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Relation Between Quality of Executive Functions, Attention and Religious Beliefs in Elderly Population

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Abstract

The presence of the religious beliefs in elderly may affect the self-control, socialization and the quality of life. We will try to determine the relation between the quality of executive functions, attention and the religious beliefs in elderly. This research included 50 subjects (27 female and 23 male). The following instruments were used: Questionnaire for the religiousness assessment; MMSE for cognitive condition assessment; WCST for the executive function assessment; TMT A B for the attention assessment. The higher degree of efficiency in achievement had the respondents who did not belong to the group of the religious estimating executive functions and attention, with statistical significance ($p < .01$). Statistically significant relation between the quality of executive function and attention and negative emotional experience was present in respondents who belonged to the group of the religious ($p < .01$). The respondents with the efficient executive functions and attention don't belong to the group of the religious ones.

Keywords: executive functions; attention; religiousness.

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1. Introduction

About the faith in God, we must not overlook the way in which a man thinks, plans, organizes and creates. Faith and mind are complementary, because faith enriches the mind, and the mind enlightens the faith [1]. In the basis of every religion are gathered knowledge in scriptures like *Holy Bible*, *Kura-an*, *Talmud* and are based on faith in God. Numerous messages from these scriptures give meaning and explain the various life circumstances. Since religiousness is one of the most wide spread phenomena in humans, and that human behavior is not determined only by conscious thinking, but also by the spiritual processes which are not always available to consciousness, it can be assumed that the religiousness has an important role in planning and organizing activities, that is an integral part of human functioning. This creates need for examining the relationship of the planned goal-directed behavior and religious abandonment.

Planning and organization of activities and attention, as cognitive features, allow human to specify the strategy which will be implemented in intentions and the achieved objective. They represent the highest level of functioning of the frontal lobes, and are the privilege of humans and comprise a part of metacognition. Executive functions are the highest form of human activity which enables a person to successfully organize independent and purposeful behavior [2]. According to the neuropsychological standpoint, executive functions are divided into four elements [3]: formulating of objectives and their conceptual realization, that is the ability of willing, deliberate action; planning involves the identification and organization of the elements and the sequence of actions for the implementation of activities and achieving goals; purposeful action is transforming the plan into productive activity; the effective implementation of the activities.

The other definition includes the concept of working memory. Besides executive part which is the system of attention in limited capacity which participates in complex cognitive operations, working memory includes both verbal and visual-spatial short-term memory. A person with preserved executive functions can successfully compensate significant cognitive loss, while people with disexecutive syndrome with preserved cognitive function, are not able to function successfully [1]. The relation or a hint of relationship between religiousness and cognitive functioning is reflected in the theoretical approaches as well as in the empirical findings. Jung believed that religion was essential for human health. He pointed out that among the thousands of his more mature patients, all of them tried to find their way out from a religious perspective. According to him, a man needs ideas that will locate him and help him to find his place in the entire universe. The role of religion is to give a sense to the man's life [4]. According to all port, religion contributes to a better mental health. On the basis of fundamental religious principles and preferences, man develops and creates his beliefs about life in general. Besides, religion can satisfy affiliate needs, needs for love and relationships with other people [5]. According to some studies, religion can help in organization of every day activities and in confronting numerous life circumstances [6]. The marriages of religious people note significantly less break-ups than those of not religious [7]. Between the spiritual and existential well-being, there is a positive correlation with religiousness [7]. A certain part of humanity does not believe in God and rejects the need for religious experience. Atheists are convinced that the phenomenon of religion can be reduced to a human, in authentic and basically superfluous limited historical artifact. Confirmation of their point of view they largely find in the ideas of

Ludwig Feuerbach, Karl Marx and Sigmund Freud, which have in common the thesis that the origin of the God is explained by the nature of man, his psychic structure and his social relations [4]. However, a man is a complex being, rational, but no less a homo religious, that is, the Being of Faith, created for holiness, directed to God [8]. In order for a man to plan and organize activities, to perform the planned and control the performed, he must be aware of himself and his own knowledge and cognition. Thus, metacognition is the privilege of man and the highest level of functioning of executive functions. However, the man cognition is not so simple. Along with cognitive, divine-spiritual self-cognition of a man represents a significant artifact and totally legitimate way of earthly human existence. That is the very reason for a need of such a study, which should investigate the relationship between these two areas of cognition. Based on the aforementioned previous researches and theoretical assumptions, the basic premise of the present study is that the efficient capacity of planning activities and attention should be linked with the present religiousness.

