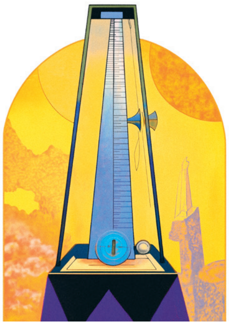
Anxiety Pathways in ISTDP:

Self-reported Symptom Clusters in Patients with Persistent Physical Symptoms

RESEARCH



MAROTI, D.*, HASSELGREN, E.†, VALLHAGEN, V.†, HELLGREN, J., LILLIENGREN, P., & JOHANSSON, R.
DEPARTMENT OF PSYCHOLOGY, STOCKHOLM UNIVERSITY, STOCKHOLM.
*CORRESPONDING AUTHOR: DANIEL MAROTI, STOCKHOLM UNIVERSITY,
GRETA ARWIDSSONS VÄG 30, 114 19 STOCKHOLM. DANIEL.MAROTI@SU.SE
† EQUAL CONTRIBUTION.

Abstract

Although case studies support the notion of three anxiety pathways in Intensive Short-Term Dynamic Psychotherapy (ISTDP), empirical research remains scarce, highlighting the need to investigate how somatic symptoms cluster in line with ISTDP's anxiety pathway theory using validated measures. This study therefore explored the clustering of self-reported somatic symptoms in 550 patients with persistent physical symptoms (PPS) from three previous randomized controlled trials, examining their potential alignment with the theory of unconscious anxiety and its discharge pathways, as proposed in ISTDP. Using the Patient Health Questionnaire-15 (PHQ-15), an exploratory factor analysis identified three symptom clusters – musculoskeletal, gastrointestinal, and cardiopulmonary – that together explained 40.1% of the variance. This three-factor structure, validated through confirmatory factor analysis, partially aligned with ISTDP's conceptual anxiety pathways, though limitations were noted in capturing cognitive-perceptual disturbances. These findings suggest that self-reported symptom assessment can complement clinician-led methods in identifying anxiety-related symptom clusters, warranting further development of self-report tools within psychodynamic assessment frameworks.

Keywords: Intensive-Short term Psychodynamic Therapy, Factor Analysis, Anxiety pathways, PHQ-15

AUTHOR CONTRIBUTION
DM and RJ made significant contributions to recruitment and assessment. DM, EH and VV were instrumental in the study design, while JH, EH, VV made key contributions to the methodological approach.

DM, EH and VV played a major role in writing the manuscript, while PL made extensive comments. DM led the project while RJ supervised it. All authors provided feedback and approved the final version of the manuscript.

ETHICAL CONSIDERATIONS
This study was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki and was approved by Institutional Review Board/ Etikprövningsnämnden (approval number: DNR: 2023-04956-01 (Maroti et al., submitted), 2023-07805-02 (Maroti et al., 2021); 2023-07124-02 (Maroti et al., 2022). All participants provided informed consent prior to participation in the study.

STATEMENT AND DECLARATIONS
The other author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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POSSIBLE CLINICAL IMPLICATIONS OF THIS STUDY			
ISTDP posits that persistent physical symptoms may arise and persist through three unconscious anxiety pathways, each linked to specific somatic symptoms. This framework facilitates targeted interventions tailored to the observed types of symptoms.	Self-report measures, such as the PHQ-15, could be utilized in clinical practice to efficiently screen for more stable somatic symptoms possibly linked to unconscious anxiety.	Using both self-reports and observer-based assessments allows clinicians to gain a fuller understanding of a patient's unique symptom presentation, consisting of both more temporary to more stable patterns of somatic symptoms.	By incorporating self-assessments, patients can become more aware of the connection between anxiety and somatic symptoms, which in turn may enhance their motivation for treatment and increase the effectiveness of ISTDP interventions.

