

Going all the Way: Theories, Models and Determinants of High Achievement Development

Abstract

In our article we present an overview of current research on giftedness, achievement and factors influencing their development. Determinants of high achievement such as abilities, social factors, deliberate practice, personality and others are discussed, ways of better support of its successful development are sought and its possible changeability is pointed out.

Key words: *giftedness, achievement, abilities, deliberate practice, personality, social influences, intervention*

1. Introduction

Giftedness and achievement are topics attracting growing attention not only recently. We can repeatedly encounter these terms, usually defining giftedness as a potential for future achievement, and concrete actions and activities aimed at support of adequate development of gifted children as well. For the first time the concept of giftedness has been introduced into the Czech educational law system; this allows individuals identified as gifted to get institutionalized care. In this case, “gifted” means an individual, whose distribution of abilities reaches an extraordinary level along with high creativity in a wide range of activities or in particular cognitive, kinaesthetic, artistic or social areas and his or her identification is carried out by School counselling facility (edict of MSMT 73/2005). This step follows a movement noticeable mostly in the USA, where the egalitarian approach to education is increasingly criticized (Benbow, Stanley, 1996) and ways of preventing underachievement of gifted students are sought – the phenomenon of under-

achievement is in the US context referred to by Davis and Rimm (2004) as a national epidemic. This development should be viewed as unambiguously positive; however, identification and appropriate nurture of individuals with potential for high achievement can be linked with various problems. If we want to pursue the recommendation of Feldhusen and Jarwan (1993) and base the process of identification on the best conception of giftedness, we face a difficult task, because the current state of the art is not without controversies. For example, the timeless nature-nurture conflict is presently fomented on one side from the environmentalist positions based on research on development of experts and theory of deliberate practice (Ericsson et al., 1993, Ericsson and Charness, 1994, Davidson, Sloboda, 1998), on the other side there are behavioural geneticists pointing at the significant influence of heredity on human abilities (Plomin, Thompson, 1993, Bouchard, McGue, 1998, Plomin, Price, 2005). The debate between the apologists of the “g” factor (Murray and Herrnstein, 1994, Gottfredson, 2002, Gottfredson, 1997) and the theorists of multiple intelligences (Gardner, 1983, Károlyi, 2005, Sternberg, 1985, Sternberg, 2005) is similarly tempestuous; however it is followed by attempts at objective consideration of current evidence (Neisser, 1996).

Nevertheless, despite these disagreements the contemporary conceptions of giftedness and achievement have much in common and the main subject of controversy lies in the relative influence of various factors, not in their entire denial (cf. Gagné, 2004, Ericsson, 1993). We will try to capture the present state of this debate and to draw conclusions for optimal support of the development of human potential, as Therman (1975) says the most precious resource of society and the most precious resource of every individual as well.

In the first part of our article, we will pay attention to the contemporary models of giftedness and achievement, their theoretical basis, points of concurrence and variance, in the second part we will focus on individual factors, which are considered significant for the high achievement development. At the end we will draw a conclusion concerning the presented research and deduce the best way of identification and support of individual potential.

2. Theories of Giftedness

2.1. Development of Giftedness Theories

The first scholar who strived for the scientific explanation of extraordinary development of an individual was the English polyhistor Francis Galton (Simonton, 1999). In his famous work *Hereditary Genius* based on the research on genealogies of outstanding English citizens he came to the conclusion that the main source of

their achievement rested generally in an inherited high ability. However, also the necessity of “eagerness to work and an adequate power of doing a great deal of very laborious work” (Ericsson, 1994, p.728) was pointed out. Colangelo (2005) calls Galton the grandfather of the gifted movement and as its spiritual father he considers L. Terman, the author of the famous longitudinal study of high IQ Californian children *Genetic Studies of Genius* (Terman, 1954). In this project, giftedness was equated to high intelligence (IQ more than 130), but the evidence against this assumption and the necessary broadening of that time conception of giftedness emerged and new ways of a better explanation of its successful development were sought. For example, Getzels and Jackson (1975) pointed at the importance of creativity for achieving above-average results, or Witty (1958) recommended taking as a criterion of giftedness adult productivity rather than children’s ability. The approach to abilities was also broadened, i.e. Marland in his well-known report (1972) mentioned intellectual abilities, creative or productive thinking, specific academic abilities, leadership ability, visual or performance arts and psychomotor ability.

