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Psychoneuroimmunological Factors of Physical Impairment of Aging Period

Abstract

The concept of life span assumes that old age is a period of development being a balance of gains and losses. Aging goes hand in hand with increasing losses and decreasing gains. The system theory perceives a human being as a psychophysical system which can be easily seen in critical periods, e.g. old age. Thus, it is assumed that psyche and soma are interdependent. Taking into consideration the way old age is perceived, the balance of way and the feeling of life control, one may assume that these factors may influence physical abilities and somatic health of an organism. Old age is not an illness but increased vulnerability to illnesses. Speaking objectively, one may say that age as a feature of getting old weakens the immunological system of the organism in a natural way and thus it increases the vulnerability to a variety of illnesses and decreases physical abilities. It is possible to avoid the physiological processes connected with aging. One may hypothesize, however, that a positive approach towards old age, good balance of life and a feeling of internal control slow down the processes of aging of cells and vice versa. The overall aim of slowing down these processes is not to prolong human life but to increase the quality of life.

The research carried out was based on the assumption that the way a person sees his or her life, the balance of life and the feeling of control go hand in hand with physical agility. The research covered 436 people, i.e. 120 men and 316 women, all of them over 60. A set of mutual relationships of the indicated variables was determined and an analysis of repeated regression was made.

The conclusion is: better balance of life and better positive self-image go hand in hand with better physical agility of the examined individuals. It is difficult to say which of the factors are primary or secondary. It seems that there is an interdependence.

Key words: *psychoneuroimmunology, aging, feeling of life control, , quality of life.*

Introduction

Gerontology takes into consideration the problem of aging which is seen as one of the developmental periods in psychology – life span. It assumes that aging is determined by a life experience of previous developmental periods and by a feeling of control. The mentioned factors influence aging in every life period through creating a mutual system. As a result these factors broaden an attitude of aging acceptance, which includes emotional aspects (fears, aggression), cognitive aspects (value and self-evaluation) and behavioural aspects (activity, free time management). This attitude, through the central nervous system (connected with the autonomous and endocrine system) influences the acceleration and delay of physiological aging processes.

The attitude towards one's own aging, the environment in which a human being lives, somatic and psychical health affects the level of life quality in the aging period. My dissertation deals with two scientific fields: psychology and medicine and with a new field of psychology of health, which scientists named psychoneuroimmunology (PNJ). This field of study assumes that the psychical attitude towards one's own aging determines the strength of the immune system and somatic health in this period of life.

These are interdisciplinary studies of psychology and health. This is a very new discipline because it started to develop in the 70s of the last century and was formally established by the American Association of Psychology in 1978.

This field of studies promotes a holistic approach to human organism, recognizing a strict two-sided relationship between psyche and soma. That is why it promotes a biopsychosocial model of health. This model is based on the theory of systems. What is more, it recognizes that social and psychical (not only biological) factors influence the human organism. Therefore, psychology of health can help a person to prevent diseases and aging through learning how to change attitudes and behaviour.

Basing the empirical programme of the aging issue on life-span psychology, I believe that there is no contradiction between this theory and the theory of systems. A human being is perceived as a psycho-somatic system and an under-system to a human environmental system. Among the main assumptions of this theory, there is one which allows - because of psyche's multi-dimensionality and its potential endless development – to do multipragmatic, theoretical and methodological research. The most noble representatives of life-span philosophy, independently of their personal research preferences, believe that 'methodological purism' does not have full explanation on the psychology field and even limits its development. Thus, it is suitable to abandon this theory, especially in the sphere of research that deals

with personality and its development (Baltes, Reese, 1980). Each system of the human organism undergoes dynamic changes within successive developmental periods. It creates continuity, besides, by its transforming, it influences other systems causing new positive or negative developmental changes.

