1.67).

### Procedure

The IAS was administered to students as a group in the lecture hall before attending each educational clinic. All participants were informed about the administration of the psychometric tool and signed a consent form to participate.

### Measures

The IAS psychometric tool was translated into Greek and back-translated (reverse translation) (in a modified yes or no form), using the method developed by Brislin.[16] The translation was realized by the first author, the back-translation by the second author, and proofreading by an independent reviewer. The translated items were checked to ensure that semantic and syntactic aspects were not lost. The two authors and the independent reviewer were fully bilingual in English and Greek and adhered to Greek standards as much as possible.

### Statistical analysis

In order to investigate the structure of the IAS, as formed by a Greek sample of medical students, the Maximum Likelihood Estimation (MLE) with lateral rotation factor was used. The Maximum Likelihood Estimation is a statistical method used to estimate the parameters of a probability distribution by maximizing a likelihood function and helps the determination of the parameter values that make the observed data more likely under a given statistical model.[17] Oblique rotation (SPSS Oblimin, $\delta = 0$) was used because the original scales of the IAS were designed as dependent scales, and a previous study[8] found a better fit to the data in dependent factor solutions. Tabachnick and Fidell[18] strongly recommend the use of lateral rotation

when factors are expected to be related to each other. This approach was chosen since several previous research findings[7–10,14] have shown that this approach achieves substantial solutions. Factors will be created from factor loadings (>.40), and their reliability and stability will be analyzed. The analysis was conducted with the SPSS program v.23.

## Results

### Factor Structure

Application of Maximum Likelihood Estimation (MLE) as well as the scree test and Kaiser's criterion (eigenvalue >1) indicated a seven-factor solution (figure 1).

The seven factors with the Kaiser criterion (eigenvalue >1) presented the following results: 8.02, 2.53, 1.96, 1.67, 1.52, 1.22, 1.12, with the total variance explained by the model at 66.81%, a particularly significant percentage, especially concerning that found in similar studies (table 1).[8–11,13]

The loadings revealed a 7-factor structure (table 2), which included factor 1 with 5 items and the remaining 6 with 3 items.

The seven factors can be named as follows: (1) Worry about Illness after Pain Sensation, and includes 5 items with three of the original Illness Anxiety scale and two items (4,6) of the Concerns about pain scale, (2) Effects of Symptoms, (3) Health Habits, (4) Hypochondriacal Beliefs, (5) Thanatophobia, (6) Treatment Experiences, (7) Nosophobia. The last 6 factors were equivalent to the original scales of Kellner,[6] a finding that is considered particularly important, especially because the present research is the only one that approaches through factor analysis the original structure proposed by Kellner.[6]