More recently, Renzulli (1986) reprehends this work for not including motivational factors, connecting incompatible terms and not offering a sufficient basis for identification; he puts forward his own approach, the so-called Three Ring Definition of Giftedness, which changed up-to-date conceptions matching giftedness and high ability by including another two dimensions – creativity and task commitment.

This model also points out that the intellectual ability does not need to be highly superior to let us recognize a good potential; the upper 25% is considered to be well enough.

Renzulli’s work is followed, e.g., by Monks (Mason, Monks, 1993), who adds the fourth social dimension referring to the main social domains of the child’s development – family, school and peers.

Cziksztentmihalyi and Robinson (1986) bring up the importance of the cultural context – expression of giftedness is determined by the relationship between culturally defined possibilities and individual abilities.

The approaches broadening the traditional concept of abilities, especially the theory of general intelligence and IQ (Sternberg, 1985, Gardner, 1984) are also widely acknowledged.

2.2. Comprehensive Models of Giftedness

Ancient effort to capture various influences in the development of giftedness led to the work of F. Gagné (1993, 2004). The dominant theme of his *Differentiated Model of Giftedness and Talent* (DMGT) is a transformation of inborn abilities (he

speaks about intellectual, creative, socio-affective and sensomotoric abilities) into various developed talents via the process of formal and informal learning and practice, which is influenced by the so-called catalysts (environmental, intrapersonal and chance). Gagné (2004) also thinks over the relative influence of these factors and assigns the greatest significance to chance and inborn abilities followed by intrapersonal factors, practice and environmental influences.

Simonton (1999) proposes the so-called Emergenic-Epigenetic Model of Talent Development. According to this model, talent consists of all attributes necessary for high performance in a particular domain and it is inborn. These attributes are considered to be mutually independent and can be either domain-specific (i.e. height) or general (i.e. intelligence). Success in any human activity is a subject of a specific combination of these attributes, whose influence is not an additive one, as usually presumed, but a multiplicative one. It means that in case of a low or zero value of even a single attribute, talent will not appear. This idea follows the concept of emergencies (Lykken et al., 1992), which explains why some traits emerging “accidentally” can have a genetic background. According to Simonton, the emergence model, which is aimed at the description of individual differences, is too static and it is necessary to add a dynamic component. This is provided by the so-called epigenetic model based on two assumptions: a) various attributes develop independently and b) these epigenetic programmes are individually specific. The epigenetic model tries to explain early or late blooming talent, the potential absence of early talent indicators, the possibility of talent loss or age-dependent cross-sectional distribution of talent. One of the main conclusions stemming from this model is that later achievements may be very difficult to predict.

Tannenbaum (2005) presupposes participation of five factors in the transformation of childhood promise into adult fulfilment. These are the superior general ability (“g”), special abilities associated with particular domains of activity, non-intellectual facilitators, environment and chance. A certain level of all factors is considered necessary for the development of high achievement.

Feldman (Morelock, Feldman, 1993) formulates a theory of development of human achievement based on the research of child prodigies, the so-called Theory of Coincidence. According to this theory, biological qualities (genetic and non-genetic), individual psychological qualities, a proximal context (the closest environment of a developing child), an intermediate context (structure of family), a domain of knowledge (its state and development) and distant context (social and historical factors influencing development of individual potential) participate in the development of high achievement.

2.3. Critique

The common denominator of the above-mentioned approaches to giftedness and achievement (perhaps excluding Renzulli's) is the emphasis on the necessity of an extraordinary level of inborn abilities in high achievement development. Usually, the upper 3-5 % is mentioned as a limit, 10% at the most. These conclusions, based mostly on the research into children, become the subject of critique. In the contemporary literature, authors have recently appeared who impeach these hypotheses and ask if the influence of social environment and especially of the so-called deliberate practice does not prevail over inborn inter-individual differences when a longitudinal point of view is adopted (Ericsson et al., 1993).