The following notions are basic in the programme of research:

1. life experience or balance
2. environment
3. sense of control
4. attitude towards one's own aging
5. somatic state (multi-disease, physical impairment decreasing)
6. level of aging depression
7. mental impairment

1. Life balance is a subjective evaluation experienced through the whole life. That is adopted and gathered information, gained as a result of mutual interaction of a unit with environment in each developmental period. Hereby, in the dissertation I examined old people's life in three developmental periods: childhood, youth and the current life period.

2. Environment is a general condition of situations, events, units and social groups, which influences a human being in each life period. We assume that everything that cannot be described as a unit is in fact relatively its environment. A unit itself also affects environmental factors, transforms and modernizes them and in the transformed and modernized form enters into relation with a given unit, so there is a mutual relation between a unit and environment. The examined old people live in villages, small towns, big cities, in old people's homes or on their own.

3. A sense of control is a conviction of a person that he/she has an influence on their life, functioning, satisfying their needs, making choices and decisions. If a person believes that decisions and choices depend on him/her, they control their life. Additionally, it means that they use internal control. However, if a person thinks that he/she does not have an influence on their decision taking and does not have an influence on their life – it means that he/she uses a sense of external control. The sense of control is formed during the whole life and at work. In the dissertation, the qualitative analysis of sense of control – as a feature of personality within the whole life on the basis of semistructural examination – will be taken into consideration.

4. Attitude towards one's own aging is an emotional, cognitive and behavioral structure that appears as an attitude towards oneself as well as toward the life period which currently a given unit is dealing with. In the dissertation, what is the most important is the attitude towards one's own aging, not aging at all. The research

results show that the examined old people who consider their own aging are not reliable. That occurs because old people answer in the way as if aging did not concern them, they consider it as a feature of other old people. On the basis of the research, in my dissertation I would like to distinguish four old people's attitudes towards their own aging and towards their own life: two positive ('towards yourself' and 'towards other people') and two negative ('against yourself' and 'against other people').

A) A positive attitude 'towards yourself' is characteristic of people who develop their personality, wonder what they may do, what is good for them, which activities are the most suitable, take care of being fit, use relaxation techniques, think positively, read and discuss current issues, etc.
B) A positive attitude 'towards other people' is characteristic of people who try to help other people, participate in social life, take care of ill people or act in church movements etc.
C) A negative attitude 'towards yourself' is an attitude of old people who analyze their reactions, behaviour, have somatic disorders, are often in a bad mood and always complain.
D) A negative attitude 'towards other people' can be described as interfering in other people's life, criticizing, causing conflicts or being malicious.

5. The somatic state of an old person can be characterized on the basis of two types of biological changes in the aging period: dropping of fitness and multi-pathology. Dropping of fitness is revealed in limitation of physical ability, higher tiredness, low activity and vigour lacking. It happens because of gradual receding of organs' functioning, which cannot be regarded as a normal aging process but as a complication after diseases. Thus, the multi-pathology term refers to disease occurrence at the same time, which is caused by domination of katabolic and metabolic processes which influence largely organ functioning (Harwas-Napierała, Trempała, 2002). Aging is not a disease, but it is a period of higher susceptibility to diseases – which is connected with worse functioning of the immune system and with the above-mentioned susceptibility of cells.

It is generally accepted that there is no typical illness of aging. All diseases that occur in the aging period may also occur in different periods; only the frequency of their occurrence can be different.

Susceptibility of cells, tissues and organs changes relatively to age and may influence disease processes. In fact, the biological age of an old person is crucial here. The stronger and more vital person is, the better their organism functions.

The decrease in organism functioning is characterized by higher physical impairment, especially if it is of degenerative character. It influences problems with independent functioning and with coping with daily activities. First of all, sight and hearing deteriorate. The motor system of an old person is getting worse because

an old person does not feel safe, is afraid of having an accident on the road. The next problem can be connected with diseases characteristic of the motor system, which of course, causes problems with movement (Wiśniewska-Roszkowska, 1987). The somatic state of the examined people will be evaluated on the basis of illness frequency, of typical illnesses chosen from the geriatric literature. The number of diseases is a kind of clue how the immune system functions in the aging period. The motor system is evaluated on the basis of subjective evaluation of dealing with daily routines: independent dressing, consuming of meals, moving on stairs, using of toilet, and with appearance.