Introduction

Persistent physical symptoms (PPS) are common in primary care (Löwe et al., 2024), posing significant challenges for patients by contributing to substantial distress and reduced quality of life (Henningsen et al., 2003; Maroti et al., 2023; Joustra et al., 2015). Intensive Short-Term Dynamic Psychotherapy (ISTDP) is among the psychodynamic therapies shown to be effective for PPS, with evidence from meta-analyses demonstrating its capacity to reduce symptom burden more effectively than controls (eg. wait-list, usual care) (Abbass et al., 2020, 2021). However, the precise processes through which ISTDP achieves these therapeutic effects remain a subject of investigation. A key theoretical proposition is that PPS are influenced by unconscious anxiety, which is hypothesized to manifest through distinct anxiety pathways (Abbass & Schubiner, 2018; Frederickson, 2013). ISTDP techniques aim to address this unconscious anxiety, yet the empirical validation of this anxiety-based theory remains limited.

In ISTDP, unconscious anxiety is understood to be triggered by complex, often ambivalent emotions toward significant others and is theorized to manifest somatically across three primary anxiety pathways: striated muscles, smooth muscles, and cognitive-perceptual pathways (Davanloo, 2005; Abbass, 2015). The first pathway involves striated muscle activation, with somatic expressions such as muscle tension and restlessness, potentially leading to symptoms such as back pain and tension headaches (Abbass & Schubiner, 2018). In ISTDP, this pathway is activated when anxiety is at a manageable level, as the body attempts to regulate heightened emotions through physical tension. The second pathway involves smooth muscles under autonomic control, resulting in symptoms such as abdominal pain and cardiovascular issues. When anxiety rises beyond the tolerance of the striated muscle pathway, it may overflow into smooth muscle areas, leading to these types of somatic complaints (e.g. fluctuations in blood pressure, nausea, abdominal pain). The third pathway impacts cognitive-perceptual functions, causing disturbances in thought and perception, such as mental confusion (Davanloo, 2005; Frederickson, 2013). This pathway is characteristic of the most severe level of anxiety dysregulation. Even though not integrated into the typical presentation of anxiety channels (Frederickson, 2013), Abbass (2015) has proposed motor conversion as an additional anxiety pathway.

While case studies have offered support for these three anxiety pathways (Davanloo, 2005), empirical studies remain limited, underscoring the need to further validate ISTDP's anxiety pathway theory (Abbass et al., 2008). Lately, there has been an increasing interest in self-report measures for clinical and empirical use in psychodynamic therapy. Recent findings have demonstrated that self-reported defenses correspond well with observer-based methods (Prout et al., 2022; Di Giuseppe et al., 2020). Other studies have developed self-report instruments to capture important psychodynamic aspects, such as the interplay between emotions and pain, in patients with persistent physical symptoms (Barth et al., 2024). Moreover, in a laboratory study, where participants viewed an anxiety-inducing film, Chen (2021) empirically tested the relationships between emotions, anxiety, and defenses based on ISTDP theory, utilizing a self-report measure, the Anxiety Discharge Questionnaire (ADQ-13), to evaluate anxiety pathways – striated muscle, smooth muscle, and cognitive/perceptual disturbances. While the questionnaire identified three distinct factors showing robust inter-item reliability and convergent validity, the instrument has not undergone peer review, which limits the confidence that can be placed in these findings.

Self-report tools of somatic symptoms can be of particular relevance for patients with PPS, as these individuals are well aware of their physical symptoms, even if they do not explicitly link them to unconscious anxiety. Since patients are attuned to their physical symptoms, even if they do not make the connection to unconscious anxiety, self-assessment can be an effective method for identifying stable symptom patterns and potential clusters of anxiety-related issues that could underlie chronic health problems. While any patient can experience anxiety across multiple pathways at different times, certain patient groups tend to predominantly express their anxiety via a specific pathway. For example, individuals with persistent migraines or fibromyalgia often report a consistent pattern of somatic symptoms that may reflect anxiety in smooth muscle anxiety pathways (Abbass & Schubiner, 2018). These consistent and frequent patterns could potentially be captured in patients' self-reports.