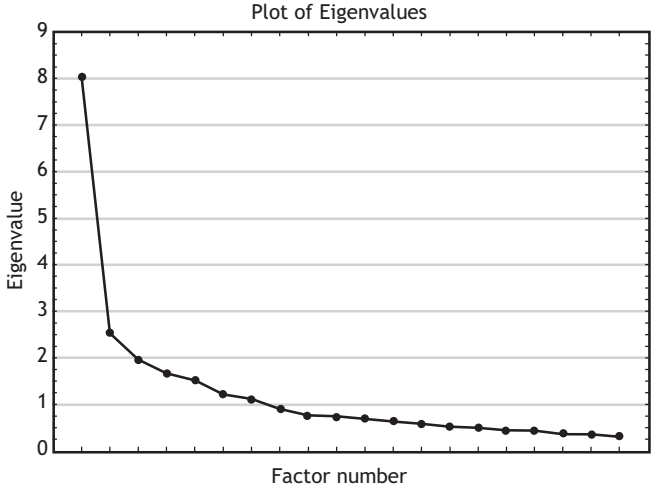


**Figure 1.** Screen plot from the exploratory factor analysis.

**Table 1.** Total Variance of the factors.

| | Initial Eigenvalues | | |
|---|---|---|---|
| Factor | Total | % of Variance | Cumulative % |
| 1 | 8.02 | 29.72 | 29.72 |
| 2 | 2.53 | 9.37 | 39.09 |
| 3 | 1.96 | 7.27 | 46.36 |
| 4 | 1.67 | 6.18 | 52.53 |
| 5 | 1.52 | 5.63 | 58.16 |
| 6 | 1.22 | 4.5 | 62.67 |
| 7 | 1.12 | 4.15 | 66.811 |
| 8 | 0.9 | 30.35 | 70.16 |
| 9 | 0.77 | 20.83 | 72.99 |
| 10 | 0.75 | 20.77 | 75.76 |
| 11 | 0.69 | 20.55 | 78.31 |
| 12 | 0.64 | 20.37 | 80.68 |
| 13 | 0.59 | 20.17 | 82.85 |
| 14 | 0.52 | 10.93 | 84.78 |
| 15 | 0.5 | 10.85 | 86.62 |
| 16 | 0.45 | 10.65 | 88.27 |
| 17 | 0.44 | 10.63 | 89.9 |
| 18 | 0.39 | 10.43 | 91.33 |
| 19 | 0.36 | 10.32 | 92.65 |
| 20 | 0.34 | 10.25 | 93.9 |
| 21 | 0.3 | 10.12 | 95.02 |
| 22 | 0.28 | 10.05 | 96.07 |
| 23 | 0.26 | 0.98 | 97.05 |
| 24 | 0.23 | 0.85 | 97.9 |

Note: Total variance explained by the seven factors

The items of the Bodily Preoccupations scale do not represent an integral factor, nor do they belong to another factor, as they present low loadings (0.30–0.33) on factors 1, 4, 5, and 7. Item 19 had loadings on two factors, on 5 (0.33) and 7 (0.32). Also, item 5 from the Concerns about Pain scale showed low loadings on factor 6 (0.35) and factor 7 (0.36).

The maximum absolute correlation was 0.37 between factors 2 and 6, and the minimum was 0.07 between factors 3 and 7. The overall factor correlations were low, supporting this way, the seven-factor solution.

### Reliability

To assess the internal consistency of the IAS questionnaire as formulated by factor analysis, the Cronbach's alpha coefficient was used, with the following measurements for the seven-factor solution: (1) 0.86, (2) 0.88, (3) 0.68, (4) 0.76, (5) 0.73, (6) 0.65, (7) 0.81. The average corre-

**Table 2.** Maximum Likelihood Estimation of the Illness Attitudes Scale: oblique–rotated factor loadings for the seven–factor solution