6. Despite the common social belief that the problem of depression refers mainly to elderly people, they are less likely to suffer from this mental disorder than younger ones . If, however, the disorder occurs in relation to an eldery person, its symptoms are somewhat different from the standard ones. Eldery people with visible signs of apathy, indifference and decreased vitality as well as a lack of self-care and inclinations towards self-depreciation, avoid calling their mental state a depression. On the other hand, when the presence of physical symptoms, which may point to depression, is confirmed (e.g. lack of appetite or sleep disorders) more attention should be drawn to the exclusion of all the alternative sources for these disorders, somatic diseases included.

Unfavourable changes in life of an elderly person (such as: retirement, disease, loss of a spouse) very quickly lead to depression. "Depressive reaction" is a state of emotional disorders, which are extremely intense and still present despite removing the causes of emotional tension.

In some cases senile depression refers to people who have already suffered from depressive psychosis for a longer period of their mature life. In these cases the symptoms of senility interweave with already existing depression symptoms. Such people are very restless and excited; they suffer from insomnia and a feeling of guilt (D.B. Bromley, 1969, p. 156).

The cause of depression is always very complex and covers psychological as well as biological and social factors.

The mental state of elderly people suffering from depression gets worse very abruptly within a few weeks. During this time, anxiety, hopelessness and unhappiness increase. The ill are incapable of sleeping and having a proper diet.

In case of elderly people, the so-called purpose depressions (with no previous symptoms) can occur. Depressions being the result of brain damage (increasing steadily from initial mild symptoms) are also common. Such initial symptoms as the decrease of intellectual level, the impairment of recent memories, absent-mindedness and confusion lead to the restraint from private and social life. As a result, these people become less sensitive (Kepinski, 1978, p.150).

Analyzing the level of depression, people's life was described with reference to satisfaction, coping with difficult situations, future plans, etc.

7. The efficiency of the intellectual functions, such as attention, memory and intelligence, decreases with age. When considering attention, its three basic features should be taken into consideration: selectivity, capacity and concentration. Selectivity is the ability to register a certain range of available stimuli. It is known that this ability aggravates with age and that elderly people have more and more difficulties with visual searching for a concrete element (Bryant, Colman,1997).

Capacity is the amount of information a person can process simultaneously. Age is a typical factor influencing a typical evaluation test for this feature, which is doing two things at the same time. An elderly person has more problems with the aforementioned task than a young one. Concentration is measured with the time needed for keeping an object in the attention span. According to the research, elderly people (with the same capability as the young to recognize the objects properly) get tired sooner and start to make mistakes. In the tasks devoted to concentration they score worse and even when given more time for a certain exercise, they do not have the same results as their younger mates (Coni,1994).

Together with age, working memory is less and less effective; we are left with long-term memory only. The capability for memorizing and storing decreases (Bryant, Colman,1997).

When accepting the above-mentioned definitions in the empirical research programme, one is bound to present their correlations.

The feeling of control is treated as a criterion for the whole life assessment and it can be interpreted with reference to 'life-span' psychology. It is a constant factor present in every life period, though the forms and the level of control are different for every individual and for every life period. The feeling shape is influenced by the individual's activity and their relations with the social environment. Thus, the feeling of control as well as the relations with the environment condition the acquiring of life experience in every life period.

Life experience defined as the subjective assessment of the whole life (life balance) conditions the shape of the structure, referred to as the attitude towards one's own senility in the emotional, cognitive and behavioural aspect. Through the central nervous, autonomous, hormonal and immunological system, the attitude influences our somatic and mental health, i.e. the acceleration or delay of the aging processes. Thus, all the above mentioned factors condition the quality of life in its every development period, also in the senility one. Elderly people with a high level of the sense of control, positive life balance, positive attitudes

towards themselves and their life situation are healthier and more kinaesthetically and intellectually efficient. On the other hand, those with a lower level of sense of control, negative attitudes towards themselves and their life situation, have health problems, lower psychical and intellectual efficiency as well as kinaesthetic one.