The Patient Health Questionnaire-15 (PHQ-15) is a widely used self-report instrument to assess 15 common physical symptoms and how much burden each symptom places on the individual, and the PHQ-15 has been validated in the PPS population (van Ravesteijn et al., 2009). Moreover, previous factor analyses of the PHQ-15 have been able to demonstrate distinct factors (Witthöft et al., 2013; Cano-García et al., 2020; Terluin et al., 2022) but none of the studies have had the aim of exploring these extracted factors relation to ISTDP anxiety channel theory. In attempting to validate the anxiety-based theory of ISTDP, self-report measures may further bridge the gap between theoretical constructs and measurable clinical phenomena. This study therefore aimed to explore whether somatic symptoms reported via the PHQ-15 cluster in ways that correspond to the anxiety pathways proposed by ISTDP. We hypothesized that the symptoms would form distinct factors corresponding to the three anxiety pathways: striated muscle, smooth muscle, and cognitive-perceptual disturbances. By assessing the degree of alignment between self-reported symptoms and ISTDP's anxiety pathway theory, this study provides preliminary insights into the potential for self-report tools to complement traditional, clinician-led assessments in identifying anxiety-related symptom clusters within psychodynamic therapy. This approach might enhance our understanding of ISTDP's processes but also provide a practical tool for clinicians to monitor treatment progress and possibly tailor interventions.

Method

Participants

This study utilized baseline participant data from three randomized controlled trials, exploring the efficacy of Emotional Awareness and Expression Therapy interventions for PPS (Maroti et al., 2021; Maroti et al., 2022; Maroti et al., submitted). Participants were recruited nationwide throughout Sweden using media and social media advertisements looking for people with medically unexplained somatic symptoms. To be eligible for inclusion in all three studies, participants had to be over 18 years of age, have persistent physical symptoms for at least three months that had been medically evaluated, and expressed an interest in investigating emotional factors in their somatic symptoms. Participants were excluded if they had a somatic disease with recognized tissue damage (e.g., cancer, multiple sclerosis, or rheumatoid arthritis). Moreover, participants were excluded if they had ongoing substance abuse (alcohol or drugs) or a serious mental illness (e.g., psychosis, severe suicidal ideation, antisocial personality disorder). For this study, the three study samples were combined, leading to a total of 550 participants.

Measurement

The Patient Health Questionnaire-15 (PHQ-15; Kroenke et al., 2010) was used to assess self-reported somatic symptoms and their impact on participants' lives. The PHQ-15 consists of 15 somatic symptoms, and participants are asked to rate how bothersome each symptom has been in the past week on a scale from "not at all" (0), "a little" (1), or "a lot" (2). Total scores range from 0 to 30, and scores of 5, 10, and 15 represent cut-offs for mild, moderate, and severe levels of somatic symptoms. PHQ-15 has demonstrated moderate reliability for detecting somatoform disorders in primary care settings (Van Ravesteijn et al., 2009) and in the general population (Kocalevent et al., 2013). Its psychometric properties are considered to be very good (Cronbach's alpha = 0.80) (Kroenke et al., 2010). The questionnaire has also been validated in the Swedish population with similar psychometric characteristics (Nordin et al., 2013). In this study, Cronbach's alpha was good in Dataset 1 (0.74) and Dataset 2 (0.78).

Statistical Analyses and procedures

All statistical analyses were conducted using JASP version 0.18.2. The exploratory factor analysis was performed with the R package "psych" (version 2.3.6), while confirmatory factor analysis was conducted using the R package "lavaan" (version 0.6-16) (JASP, 2024).

The total sample of 550 participants was randomized into two datasets: Dataset 1 (n = 275) and Dataset 2 (n = 275). Dataset 1 was used for an initial exploratory factor analysis (EFA), and the factor structure identified in the EFA was subsequently tested using confirmatory factor analysis (CFA) with PHQ-15 data from Dataset 2.

