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Neuroticism and Extraversion in Patients Suffering from Hand Pain

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Abstract

Morbid conditions of the hand usually provoke intense pain. The relationship between the experience of pain and personality characteristics have been studied extensively. The aim of the study was to assess the relationship between personality characteristics, e.g. neuroticism and extraversion, and pain intensity in patients with hand conditions, and to examine possible differences between patients and healthy individuals. Numerical Rating Scale (NRS) and the Neuroticism (EPQ-N) and Extraversion (EPQ-E) subscales of Eysenck Personality Questionnaire- Revised (short form) were administered to 104 patients of an outpatient orthopaedic clinic. Moreover, 65 healthy individuals were used as a control group. Bivariate correlational analyses was used to examine the relationship between neuroticism, extraversion and pain intensity. Neither neuroticism nor extraversion correlated with pain intensity.

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One-way analysis of variance was conducted to examine the differences between patients and controls concerning neuroticism and extraversion. Patients had significantly higher scores in both personality characteristics of neuroticism and extraversion. The assessment of personality characteristics in patients with pain may be an important factor for the design of more effective interventions for pain management.

Keywords: Neuroticism; extraversion; hand conditions; pain.

1. Introduction

Many hand related orthopaedic conditions may lead to acute as well as to chronic pain. It has been found that in Europe 6% of patients with chronic pain complain of pain located in their hand [1]. Some of those hand conditions that can cause pain are the distal radial fractures [2], the carpal tunnel syndrome [3], the osteoarthritis of the hand [4] and the ganglion of the wrist [5].

The role of personality characteristics in the experience of pain and in issues related to health has been studied extensively [6, 7, 8]. According to Eysenck in [9], a typical extrovert tends to be sociable and impulsive, does not control his or her feelings, has a wide circle of friends, and is often unreliable. Eysenck in [7], proposed that extraversion is linked to a higher pain threshold, better tolerance of pain and better adaptation to prolonged pain. This idea was supported by an experimental study on students which showed that high scores in extraversion correlated with greater pain tolerance [10]. The author in [11] studied the individual differences in pain threshold and he found that extraverts had a higher mean pain threshold compared to introverts. In addition, in a cold water pressure test the authors in [12] found a significant positive relationship between extraversion and tolerance of pain.

On the other hand, there are studies that have found no relationship between pain intensity and extraversion. An experimental study on undergraduate students showed that extraversion was unrelated to pain perception [13], while study on patients with low-back pain showed that extraversion didn't correlate with pain intensity and related functional impairment. Nevertheless, extraversion was found to be negatively linked to psychological distress [6]. Similar results were found in patients suffering from ischaemic rest pain [14], visceral pain [15] and postoperative pain [16].

Research has also focused on the relation between neuroticism and pain intensity [6, 7, 17]. According to Eysenck in [9], characteristics of a typical neurotic include a tendency towards anxiety and depression, emotional behavior and irrational reactions. Eysenck in [7] supported the idea that high neuroticism is related to lower pain threshold and pain tolerance. The author in [18] found a negative correlation between neuroticism and pain threshold. Researchers in [19] studied the relation of pain to personality characteristics in patients who had undergone surgery and their results showed that patients who had higher levels of neuroticism reported more intense pain. In addition, high scores on neuroticism have been linked to postoperative pain and pulmonary complications [17], as well as the development of chronic pain after surgery [20].

Nevertheless, other studies have failed to support the aforementioned idea. In a study with myofascial dysfunction pain patients, neuroticism didn't correlate with pain intensity [8]. In addition, the authors in [21]

found that neuroticism couldn't predict pain intensity in patients with low back pain who had received nerve block treatment. Similar results have been found in an experimental study in which no relationship was found between neuroticism and tolerance of pain or pain intensity [22].

In an attempt to explain the relationship between neuroticism and pain, researchers have proposed several ideas [23, 24, 25]. For example, the authors in [25] proposed that individuals with high neuroticism have a tendency to observe their internal sensations and detect even minor discomforts. More recently the author in [24] suggested that neuroticism predisposes the individual to bad health, while the authors in [23] suggested that neuroticism might be a vulnerability factor that leads someone to perceive pain as more threatening.

Aim of this study is to assess the relationship between neuroticism, extraversion and pain intensity in a sample of patients with orthopaedic conditions of the hand, as well as to examine the differences between patients and healthy individuals in neuroticism and extraversion. To our knowledge, there aren't any previous studies in Greece that have examined the role of these personality characteristics in the experience of pain.