The aim of work, methods and variables

The aim of my research is to present the influence of the psychological variables on the somatic state and on the symptoms of aging such as: lower kinaesthetic efficiency, intellectual disorders, a high level of senile depression, a low level of life quality and multiple diseases. The most important psychological variables described with reference to the scientific literature (gerontological, geriatrical, medical and psychological) and important for an elderly person's functioning are: the level of self-control shaped according to assumptions of "life-span" psychology, life balance and the attitude towards oneself and one's current life situation.

The research done on 436 individuals is to answer the question concerning the extent to which a constructed model of an elderly person's functioning corresponds to the empirical one. With reference to the above-mentioned assumptions, the following problematic question has been formed:

How deeply do the psychological variables influence the analyzed kinaesthetic efficiency functions, vulnerability to depression, intellectual functions disorder and vulnerability to diseases?

The independent variables for the needs of this paper will be:

1. the feeling of control (low, medium and high PK)
2. the attitude towards oneself and one's life situation (weak, temperate and strong intensification of attitudes: positive towards oneself – PKS; positive towards the others PKI; negative towards oneself – NPS; negative towards the others – NPI)
3. life balance (negative, neutral, positive)

The dependent variables are as follows:

1. decrease of kinaesthetic efficiency
2. depression level
3. impairment of the intellectual functions
4. vulnerability to diseases

The verification of the above-mentioned hypotheses and the determination of the variable importance will be carried out with the aid of suitable research methods.

The analysis of the degree of kinaesthetic efficiency impairment

The process of the organism's progressive aging leads to the situation when elderly people have greater problems with moving and everyday existence. The lowering of the kinaesthetic efficiency is an individual process depending on age, sex, education, place of residence and social environment.

Table1: The kinaesthetic efficiency impairment and age/sex of the analyzed individuals.

	60–65			66–71			72–77			78 +		
	M	**Me**	**SD**	**M**	**Me**	**SD**	**M**	**Me**	**SD**	**M**	**Me**	**SD**
F	4.46	0	10.16	4	0	7.31	7.15	1	11.04	14.72	8	17.37
M	1.94	0	6.65	4.49	0	12.07	6.12	0.5	14.33	12.52	10	12.84

One has to take into account the fact that the above-mentioned questionnaire points to the loss of the kinaesthetic efficiency with reference to elderly people. Thus, the greater the statistics in the table, the lower the kinaesthetic efficiency of the analyzed individuals. As results from the table, with the passage of time, the kinaesthetic efficiency (including both sexes) decreases. However, in every age group, this is the men who are fitter than the women.

Table 2: The kinaesthetic efficiency impairment and the level of education of the analyzed elderly individuals

	elementary			vocational			secondary			higher		
	M	SD	Me	M	SD	Me	M	SD	Me	M	SD	Me
F	8.94	13.75	2	6.98	13.04	0	3.68	6.10	0	4.09	12.00	0
M	11.79	16.68	2.5	24.45	18.93	20	1.39	3.86	0	0.5	1.22	0

Analyzing the kinaesthetic efficiency impairment with reference to the educational level of the researched group, it is visible that the higher the education, the lower the impairment. Men with higher education are the fittest ones. Their counterparts with high school education are next in line, followed by women with higher and secondary education. The worst results are obtained by men with vocational education. Such a great kinaesthetic functions impairment within the male vocational group may be correlated with the fact that they have been working hard all their lives and as a result the condition of their joints and muscles is poor.

Table 3: The kinaesthetic efficiency impairment and the place of residence of the analyzed individuals.

	M			MM			with WSI		
	M	SD	Me	M	SD	Me	M	SD	Me
F	7.28	13.00	1	4.79	8.50	1	8.38	2	12.92
M	5.11	12.00	50	7.136	12.27	0	5.78	0	11.39

Analyzing the correlation between the kinaesthetic efficiency impairment and the place of residence, it is visible that women from small towns and men from villages and big cities are the fittest ones. The most impaired kinaesthetic efficiency refers to women from villages and big cities as well as to men from small towns.

