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## CORRELATION BETWEEN OPTIMISM AND EXPERIMENTALLY INDUCED PAIN

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### ABSTRACT

**Purpose:** The purpose of the present study is to estimate the connection between optimism and negative expectations with the pain threshold and the pain tolerance toward experimentally induced pain. **Subjects:** Sixty healthy individuals participated in the study. **Methods:** Cold pressor test, Optimism and negative expectations Inventory and Subjective health assessment scale have been used. **Results:** Positive and significant correlation between optimism and the level of stress, as well as between optimism and stress symptoms have been found. No correlation between optimism and pain tolerance threshold have been found. No significant differences in pain threshold and pain tolerance between optimist and negative expectation groups have been found. **Conclusions:** Age influences on optimism, stress and pain tolerance. Pain tolerance increases with age. Optimism supposes better adjustment toward stress.

**Key words:** cold pressor test, pain tolerance, pain threshold, optimism and negative expectations

### INTRODUCTION

The sensitivity of pain is completely individual and severely modified by psychological factors. In the scientific literature it has been suggested that optimism may positively influence the course and experience of pain. A number of clinical trials show that the optimism suggests better adjustment towards the chronic pain (1-8). Researches on optimism and chronic pain among heterogeneous groups of patients show that optimists usually report about less pain and react toward the treatment better. For example, optimism is associated with lower intensity of the pain, reported from patients with different types of cancer (2, 9, 10) and musculoskeletal pain (11-13). There is data that optimists recover more successfully and declare about less postoperative pain in comparison with patients who have negative expectations (14). These findings lead to increase researches on influence of optimism but not only among patients with acute and chronic pain but as well as experimentally induced pain and healthy people.

Results from cold pressor test with healthy volunteers show the optimists have lower intensity of pain in comparison with the people with negative expectations as well as lower cardio-vascular reactivity and they feel less distress as a result of the experiment (15). Another research proves that the optimism is associated with lower grades of intensity of the pain in answer to the cold pressor test among healthy people (16). An experiment to reveal the character of the connection between optimism and pain is induction of optimism before the test and it leads to lower intensity of pain in the experimental group in comparison with the control group. This is the first research which proves experimentally cause-and-effect relationship of optimism and reactions to the pain (17). But all researches don't prove these results, for example Snyder et al. don't recover influence of individual differences in optimism over pain threshold and pain tolerance (18).

The purpose of the present study is to estimate the connection between optimism and negative expectations with pain threshold and tolerance toward experimentally induced pain.

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## PERSONS EXAMINED

60 volunteers age between 19 and 61 years. Male – 21, female – 39. The subjects were recruited from Trakia University. The study was approved by the local ethical committee at Trakia University. An informed consent was obtained from all participants before initiation of the experimental procedures.

