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MULTIFACTOR NATURE OF ADOLESCENCE

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Abstract: *Adolescence is a hormonally unstable, critical period of life, with dramatic dimensional changes and fast rate of sexual development. It is during this period that previously established structures become consolidated following transitory phases of more or less instability. The complexity of human ontogenesis embraces biological growth and maturation as well as mental, affective and cognitive progress, and adaptation to the requirements of society called socialization process. All these spheres of development are intimately related in the formation of personality. To accept our morphological constellation as part of our gender may prove a problem even to a child of average rate of maturation. Adult self-assessment, a never ceasing process, has its roots in pubertal development. Any disharmony perceived affects adult self-acceptance and sense of identity, our emotional, cognitive and social development as well as our cognition. The main rules of maturation that govern the interrelations between hormonal, physiological and mental processes as well as the sequence of developmental stages are common and universal for our species. However, the rate of maturation can be very different and its inter- and intraindividual variability is most conspicuous in adolescence.*

Keywords: *Adolescence; Puberty; Body height; Secular changes in growth and sexual maturation; Psychic maturation.*

What exactly is adolescence?

In a funny way, almost everyone who studies this period of life is as awkward and clumsy as adolescents themselves. We have immediately to face a multitude of problems, such as: What exactly is adolescence? What are its properties? How long does it take? What are the criteria by which the same individual is no longer called a child but an adolescent? Or a youth? Or a young adult? Have we to do with more or less general features? Or with ones depending on history, culture, a specific generation? Questions abound, and to most of them we have no clear-cut answers. One may even wonder if answers, even approximate ones, are possible at all.

Instead of biologically founded answers we work with hints. We work with terms of silent associations so we should be tolerant to any kind of approach. One can speak only of 'an age of transition' instead of exact boundaries between these phases of life. The biological basis is obviously sexual maturation. Puberty in Latin means becoming a hairy, that is a full-grown and fertile man. However, we all know that the potential to reproduce does not necessarily imply adulthood.

In anthropoids, as in other animals, the ultimate goal of ontogenesis is the preservation of the species. For humans, however, the transition to adulthood requires the acquisition of culture and the skills of coexistence. The acceptance of norms to become able to meet social demands. The acquisition of social roles and functions to become a responsible

adult. Socialization is a precondition of adulthood as important as physical development and maturation are.

In this way the 'age of transition' is a multicollinear process of several levels and several interactive stages. It is not quite right to use the term puberty as a synonym of adolesescence. Adolescence is a derivate of the Latin verb of 'adolescere' meaning to grow, to mature. Thus it carries the acknowledgement that human development involves biological growth and maturation, but also the exfoliation of psychic faculties and socialization.

The complexity of human ontogenesis embraces not only biological growth and maturation but mental, cognitive and affective progress, and adaptation to the requirements of society called socialization process. All these spheres of development are intimately related in the formation of personality.

Features of pubertal growth and maturation

The main rules of maturation that govern the interrelations between hormonal, physiological and mental processes as well as the sequence of developmental stages are common and universal for our species. Pubertal growth spurt is a typical attribute of growth of all normal children (Figure 1). However, the rate of maturation can be very different and its inter- and intraindividual variability is most conspicuous in puberty (Figure 2).

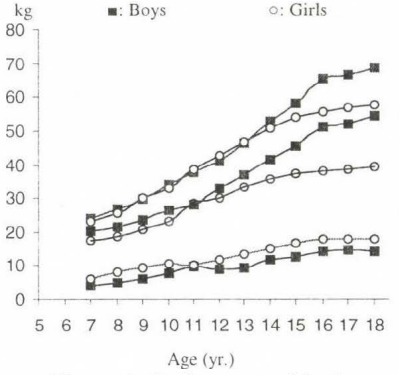

Figure 1: Body mass and body components by age (Bodzsár and Szmodis 2000).

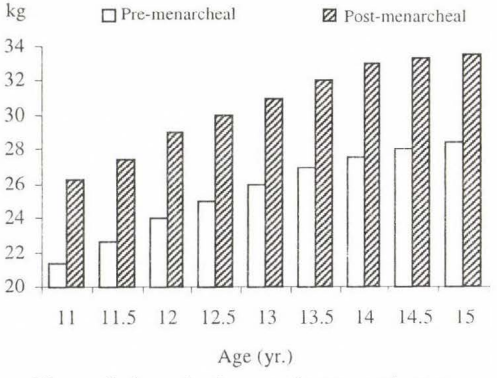

Figure 2: Lean body mass in pre- and post-menarcheal girls (Bodzsár 2001).