| Items | F1 | F2 | F3 | F4 | F5 | F6 | F7 |
|---|---|---|---|---|---|---|---|
| 1. Do you worry about your health? | 0.61* | –0.11 | 0.09 | –0.13 | –0.1 | 0.23 | 0.24 |
| 2. Are you worried that you may get a serious illness in the future? | 0.74* | –0.07 | –0.04 | 0.04 | –0.06 | –0.01 | 0.25 |
| 3. Does the thought of a serious illness scare you? | 0.65* | –0.08 | –0.06 | 0.04 | 0.07 | 0.07 | 0.1 |
| 4. If you have a pain, do you worry that it may be caused by a serious illness? | 0.69* | –0,08 | 0.02 | 0.03 | 0.07 | 0.02 | –0.09 |
| 5. If a pain lasts for a week or more, do you see a physician? | 0.22 | –0.1 | 0.19 | –0.07 | 0.19 | 0.35 | –0.36 |
| 6. If a pain lasts a week or more, do you believe that you have a serious illness? | 0.66* | 0.02 | 0.09 | 0.14 | 0,17 | 0.01 | –0.24 |
| 7. Do you avoid habits that may be harmful to you, such as smoking? | –0.02 | –0.07 | 0.72* | –0.17 | 0.1 | 0.03 | 0.08 |
| 8. Do you avoid foods that may not be healthy? | –0.07 | 0,05 | 0.80* | 0.11 | –0.09 | 0.06 | 0.01 |
| 9. Do you examine your body to find whether there is something wrong? | 0.29 | 0.04 | 0.39* | 0.19 | 0.05 | –0.04 | –0.12 |
| 10. Do you believe that you have a physical disease but the doctors have not diagnosed it correctly? | 0.03 | –0.09 | 0.09 | 0.49* | –0.05 | 0.07 | 0.2 |
| 11. When your doctor tells you that you have no physical disease to account for your symptoms, do you refuse to believe him? | –0.02 | –0.1 | –0.02 | 0.78* | –0.06 | 0 | –0.07 |
| 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? | 0.1 | 0 | –0.01 | 0.64* | 0.07 | 0.07 | 0.15 |
| 13. Are you afraid of news that reminds you of death (such as funerals, obituary notices)? | –0.08 | –0.04 | 0.19 | 0.02 | 0.71* | –0.04 | –0.02 |
| 14. Does the thought of death scare you? | 0.17 | –0.06 | –0.06 | –0.17 | 0.74* | 0.03 | 0.01 |
| 15. Are you afraid that you may die soon? | 0.1 | –0.05 | –0.17 | 0.15 | 0.49* | 0.04 | 0.2 |
| 16. Are you afraid that you may have cancer? | 0.32 | 0.06 | 0.04 | 0.08 | 0.09 | –0.06 | 0.54* |
| 17. Are you afraid that you may have heart disease? | –0.04 | –0.09 | 0.02 | 0.18 | 0.14 | 0.03 | 0.54* |
| 18. Are you afraid that you may have another serious illness? | 0.29 | –0.07 | 0.05 | 0.13 | 0.11 | –0.03 | 0.57* |
| 19. When you read or hear about an illness, do you get symptoms similar to those of the illness? | –0.05 | 0 | –0.01 | 0.17 | 0.33 | 0.09 | 0.32 |
| 20. When you notice a sensation in your body, do you find it difficult to think of something else? | 0.07 | –0.14 | 0.07 | 0.3 | 0.25 | 0.15 | 0.11 |
| 21. When you feel a sensation in your body do you worry about it? | 0.31 | –0.07 | 0.1 | 0.05 | 0.24 | 0.22 | 0.13 |
| 22. How often do you see a doctor? | 0.08 | 0.09 | 0.02 | 0.17 | –0.04 | 0,67* | –0.09 |
| 23. How many different doctors, chiropractors or other healers have you seen in the past year? | –0.08 | 0.01 | 0 | –0.01 | 0.09 | 0.76* | –0.01 |
| 24. How often have you been treated during the past year? (For example, drugs, change of drugs, surgery, etc.) | 0.04 | –0.2 | 0.06 | –0.09 | –0.13 | 0.43* | 0.1 |
| 25. Do your bodily symptoms stop you from working? | –0.06 | –0.84* | –0.06 | 0.05 | 0.06 | 0.02 | –0.08 |
| 26. Do your bodily symptoms stop you from concentrating on what you are doing? | 0 | –0.93* | 0.04 | 0.04 | 0.07 | –0.08 | –0.06 |
| 27. Do your bodily symptoms stop you from enjoying yourself? | 0.12 | –0.78* | 0.01 | 0.02 | –0.12 | 0.02 | 0.08 |

*Eigenvalues higher than .4 are marked with an asterisk

F1: Worry about Illness after Pain Sensation, F2: Effects of Symptoms, F3: Health Habits, F4: Hypochondriacal Beliefs, F5: Thanatophobia, F6: Treatment Experiences, F7: Nosophobia

lations between items for the factors (including only items with loadings r≥0.40 on a single factor) were 0.56, 0.72, 0.43, 0.52, 0.48, 0.40, and 0.58, respectively (see table 3).

The reliability control (alpha coefficients and mean inter-item correlations) of the seven-factor model of the present research is presented below.