2. Materials & Methods

Subjects

The research was conducted on a sample of fifty participants, residents of the Gerontology Center, 27 of whom were females, and 23 males. The mean age was 67.18 years. The educational structure of the respondents indicated a high percentage of elemental and below elemental education 56%, while with secondary education and 26% of high and higher only 18% of respondents. In terms of marital status, the highest percentage were respondents who lived alone (divorce or not conceiving marriage) 38%, then, widows and widowers 36%, and only 26% were married. Subjects were randomly sampled, considering that in their history and neurological reports there were no symptoms of acute and chronic neurological diseases, dementia, depression, multiple sclerosis and stroke. Having in mind the absence of neurological damage, all respondents had preserved cognitive abilities and their average value was 26.56, SD 5.85.

Table 1: Demographic characteristics of participants included in the study

Characteristic group		n (%)
<i>Gender</i>	Female	27 (54%)
	Male	23 (46%)
<i>Age</i>	AM (SD)	67.18 (9.27)
	Range	51 – 82
<i>Education</i>	Low (less than 8 year)	10 (20%)
	Basic 8 year	18 (36%)
	High school (12 year)	13 (26%)
	College / Higher (16 and more years)	9 (18%)
	Married	13 (26%)
<i>Marital status</i>	Widower	18 (36%)
	Divorced	11 (22%)
	Unmarried / Single	8 (16%)

The basic methodological principle of the tests is based on the group difference in the quality of the executive functions and attention in relation to the presence of religious groups of the selected respondents. Respondents were divided on religious and not religious, not according to their determination, but in relation to the answers that they opted for membership in a particular group. The specificity of the selected sample was in age and institutionalism of the respondents. Prior to the survey, the respondents were informed about the objectives and the content of the research and gave their consent.

Assessment of religiousness - Questionnaire

In addition to demographic data, the questionnaire included modified questions from the scale for measuring religiosity [9], which were used for examining the cognitive components of religiosity, relationship to God, the church, the Bible, and others. The questionnaire was adapted to the test sample and made by complex questions formulated in relation to the objective of the research. It is entirely understandable, without the possibility of giving socially desirable answers, avoiding suggestive questions. The used a questionnaire was made up of fourteen questions with multiple choice answers from which respondents had to choose just one. Answers were placed in the specified category.

Assessment of attention - Trail Making Test – TMT A B

This is a test of the scope of neuropsychological battery of tests and is used for the evaluation of flexibility of attention. The attention is focused on orientation and concentration of mental activity to something specific, whereby the orientation determines selectivity and duration, and a focus possibility of removing distractions. Attention was tested by TMT A B test. It has been recognized since its inception as a technique sensitive to the effects of brain damage in general [10]. The TMT consists of two parts. TMT-A requires an individual to draw lines sequentially connecting 25 encircled numbers distributed on a sheet of paper. Task requirements are similar for TMT-B except the person must alternate between numbers and letters (e.g., 1, A, 2, B, 3, C, etc.). The score on each part represents the amount of time required to complete the task.

Cognition Assessment – Mini Mental State Examination - MMSE

Mini Mental State Examination – MMSE [11] is a screening test for assessing the cognitive state of patients, simple to use, sensitive and valid. Since the inclusion into clinical practice it has been proven as a reliable and suitable for the initial assessment of mental status follow up. MMSE examines the temporal and spatial orientation, memory skills (immediate and delayed), attention, oral and written language, and constructional abilities in two dimension.

