Journal of Psychosomatic Research 115 (2018) 14–23

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

journal homepage: www.elsevier.com/locate/jpsychores

Predicting physical and mental health symptoms: Additive and interactive effects of difficulty identifying feelings, neuroticism and extraversion

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ARTICLE INFO

Keywords:
Alexithymia
Difficulty identifying feelings
Neuroticism
Extraversion
Health complaints

ABSTRACT

Objective: Alexithymia, neuroticism, and extraversion have been described as relevant predictors of mental and physical health conditions, but their putative interactive effects remain poorly understood and their prospective effects are not well studied. The present study has investigated the differential contributions of distinct personality traits in predicting mental and somatic health symptoms in cross-sectional and longitudinal analyses.
Methods: Additive and interactive effects of neuroticism and extraversion (NEO-FFI), the TAS-20 total score (20-Item Toronto Alexithymia Scale) and its factors (Difficulty Identifying Feelings (DIF), Difficulty Describing Feelings (DDF) and External Oriented Thinking (EOT)) have been investigated on depressive symptoms, the number of chronic diseases, somatic and mental subjective health complaints. Analyses have been based on data from the population-based "Study of Health in Pomerania" (SHIP) in cross-sectional (N = 1704) and longitudinal (N = 1244) analyses.
Results: In cross-sectional and longitudinal analyses, additive associations of the TAS-20 total score and neuroticism on somatic and mental health complaints have been observed. The effects of the TAS-20 total score have been mainly carried by DIF. Further, in interaction effetcs extraversion has attenuated the negative impact of neuroticism, whereas DIF has augmented it.
Conclusion: The present study is the first demonstrating longitudinal effects of alexithymia, particularly DIF, neuroticism, and extraversion in predicting mental and somatic health symptoms. Associations between DIF, neuroticism, and extraversion have been additive and interactive. Hence, subjects high in neuroticism and DIF but low in extraversion have reported most health symptoms and thus might be in need for prevention strategies. Treatments should be adapted to the associated combination of the personality characteristics.

1. Introduction

Alexithymia, as measured with the 20-Item Toronto Alexithymia Scale (TAS-20), is a personality construct characterized by an impaired ability to identify (Difficulty Identifying Feelings, DIF) and describe feelings (Difficulty Describing Feelings, DDF) as well as a preference to external details of everyday life rather than internal experiences (External Oriented Thinking, EOT) [1,2]. In previous studies, alexithymia has been associated with a tonic sympathetic hyperarousal, hypertension and lower numbers of lymphocytes but also with misinterpretations of somatic sensations, reduced health behavior (e. g. smoking, less treatment seeking, lower medication adherence) and an impaired differentiation between various affective states [3–9]. In particular, health behavior, stress reaction, interpretation of somatic sensations and stress avoidance have been discussed as potential mediators between alexithymia and mental and physical diseases [8,10]. Various studies have demonstrated associations of alexithymia with psychopathology as depression, anxiety and somatization [11–16], but also with physical complaints as chronic pain, somatic diseases and obesity [17–19]. In detail, whereas DIF has been linked to mental and somatic distress and a misinterpretation of somatic sensations, DDF has been associated with an impaired interpersonal functioning and enhanced social conflicts [12–15,18,19]. The external focus associated with EOT has not been directly related to common health symptoms but

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https://doi.org/10.1016/j.jpsychores.2018.10.003
Received 19 July 2018; Received in revised form 9 October 2018; Accepted 9 October 2018

has been reported to induce a poorer response to psychological treatment [12–15,18–21].

Accordingly, Pandey and Mandal [3] have postulated that an alexithymic personality style is characterized by high somatic arousal sensitivity, high social introversion (low extraversion) and low emotional stability (high neuroticism). Just as alexithymia, high neuroticism has been related to reduced health behavior and quality of life as well as increased mortality [8,22–26]. On the other hand, extraversion has been associated with positive emotions, warmth and low somatic arousal [3,23,25–27]. Luminet et al. [23] have described alexithymia as an admixture of the Big Five personality traits: neuroticism, extraversion, conscientiousness, agreeableness, openness. To better understand the relations of the personality traits with mental and somatic health symptoms, Atari and Yaghoubirad [28] have used a structural equation model to investigate the relation of alexithymia and the Big Five in predicting general health covering depression, anxiety, social function and somatic symptoms. They have reported alexithymia to mediate the relationship between the Big Five and general health [28,29]. Lee and Guajardo [29] have reported neuroticism to have a direct and an alexithymia-mediated indirect effect on depression. On the other hand, De Gucht et al. [30] have demonstrated negative affect to mediate the influence of both alexithymia and neuroticism on medically unexplained symptoms. Hence, the character of the relation between neuroticism, extraversion, and alexithymia in predicting physical and mental health symptoms is not conclusively defined. Moreover, all these studies, have focused on independent and mediation effects but did not investigate possible interactive effects. However, neuroticism and extraversion have been inversely associated with alexithymia and opposite effects of neuroticism and extraversion with emotion regulation, health behavior, and health outcomes have been reported. Thus, it has been queried if neuroticism and extraversion depict the extremes of one scale or if they rather have independent effects from each other and from alexithymia [10,26].