The factors of the seven-factor model show very good internal reliability, as shown in table 4, with the max value of factor 2, "Effects of Symptoms", with three items (α=0.88), with the minor exception of the factor "Health Habits" (α=0.68) and of the "Treatment Experiences" factor (α=0.65), which is lower than the recommended 0.7.[19] However, this three-item factor presents a positive correlation coefficient r≥0.4 and is above the recommended minimum level for group comparisons.[20]

## Discussion

The results of the present study reveal a seven-factor solution, which, like previous factor analysis,[7–14] is smaller than Kellner's original structure6 but closer to the original factor structure. The seven-factor structure is different and larger than other sample studies[7,8,10] that reported a four-factor structure and one study[9] that reported a five-factor structure. Moreover, the factor structures of these studies differ partially in terms of the number and items included in the factors. Interpreting these differences is not easy because the studies differ in planning, sample, and methodology. One crucial difference is in the statistical method, as the aforementioned studies used Principal Component Analysis while the present study used Maximum Likelihood Estimation.

In all studies[7–10] with a similar sample, factor 1 emerges, and although each study includes a different number of items, it maintains a relatively similar composition of items. In one research[7] we find 12 items; in another,[9,11] in another,[9,10] and in the last one, 8 items.[8] In the current study, there are the fewest items, 5, which come from the Worry about Illness and Concerns about Pain scales. As in this study, all studies[7–10] present in factor 1 items from the original Worry about Illness and Concerns about Pain scales, showing that among the respective samples, there is an increased general worry about illness enhanced by the presence of pain. However, the Thanatophobia scale appears integral on factor 1 in three studies,[8–10] connecting, along with other items, the fear of illness to death, in contrast to the current study. The difference in sample composition probably explains this variation, as in the present study, the sample consists of medical school senior students who are sufficiently knowledgeable about disease and illness from their training and probably do not associate it with risk of death, compared to the other studies that had undergraduate students[7–9] and psychology and theology students.[10] Additionally, two of the surveys[8,9] have been conducted in the late 1990s in Canada and share common items on factor 1, and except for Thanatophobia, the same items are observed for Worry about Illness[2,3] and almost the same from the Nosophobia scale, three of them in one survey[9] and two[16,18] in the other.[8] It is possible that the findings for Factor 1 with fear of death were related to Canadians' general dissatisfaction with their country's health care system at the time.[21] Corresponding correlations with factor 1 can be made in another research study[7] conducted in England. It presents 12 items, most on factor 1 from various scales dominated by Concerns about pain and Hypochondriacal Beliefs, and can be related to English people's perceptions of the radical NHS reforms of the 1990s, when new private health providers were created, leading to the closure of public hospitals and causing unrest.[22] The authors of the same research,[7] interpret through the lens of the general population their factor 4, coronary heart disease and health habits, as a separate factor that is not related to the Worry about Illness, but more to the increased knowledge of the general (ordinary people) population on the connection of lifestyle and serious diseases.[23] All three items of the original Worry about Illness scale are found on fac-

**Table 3.** Factor correlation table.

| Factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1 | 1.00 | –0.34 | 0.27 | 0.29 | 0.35 | 0.34 | 0.23 |
| 2 | –0.34 | 1.00 | –0.12 | –0.21 | –0.22 | –0.37 | –0.20 |
| 3 | 0.27 | –0.12 | 1.00 | 0.13 | 0.19 | 0.35 | –0.07 |
| 4 | 0.29 | –0.21 | 0.13 | 1.00 | 0.24 | 0.17 | 0.31 |
| 5 | 0.35 | –0.22 | 0.19 | 0.24 | 1.00 | 0.17 | 0.21 |
| 6 | 0.34 | –0.37 | 0.35 | 0.17 | 0.17 | 1.00 | 0.08 |
| 7 | 0.23 | –0.20 | –0.07 | 0.31 | 0.21 | 0.08 | 1.00 |