The implementation itself lasts 10-30 minutes. The test has eleven tasks where each one scores a number of points, total score is 30 points, and the scale ranges from 0-30, so that there are levels of severe cognitive impairment (from 0 to 17 points); medium impairment (from 18 to 23 points) and without impairment (from 24 to 30 points).

It must be taken into account that the test provides just a rough evaluation of cognitive impairment. The level of

education of examinees must also be taken into account. Classification of patients into categories of cognitive impairments according to MMSE test, we took into account the existence of the following specific standards depending on the level of education: for persons with only completed primary school it is considered to be a result of 21 or less that indicates cognitive impairment, people with high school education on cognitive impairment indicates the result is less than 23, and for persons with higher education score lower than 24.

Assessment of control functions – Wisconsin Card Sorting Test - WCST

Wiling, planning, anticipation, intent implementation and verification of the activities were assessed by WCST - Wisconsin Card Sorting Test-TV [12]. This is a sorting cards test for detecting perseveration and mental rigidity. Primarily it was designed for the evaluation of abstraction in healthy subjects. Administration: in the standard version of the test subjects were given two identical decks of 64 cards (128 cards) with painted figures: cross, circle, star and triangle in red, green, yellow and blue, while the number of pieces on the map of 1-4th. On one map all the figures were in the same color.

They represent the four stimuli cards, according to which should be stacked, the map below each map stimuli. Respondents should reveal the actual pairing principle cards based on stimulus decks of cards, based on feedback from the examiner whether the answer was right or wrong.

The test is sensitive to impairments of planning, the formation of concepts and perseveration. Scoring is carried out in respect to eleven categories. In a clinical search the most importance core was perseveration response and number of categories achieved. The standards used for adults: the total number of categories achieved AS 5.4; SD 1.3; no perseveration response AS 12; SD 10th.

Statistical Analysis

Basic methodological principle is based on the analysis within the group differences of the examined variables. For statistical analysis we used the Median test. The results will be presented graphically.

3. Results & Discussion

Belief means accepting some principles, attitudes, truths, values, without testing, proving and checking. Faith is not an intellectual knowledge, nor an occasional religious feeling that arises and disappears. Faith is a personal relationship. The presence of religion in people's lives opens a series of questions about its effect on various spheres of human life.

This study analyzes the relationship between skills attention and planning activities with existing religiosity. In literature we do not find a large number of papers dealing with this issue, but there are a lot of arguments that suggest that this relationship exists and that it is positively correlated. However, the results of this study indicate that the capabilities of planned behavior, activities and attention correlate with the absence of religion, or is influenced by non religious thinking and behavior.

4. Figures

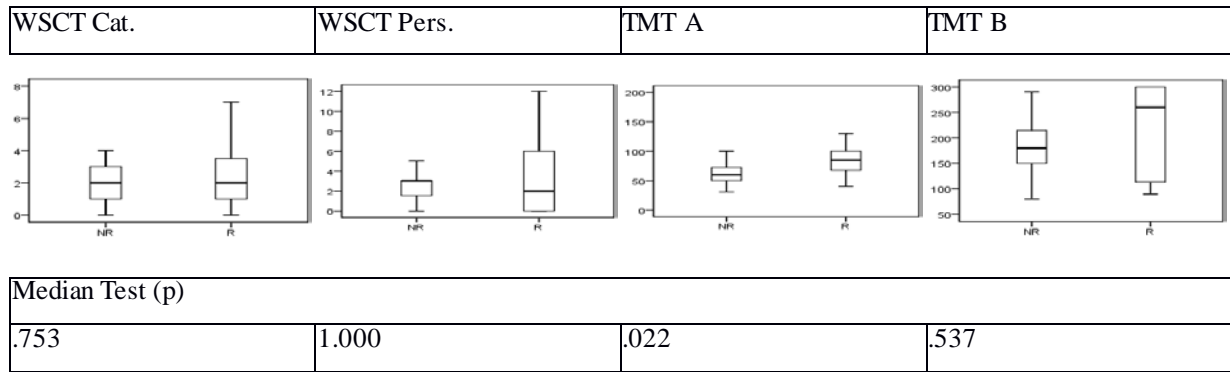


Figure 1: Relation between executive functions and religious attitude regarding the attendance of liturgy