Table 4: The kinaesthetic efficiency impairment and the social environment.

	ZDZ			S			DPS		
	M	SD	Me	M	SD	Me	M	SD	Me
F	7.99	11.44	3	7.23	12.97	1	17.63	18.45	13
M	6.1	9.86	1	10.85	16.94	2	25.63	18.81	21.5

Taking into account social environment as a differentiating factor, it can be observed that men and women living with their families as well as women living on their own are the fittest ones. The lowest degree of kinaesthetic efficiency refers to the residents of the social security houses. This situation can be related to the extensively caring attitude of the staff towards the residents.

Kinaesthetic efficiency impairment

Analyzing the above-mentioned variable, the following multiple regression parameters have been achieved:

R = .35886088 R2 = .12878113 Correct. R^2 = .11659625

F(6.429)=10.569 p<.00000 error of the estimation: 11.532

Table 5: The summary of the dependent variable regression: kinaesthetic efficiency impairment

	BETA	*Error BETA*	*r*	*B*	*Error B*	*t(429)*	*p*
W. free				25.42406	5.28214	4.813211	2.06E–06
P_K_	0.093639	0.047713	–0.02532	0.052594	0.026799	1.962543	0.050345

	BETA	*Error BETA*	*r*	*B*	*Error B*	*t(429)*	*p*
PKS	**–0.20068**	0.051893	–0.28588	–0.17934	0.046373	–3.8673	**0.000127**
PKI	–0.06551	0.047907	–0.16573	–0.06469	0.047304	–1.36752	0.17218
NPS	0.09016	0.047983	0.160898	0.072461	0.038564	1.878993	0.060923
NPI	0.009077	0.047092	0.076417	0.007823	0.040586	0.192752	0.847244
BALANCE	**–0.17458**	0.051703	–0.27336	–0.17325	0.051309	–3.37655	**0.000801**

As results from the presented research, the most important predicate of the kinaesthetic efficiency impairment with reference to elderly people is the positive attitude towards oneself and the positive life balance. Both variables have a negative correlation with the discussed variable, which means that the more positive the life balance and the more positive the attitude, the better the kinaesthetic efficiency of the analyzed individuals. It is hard to say which of the factors is primary and which is secondary. Most probably, the correlation is bilateral.

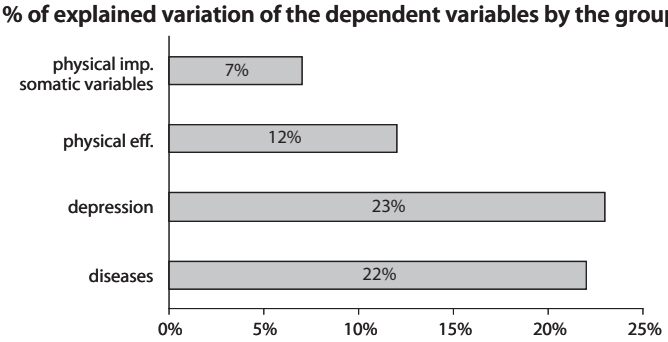
Table 6: Redundancy of the independent variables; DV: kinaesthetic efficiency impairment

The column R-Square includes R-Square of the appropriate				
variable with all the other independent variables.				
			Partial	**Semipart.**
	Tolerance	**R-Square**	**Cor.**	**Cor.**
PK	0.892071	0.107929	0.094331	0.088442
PKS	0.754151	0.245849	–0.18354	–0.17428
PKI	0.884839	0.115161	–0.06588	–0.06163
NPS	0.882046	0.117954	0.090343	0.084672
NPI	0.915749	0.084251	0.009306	0.008687
BALANCE	0.759703	0.240297	–0.1609	–0.15216

Analyzing the semi-partial correlations, we see that the most important correlation also points to the relation and explanation of the kinaesthetic efficiency impairment by means of PKS (Positive Towards Oneself) and the balance. Both variables explain the analyzed dependent variable in 24%.