**Table 4.** Internal reliability estimation of the seven factors (Cronbach's α).

| Factor | Mean Difference | Std. Error | Cronbach's α | Average inter-item correlation |
|---|---|---|---|---|
| Worry about illness after the pain sensation | 8.21 | 3.96 | 0.86 | 0.56 |
| Effects of Symptoms | 6.74 | 2.76 | 0.88 | 0.72 |
| Health Habits | 2.67 | 2.54 | 0.68 | 0.43 |
| Hypochondriacal Beliefs | 1.53 | 1.93 | 0.76 | 0.52 |
| Thanatophobia | 3.34 | 2.51 | 0.73 | 0.48 |
| Treatment Experiences | 3.47 | 2.03 | 0.65 | 0.4 |
| Nosophobia | 3.08 | 2.8 | 0.81 | 0.58 |

tor 1 in one more study,[10] while items 2 and 3 from the same scale are in two studies,[8,9] and 1 and 2 in one.[7]

Items 4 and 6 from the Concerns about Pain scale are found on factor 1 in the current study and in two other studies,[9,10] while in another study[8] we see only 4, and in another[7] all 3 items of the same scale. The two items (4, 6) are semantically very close as they relate to the direct association of pain with serious illness, and this is probably why they are presented in three surveys along with the items of the Worry about Illness scale.

Differences were observed in the evaluation of loadings, with one study[9] calculating significant loadings ≥0.30 and not excluding any item from Kellner's original scale. No items were excluded in Stewart and Watt's study,[8] where the loadings were ≥0.35. The remaining two studies,[7,10] like the current one, assessed loadings ≥0.40, and while in the first[7] no item was excluded, in the second10 5 items were excluded, while in the current study 4 items did not pass the loading limit, with the latter two studies sharing excluded items 19 and 21 from the original Bodily Preoccupations scale.

The items of the present study that were not included in a factor or did not form a separate factor come from the original Bodily Preoccupations scale. Item 19 from this scale had a defective presence in factors 5 and 7. Item 20 had a presence in factor 4, which is probably related to the wording of the question and is closer to hypochondriasis, as people with hypochondriasis experience difficulty in remaining functional when dealing with a body sensation.[4] Finally, item 21 was present in factor 1, probably because it mentions the word "worry" and was correlated with the items that had the same word. The same items are also excluded in another study[10] and are not included in any factor.

The original Bodily Preoccupations scale does not appear as an independent factor in any other research, regardless of sample, and its items appear on several factors in these studies.[7–10] Similar results to the present study for the items of the Bodily Preoccupations scale are observed in a study[9] where item 19 presents a loading on factor 4, Disease Conviction. In another study,[8] it is found that loading of all the items of the Bodily Preoccupations scale on their own 4th factor, Beliefs, which includes the items of the Hypochondriacal Beliefs scale. Both studies were conducted in the same country, Canada, which indicates the strong participation of cultural factors in the formation of attitudes towards the disease. The results show that the items of the original Bodily Preoccupations scale can be better understood through other factors related to hypochondriasis, as the questions are not understood as a separate concept.

Item 5 of the original Concerns about pain scale was not included in any of the seven factors of the present study, as it did not show a high loading on any of them. The item appears with low loading on two factors, factor 6 (0.35) and factor 7 (0.36). However, we see the same item loading on the Treatment Experiences factor in other studies[9,10] and factor 2, Behavior, in a study8 that includes all the items from the original Treatment Experiences scale, which shows that perhaps it can be understood better with the Treatment Experiences factor in a relevant sample. This item mentions the visit to a doctor and is more about a behavior associated with visiting a doctor rather than subjectively interpreting a certain pain.

The lower internal reliability of factor 3, Health Habits, is a finding also observed in previous studies, as none of them has found a satisfactory internal reliability regardless of sample, with a range of values ranging from α=0.49 to 0.64.[8,10,12,14,15] Especially in Kellner's original scale, this factor has α=0.44.[7] A possible reason for the low internal reliability of the Health Habits factor in the current study, also found in another study,[7] is that the items in this factor are more related to avoiding illness and recording health-promoting behaviors and less with the fear or worry of being ill. A reformulation of the questions to link negative health behaviors with the belief or worry about the disease would probably give

higher reliability to the specific factor and would be better related to the other factors of the psychometric tool.