Legend: NR – not religious, R – religious

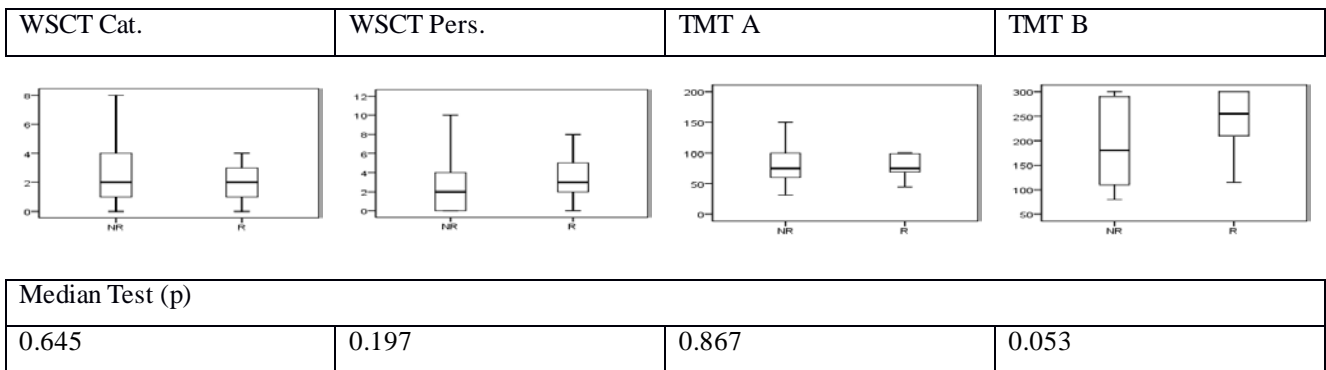


Figure 2: Relation between executive functions and religious attitude regarding reading Bible

Legend: NR – not religious, R – religious

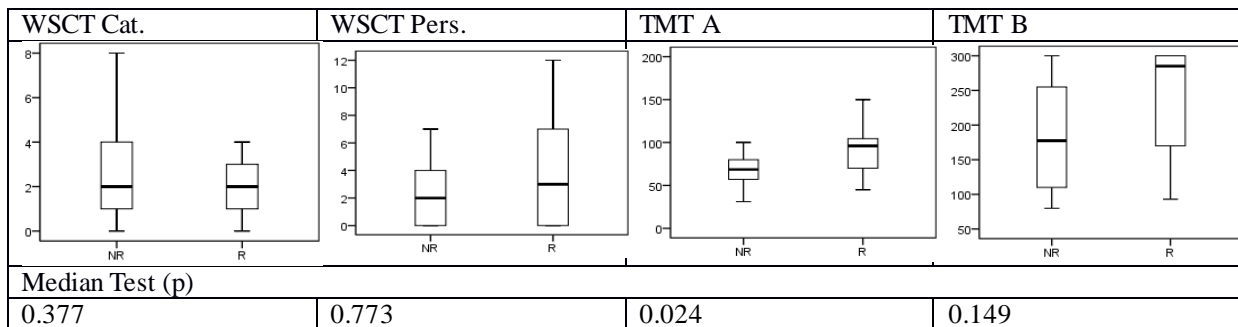


Figure 3: Relation between executive functions and religious attitude regarding knowing the Prayer