The following diagram presents the clarifying dependent variables in the regression analysis.

The diagram presents the effects of the survey of the explanatory variables for the intellectual functions impairment, kinaesthetic efficiency impairment, depression level and the vulnerability to diseases.



With reference to elderly people, the quality of life is to a great extent (22%) influenced by diseases. This is explained by the group of variables created in relation to the analysis of regression.

Conclusions

The kinaesthetic function impairment deepens physiologically with age. The research confirmed this relation and proved that men are less kinaesthetically impaired in comparison to women. The analysis of this function research also proves the relation between kinaesthetic efficiency and education. The higher the education of the analyzed individuals, the better the physical efficiency. The highest kinaesthetic efficiency refers to women from small towns, men from big cities and people living with their families. The lowest one relates to the individuals from villages and to the residents of social security houses.

The variable has been verified with the method of multiple regression. As a result of using this method, it turned out that the above-mentioned efficiency is influenced mostly by two predicates: the positive attitude towards oneself and life balance. The research of elderly people's kinaesthetic efficiency pointed to its loss. It means that elderly individuals are fitter if their attitude towards themselves and their life balance is positive.

The process of aging is an individual one. It depends on psychological and somatic factors as well as on the social environment. According to prof. Kepinski, the psychosomatic correlations reveal themselves most often in the critical period of life. Senility is such a critical period.

As results from the presented research, the psychological as well as the somatic factors are covariable. A human being is a psychosomatic system and both spheres, psyche and soma, are closely correlated. Life balance plays a very important role in the life of an elderly person, who tends to evaluate their life as a whole. If the

balance is positive (i.e., if an elderly person perceives his/her life as a good and happy one), the person himself/herself has a very positive approach to himself/herself. A person is more active and as a result more efficient in everyday life; they feel fully responsible for their life.

This influences the immunological system in a favourable way and protects the organism against diseases. Thus, a person ages physiologically. If, however, the life balance is negative, a person becomes bitter, pessimistic towards themselves and the world, less active and not responsible for their own life. Success as well as defeat are perceived to be dependent on external factors. The immunological system is weaker and a person is more prone to various diseases. He/she also needs help from others. A functional regression follows, which means that the kinaesthetic efficiency is more and more impaired.

As a result, the so-called plural pathology appears. Analyzing the term "quality of life" along with the concepts of different authors, it can be noticed that health as a factor conditioning the feeling of quality, is a relatively new concept. Research suggests that health is the most important category of elderly people's life quality. Thus, seniors should be informed of this holistic model – the influence of psyche on immunity.

The research presented in this paper is based on the psychoneuroimmunological theory. This science allows to create models of empirically verifiable correlations between human personality and the reactions of the immunological system and disease symptoms. The intention of the author of the paper was to test the model referring to human functioning in senility. Starting with the assumption of the "life-span" psychology, senility is perceived as a development period, in which developmental changes take place, both losses (restrictions) and profits (increase).

Bibliography:

Ader, R. (1990): Psychoneuroimmunologia. *Nowiny Psychologiczne, 1–2,* 141–150

Baltes, P.B.; Rees, H.W. & Lipsitt L.P. (1980): Life-span developmental psychology. *Annual Review of Psychology, 1*, 65–110.

Bromley, D.B. (1969): *Psychologia starzenia się*. Warszawa: PWL

Bryant, E. & Colman A. (1997): *Psychologia rozwojowa w zarysie*. Poznań: Zysk i S-ka.

Coni, N.; Davison, W. & Webster, S., (1994): *Starzenie się*. Warszawa: Wydaw. Naukowe PWN

Harwas-Napierała B. & Trempała J., (2002): *Psychologia rozwoju człowieka*, Vol. 2. Warszawa: PWN.

Wiśniewska-Roszkowska K.,(1987): *Starość jako zadanie*. Warszawa: PAX.