The same scale also shows defective depiction in Kellner's original study[6] as it fails in clinical samples to distinguish patients diagnosed with hypochondriasis from family practice patients, non-patient employees, and non-hypochondriasis psychiatric patients.[7] Also, the same Health Habits scale does not relate to the criteria defined in the DSM-IV for the diagnosis of patients with hypochondriasis.[4]

The Treatment Experiences factor related to receiving treatment presents in the present study the lowest internal reliability index, however, just below the limit of 0.7.19 Relevant results with low internal reliability in the same factor are also reflected in other studies (α=0.649, α=0.527), while in another,[10] it is slightly above the limit (α=0.75). The low reliability may be related to the participants' perception of their national health care system, as mentioned above, while another reason may be the young age of the sample of students with average of 23.84 years, as they might not have particular experiences of treatments, which could have a different result in a wider age or clinical sample.

However, it is interesting that Ferguson and Daniel[7] examining the internal reliability indices for the original nine scales of the IAS, found that all, except for the scales Thanatophobia (α=0.72), Treatment Experiences (α=0.75), and Effects of Symptoms (α=0.84), were below the recommended 0.7.[19]

The seven-factor solution of the current study explains 66.81% of the variance of the sample, and it is the largest in relation to other studies.[8–11,13] In particular, we observe that the three-factor solution of Dammen et al,[13] in patients with heart disease problems explained 47% of variance, while four- and five-factor solutions, including studies in student samples,[8–11] explained a range of variance from 47.1% to 56.4%.

Studies that used translations of the IAS for factor analysis suggested two[12] and three-factor solutions.[13,14] However, due to the difference in the composition of the sample (patients and general population), these results are difficult to compare with the findings of the present study.

Generally, the current study revealed that the IAS can be captured with a relatively simpler but not radically different hierarchical structure than Kellner's original,[6] supporting a seven-factor solution. Six out of the seven factors hold the original recommendation with the original scales and with good internal reliability, which is interpreted as meaning that in a student sample, the IAS is a tool that can be recommended for investigating hypochondriasis and abnormal illness behavior. Despite different and somewhat inconsistent factor solutions, perhaps due to differences in samples and factor analysis methods used, these studies[7–14] collectively suggest that the IAS tool has multidimensional factors and is not interpreted with a single factor.

A limitation of the current study is the relatively small sample and its specialization. However, the number of subjects was nearly three times the number of subjects in Kellner's original research and also more than three times the number of variables. Another limitation is the low internal reliability of two out of seven factors, Health Habits and Treatment Experiences. Rephrasing questions of the Health Habits factor to connect health behaviors with illness anxiety could give higher reliability. Moreover, in a more general population sample or a clinical sample, a higher reliability might be revealed for the Treatment Experiences factor. Given the specialized and small sample, more research needs to be done in a wider and clinical sample to determine any difference, if there is one, in these factors. Further confirmatory factor analysis research could be done in the future on a similar sample. Finally, there is a need for contemporary factor analysis research of the IAS, as most of the research has been conducted several years ago.