Legend: NR – not religious, R – religious

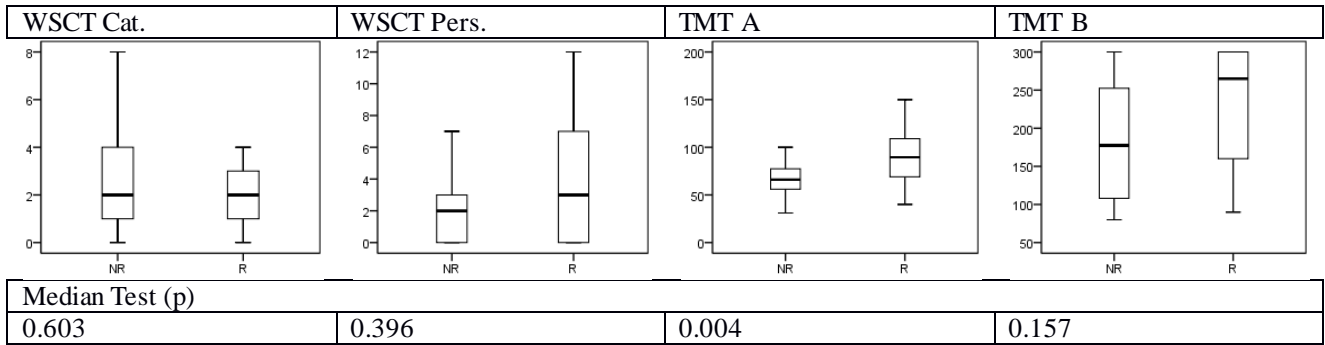


Figure 4: Relation between executive functions and religious attitude regarding regular confession and Communion

Legend: NR – not religious, R – religious

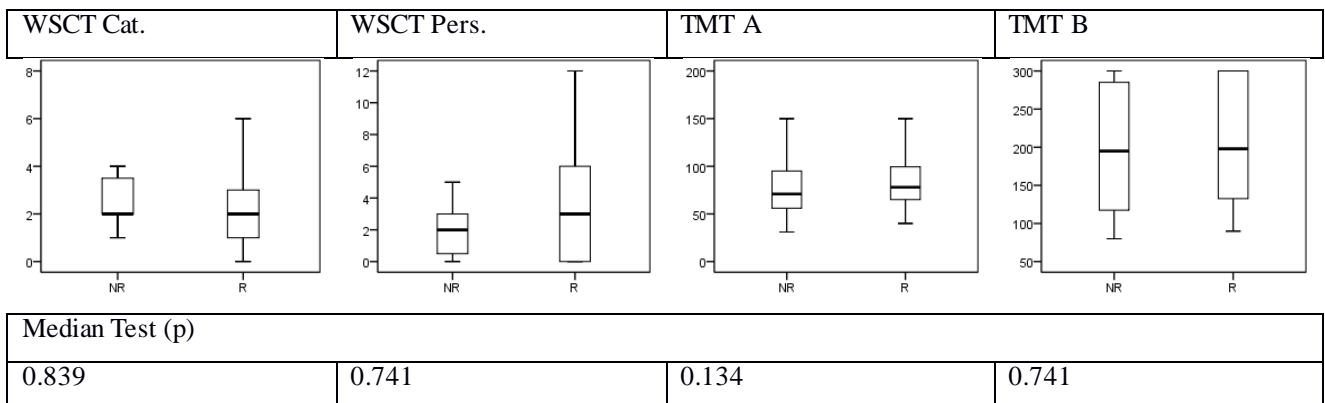


Figure 5: Relation between executive functions and religious attitude regarding existence of hope