3. Theory of Deliberate Practice and Development of Expertise

3.1 Cognitive Background

Lately, a new approach which studies the development of high achievement "from the other side" by retrospective investigating of adult experts has got increasing attention (Ericsson, Krampe, Tesch-Romer, 1993, Ericsson, Charness, 1994). Contrary to the above-mentioned theories of giftedness, the necessity of a high level of inborn ability for the development of exceptional achievement is to a large extent questioned here. Cognitive psychology, especially the analyses of differences between novices and experts (de Groot, 1978, Simon and Chase, 1973) and the theory of information processing (Newell, Simon, 1972), serves as the main intellectual source of this approach. These theories suppose a relative similarity of a basic information-processing system with all its processes and capacities among human beings and generally consider acquired knowledge and skills as the most important cause of inter-individual differences. I.e. while Simon and Chase (1973) assume inter-individual differences in dispositions to play chess, they believe them to be erased by long term learning and practice. According to these authors, experience plays the most important role in the differentiation of achievements.

3.2. Facets of Deliberate Practice

Ericsson (Ericsson, Krampe, Tesch-Romer, 1993) supposes that the systematic and long-term training of relevant skills and acquisition of knowledge called deliberate practice is the most important influence on reaching a high level of achievement ('expertise') in various domains. It is defined as "an effortful activity motivated by the goal of improving performance" (Ericsson, Charness, 1994, p. 738.). The commitment to deliberate practice invariably withers away without

this goal, because practice itself is not inherently motivating (unlike play) and does not lead to immediate social and monetary rewards (unlike work). The importance of deliberate practice for the development of experts in various fields has been pointed out; e.g. in music (Ericsson et al, 1993, Sloboda, 1996), sports (Starkes et al., 1996), medicine (Moulaert et al., 2004), software engineering (Sonnentag, 1998), teaching (Dunn, Shriner, 1998) and others.

Deliberate practice has to be of a long-term character; Simon and Chase (1973) show that nobody has reached the level of a chess grandmaster in a period shorter than ten years. Ericsson, Krampe and Tesch-Romer (1993) assume that the general validity of this “ten-year rule” exists even in other domains of human activity.

The most important role is naturally played by the actual time spent in deliberate practice, Ericsson and Charness (1994) speak about the so-called monotonic benefits assumption – resulting performance is a monotonic function of the amount of deliberate practice accumulated since entering a domain. Ericsson, Krampe and Tesch-Romer (1993) found out that the total length of time was in practice reliably differentiated between various levels of musical skills (i.e. at the age of eighteen the most advanced group of violinists invested on average 2000 hours of practice more than group of less accomplished but also professional musicians), whereas no other differences were found. Similar findings are proposed by, e.g. Charness et al. (2005) in chess or Starkes et al. (1996) in athletics.

It seems that the improvement proceeds according to the so-called power law of practice (Newell, Rosenbloom, 1981); at first, depending on the amount of practice the increase of performance is fast and then it slows down, whereas preservation of an attained level is possible until old age, even here Ericsson (2000) presupposes a prevailing influence of practice over the decrease of general ability.

The practice should be carried out on tasks of adequate difficulty with a possibility to make and correct mistakes and it should be accompanied by feedback. Its total length is limited by the ability of an individual to maintain full attention and its frequency by the time of complete regeneration; Ericsson et al. (1993) write that the actual length of time restraining effectiveness of practice is about four hours a day; it is necessary to avoid extreme amounts of practice that lead to overtraining or the burn-out syndrome.

The improvement of performance in a domain is closely connected with an active better-solution seeking and a proper-method finding. When an individual is unable to discover a suitable way of particular problem solving, it is often assigned to a lack of giftedness; nevertheless, it seems that specific instruction may lead to dramatic improvement of performance even in case of people, who are not exceptionally promising (Ericsson, Charness, 1994). As an example we may take children taught to play the violin according to Suzuki’s method; even pupils without foregoing signs

of giftedness were able to reach an extraordinary level when early start and appropriate instruction had been provided.

Simultaneously with the improvement of instruction even the level of entire domain progresses; e.g. Baker and Horton (2004) speak about the growth of sport maturity dependent on the quality of instruction, Ericsson and Charness (1994) mention examples from the area of music, mathematics or sports; i.e. compositions previously considered unplayable now constitute part of the standard repertoire or the winning time of Olympic marathon at the beginning of the twentieth century is currently reached by thousands of people.

3.3. Social Influences in the Development of Expertise

An extremely important role in the development of extraordinary achievements seems to be played by a teacher able to provide appropriate guidance and feedback; individualized instruction is considered to be the most suitable (Bloom, 1984). At the beginning, establishment of future motivation basics should be a priority, for it is an essential condition of ongoing success (Baker, Horton, 2003).