To assess sample size adequacy, the ratio of participants to factors was inspected (Costello & Osborne, 2005; Stevens, 1996). Normality assessments for both the EFA (Dataset 1) and CFA (Dataset 2) followed Kim's (2013) guidelines for medium sample sizes (50 < n < 300). Sample suitability was further evaluated using the Kaiser-Meyer-Olkin (KMO) index and Bartlett's test of sphericity. Suitability thresholds were set at .60 for the KMO and a significant Bartlett's test ($p < .001$) (Dodge, 2008).

EFA was conducted using Principal Axis Factoring (PAF) with oblimin rotation. PAF is one of the most commonly used methods and is robust to variables that are not strictly normally distributed (Costello & Osborne, 2005; Henson & Roberts, 2006). Given that the factors were expected to correlate, an oblique rotation was applied (Henson & Roberts, 2006; Costello & Osborne, 2005).

Multiple criteria were used to determine the number of factors to retain: the scree test (Cattell, 1966) and the parallel method (Costello & Osborne, 2005; Henson & Roberts, 2006). A stepwise model optimization was performed, progressively removing variables that did not load sufficiently onto any factor. The cutoff for acceptable factor loadings was set at .40 (Hair et al., 1995). Variables with cross-loadings above .32 on any factor other than the primary one were excluded (Costello & Osborne, 2005). The reliability of the extracted factors was evaluated using McDonald's omega.

For the CFA, Maximum Likelihood (ML) estimation was used. Model fit was evaluated using the following criteria: Chi-square test (x^2), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Normed Fit Index (NFI). Confidence intervals for RMSEA were computed for a more comprehensive evaluation. Cutoff values for acceptable model fit followed Sun (2005): CFI > .95, RMSEA < .06 indicating good fit, with values below .08 considered acceptable. NFI > .95 indicated a good fit, with values above .90 considered acceptable. For missing data, Full Information Maximum Likelihood (FIML) estimation was employed.

Results

Demographic Data

The demographic characteristics of the study population are presented in Table 1.

Exploratory Factor Analysis (EFA)

EFA was conducted on Dataset 1 to examine the underlying structure of the 15 variables from the PHQ-15. Item d (menstrual pain) was excluded a priori since it was not relevant to all participants. Additionally, item e (headache) and item k (pain during intercourse) were removed due to a Kaiser-Meyer-Olkin (KMO) value below .6. Item h (fainting spells) exhibited significant non-normality and was excluded from the analysis. The remaining data were deemed suitable for factor analysis.

Both the scree plot and parallel analysis supported a three-factor solution, explaining 40.10% of the total variance. A non-significant chi-square test ($x^2 = 6.79$, df = 7, $p = .45$) indicated an adequate model fit. Additional fit indices indicated good model fit: RMSEA = .00–.07 (90% confidence interval), CFI = 1.00, and SRMR = 0.16. Factor 1 had an eigenvalue of 1.56, Factor 2 had an eigenvalue of 2.40, and Factor 3 had an eigenvalue of 1.01. The factors showed moderate inter-factor correlations, ranging from .39 to .51 (see Figure 1), indicating that while the factors represent distinct constructs, there was some degree of association among them.

Factor loadings revealed that most items loaded onto the extracted factors, with the exception of item f (chest pain), which did not load significantly on any factor and was thus excluded. Item o (difficulty sleeping) and item n (fatigue or lack of energy) had loadings below the threshold of .40 (Hair et al., 2006) on Factor 1 and were removed from the analysis. After this step, 8 items remained, all with loadings above .40 on one of the three factors (see Table 2).

McDonald's Omega was calculated to assess the internal

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

Variable	Dataset 1 (EFA) (N = 275)	Dataset 2 (CFA) (N=275)	Total (N=550)
Age M (SD)	45.24 (11.54)	43.58 (10.81)	44.41 (11.20)
Missing data N (%)	2 (0.73 %)	1 (0.36 %)	3 (0.55 %)
Women	243 (88.36 %)	245 (89.09 %)	488 (88.73 %)
Missing data N (%)	4 (1.45 %)	3 (1.10 %)	7 (1.27 %)
PHQ-15: M (SD)	12.79 (4.66)	12.85 (5.05)	12.82 (4.85)

Comment : Participants who selected "other" for gender were reported as "missing" due to the low frequency of responses.

consistency of the factors identified through EFA. For Factor 1, McDonald's Omega ranged from .49 to .67 (95% confidence interval), which does not meet the recommended threshold of > .70 (Panayides, 2013). Factor 2 demonstrated good internal consistency, with McDonald's Omega ranging from .64 to .76 (95% confidence interval). Factor 3 also fell short of the > .70 criterion, yielding McDonald's Omega values between .53 and .71 (95% confidence interval).

