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**SOMATO-PSYCHICAL CHARACTERISTICS OF CHILDREN IN
THE PUBERTY AGE**

THESES OF THE DOCTORATE DISSERTATION

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1. Introduction

In respect of our somato-psychical status the puberty age is one of the most critical period of our life where the instability of the hormon-system is followed by the dramatical change of dimensions of the body skeleton and by the quick maturing processes of the sexual development. The somatic structures which has been already developed by that time but which are not yet matured reach their developed form after their temporary, instabile, puberty-age development stadium, their function approaches the adults's functional stability (Tanner 1962, Bodzsár 2001):

The body's changes occurring in the course of the puberty, the development of the visible sexual characteristics call forth unbalanced psychical fuctions and increased self-observation (Tanner 1961). To accept the complex of morphological properties which are characteristic to his own gender and the serie of the somatic changes which lead to their development and to let accept them by others causes problem even to a child of average maturing and/or growing type; this is even more true in the case of children whose development differs from the average, either in respect of the body's dimension and shape or who develop significantly earlier or later than their similar-aged companions. The self-valuation of the adults are based ont he complex system of the intersive somato-psychical changes in the adolescent's age. Therefore any disharmony of this complex system may cause the trouble of self-acceptation in the adult age and that of development of the identity.

The complexity of the of the invidiual's development includes - beyond the somatic growing and maturing processes - also the complicated processes of the mental and emotional development and that of the socialisation which are frequently depending on each other (Kohen&Raz 1974, duke and cie 1980, Bodzsár 1981, Bodzsár and Pápai 1991). These physical and psychical factors of the development form the personality together, influencing each other. The socialisation, the learning of the social roles and fuctions in the different groups are similarly important elements of this complex process of development as the processes of the physical development and those of the sexual maturing. The connection between the body development, the sexual maturing further of the mental, emotional and social development and that of the will of the children is a searching field since long of the experts who are working in the different spheres dealing with children and adolescents. Due to the complexity of the subject the number of the examinations which relate to the connection between the physical and the psichycal maturing is relatively low.

2. Targets of the examination

In my dissertation I have examined some phsycho-social characteristics of the puberty age - of this life period which is accompanied by intensive physical changes - in the mirror of the somatic development status by the way that at each point of view of the examination, i.e. in each case of the somatic factors I compare the phsycho-social status of the groups significantly differing from the average to that of the groups of average development characteristic for the group in respect of age (chronological or byological) and of gender.

According to my supposition:

- 1) In the course of the puberty age the somatic changes relating to the complex physical development, the development processes are accompanied by the development of the personality. However, the development of the personality is not independent of the development of the physical developping processes; the physical development diferring from the average could disturb the factors of the phsycho-social sphere too.

2) Further I suppose that the influence to the personality's development differing from the average depends on the measure how „far” this difference is, on the direction of the difference – i.e. if it is positive or negative – and on the period of the puberty age this difference is present in the person being in the status of physical and psycho-social development. According to my supposition the difference of similar volumen and of similar direction could cause considerably worse and considerably better self-valuation, satisfying with life depending on the age-group, so altogether a worse and a better psycho-social status, in addition the somatic difference of the same measure and direction could cause different effects in the adolescents of different gender.

In respect of body composition and body constitution all these effects may be influenced also by the beauty ideal of the age. According to my supposition first of all in the age-groups of the girls it is an important point of view that not only the average body dimensions of the others of similar age may be attractive and the difference from this does effect the psycho-social status, but also the forms which considerably differ from the average, by chance also the forms which show the dimensions of morbid body shape. To prove all these suppositions I examine the following connections:

1) The connections between the status of sexual maturity and the psycho-social characteristics:

- The connection between the mental development level and the status of sexual maturity;
- the connection between the subjective wellbeing (measure of being satisfied with life, judgement of the health, appearing of psycho-somatic symptoms) and the status of the sexual maturity;
- Examination of the connection between the factors of the self-valuation and the status of the sexual maturity.

2) Analyzis of the connections between the body composition and the psycho-social status:

- the connection between the mental development status and the body composition;
- the connection between the subjective wellbeing (measure of being satisfied with the life, health-valuation, appearing of psycho-somatic symptoms) and the body composition;
- Examination of the connection between the factors of self-valuation and the body composition;

3) Searching of the connections between the morphological body constitution and the status of the psycho-social development;

- the connection between the mental development status and the morphological body constitution;
- Analyzis of the connections between the factors of self-valuation and the morphological body constitution.