The timing, rate and duration of the pubertal changes depend on the population as well as on the environment and each of these changes is gender-specific (Figure 3).

This is then also the phase in which sexual dimorphism in the somatic characteristics becomes more and more manifest. In this way, the pattern of growth and development of a given child population tends to change dynamically with time and with the change in the environment (Figures 4–5).

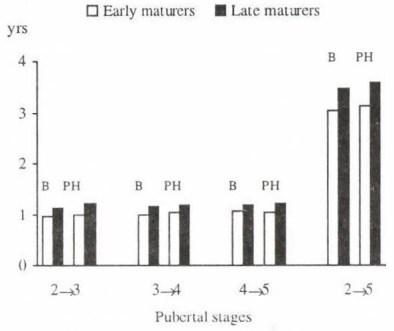

Figure 3: Time intervals between stages of breast (B) and pubic hair (PH) in early and late menarcheal girls (Bodzsár 2000b).

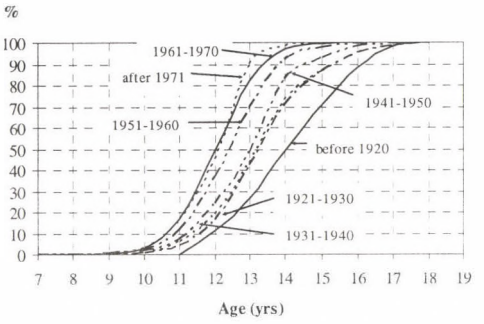

Figure 4: Change in the cumulative frequency (%) of menarche in Fejér county (Bodzsár 2000b).

The reasons that make the follow-up of this changing pattern worth closer study are manifold. Any shift towards an earlier or later age in the start of biological adulthood as well as the directional or rate changes of the population's maturation pattern must be reflected by appropriate changes in education policy, in legislation and legal decisions.

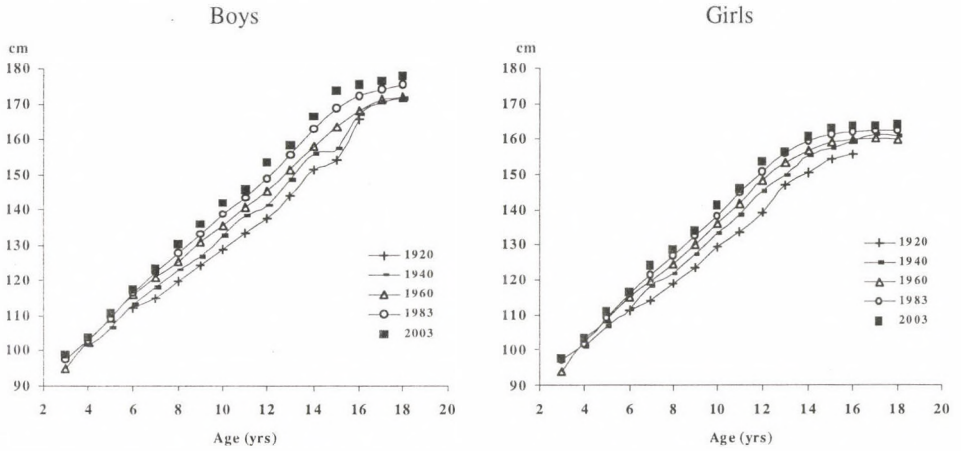

Figure 5: Secular changes in Hungarian children's body height (Bodzsár et al. 2004).

The rapid change in physical dimensions and sexual maturity, the hormonal instability of this phase create sharp differences not only between the genders, but even between children of the same sex if their developmental and growth patterns differ. Body dimensions grow very fast (of the total increment towards adult size about 20% occurs in this period), and eventually bring about qualitative changes and may so determine final body composition until adult body structure develops. On the other hand, pubertal physique and body composition are important factors acting upon the intensity of growth and the rate of sexual maturation.

