

## Analyzing Reciprocal Relation between Mental Capacity, Attention and Its Coping Styles in Cardiovascular Patients

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### ABSTRACT

This study analyzes cardiovascular disease and psychological performance changes & patients' mental-psychical condition. Cardiovascular diseases are usually considered serious stressors resulting in patients' mental-psychical condition changes. Also, these changes accompany the patients' psycho-physiological performances alterations including mental attention & efficiency. In this study, we study the status of mental attention & capacity processes in two groups of patients, one suffering from acute myocardial infraction & the other with cardiovascular maladies. To compare data, identical parameters in the healthy group have been studied. The overall subjects groups include 232 ones, 87 healthy & 68 cardiac patients & 77 heart stroke-stricken patients. To examine mental capacity & attention, psycho-physiological computerized test developed at Armenia physiology institute has been used & to analyze coping styles, coping stressful situations inventory designed By Endler & parker (1990) has been applied. Voluntary concentration & mental capacity level of cardiovascular patients has been meaningfully lower than healthy individuals parameters has been identified in myocardial infraction stricken patients. This analysis showed the correlation between mental performance & attention & coping style capability against problems. High level of mental activity & attention instability in cardiac & stroke-stricken patients compared with healthy individuals.

**KEY WORDS:** Cardiovascular Diseases, Attention, Mental Capacity, Coping Style, Attention Psycho Physiological

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### INTRODUCTION

Nowadays, social existence-psychic is the dominant pattern on the diseases in which human is viewed as a multi-dimensioned entity and each dimension of his social existence-psychic acts as interactive systems which affect each other. Social-psychic stress is one of the important factors in the Heart failure (Johansson P. et al, 2006). Emotional tension and social-psychic stresses are the risk factors of heart coroner disease. These factors act through physiologic psychic mechanisms and stimulation of the automatic nervous system, in the form of cardiovascular reactions to stressor and it is resulted in the outbreak of the disease (Young, D.R 1994). Although. Mind and body interweaving is evident, the philosophy of this interweaving is controversial in terms of how they affect one another. Considering the psychological status and characteristics and personality features and its relevance to the health and disease is a process which helps human being to improve the health and prevention and treatment of heart diseases since the last 30 years (Ghasemipour, 2005).

A study shows that the psychological factors are the third cause of myocardial infraction and the social psychical stresses are resulted in the heart disease. Up to now, many studies have supported the positive relationship between stress and cardiovascular diseases. The research cases show that the patients have experienced more stressful events in the two years before suffering from the disease (Siegerist et al., 1999). A research considered the status of the patients who have been saved from the first heart infraction for ten years and it showed that the group who had two heart infractions compared to the group without heart attack has experienced the stressful events in their life one year prior to the heart attack. The finding based on the correlation studies show that the individuals, who experience high levels of stress, have more tendencies to behaviors which increase the risk of disease and damage. The research also showed that stress levels and life pressure are related to the high blood pressure and abnormal increase in the heart volume (Basharat et al., 2007). For example, there is an abundant amount of activated placket and high LDL in the blood of people who suffer from stress. These changes in the blood help closing vessels and outbreak of the disease. Besides, by affecting the hormones activities peculiarly releasing the Adrenal Gland, stress creates disorder in the heartbeat, increases blood pressure, sediment of abnormal calcium and harmful cholesterol in the wall of coroner vessels. As an independent risk factor as well as affecting other factors (increase in blood pressure, calcium sediment), stress, therefore, increases the possibility of outbreak of cardiovascular disease

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and heart infraction. Also, it is possible that stress causes disorder in the heartbeat, heart attack and sudden death ( Sarason et al.,1995).