3. Examined persons and adapted methods

The base of the analysis serving the searching targets are the data concerning the body development status resp. the psycho-social status of the subsample consisting of children aged 10-16 years (5 649 boys, 5 508 girls) of the II. Growth Study (Bodzsár és Zsákai 2007) The sample choosing of the searching had meet the commendations of KSH; it is representative with regards to the national distribution according to the type of settlements and educational institutes of the children aged 3-18 years.

3.1 *The methods adapted for searching the somatic characteristics:*

Antropometrical searching. The measuring of the body measurements has been executed by means of certified antropometrical measuring instruments meeting the international standards and standard measuring technics (Weiner és Lourie 1969).

Estimation of the status of sexual maturity. The estimation of the status of sexual maturity was carried out on the base of the development phase of the secondary gender characteristics (examination of pubic hair and hair on the face, at boys the external genitalia, at girls the development of the breasts (Tanner 1962), further the first pollution resp. menstruation. I have listed the children maturing in a rythme differing from the average – relatively early resp. late – on the base of the scale +-1 of the age median of the development phase of the genitalia in the case of the boys and of the development phase of the breasts in the case of the girls.

Estimation of body composition components. For estimation of the body composition components (bone-, fat-, muscle- and residual mass) I have used the four-component anthropometric method elaborated by Drinkwater and Ross (1980).

Examination of body proportions. The changes of the body's proportions accompanying the growing and the sexual maturing have been analyzed using the z-transformation method elaborated by Ross and Wilson (1974). I have carried out the transformation in the case of the sitting- and iliospinale height, shoulder- and pelvis breadth, elbow- and knee breadth, arm- and thigh circumference, two trunk skinfolds (shoulder-blade and navel) and two extremity skinfolds (biceps- and lower limb).

Analyzing of body composition. I have estimated the individual morphological body compositions by the means of the regression equations introduced by Szomodis and collaborateurs (1976) to estimate the antropometrical somato type according to Heath-Carter (Carter and Heath 1990).

3.2 *Adapted methods to estimate the psycho-social characteristics.*

In the course of the examination we have collected data relating to more psycho-social characteristics from the children.

Estimation of mental achievement. The mental achievement has been estimated on the base of a non-verbal intelligence test elaborated by Cattell (1949) and adapted to Hungarian people. As measure of the mental achievement I considered the percentual proportion of the questions well answered in the test.

Assessment of subjective health status and subjective evaluation of life quality. The rate of the satisfaction with their own life has been estimated using the so called Cantrill-scale (1965). The subjective health status has been assessed on the base of their answer given to the question: „What is like your health?”. On analyzing I have considered the drawn frequencies of the categories „bad” and „satisfactory” resp. „good” and „very good”.

Assessment of psycho-somatic symptoms. In the course of the examination we have collected data also in the respect how frequently the children had met with psycho-somatic complaints (standard symptom list; Haugland és Wold 2001). The examined psycho-somatic complaints has been divided to groups on the base of their characteristics: somatic resp. psychological symptoms, further symptoms referring to sleeping trouble. On the base of the frequency of the complaints we have created sub-groups resp. at more complex analyzes we have compared the sub-groups of children who frequently resp. who only rarely have these complaints.

Examination of body image and self-image. To examine the self-image and the body image within we have used the self-image Tennessee scale elaborated by Fitts (1965) and adapted to Hungarian people by Dévai and Sipos (1986). The sub-groups (self-valuation under average, average, above average) created according to the different components of the self-image (body image resp. moral, individual, family and social self-image) have been created by stating the quartils of the number of the self-valuation points – according to Karkus (2010).

3.3 Statistical processing

The statistical processing and analyzing of the data has been performed with the program packages SPSS for Windows v. 17.0 and LibreOffice Calc v. 3.3. I have analyzed the differences between the children's sub-groups by variance analysis, the significance of the differences between the groups of succeeding maturity phase using the Scheffé comparison by pairs on a significance level of 5%. I have estimated the medians of oigarche- and menarche age used at estimation of the sexual maturity state, resp. the age medians of the development phases of the secondary sexual characteristics by means regression probit analysis (Weber 1969) performed by maximum-likelihood process. The homogeneity examination of the sub-groups created according to the psychological characteristics (body image, psycho-somatic symptoms, subjective health feeling, satisfaction with life) has been performed by means of χ^2 test, on a significance level of 5% as well.