2. Materials and Methods

The present study was done in the context of the MSc "Pain Management", Laboratory of Medical Psychology, Psychiatric Clinic, Medical School, University of Ioannina, and in collaboration with the Department of Educational and Social Policy, University of Macedonia, Greece.

2.1. Subjects

Participants were 104 orthopedic patients who visited an outpatient orthopedic clinic for hand conditions of a general hospital in Greece. The sample of the patients was gathered in a five month period from November 2014 to April 2015. A control group consisted of 65 healthy individuals from the community, matched for gender and age. The first group consisted of 55% female and 45% male and the mean age was 46 years (SD =14.94) (range: 18-80). In the second group 58.5% were female and 41.5% were male while mean age was 46.4 years (SD=15.16) (range: 19-85). There weren't any differences in sex ratio and mean age between our two samples. The study was approved by the ethics committee of the hospital.

2.2 Measures

Pain Intensity

Pain intensity was assessed with the 11-point Numerical Rating Scale [26]. Patients were asked to rate their current pain severity by circling a number between 0 (no pain) and 10 (extreme pain).

Personality traits

Neuroticism and Extraversion were assessed by the Neuroticism (N) and the Extraversion (E) subscales of the Greek version of Eysenck Personality Questionnaire- Revised (EPQ-R) short scale [27]. The EPQ-R is a yes/no

self-report questionnaire in which each subscale consists of 12 items. Previous application of EPQ-N and EPQ-E in a Greek population showed good reliability (Cronbach's alpha = 0.78 for EPQ-E, 0.71 for EPQ-N).

2.3 Statistical Analysis

A one-way analysis of variance (one-way ANOVA) was conducted to compare the two groups for neuroticism and extraversion. A second ANOVA was conducted to compare male and female patients for pain intensity, neuroticism and extraversion. Bivariate correlational analyses were also used for age, pain severity, neuroticism and extraversion in the patient group. Analysis was conducted using the Statistical Package for the Social Sciences (SPSS V.22).

3. Results

The mean score of pain intensity was 4 (SD= 2.58). The ANOVA comparing patients and controls with respect to neuroticism and extraversion showed statistically significant differences. Patients had significantly higher scores in both neuroticism and extraversion ($p<0.05$ in all comparisons) than controls.

A comparison between male and female patients in pain intensity, neuroticism and extraversion found no differences between genders ($p>0.05$ in all comparisons).

Bivariate correlational analyses among age, pain intensity, neuroticism and extraversion revealed that, pain intensity correlated with age ($r= 0.27$, $p<0.05$), while it didn't correlate with neuroticism or extraversion. As expected, neuroticism correlated negatively with extraversion ($r= -0.41$, $p<0.001$).

Table 1: Mean scores of Neuroticism and Extraversion in patients and healthy individuals (n=104, n=65 respectively)

	Patients MS (SD)	Control Group MS (SD)	F	P
Neuroticism	5.12 (2.87)	4.18 (2.7)	4.4	.037*
Extraversion	9 (2.65)	7.72 (3.05)	7.6	.006*

*p<0.05

4. Discussion

Aim of the present study was to assess the relationship between neuroticism, extraversion and pain intensity in a sample of patients with hand pain, as well as the differences between patients and healthy individuals in these personality characteristics. Our results showed that neither neuroticism nor extraversion correlated with pain intensity. However we also found that patients had higher levels of neuroticism and extraversion compared to healthy controls.

Table 2: Pearson's r correlation coefficients among age, pain intensity, neuroticism and extraversion

	Neuroticism	Extraversion	Pain Intensity
Age	NS	NS	.27**
Neuroticism		-.41**	NS
Extraversion			NS

*NS: non significant , ** Correlation is significant at the 0.01 level (2-tailed)

The fact that neuroticism didn't correlate with pain intensity seems to contradict Eysenck's theory in [7] who suggested that individuals with high levels of neuroticism have lower pain threshold and tolerance of pain. Although some studies are in line with that theory [18, 19, 20], others haven't established a relationship between neuroticism and pain intensity [8, 21]. For example, the authors in [8] found no relationship between neuroticism and pain sensation intensity; nevertheless, they found a relationship between high scores on neuroticism, unpleasantness, and affective disturbance due to pain. The authors in [8] concluded that although neuroticism doesn't have an impact on the nociception pain processing, it appears to have an influence on the affective dimension of pain. In addition, researchers in [28] found that neuroticism could predict change in beliefs concerning pain self-efficacy. These results suggest that although neuroticism is not related to the physical aspect of pain, it can influence different dimensions of the experience of pain and some related variables.