Factor 1 was labeled "Cardiopulmonary" and consisted of three items: dizziness (item g), feeling your heart pound or race (item i), and shortness of breath (item j). Factor loadings ranged from .49 to .63. Factor 2, labeled "Gastrointestinal", included three items: stomach pain (item a), constipation, loose bowels, or diarrhea (item l), and nausea, gas, or indigestion (item m). These items, all related to gastrointestinal symptoms, loaded between .54 and .73. Factor 3, labeled "Musculoskeletal pain", consisted of two items: back pain (item b) and pain in arms, legs, or joints (item c), with loadings of .65 and .69, respectively.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted on Dataset 2 to evaluate the fit of the model generated from the EFA. The results indicated that the proposed model fit well, suggesting that the fictional and empirical correlation matrices did not statistically differ: CFI = 1.00; RMSEA ranged from .00 to .06 (95% confidence interval, p = .96), and NFI = .96, indicating good fit according to Sun (2005). The chi-square test was not statistically significant (x^2 = 18.58, p = .35), further supporting the adequacy of the model. The model exhibited significant (p < .001) factor loadings ranging from .40 to .65, and the items loaded in the expected direction on their respective factors. Correlations between factors varied from .14 to .47, which is within the acceptable range according to Shao et al. (2022), who state that bivariate correlations between factors should not exceed .70.