According to the review of Kojima [22], most studies investigating longitudinal effects of alexithymia on mental and physical diseases have focused on clinical populations with psychiatric or psychosomatic diseases. Only a few studies have examined longitudinal effects in the general population and have focused on mortality, pain or mental health and treatment outcomes [22]. However, in intervention studies, the personality traits have been associated with the severity of mental symptoms at the onset of the therapy [11,12,31]. It has been suggested that difficulties in regulating negative emotions and unhealthy behavior could be treated effectively with stress management therapy [25,26]. Alexithymia has been associated with poorer therapy outcomes and more negative reactions to one's therapist in outpatient but not in inpatient treatment [11,12,32]. As a positive aspect, in medical therapy alexithymia has been suggested to reduce pain in cancer therapy and to improve the outcome of surgery [22]. Hence, a better understanding of the relation between neuroticism, extraversion and alexithymia in association with mental and physical health symptoms might improve the individualized adaptation and choice of appropriate therapies.

The present study has used both cross-sectional and longitudinal analyses to examine possible additive and interactive effects between alexithymia and its factors, neuroticism, and extraversion in the prediction of physical and mental health symptoms. The study has aimed (1) to differentiate between overlapping, additive and interactive effects of the personality traits; (2) to examine the time stability of cross-sectional results using longitudinal analyses and (3) to investigate differences in the character of the relation between the personality traits regarding mental (current depressive symptoms, mental health complaints) and somatic health symptoms (number of chronic diseases, somatic health complaints). Hence, the present paper will add new knowledge about differential effects of the TAS-20 factors DIF, DDF, and EOT in association with extraversion and neuroticism.

2. Method

2.1. Study population

We have analyzed data from the "Study of Health in Pomerania" (SHIP), comprised of adult German residents of north-eastern Germany. For a description of the purpose, recruitment, and design as well as detailed descriptions of the assessments see John et al. [33] and Völzke et al. [34]. Briefly, a stratified two-stage cluster sample of adults, ages 20–79 years (baseline), has been randomly drawn from local registries. At baseline (SHIP-0: 1997–2001), 4308 Caucasian subjects have participated. Three follow-up measurements have been carried out (SHIP-1: 2002–2006, SHIP-2: 2008–2012, SHIP-3: 2015–2017). In parallel to the second follow-up (SHIP-2: n = 2333), detailed assessments of life events and mental disorders have been conducted within the study "Life Events and Gene-Environment-Interaction in Depression" (SHIP-LEGEND). Out of the baseline sample (SHIP-0), all subjects still alive in 2006 have been asked to participate in SHIP-LEGEND. Finally, 2400 participants took part in SHIP-LEGEND from 2007 to 2010. For the following analyses, the somatic health data of SHIP-2 have been integrated with the mental health data of SHIP-LEGEND. Out of 1841 subjects who have participated in both SHIP-2 and SHIP-LEGEND, all participants with missing data on any variable included in the main analyses were excluded, resulting in 1704 analyzed subjects. Moreover, the somatic health data of SHIP-3 have been used in longitudinal analyses to validate the cross-sectional results. For 1244 subjects, complete data have been available in SHIP-LEGEND, SHIP-2, and SHIP-3. Comparisons between the study sample (SHIP-LEGEND, SHIP-3) and the subjects of the baseline sample (SHIP-0) not included in the present study are presented in the supplement.

All analyses have been performed in accordance with the Declaration of Helsinki, including written informed consent of all participants. The survey and methods of the SHIP studies have been approved by the institutional review board.

2.2. Interview and psychometric data

All assessments have been conducted at one of two study sites, Greifswald and Stralsund. First, sociodemographic and medical history information have been assessed by a computer-assisted face-to-face-interview. Using a chronic disease list (deep vein thrombosis, dermatitis, kidney disease, hypotension, osteoporosis, gout, arthritis or degenerative diseases of the joints and spine, peptic ulcer, gastritis, liver disease, dyslipidemia, Parkinson's disease, chronic bronchitis), the number of self-reported chronic diseases has been summed up. Afterwards, medical examinations have been conducted and self-report questionnaires have been handed over to the participants. To measure mental and physical health complaints, the Subjective Health Complaints questionnaire (SHC) [35] has been used at all assessment points. The SHC assesses 38 subjective health complaints in eight categories: anxiety/depression, exhaustion, difficulty in breathing, pain, disturbances of sensations in the extremities, digestive trouble, nausea/weight loss, sensitivity to temperature. Current depressive symptoms have been measured using the Beck Depression Inventory-II [BDI-II; 36] in SHIP-LEGEND which is a 21 item questionnaire covering the diagnostic criteria of the DSM-IV [37]. SHIP-LEGEND has been designed for a detailed psychological assessment. Due to time constraints, a shorter questionnaire for the assessment of current depressive symptoms has been used in SHIP-3: The Patient Health Questionnaire PHQ-9; [38] assesses the nine key-criteria of MDD according to the DSM-IV [37] and thus is less time consuming. To optimize the comparability, the PHQ-9 has been transformed into a BDI-II score according to Wahl et al. [39]. Baseline data of alexithymia and the Big Five personality traits (neuroticism, extraversion, conscientiousness, agreeableness, and openness) has been assessed only in SHIP-LEGEND. Alexithymia has been assessed using the 20-Item Toronto Alexithymia Scale [TAS-20; 2] which is