Legend: NR – not religious, R – religious

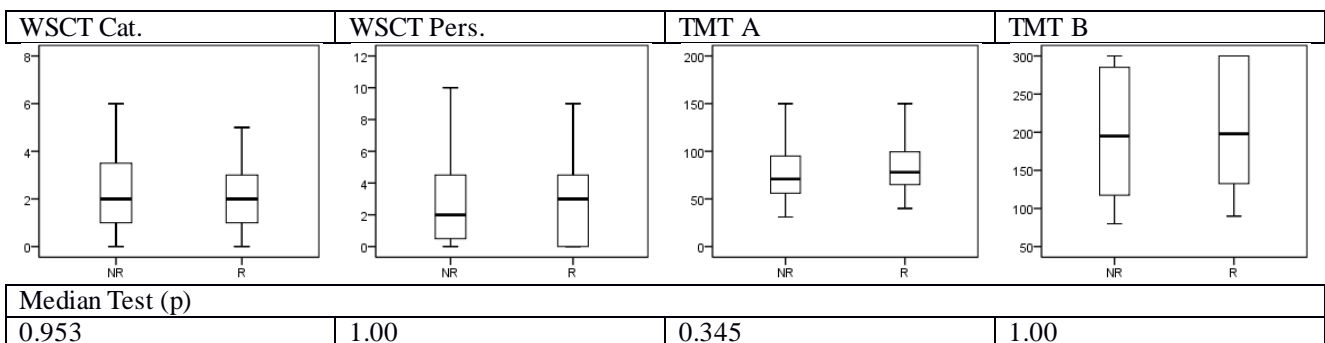


Figure 6: Relation between executive functions and religious attitude regarding optimism

Legend: NR – not religious, R – religious

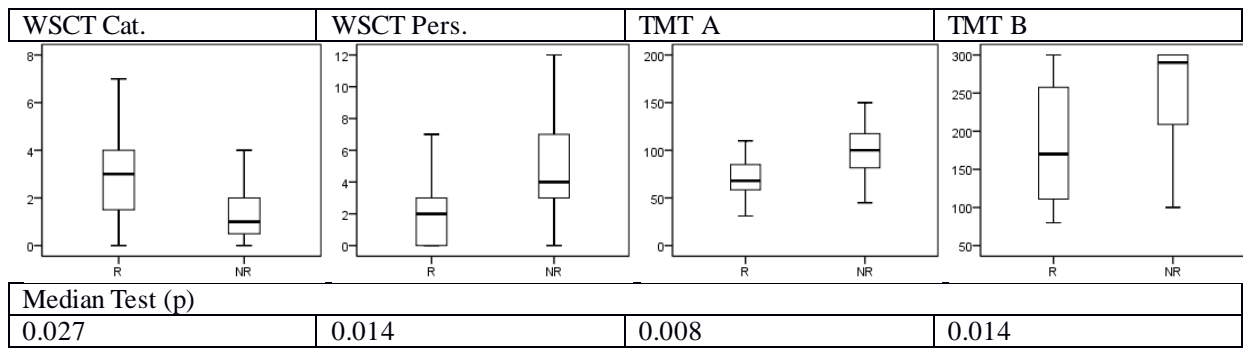


Figure 7: Relation between executive functions and religious attitude regarding negative emotions - fear

Legend: NR – not religious, R – religious

Quality of executive functions shown by the ability to plan activities and care, and estimated by the WCST total number of categories achieved and, number of perseverative responses and TMT B total time in visuo-motor tracking of two different conceptual sequences is more efficient in those groups of patients belonging to the group of non-religious (see:Figure 1). We have tried to present some arguments why the obtained results differ from the initial assumptions.

Having in mind the demographic characteristics of respondents, we took into account the specific characteristics that may have or have had an impact on the results obtained. Since religiosity is one of the most widespread phenomena among people, it is equally present in less educated individuals and those with higher education. When we talk about the education level of the respondents, the majority of respondents were with primary education or less, less those with a high school and least with the high education. In the opinion of a group of experts who have dealt with in terms of education [13] low education had no decisive role in whether someone would have awareness, an idea or a feeling of being something beyond this physical existence. The less educated persons belong to the religious group. Among highly educated people there was the equal number are in an equal number of those belonging and not belonging to a religious group (Figure 2).

Results of this study show that respondents with lower education belong to a group of religious subjects. Looking at the mean age of the patients, the results deviate from the initial position. It was expected that the presence of religiosity contributes to a positive view of the world and the future, as temporally and spatially limited, given the specificity of the sample. Subjects that did not belong to a religious group of manifested an increased optimism, better control of their own experience of activities and behaviors, as well as social control which made higher self-esteem (Figure 3). True faith is free because it liberates man from himself, from all the superfluous things of this world. Whoever believes most, he gives the most. In the analysis of eight experiments published in PLOS ONE, scientists have found that people with faith in God have more empathy than atheists. The results of our research are not fully compatible with these experiments published in PLOS ONE. Maybe the reason for this difference can be found in the fact that the respondents were older people. The persons who did belong to a religious group expressed the need for the presence of social support by another person or religious institutions. Maybe the reason for that can be found in their less efficient capacity for planning and organizing

activities. One research study indicates that persons belonging to a religious group were significantly more disciplined and that they had arranged relationship with themselves, as well as they healthy lifestyle [14]. The results of this research support the results of aforementioned study, but the institutionalization of patients, must be taken into account by itself requires a defined relationship with self, others and living conditions (Figure 4).