In the present study we found that orthopaedic patients with hand conditions exhibited higher levels of neuroticism and extraversion compared to a control group. Concerning neuroticism, this result is consistent with the findings of previous studies on patients with fibromyalgia who had higher levels of neuroticism compared to healthy individuals [29], on adolescents with chronic pain compared to their peers without chronic pain [30], as well as on patients with burning mouth syndrome [31]. This finding might support the idea that has been proposed that neuroticism might be a vulnerability factor for bad health [24]. Nevertheless, another study in patients who had undergone surgery for pain relief and also received a psychological intervention, showed that there was a reduction in the levels of neuroticism after treatment [32]. Based on these results the authors suggested that neuroticism might be the outcome of chronic pain and that it can be reduced when the level of pain is diminished. In addition, in a study on patients who had undergone laparoscopic cholecystectomy researchers found that patients with persistent pain had higher levels of neuroticism one year after operation and concluded that high levels of neuroticism were not the cause, but rather the result of pain [33].

Our results showed that extraversion didn't correlate with pain intensity. Eysenck in [7] was the first to propose that individuals with higher levels of extraversion have higher pain thresholds and pain tolerance, but consequent studies failed to support this theory [13, 15]. Our results are similar with the results of these studies. Research in patients with chronic pain also showed no relationship between pain intensity and extraversion [34]. However, extraversion correlated with negative beliefs about pain, a finding that supports the idea that this

personality characteristic affects cognitive processes associated with the experience of pain.

Surprisingly, patients of our sample had higher levels of extraversion compared to our control group. However, our patients exhibited the same mean score in Extraversion (mean score=9) as the normative value score found from the application of the EPQ-R of another Greek sample (mean score=8.85) [27], while the control group appear to have a lower mean score (mean score=7.72). The occurring difference between our patient and control samples may be attributed to some type of bias in the selection of our control group.

We found no gender-specific differences regarding expressed pain intensity. Although female subjects reported more intense pain than males, the difference was not significant. Some studies have shown that females report greater pain than males and have lower pain thresholds [35], while others haven't found such differences [36, 37]. For example, in a study on patients who were undergoing treatment for painful conditions researchers found no gender differences in pain reports and they suggested that the relationship between gender and pain could be due to the differential role of anxiety [37].

As expected, neuroticism correlated negatively with extraversion, a finding that is consistent with findings of previous studies [27, 38].

To our knowledge there aren't any previous studies examining the role of extraversion and neuroticism in patients with hand pain. In addition, this is the first study in Greece that assesses the role of personality characteristics, like extraversion and neuroticism, on the experience of pain.

The rather small size of our patient sample may be a limitation of our study. Our results cannot be generalized when it comes to other clinical populations, aside from patients with orthopaedic conditions of the hand. Further research is needed to explore the role of personality characteristics in different pain conditions. . In addition, we only used self-report measures for the assessment of the variables, which might raise the occurrence of bias. Future research that will also include an interview with each individual may be useful.

5. Conclusion

In conclusion, results of the present study highlight the importance of the assessment of personality characteristics for the understanding of the experience of pain. Although we didn't find any relationship between neuroticism or extraversion and pain intensity, the present results showed that there were significant differences between patients and healthy individuals in these personality characteristics. Such findings suggest that, although personality doesn't affect the sensory dimension of pain, it might affect other aspects of the experience of pain. Thus, assessing personality characteristics in pain individuals may be important both for the understanding, as well as for the planning of more effective interventions for the pain management. Further research should aim at distinguishing between acute and chronic pain in orthopaedic conditions of the hand, since the experience of pain may vary depending on the type of pain. Furthermore, it may be useful to study the role of personality characteristics in individual hand conditions, as the experience of pain may differ according to the nature of each condition. It might also be beneficial for future research to take into account the role of hand preference. One could suggest that pain in the right hand of a right-handed person will cause greater

functional discomfort and emotional distress than pain in the left hand, and vice versa.

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