## METHODS

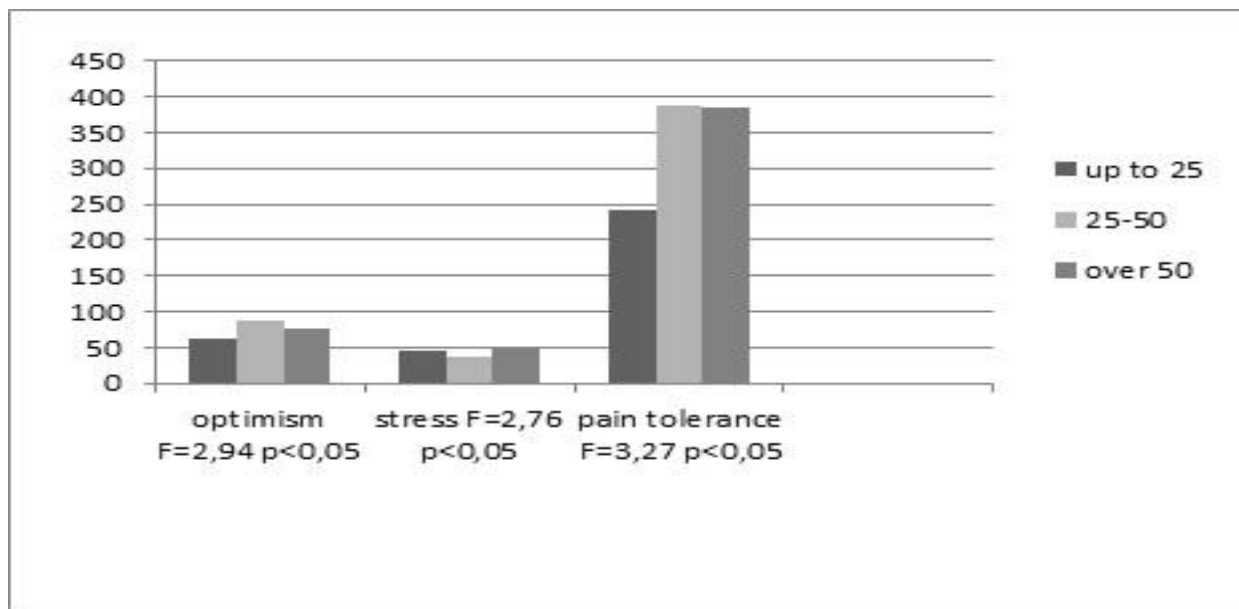
1. Cold pressor test (19,20)
2. Optimism and negative expectations Inventory (21)
3. Subjective health assessment scale (22)

## RESULTS

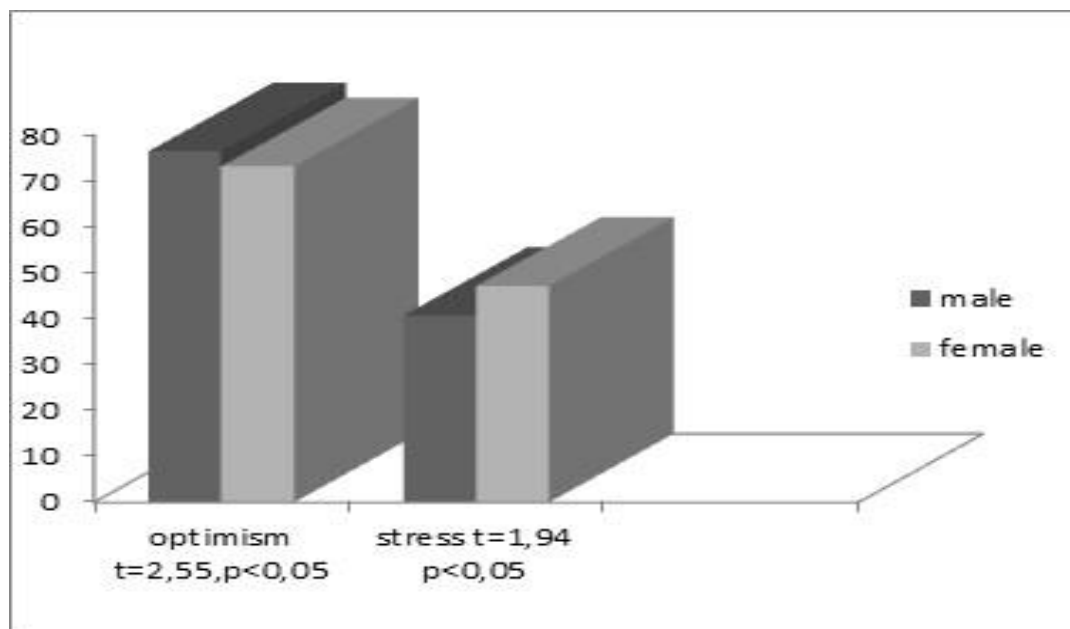
Negative and significant correlation between optimism and stress level, as well as between optimism and stress symptoms has been found. No correlation between optimism and pain threshold and pain tolerance has been found. **(Table1)** No significant differences in pain threshold and pain tolerance between optimist and negative expectation groups have been found. Significant differences in optimism, stress and pain tolerance by age and gender have been found. **(Figure 1)** No significant differences in pain threshold by age have been found. Significant differences in stress level and optimism by gender have been found. **(Figure 2)**