Discussion

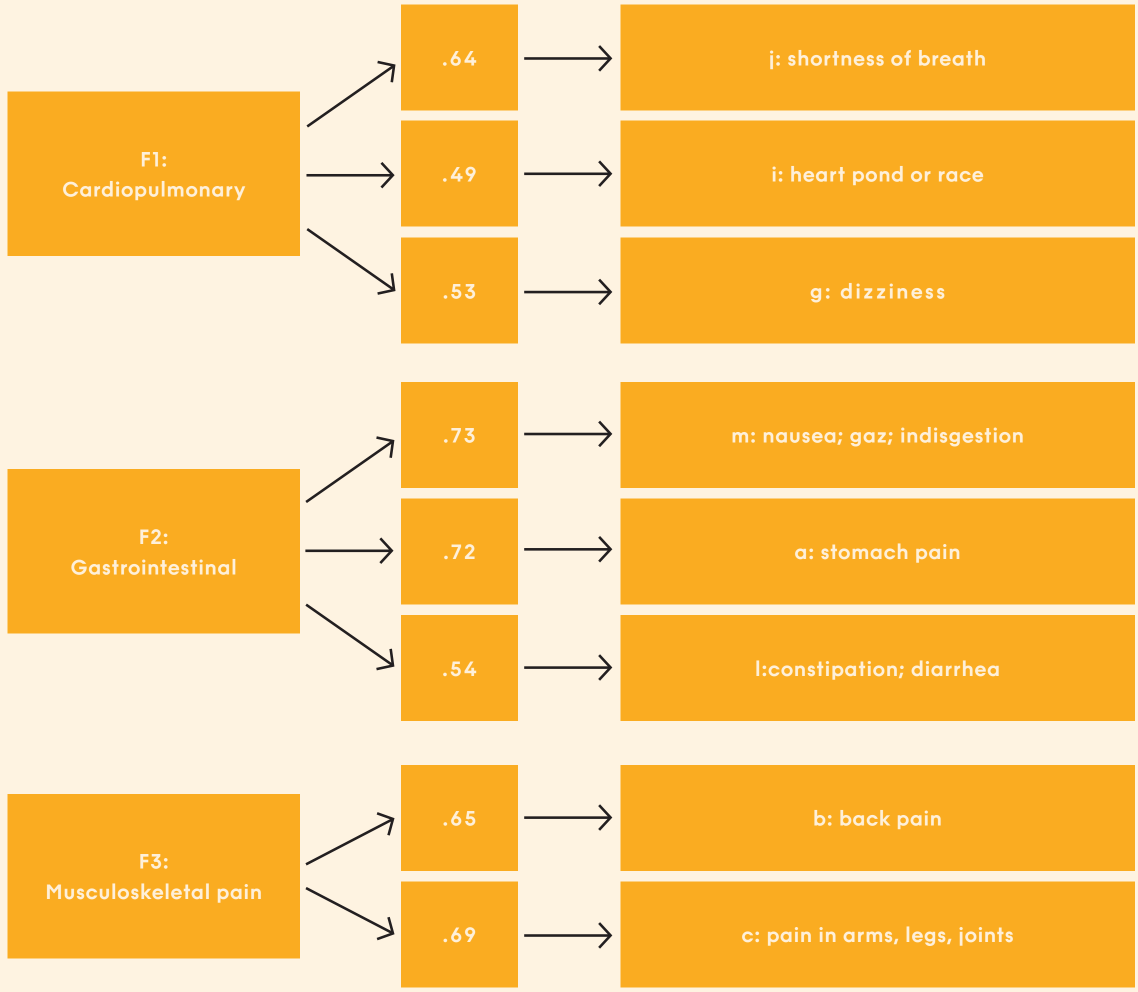
This study investigated the clustering of physical symptoms reported via the Patient Health Questionnaire-15 (PHQ-15) in patients with persistent physical symptoms (PPS) to evaluate their alignment with Intensive Short-Term Dynamic Psychotherapy's (ISTDP) postulate of anxiety pathways. The exploratory factor analysis identified three distinct factors, which together explained 40.10% of the total variance. This three-factor model was validated through confirmatory factor analysis. The three extracted factors partially aligned with ISTDP's theory of anxiety pathways. Factor 1, representing "Cardiopulmonary symptoms" (shortness of breath, heart palpitations, and dizziness) and Factor 3, which encompasses "Musculoskeletal pain" (back pain and pain in the arms, legs, or joints) can be interpreted as anxiety in "striated muscle" activation, involving voluntary muscle control. In contrast, Factor 2 "Gastrointestinal symptoms" (stomach

TABLE 2. FACTOR EXTRACTION AND CORRELATION LOADINGS

	Factor 1 Cardiopulmonary	Factor 2 Gastrointestinal	Factor 3 Musculoskeletal pain	Uniqueness
a. Stomach pain	.03	.72	.01	.47
b. Back pain	.03	.01	.65	.56
c. Pain in your arms, legs, or joints etc	– .02	– .01	.69	.53
g. Dizziness	.53	– .01	.07	.75
i. Feeling your heart pound or race	.49	– .01	.05	.73
j. Shortness of breath	.64	.01	.02	.57
l. Constipation, loose bowels, or diarrhea	.03	.54	.00	.70
m. Nausea, gas, or indigestion	– .03	.73	.01	.48
Eigenvalue	1.56	2.40	1.01	
% explained variance	11.8 %	16.8 %	11.4 %	Total: 40.10%

Comment: Factor loadings above .40 are bolded, indicating that the variable was selected for the respective factor. 'Uniqueness' shows the proportion of variance in each variable that is not explained by the extracted factors.

FIGURE 1. FACTOR STRUCTURE DERIVED FROM THE EFA, SHOWING FACTOR LOADINGS AND INTER-FACTOR CORRELATIONS.



ache, constipation, and nausea) may relate to "smooth muscle" anxiety according to ISTDP.