There are agreements in the literature of psychical pressure and coping in which we can distinguish the coping style of task- oriented, avoidance-oriented, emotion-oriented;1)Task oriented coping: it consists of the purposeful operation for problem solving, mental re-organization of the problem and struggle for changing the situation by focusing on the problem, programming and problem solving. The style reduces the psychological and physiological effects of problems and daily stressful factors. 2) Intensive coping over the emotion: the style contains self-oriented emotional reaction and it aims to reduce stress. Although it is not always successful, it contains the reactions including emotional reactions as recognizing themselves as guilty because of emotion, being nervous, self-interested and confrontation. In some cases, stress increases and reaction is oriented toward the person. Avoiding and denying are the prevailing guidelines of intensive coping over emotion. Avoiding refers to the physical receding from the stressful situation and denying contains the mental escape from the stressful situation. 3) Avoiding: this coping style is described as the activities and cognitive changes which lead to the stressful situation. This style, through the entertainment (self-forgetfulness) in a situation or feeling too responsible or returning to the community (individualist, individual- oriented as an instrument to relieve stress is performed (Lazarus, 1996). Coping guideline a way by which everybody copes with stress in each stage of his/her life is particularly important in the psychological adjustment (correspondences) in heart patients and influences the reaction of the individual toward the disease.

A person who has the adjustment coping guideline will show the better physical and psychical answers during the disease and he/she has more calmness. While the individual applies the irreconcilable guidelines and does not adjust him\herself to the disease will show a better and more intensive psychical and physical reaction to the disease and his/her life will run into an inadequate situation ( Dracupet al.,2004).Evidently, the applied guidelines by the individual not only affect his/her psychological welfare but his physical welfare. The clinical specialists emphasize the adequate coping skills more than reducing negative feeling and they believe that the patients who apply the active guidelines and adjust coping guidelines have less anxiety, boredom, and depression ( Dracupet al.,2004).

It is clear that stress, especially acute stress, has important effects on attention and perception. But the effects are quite irregular, and depend on serious ways of the qualitative features of the stressor. Different stressors have different effects on performance. One stressor might cause shifts in attention or a failure to inhibit irrelevant stimuli, while another stressor creates a lapse of attention or narrows attention in the same task. Skosnik, Chatterton, Swisher, and Park (2000) induced mild stress into the verbal priming paradigm using a video game. Stress reduced negative priming, a measure of inhibition processes, and also increased salivary cortisol and alpha-amylase (a correlate of norepinephrine). So, both chronic anxiety, as in trait anxious subjects, or acute anxiety, as in trauma, is associated with a general deficit in the inhibition of attention, and is best revealed when limitations are placed on controlled processing, forcing subjects to rely more heavily on automatic reactions. Behavioral and physiological measures are consistent with changes induced by stress on inhibitory processes. These results imply that, in a natural emergency, when stress is high, it is necessary to be concerned about an operator's ability to focus on the relevant information in the task at hand and to inhibit irrelevant sources of input.

The special interaction between coping forms & cardiovascular disease is still complicated and contradictory. And it has been little dealt with. This stud is an effort to analyze the interaction of mental physical performance in cardiovascular patients, this work objectives are 1) analyzing psycho physiological parameters, mental capacity performance & voluntary attention in cardiovascular patients 2) special physiological features of stress coping methods (coping styles) regarding the goals proposed. Two variables of attention & coping styles are analyzed in this research.

## **MATERIAL AND METHODS**

The research is done by a cross -sectional method. The statistic samples of the research were 232 persons including 87 are in the health, 68 cardiovascular disease and 77 myocardial infraction groups. The healthy persons who had not any background of heart disease and were in the psychical and physical health were evaluated .The scale for selecting the patients has been based on Angiography test, diagnostic interview and memoir of patient as well as the specialist physicians. In the research, the Coping Inventory for Stressful Situation (CISS) developed by Endler and Parker (1990) has been used. Coping Inventory for Stressful Situation is used to measure the ways of coping designed for considering the various ways of coping in stressful situations in 1990 by Endler and Parker. The inventory has 48 items consisting of three main fields of Task- oriented, Avoidance-oriented, and Emotion -oriented coping behavior. And to study the processes of attention and mental capacity computer-based test "Clocks Carrousel" is used. This is a part of a package of psychophysiological "Vigilance Research" developed at the

Institute of Physiology NAS RA; The test is performed in two consecutive terms in two modes - with the possibility of forecasting the operations (easier variant, 5 min) and without it (the hard variant, 10 min). (Gevorgyan E.G.,2004).