Effect of the physical traits on psychic maturation

In addition to the change in body form and structure, puberty is associated with such modifications of the psyche that mould personality as a whole. The course of dimensional growth, sexual maturation, the development of the secondary sexual characteristics are joined by a marked instability of psychic functions and a growing awareness and criticism of self. Identification with one's sex-linked morphological build may pose a problem even for a child of average developmental rate, and the same becomes accentuated when one's developmental rate differs from the average (Jones and Bayley 1950, Tanner 1962, Shipman 1964).

The hypothesis that the developmental rate of some physical, respectively mental and emotional indices of maturation are mutually related has been supported by a number of studies. Relationship of mental and affective development to early and late maturation has been found to be closer in boys while observations made in girls are rather contradictory (Stone and Barker 1937, Douglas and Ross 1964, Lindgren 1979, Bodzsár 1981, 1996). This state of affairs may have several reasons as physical traits can affect adolescent behaviour and personality in three aspects:

(1) relative maturity, size and body build get directly manifest in physical abilities;
(2) outward look and expressions of maturity are socially recognized values so invoke immediate emotions and expectations of the social environment;
(3) congruence or incongruence between look and individual abilities and between these abilities and their social reception exert strong influence on our self-concept.

A boy whose growth rate is accelerated can excel his less fast developing peers in size, bulk, physical strength and sport performance for years. In males the effects of an out-of-step development can be demonstrated even in adulthood since tall stature and physical strength are much valued attributes at every age. The social repercussions of a similar difference between early and late maturation are much less obvious in girls. Some studies have reported preferences for late maturers, some others have stated that early maturers enjoy more social advantage.

Adult self-assessment, a never ceasing process, has its roots in pubertal development. Any disharmony perceived affects adult self-acceptance and sense of identity, our emotional, conative and social development as well as our cognition.

In studying the differences in mental performance, self-concept, social impact of the personality, fat content and body image between the early and late subgroups of sexual maturation we found that:

1) Accelerated physical maturation was accompanied by faster mental development, that is, the latter largely paralleled bodily development (Figure 6). This observation corroborates other studies (Jones 1957, Weber 1976, Lindgren 1979, Duke et al. 1980, Bodzsár 1981, 1996, Bodzsár and Pápai 1992).

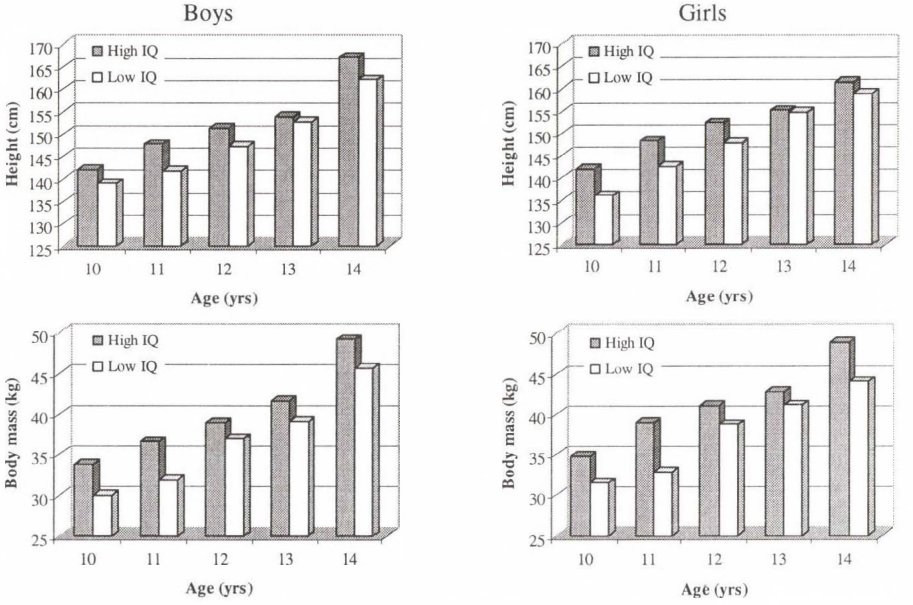

Figure 6: Body height and body mass by IQ (Bodzsár 2003).

2) The observed relationship of body composition and body image reflects that the higher fat content contributes markedly to an accumulation of negative scores in self-concept as well as to a rejection of fat in others (Figure 7).