**Table 1.** Correlation between optimism, stress, symptoms of stress, pain threshold, pain tolerance (Pearson Correlation,  $p < 0,01^*$ ,  $p < 0,05^{**}$ )

		Stress	Stress symptoms	Optimism	Pain threshold	Pain tolerance
<b>Stress</b>	Pearson Correlation	1	,556**	-,575**	,071	-,062
	Sig. (2-tailed)		,000	,000	,663	,703
<b>Stress symptoms</b>	Pearson Correlation	,556**	1	-,357*	-,034	-,133
	Sig. (2-tailed)	,000		,024	,835	,413
<b>Optimism</b>	Pearson Correlation	-,575**	-,357*	1	-,168	-,130
	Sig. (2-tailed)	,000	,024		,301	,425
<b>Pain threshold</b>	Pearson Correlation	,071	-,034	-,168	1	,212
	Sig. (2-tailed)	,663	,835	,301		,189
<b>Pain tolerance</b>	Pearson Correlation	-,062	-,133	-,130	,212	1
	Sig. (2-tailed)	,703	,413	,425	,189	



**Figure 1.** Influence of age on optimism, stress and pain tolerance



**Figure 2.** Significant differences in optimism and stress level by gender

## DISCUSSION

The negative correlation between optimism and stress, as well as between optimism and symptoms of stress may be explained by the role of optimism as a buffer to the effect of stress on health (23) and a moderator for coping in a stressful situation, in comparison with negative expectations. The optimistic expectations toward results from own activities and toward the future allow people to be more adaptive toward stressful events and to deal with less distress (25). In our study the optimism is associated with lower values for the level of stress and higher values for the physical health. According to meta-analysis optimism is connected with better physical health as a result of the influence of optimism over the decrease of stress and its unfavorable results for the health (26). In this way the optimism correlates positively with the well-being and has influence over well-being indirectly by the effects over stress (27). Meta-analysis also confirms that optimism positively correlates with physical and psychological well-being and negatively correlates with depression and anxiety (28).

Our research results do not find connection between the optimism and pain threshold and tolerance toward experimental pain as well as significant differences between the group of pessimists and optimists in respect to pain threshold and pain tolerance. Although some longitudinal (2, 14, 29) and laboratory (15)

researches find a connection of the optimism with reduced sensitivity toward experimentally induced pain, scientific research have not confirm such kind of connection categorically. Indirect influence of optimism on the pain is discussed and expectations for pain intensity and pain catastrophizing are examined as eventual main mechanisms of the connection between optimism and pain.

In our study, it is found that there are statistical significant differences in the level of stress and optimism by age and gender. The levels of stress are highest among subjects who are more than 50 age and the optimism is the lowest among subjects till 25 age. Among examined people from 25 to 50 age – the levels of stress are lowest and the optimism is the most expressed. Perhaps it is due to the negative correlation between the optimism and stress. In the study, the men have more expressed optimism and lower levels of stress in comparison with the women. It could be explained by the fact that the explored men are students and the women are also working which is connected with the possibility of existing professional stress. Age has influence over the tolerance toward the experimentally induced pain as subjects till 25 age have the lowest pain tolerance, and subjects from 25-50 age – the highest. The tendency about the pain tolerance to increase with age is possibly to be a result of greater experience and coping with pain with the increasing of age.

## CONCLUSIONS

1. The optimism suggests better adaptation toward the stress.
2. Age has influence over the optimism, stress and tolerance toward the experimentally induced pain. Among the subjects from 25-50 age the most expressed optimism, the lowest levels of stress and the highest pain tolerance were established.
3. The tolerance toward the experimentally induced pain increases with age.

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