**RESULTS AND DISCUSSION**

Table.1. Comparing performance test parameters for attentiveness and mental capacity in the groups of healthy persons and patients with cardiovascular diseases.

**Table1** Comparison of performance parameters of the test attention in the groups

<b>Test for attention and mental capacity without forecasting (10 minutes, difficulty task)</b>					
Performance parameters	Healthy		Heart patients		P <
	M	±SD	M	±SD	
Processed figures per minute	56,3	12,2	41,7	12,8	0,001
Mean value of Fig_Proc_T	1,12	0,28	1,64	0,80	0,001
Std.deviation of Fig_Proc_T	0,59	0,47	1,87	3,13	0,001
Number of correct decisions (%)	90,5	7,47	87,1	10,0	0,01
Number of wrong decisions (%)	9,49	7,47	12,9	10,0	0,01
Decision making time (second)	0,87	0,19	1,30	0,93	0,001
Aftereffect time (second)	0,53	0,27	1,09	1,30	0,001
Accuracy of performance (%)	85,0	13,6	79,8	19,7	0,05
Validity of performance (%)	79,2	16,6	71,7	23,0	0,05
Coeff. of mental capacity	0,76	0,21	0,52	0,22	0,001
Utilization of information (%)	95,1	4,11	93,3	6,2	0,05
<b>Test for attention and mental capacity with forecasting (5 minutes, simple task)</b>					
Processed figures per minute	58,4	18,1	51,7	19,4	0,05
Mean value of Fig_Proc_T	1,17	0,57	1,36	0,61	0,05
Std.deviation of Fig_Proc_T	0,87	1,06	1,63	2,19	0,01
Number of correct decisions (%)	87,3	8,0	85,5	10,5	-
Number of wrong decisions (%)	12,7	8,0	14,5	10,5	-
Decision making time (second)	0,77	0,34	0,93	0,61	0,01
Aftereffect time (second)	0,71	0,47	1,20	1,12	0,001
Accuracy of performance (%)	77,4	14,5	74,5	20,6	-
Validity of performance (%)	71,3	17,6	67,4	24,1	-
Coeff. of mental capacity	0,73	0,28	0,60	0,26	0,001
Utilization of information (%)	92,8	4,5	92,3	6,3	-

Table 1 presents the results of psychophysical tests for attention and mental performance (in 2 versions) obtained in groups of healthy individuals and patients with cardiovascular diseases. As seen from the tabular data, patients with CVD on all parameters significantly inferior healthy individuals, which is most notably for the more tedious "hard test version" (most of the differences are statistically reliable at a high level of significance). It was also found that with the deficiency of the attentiveness and mental health, the higher level of the instability of mental activity is typical for the patients with CVD (compared to healthy individuals), about which the high values of the spread of the duration of figure processing in the dynamics of the tests are evidenced. Data analysis also showed that people with CVD, together with low efficiency and high variability of mental activity, are characterized by higher levels of fatigue of central nervous system.

Table 2 : Comparison test of attention average on different coping styles

Parameters	Coping_Style	N	Mean Rank	Chi-Square	Df	P
Mean processing time of 1 figure	Task	82	59.36	43.818	2	.000
	Emotion	54	108.02			
	Avoid	33	111.05			
	Total	169				
% of rightly skipped figures from total number of ordinary figures	Task	82	99.11	13.421	2	.001
	Emotion	54	73.42			
	Avoid	33	68.89			
	Total	169				
Attentiveness level_ the amount of right responses (right decisions) for the time	Task	82	111.28	45.997	2	.000
	Emotion	54	61.11			