Studies show greater life satisfaction and less loneliness in persons belonging to religious groups [14]. The results of our study are not in accordance with, aforementioned study, as those who do not belong are lonely (Figure 5).

Perhaps the explanation can be found in the orientation towards one or more activities, group or individual. Found a negative correlation between religiosity and present negative emotional status, such as fear of death [15]. This is in accordance with the results of our study, because most of the respondents who belong to a religious group do not exhibit this kind of fear (Figure 7). However, one study done also in our country, found weak but significant positive correlation, and that negative emotions present in varying degrees in all people, still show the impact of religiosity, especially if it is on a superficial level [14]. The results of this study suggest that respondents who belong to the non-religious group, independently from having good ability to plan activities and behavior control, have the awareness that they cannot control everything, so that the negative emotion of fear, in respondents with non-religious views is ubiquitous. Subjects with religious views neutralize the present negative emotion.

In an earlier study, Professor Jake Brain's laboratory, Mind & Consciousness used a functional MRI machine to examine brain activity and an analytical network of neurons. Scientists have found that people have two neuronal networks - one that deals with faith and the other that deals with analytic work. It is wrong to think that religious attitudes are more common in people with lower education. The most intelligent people are profoundly religious and believe that they have come to their knowledge thanks to God's thought. One of the most important characteristics of human meta-thinking, that is the ability to think about the way we think, allows us to think of who and what we are and how other people see us. Religiosity allows us to compare ourselves in relation to a standard and it is a process present throughout the life span. However, this process does not take place continuously; it is more or less pronounced depending on several factors, including the specificity of the situation [16]. Having in mind the specificity of the sample and the circumstances, being in the institution, relation between planning activities and attention and present religiosity, was analyzed through positive (Figure 5; Figure 6) and negative aspects of thinking and feeling (Figure 7), self-cognition and knowledge of others. A previously mentioned study of two networks of neurons, one that deals with faith, and the other that deals with analytical work can be applied to the relation of faith and exquisite functions. The presence of a religious attitude limits the planning, anticipation, and verification of activities. However, the results of this study show that religious respondents are more disciplined, organized in activities and have a healthier lifestyle. Faith is not a quest for truth but an acceptance of the revealed truth. So people who are religious know that they cannot control everything in their lives. This is confirmed by the results of our research. The planning of life activities is in line with their religious thinking. The presence of the religious way of thinking among our respondents alleviates real fears of age, illness and death in the population of the elderly. The results of this study are interesting, but there are also significant limitations. First, since we rely exclusively on correlation observations,

further work is needed to better establish causal relationships between belief and neuropsychology. Second, the distinct dimensions of social cognition remain to be fully explored. There is evidence that religious thinking and/or belief is linked to emotional self-control (The presence of positive emotions and optimism and the presence of negative emotions and fears). Third, the question arises as to whether the relationships between cognitive functions and religion obtained in the younger population. Fourth, the question arises as to whether the results obtained would be different in the population of the elderly, but who did not live in the institution but in the family. A limitation of the study comes from the specificity of the selected sample. The attempt of linking neuropsychological functions and religiosity opens a new interesting field of investigation. This leaves enough space for future research with more comprehensive methodology.

5. Conclusion

The significance of present research is evidence for the existence of correlation between capacity of planning functions and attention with the present religious attitude. Our results show a positive correlation between the quality of executive functions and attention with present non-religious attitude of the respondents. The presence of religious attitude in interviewed persons in our group more easily neutralized negative emotional experience. Both of these associations are of statistical significance. The findings of this research should encourage future studies to do a deeper analysis of this relationship, with potential clinical, but also general social significance.

6. Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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