A notable contribution of this study is the use of PHQ-15 for self-assessment of somatic symptoms to potentially capture unconscious anxiety – an innovative approach in a field where assessments typically rely on real-time therapist observations (Davanloo, 2005; Frederickson, 2013). However, the use of the PHQ-15 introduces methodological challenges. The PHQ-15 contains few items that a priori align with anxiety manifesting as cognitive-perceptual disruptions, which may account for the absence of a factor capturing this dimension as proposed in ISTDP. Moreover, those items that possibly could, either exhibit significant non-normality (fainting spells) and were excluded from the factor analysis or had factor loadings below cut off (fatigue) and thus omitted from the final model. To comprehensively test the theory of anxiety pathways, future research should employ instruments that include additional symptoms related to cognitive/perceptual disturbances, such as blurred vision and hearing impairment – areas not addressed by the PHQ-15. The newly developed ASC-13 instrument by Chen and colleagues could provide a valuable step forward in this regard (Chen, 2021).

Previous factor analyses of the PHQ-15 (Witthöft et al., 2013; Cano-García et al., 2020), including studies on populations with PPS (Terluin et al., 2022), consistently support a bifactorial model as the best fit. These analyses reveal a general factor representing the co-occurrence of somatic symptoms, alongside three distinct and consistently observed symptom clusters – gastrointestinal, pain, and cardiopulmonary – which clearly align with our findings.

TABLE 3 : FACTOR CORRELATIONS FOR CONFIRMATORY FACTOR ANALYSIS USING DATASET 2.

	Factor 1 Cardiopulmonary	Factor 2: Gastroinstenstial	Factor 3: Musculoskeletal Pain
a. Stomach pain		.48	
b. Back pain			.45
c. Pain in your arms, legs, or joints etc			.65
g. Dizziness	.40		
i. Feeling your heart pound or race	.42		
j. Shortness of breath	.50		
l. Constipation, loose bowels, or diarrhea		.51	
m. Nausea, gas, or indigestion		.58	

However, the separation of striated muscle symptoms into two distinct factors ("Cardiopulmonary" and "Musculoskeletal pain") seems to contradict ISTDP's unitary model of this anxiety pathway. On the one hand, it might be reasonable to separate these factors as cardiopulmonary symptoms may reflect activation of the sympathetic nervous system in response to acute danger which musculoskeletal pain does not (Frederickson, 2018). However, it's important to note that this factor analytic separation of "Cardiopulmonary symptoms" and "Musculoskeletal pain" does not necessarily invalidate the ISTDP model. One other possible reconciliation of the findings is that the conscious reporting of symptoms may be influenced by multiple underlying processes, including both the anxiety pathway and other defense mechanisms like somatization. Dizziness, for example, is a multifaceted symptom that can arise from various mechanisms, such as hyperventilation-induced cerebral vasoconstriction or the anxiety pathway cognitive perceptual disruptions, which involves maladaptive sensory processing. In this study, dizziness is categorized under striated muscle anxiety and has a frequent co-occurrence with symptoms like palpitations and shortness of breath, consistent with acute sympathetic arousal. On the other hand, musculoskeletal pain, such as back and joint pain, may reflect a more chronic and low-intensity buildup of tension in the body and be connected to suppressed emotions or a repressive coping style (Myers et al., 2008). In ISTDP, mechanisms beyond anxiety, such as "somatization" driven by unconscious guilt, may contribute to symptoms like musculoskeletal pain, suggesting defense mechanisms distinct from anxiety pathways (Frederickson, 2013). In other words, while the physiological basis of striated muscle activation might be unitary, the way these symptoms are reported could reflect additional layers of complexity. Thus, the findings might actually indicate that conscious symptom reporting integrates several mechanisms, rather than serving as a direct mirror of a single underlying anxiety pathway.