<b>unit</b>	Avoid	33	58.79			
	Total	169				
<b>Mean processing Times for all inspected control figures</b>	Task	82	59.09	44.675	2	.000
	Emotion	54	108.91			
	Avoid	33	110.26			
	Total	169				
<b>Mean processing Times for all inspected ordinary figures</b>	Task	82	61.72	36.103	2	.000
	Emotion	54	106.08			
	Avoid	33	108.35			
	Total	169				
<b>Mean processing Times for all deleted figures</b>	Task	82	58.91	45.309	2	.000
	Emotion	54	110.11			
	Avoid	33	108.74			
	Total	169				
<b>Mean processing Times for rightly deleted control figures</b>	Task	82	59.34	43.808	2	.000
	Emotion	54	108.88			
	Avoid	33	109.68			
	Total	169				
<b>Mean processing Times for rightly skipped ordinary figures</b>	Task	82	62.35	34.233	2	.000
	Emotion	54	105.10			
	Avoid	33	108.39			
	Total	169				
<b>Mean processing Times for wrongly skipped control figures</b>	Task	82	63.73	30.653	2	.000
	Emotion	54	102.04			
	Avoid	33	109.98			
	Total	169				
<b>Mean decision-making time for all deleted figures</b>	Task	82	62.95	32.348	2	.000
	Emotion	54	105.54			
	Avoid	33	106.18			
	Total	169				
<b>Mean decision-making time for rightly deleted control figures</b>	Task	82	63.96	29.462	2	.000
	Emotion	54	104.27			
	Avoid	33	105.74			
	Total	169				
<b>Mean decision-making time for wrongly deleted ordinary figures</b>	Task	82	65.01	26.581	2	.000
	Emotion	54	103.91			
	Avoid	33	103.73			
	Total	169				
<b>Mean after effect time for all deleted figures</b>	Task	82	62.20	34.855	2	.000
	Emotion	54	108.63			
	Avoid	33	102.98			
	Total	169				
<b>Mean after effect time for rightly deleted control figures</b>	Task	82	61.60	36.509	2	.000
	Emotion	54	108.28			
	Avoid	33	105.05			
	Total	169				
<b>Mean value of mental capacity</b>	Task	82	109.30	39.303	2	.000
	Emotion	54	62.68			
	Avoid	33	61.15			
	Total	169				
<b>Validity of diagnostics (total index) %</b>	Task	82	77.30	6.199	2	.045
	Emotion	54	98.42			
	Avoid	33	82.17			
	Total	169				

In the above table, there are the results of variance analysis of different attention components. According to these components like: the number of correct answers that give per second in total test, and regarding the correct function of ordinary figures of total ordinary figures and level of function and mental capacity, recognizing figures, medium speed needing information (speed index) in people with task coping style have higher attention average. Groups with emotion coping in components (the percent of function changes in the second part of the test in comparison with the first part was more), and average of processing period and processing speed of total figure in

second and frequency of omission of ordinary figures (wrong answer) repeated mistake between ordinary answer and standard component, have higher average in other groups.

Findings of this research in evaluation variable show that, cardiac patients without MI and patients with MI have lower function relative to healthy people in many parameters. In this examination, healthy people score higher in these items: (correct omission of figures, the number of correct answer in total figure on second and also correct percent of mental capacity and recognition function. It means, this group has higher ability in attention process. Cardiac patients with MI have higher average in parameters (period of mental processing for all controllable figures, necessary period to delete figures, necessary period for making decision to delete all correct figures, and also mental processing time for all figures and the average of decision time to delete all correct figures). It means, cardiac patients and patients with MI in mental activity time that its performance needs speed and attention have experienced more stress because of their anxiety about correct performance of activity, and frequent mistake of their performance. As a result, this phenomenon has negative effect on their mental function and information processing. Ghasemipour 's findings (2009, Skosnik and park., (2000) agree with the results of this research.

Results show cardiovascular patients don't pay attention to physical changes like: heartbeat and asthma that appear before extreme development of disease. So, they don't control these changes and when they know about their disease, when their well-being is disordered.

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