4. Discussion of results and consequences

4.1 The sexual maturity phase and the psycho-social status

My results concerning the connections between the sexual maturing and the mental achievement correspond to the results of previous examinations (Lindgren 1979, Bodzsár 1981): (1) in the age of 13-14 years the mental achievement of the boys and girls who were more matured in respect of their sexual maturity status, in the age-groups of spermarche resp. the nearest to the menarche age median, was better than that of their less matured companions. (2) Our results show that the mental achievement parallel increases not only with advancing of the chronological age but also with that of the sexual maturing.

On the base of my searching results it can be stated that in respect of mental achievement of the girls with different maturing rhythm there is no significant difference excepted the girls aged 15 years: the achievement of the girls matured later is significantly better than that of the girls earlier matured. The reason for this is that the girls who mature relatively late, in the late puberty become more balanced than their companions who mature earlier (Simmons and Blyth 1987).

In the course of the examination of the connection between the sexual maturity status and the rate of the satisfaction with life it was stated that: at boys the rate of their satisfaction with life increases parallel with the sexual maturing while at girls the contrary tendency is shown. At beginning of the examined age interval the early maturing

children, in the middle the children maturing more quickly and slowly than the average are considerably more unsatisfied with their life than their companions maturing at average level.

My searching results have confirmed that the rythme of the sexual maturing and the sexual maturing status have an effect also on the subjective health feeling. The subjective health feeling of the boys before oigarche is worse than that of their companions who have already pollution. At girls this tendence is contrary; the progress of the sexual maturing has negative effect on their health-valuation. At the beginning of the examined period it can be seen at both genders that those who mature relatively early resp. late valuate their health worsely than their companions maturing at average level.

In concordance with the results of previous examinations (Költő és Kökönyei 2011) also our searching has stated that in the age intervallum examined among adolescents the freuquency of the psycho-somatic symptoms considerably increases. Comparing the frequencies of the psycho-somatic symptoms of the two genders we can say that in the three groups of complaints at both genders the psychical symptoms are the most frequent resp. nearly two times more girls than boys feel body complaints.

On the base of my searchings it can be proved that the sexual maturity status is in connection with the frequency of the psycho-somatic complaints. At both genders among the boys and girls „more matured” the frequency of the psycho-somatic complaints is higher. This tendence is also completed by the fact that at boys in the age-groups near/after the oigarche median the frequency of the complaints increases among the boys „less matured”. Also in the frequency of appearing of psycho-somatic complaints it can be definitely shown that the maturing tempo differing from the average increases the frequency of the symptoms.

Summarizing the results concerning the connection between the sexual maturing and the body-image we can state the following: At boys in respect of their body-image my searching results show the positive effect of progress of the sexual maturing; this effect comes across mostly among the boys maturing relatively early; it can supposed that this occurs because their body measurements began already to grow intensively. Contrarily: the body-image of the girls who are sexually „unmatured”, who not yet have their menstruation is more positive than that of their companions who already have their menstruation – this can be explained by the higher fat content of the girls who have already their menstruation. At the same time with the progress of the age an unfavourable tendency can be seen at the girls: among the early maturing girls the rate of those who have a positive body-image is considerably lower than among the boys.

4.2 Body constitution resp. nutritional status and psycho-social status

For both genders it can be stated that the mental achievement of the boys and girls of normal nutritional status resp. of average relative fat content is better than their thin or overweighted companions differing from the average.

In the course of my searching it has been proved that the nutritional status differing from the normal resp. the body fat content negatively effect both the satisfaction with life and the subjective health feeling at both genders. However it means an exception that among the girls in the age of 12-13 years the lower fat content has a positive effect to the rate of their satisfaction with life.

The tendency increasing with the age of the frequency of the psycho-somatic complaints has been influenced by the nutritional status resp. the fatness of the body. Among the adolescents of nuttitional status and body fatness differing from the average the frequency of

the psycho-somatic complaints is higher.