Clinical assessment allows for a more precise differentiation of anxiety expressions, as the therapist can adjust and deepen the inquiries based on the patient's responses at that moment (Frederickson, 2013), while self-assessment merely offers an overview of reported symptoms without the same contextual depth. However, in clinical settings, self-reports provide valuable longitudinal data on stable symptom patterns, capturing how anxiety may manifest over time and suggesting potential clusters of anxiety-related symptoms. Since patients are attuned to their physical symptoms, even if they do not make the connection to anxiety, self-assessment can be an effective method for identifying stable symptom patterns and potential clusters of anxiety-related issues. This is particularly seen for Factor 2 (gastrointestinal) in this study which included somatic symptoms that are coherent with signs of unconscious anxiety in smooth musculature. Similar findings were reported by Ying Xin Chen (2021), who in her factor analysis of the specifically developed self-report instrument ADQ-13 identified a factor corresponding to symptoms from smooth musculature. Moreover, and more importantly, the factor analyses in this study were able to distinguish between symptoms of smooth muscle activation (factor 2) and striated muscle activation (factor 1 and 3), showing no significant cross-correlation of items. For future research, it would be valuable to investigate whether these symptom clusters can predict treatment outcomes within ISTDP, or if certain clusters respond better to specific ISTDP interventions as previous research imply different effect sizes depending on what type of symptom cluster that dominates (Abbass et al, 2021).

This study has several limitations. One limitation is that although the confirmatory factor analysis (CFA) fits well, deviations from multivariate normality in Dataset 2 (e.g., skewness, low kurtosis) may have influenced results. Another limitation is that the reduction from 15 to 8 items for factor analysis and the fact that Factor 3 was based on only two items is problematic as typically three items are considered the minimum for an underlying factor. The three-point PHQ-15 scale also restricts variability, which could limit factor clarity compared to the five- or seven-point scales typically preferred in factor analysis (Sullivan & Artino, 2013). Traditional factor analysis methods, such as EFA and CFA, may have limitations when applied to data with low variability, like the PHQ-15. The use of alternative methods, such as Item Response Theory (IRT) or Latent Class Analysis (LCA), could potentially yield a more robust clustering. Despite these limitations, CFA indices – high CFI (1.00), acceptable RMSEA (.00–.06), and a non-significant chi-square – indicated a robust model. Overall, with adequate sample sizes and rigorous factor analysis, the three extracted factors explained a substantial portion of the variance. An additional strength of this study is its strong external validity as it utilized inclusive recruitment across Sweden, allowing participation without healthcare affiliation or formal diagnosis requirements. This strategy yielded a diverse sample of individuals with persistent physical symptoms, enhancing the study's relevance to a wide range of somatic issues in the general population. However, as our sample had a high proportion of women (almost 9 out of 10), the results do not clearly generalize to both men and women with PPS.

In conclusion, this study represents a novel step in understanding how physical symptoms in patients with persistent physical symptoms (PPS) can cluster in line with theoretical frameworks such as ISTDP's anxiety pathways. While limitations exist – particularly the use of self-report assessments like the PHQ-15, which lacks sensitivity to certain anxiety pathways and may introduce methodological constraints – the study nonetheless provides valuable insights. The results of the factor analysis partially align with aspects of ISTDP's theory, offering preliminary support for distinguishing between somatic symptom types associated with striated and smooth muscle activation.

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The authors

Daniel Maroti is a clinical psychologist and a researcher (PhD), working part time at Stockholm University and part time in primary care.

Viktor Vallhagen is a psychologist with a degree from Stockholm University, currently completing his post-graduate internship in Stockholm, Sweden.

Emelie Hasselgren is a psychologist with a degree from Stockholm University, currently completing her postgraduate internship at a specialized psychiatric clinic in Stockholm, Sweden

Robert Johansson is a licensed psychologist, and associate professor of psychology at Stockholm University, Sweden. He has one PhD in clinical psychology from 2013, and one in computer science from 2024, both from Linköping University, Sweden.

Johnny Hellgren, PhD, is Associate Professor at the Division of Work and Organizational Psychology, Department of Psychology, Stockholm University, Sweden. His research interests include organizational change, motivation, health and safety and survey methodology.

Peter Lilliengren, PhD, is a clinical psychologist and psychotherapist. Currently he holds a position as Associate Professor at the Department of Psychology, Stockholm University and works part time in private practice in Stockholm, Sweden, specializing in ISTDP for adults.