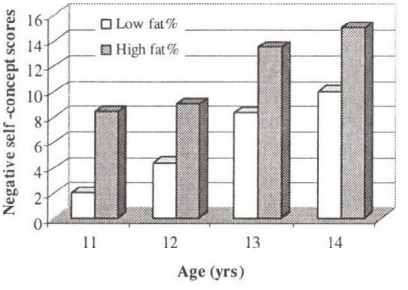

Figure 7: Negative self-concept scores related to fat percentage vs. age (Bodzsár 2000a).

In this way, — despite its high prevalence — neither adults, nor children regard fatness as a preferable trait. This may be also motivated by experience since obese children were found to score poorer in IQ tests (Tables 8–9, Kohen-Raz 1974, Bodzsár and Pápai 1991). The outcome of this negative self-concept coupled with the environmental attitude is that such children become socially isolated (Stone and Barker 1939, Davidson and Gottlieb 1955, Mussen and Jones 1957, Jones and Mussen 1958, Weatherley 1964).

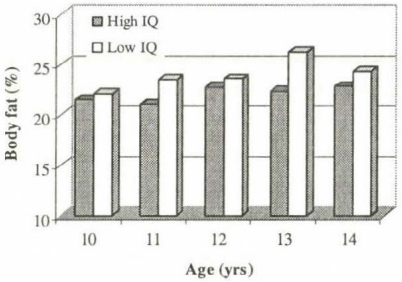

Figure 8: Percentage of fat related to IQ score vs. age (Bodzsár 2000a).

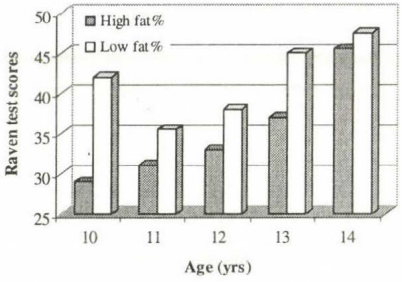

Figure 9: IQ score related to percentage of fat vs. age (Bodzsár 2000a).

3) The effect of maturation rate on the development of a negative self-concept exerted by the rate of sexual maturation depended on age and was equally demonstrable in the too early or too late maturers (Figure 10). It has to be noted that in the studied age range a lack of feminine body shape has yet no dominant role, thus it would not disturb identification with one's own body scheme. Provided that it only arose from the rate of maturation, negative attitude to body shape in the early maturers fades soon. In the late maturers this may take longer.

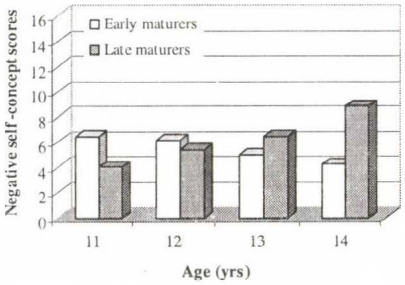

Figure 10: Negative scores in self-concept vs. maturation tempo (Bodzsár 2000a).

Conclusions

Some attributes of the affective response in puberty have their roots in the physiological and hormonal processes. Psychologists have deemed the ages between 12 and 14 the most difficult phase of emotional development. It would be a mistake, however, to reduce pubertal emotional responses merely to hormonal effects. These responses depend on, and become modified by, social interactions and breeding. Adolescents are much concerned about their body and look. Interest in one's self and body is quite naturally aroused by the experienced change in body shape and sexual maturation.

One important factor in self-concept arises from the perceived social roles, another two are body image and identification with one's physical properties. Fast physical growth and maturation induces fast changes in body image so it is small wonder that adolescents usually have a negative perception of their physical development. The degree of self-

acceptance has a strong impact on behaviour. It is a far from easy task to gain social acceptance and to arrive at a sound degree of self-acceptance even for adolescents who are attractive or nice, and a much more difficult one for those obviously farther away from the "average" or "norm" or the socially desirable one. In them accepting one's body image and developing a positive self-concept may only be achieved by a rearrangement of values. In the more fortunate cases this may involve a higher priority of mental abilities before physical ones. In the less fortunate ones it may lead to a rejection of social norms. Basing on my previous study it may be stated that in late maturing girls a higher intellect may help accepting "lacking" femininity while a lower one cannot compensate for it so identity with one's body scheme becomes distorted.