The overweighted resp. the boys with higher fat content than the average have the most unfavourable body-image. The body-image of the thin boys and that of the boys lessly fat than the average are different, in the age-groups of 14-15 years the body-image of the thin boys is expressly negative in comparison with their companions while that of the lessly fat boys is more positive. Similarly to the boys the overweight and the body fat content over average exercise a strong negative effect to the body-image of the girls, this is confirmed also by other examinations. Contrarily to the boys thinness has a positive effect to the body-image of the girls. According to my analyzation the effect to the body-image of the relative fat mass has been proved in the group of the boys: the fat mass under average influences very unfavourably their body-image.

4.3 Morphological body constitution and psycho-social status

On analyzing the connection system among the factors of the morphological body constitution and the psycho-social status I could prove connection of two factors: the mental achievement resp. the body-image and the body constitution. At examination of the connection between the morphological body constitution and the mental achievement the tendency can be observed that the mental achievement of the endomorf overweighted girls and boys is worse than that of those who have ektomorf overweight, resp. the achievement of the mezomorf overweighted boys is lower than that of the ektomorf boys.

On examining the relation between the morphological body fractionation and the body-image it has been proved that the body fractionation differing from the average influences the forming of the body-image: as I supposed, among the boys these are the mezomorf overweighted boys who have the most positive and the endomorf overweighted boys who have the most negative body-image; while the body-image of the ektomorf girls is more positive than that of the endomorf girls.

5. Summary and new scientific results

The results of the present analysis – based upon the 1% representative sample of adolescents aged 10-16 years and learning at school (which means a very large quantity both in international or national respect) - proved the initial presuppositions that the body development differing significantly from the average developmental status of the age-peers, i.e. the non-average body composition, body shape, sexual maturity status, have an important part in the evolution of personality and mental health.

- In every age-group of the examined age intervallum the psycho-social status of the children with body constitution differing from the average was considerably different in the two genders: the mental achievement, their satisfaction with life, subjective health status resp. body-image of the adolescents with sexual maturity status, body-shape, abody-constitution of non-average level are worse, further the frequency of appearing of psycho-somatic symptoms is very high.
- Comparing the mental achievement of the adolescents of similar chronological age but with different sexual maturity status resp. that of the adolescents with similar sexual maturity status but of different chronological age we have proved that the increasing with the progress of the chronological age of the mental achievement is influenced by the sexual maturity status at both genders; in the case of the girls this effect can be confirmed also by statistics. The achievement in mental test of the adolescents of quicker maturing type is better than that of their companions of slower sexual maturing.

- From the examination of the connection system of the morphological body-constitution and the mental achievement the conclusion can be drawn that the body-constitution and the mental achievement are in connection with each other – even if this connection is not direct. The lack on proving this statistically is probably in connection with the fact that both the development of the mental achievement and forming of the body constitution are the result of more factors connected with each other. The background is partly the socio-economical status, partly the psycho-social factors (body-image and self-perception) connected to the body-constitution.
- The progress in the sexual maturity process influences the satisfaction with life – at boys positively, at girls negatively. The tempo of the sexual maturing differing from the average – either slower or quicker - negatively influences the satisfaction with life.
- My searching results proved that the tempo of the sexual maturing and the sexual maturity status influence also the subjective health feeling. This is contrary at boys and girls: the health feeling of the boys not yet having pollution is worse than that of their companions having already pollution, while at girls the progress of the sexual maturing negatively influences their health-valuation. At beginning of the puberty it can be seen at both genders that those who mature relatively early resp. late valueate their health worse than their companions of the same age maturing at average. At the end of the puberty period among the boys the health-valuation of the early maturing boys will be a bit better than that of their companions of the same age, so we can draw the conclusion that ending of the the sexual maturity has a positive effect to this factor. At girls the health-feeling of the late-maturings improves; this can be caused by the fact that though at the end of the puberty their backwardness in body development had brought flustration to them but learning that there are maturing processes also in their body, the slower maturing make them more balanced.
- In the course of the examination of the connection between the body constitution and the body-image the supposition that has been often said but not proved by antropological examination that the body-image of the adolescents whose body constitution is near to the supposed ideal body constitution (at girls „slim”, ektomorf, at boys athletic „mezomorf”) is indeed more positive than that of their companions of the same age whose body constitution differs from the ideal.
- In the course of analyzing the connection between the body constitution and nutritional status resp. body fractionating it can be shown that the worse body-image self-valuation of the boys with thin nutritional status is in connection with the lower relative muscle mass. My searching proved that the negative effect to the body-image of the relative muscle content under average is much more stronger and definitive than the positive effect of the muscle content over average.

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