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Ερευνητική εργασία

# Παραγοντική ανάλυση και αξιοπιστία της Κλίμακας Στάσης για την Ασθένεια σε τελειόφοιτους φοιτητές ιατρικής

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**ΠΕΡΙΛΗΨΗ**

Η συμπεριφορά απέναντι στην ασθένεια διαμορφώνεται υπό την επίδραση υποκειμενικών, κοινωνικών και πολιτισμικών παραγόντων, παρουσιάζοντας διαφοροποιήσεις τόσο μεταξύ διαφορετικών ατόμων όσο και εντός του ίδιου ατόμου. Οι διαφοροποιήσεις αυτές εξαρτώνται από τις συγκεκριμένες περιστάσεις και τη φύση της ασθένειας που καλείται το άτομο να διαχειριστεί. Η Κλίμακα Στάσης για την Ασθένεια, σχεδιάστηκε από τον Robert Kellner για να αξιολογήσει τους φόβους, τις αρνητικές πεποιθήσεις και τις στάσεις που σχετίζονται με την υποχονδρίαση και τη μη φυσιολογική συμπεριφορά σε σχέση με την ασθένεια και είναι ένα αξιόπιστο εργαλείο για την ανίχνευσή τους καθώς δεν περιέχει στοιχεία που σχετίζονται με συμπτώματα που είναι χαρακτηριστικά άλλων ψυχιατρικών συμπτωμάτων. Παρόλο που η Κλίμακα Στάσης για την Ασθένεια χρησιμοποιείται ευρέως, μόνο λίγες μελέτες έχουν διερευνήσει την παραγοντική δομή της χωρίς να έχει βρεθεί κοινή παραγοντική λύση. Τα αποτελέσματα αυτών των μελετών διαφέρουν και κυμαίνονται από 2 ώς 5 παραγοντικές λύσεις, καθώς και ως προς το ποια στοιχεία αποδίδονται στους παράγοντες. Δεδομένου ότι η παραγοντική ανάλυση για την ελληνική μετάφραση δεν έχει ερευνηθεί στο παρελθόν, αναλύσαμε την παραγοντική δομή σε ελληνικό δείγμα χρησιμοποιώντας διερευνητική παραγοντική ανάλυση για να αντικατοπτρίσουμε τις πολιτισμικές αποχρώσεις στις αντιλήψεις για την υγεία και τις συμπεριφορές απέναντι στην ασθένεια και να είναι εφικτές οι ουσιαστικές συγκρίσεις με άλλους πληθυσμούς. Ένα μικτό δείγμα τελειόφοιτων φοιτητών ιατρικής της Ιατρικής Σχολής Αθηνών (N=163) συμπλήρωσε το ψυχομετρικό εργαλείο πριν από την παρακολούθηση των εκπαιδευτικών κλινικών με το δείγμα να αποτελείται από γυναίκες σε ποσοστό 60,98% και από άνδρες σε ποσοστό 39,02%, με τη μέση ηλικία του δείγματος να είναι 23,84 έτη (SD=1.67). Τα δεδομένα υποβλήθηκαν σε Εκτίμηση Μέγιστης Πιθανοφάνειας και πλάγια περιστροφή, η οποία ανέδειξε μια λύση επτά παραγόντων: (i) Ανησυχία για την ασθένεια μετά την αίσθηση του πόνου, (ii) Συνήθειες υγείας, (iii) Επιπτώσεις των συμπτωμάτων, (iv) Υποχονδριακές πεποιθήσεις, (v) Θανατοφοβία, (vi) Εμπειρίες θεραπείας, (vii) Φοβία για την ασθένεια. Η εσωτερική συνέπεια των παραγόντων, που μετρήθηκε με τον δείκτη άλφα του Cronbach, πέτυχε καλή έως αποδεκτή αξιοπιστία 0,86, 0,88, 0,68, 0,76, 0,73, 0,65, 0,81, αντίστοιχα. Τα αποτελέσματα της παρούσας μελέτης, αν και δεν μπορούν να γενικευτούν στον γενικό πληθυσμό, παρέχουν πληροφορίες σχετικά με τη στάση των φοιτητών ιατρικής απέναντι στην ασθένεια και μπορούν να ανοίξουν τον δρόμο για εκπαιδευτικές στρατηγικές και προγράμματα στην ιατρική σχολή για τη βελτίωση της ανίχνευσης των αρνητικών πεποιθήσεων και των στάσεων απέναντι στην ασθένεια στους φοιτητές ιατρικής κατά την κλινική πράξη.

**ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ:** Φόβος της ασθένειας, υποχονδρίαση, συμπεριφορά ασθένειας, άγχος για την υγεία, θανατοφοβία, πόνος.

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