During adolescence also qualitative changes develop in mental activity. Between the age of 12 and 15 thinking undergoes structural changes until reflective thinking develops. As mental processes become more intricate also emotions and behaviour are bound to reshape. A good number of studies have provided evidence that whenever possible, physical and mental development proceed in parallel. Optimum conditions for physical development promote mental exfoliation, in turn spiritual maturation aids correct self-assessment and efficient social adaptation. Thus — although it may appear as oversimplification — an undisturbed course of physical development has an important part in the evolution of personality and mental health.

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References

Bodzsár, B.É. (1981): Relationship between physical and mental development. *Coll. Anthrop. Suppl.*, 5: 21.

Bodzsár, B.É. (1996): Sexual maturation, intelligence and self-assessment. *Anthropologiai Közlemények*, 37: 24–31.

Bodzsár, B.É. (2000a): Some psycho-social aspects of puberty. In: Bodzsár, B.É., Susanne, C., Prokopec, M. (eds), *Puberty: Variability of Changes and Complexity of Factors.* Eötvös University Press, Budapest. 183–196.

Bodzsár, B.É. (2000b): Variability of changes in puberty. In: Bodzsár, B.É., Susanne, C., Prokopec, M. (eds), *Puberty: Variability of Changes and Complexity of Factors.* Eötvös University Press, Budapest. 1–21.

Bodzsár, B.É. (2001): *A pubertás auxológiai jellemzői.* Humanbiologica Budapestinensis, 8. pp. 198.

Bodzsár, É. (2003): *Humánbiológia. Életkorok biológiája: A Pubertáskor.* Egyetemi tankönyv. ELTE Eötvös Kiadó, Budapest.

Bodzsár, B.É., Zsákai, A., Jakab. K., Tóth, B.K. (2004): Body fatness and sexual maturation status. *Anthropological Notebooks* (in press).

Bodzsár, B.É., Pápai, J. (1992): Physical development and maturation in relation to mental performance in girls from age 10 to 14. *Anthropologiai Közlemények*, 34: 7–11.

Bodzsár, B.É., Szmodis, I. (2000): Maturation status and body composition. *Medical Review, Scripta periodica*, 3: 15–23.

Davidson, H.H., Gottlieb, L.S. (1955): The emotional maturity of pre- and post-menarcheal girls. *J. Genet. Psychol.*, 86: 261–267.

Douglas, J.V.B., Ross, J.M. (1964): Age of puberty related to educational ability, attainment and school leaving age. *Journal of Child Psychology and Psychiatry*, 5: 185–196.
Duke, P.M., Litt, I.F., Gross, R.T. (1980): Adolescent's self assessment and sexual maturation. *Pediatrics*, 66: 918–920.
Jones, M.C. (1957): The later carriers of boys who were early or late maturing. *Child Development*, 28: 114–128.
Jones, M.C., Bayley, N. (1950): Physical maturing among boys as related to behaviour. *Journal of Educational Psychology,* 41: 129–148.
Jones, M.C., Mussen, P.H. (1958): Self conception, motivation and interpersonal attitudes of early and late maturing girls. *Child Development*, 29: 491–502.
Kohen-Raz, R. (1974): Physiological maturation and mental growth at preadolescence and puberty. *Journal of Child Psychology and Psychiatry,* 15: 199–213.
Lindgren, G. (1979): *Physical and mental development in Swedish urban schoolchildren.* Studies in Education and Psychology 5, Stockholm.
Mussen, P.H., Jones, M.C. (1957): The self-conceptions, motivations and interpersonal attitudes of late- and early-maturing boys. *Child Development,* 26: 243–256.
Raven, J.C. (1938): *Progressive Matrices.* HK Lewis, London.
Shipman, W.G. (1964): Age at menarche and adult personality. *Archives of General Psychiatr.,* 19: 155–159.
Stone, C.P., Barker, R.G. (1937): Aspects of personality and intelligence in post-menarcheal girls and pre-menarcheal girls of the same chronological ages. *J. Comp. Physiol. Psychol.,* 23: 439.
Stone, C.P., Barker, R.G. (1939): The attitudes and interests of pre-menarcheal and post-menarcheal girls. *J. Genet. Psychol.,* 54: 27.
Tanner, J.M. (1962): *Growth and Adolescence.* Blackwell Scientific Publications, Oxford.
Weatherley, D. (1964): Self perceive rate of physical maturation and personality in late adolescence. *Child Development,* 35; 1197–1210.
Weber, D.P. (1976): Sex differences in cognition: A function of maturation rate? *Science*, 192: 572–573.

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