According to Ericsson et al. (1993), inborn inter-individual differences play the most important role at an early age; children who, for various reasons, achieve more success are considered to be gifted and usually get more support. In this way, they get ahead and if they stay in practice, their originally less successful peers have only a limited opportunity to outperform them. Parental intervention is very common in revealing “talent” of children (the author himself uses the quotation marks presuming that no valid indicators of inborn abilities exist at an early age), introducing them into a domain and providing early support (Bloom, 1985).

3.4. Limits and Critique

Although Ericsson et al. (1993) presuppose only a limited influence of inborn abilities in the development of high performance, they recognize that other inter-individual differences i.e. temperament, emotionality or activity influence the engagement of an individual in the long-term deliberate practice and thus at this point meet theories of giftedness.

Schneider (1993) somewhat mitigates Ericsson’s radical environmentalist point of view by referring to the necessity of a threshold; if inborn abilities reach or surpass a certain level (which does not need to be extraordinary) then the amount of deliberate practice supported by non-cognitive characteristics is decisive about upcoming achievement.

Ericsson’s work naturally provoked widespread polemics with theorists of inborn abilities (e.g. Gardner, 1995, Sternberg, 1996). Although it is difficult to accept this

conception without objections, we believe that it is very useful in thinking about the development of achievement.

4. Inborn Abilities – Stable Component in the Development of Achievement

4.1. Theories of Abilities – Multiple Intelligences and “g”

The theory of deliberate practice attempts to challenge the fundamental part of the theories of giftedness supported by common sense, likewise, which is the necessity of a high level of inborn abilities in the development of extraordinary achievement. In the contemporary literature, we can find two basic approaches to abilities (concerning mostly their intellectual aspect): the theories of multiple intelligences and the theory of general intellectual ability or “g.”

H. Gardner (Gardner, 1983, Karolyi et al., 2005) and R. Sternberg (1985, 2005) are currently considered as the foremost apologists of the multiple-intelligence theories. Gardner (1983) concludes in his work based on the research into brain damage, child prodigies, savants and the lives of extraordinary people, that there are seven relatively independent intelligences: linguistic, musical, logical-mathematical, spatial, bodily-kinaesthetic, interpersonal and intrapersonal one (recently, an attempt has been made to add another two intelligences matching Gardner’s criteria, i.e. naturalist and existential, Karolyi et al., 2005).

Sternberg (2005) proposes a concept of the so-called successful intelligence and in this context he speaks about analytic, synthetic and practical giftedness. The core of analytic giftedness is an ability to disassemble a problem and to understand its parts, synthetically gifted people are insightful, intuitive, creative, coming up with new ideas, whereas practical giftedness dwells in an ability to take advantage of any opportunity at hand to reach success in everyday situations. Successful intelligence consists of a balanced combination of these three components.

The supporters of the general intelligence theory, who are theoretically grounded mostly in the psychometric tradition (Carroll, 1993, Jensen, 1999, Bouchard, McGue, 2003), also assume the existence of special abilities, which are, however, supposed to be correlated, creating a common factor of general intelligence. Carroll (1993) structures intelligence into the so-called Strata. Stratum I represents a common factor of general intelligence, Stratum II consists of eight broad factors, which are related to g to varying extents. According to the lessening relatedness to g, they can be arranged like this: fluid intelligence, crystallized intelligence, general memory and learning, broad visual perception, broad auditory perception, broad retrieval ability, broad cognitive speediness and processing speed.

4.2. Critique of Theories of Abilities

The theory of “g” is often rejected as limited, as “a snapshot of the individual’s capabilities at a precise point in time, in a limited range of intellectual spheres, as discerned in the often stressful test-taking situation” (Karolyi et al., 2005, p. 100), or overly academic (“book smarts”) and not taking into account the socio-cultural context, creativity and pragmatic solving of everyday situations (Sternberg, 2005).

The theorists of “g” conversely refer to the interdependence of multiple intelligences, i.e. according to Jensen (1999), four of Gardner’s seven intelligences (verbal, logical-mathematical, spatial and musical) are correlated and the other three are not validly defined, reliably measured and sufficient support does not exist for this theory to be accepted (for elaborate critics of Sternberg’s research cf. Gottfredson, 2001).

Howe et al. (1998) condemn the assumption that a high level of inborn ability is a necessary condition of future high performance and they consider it discriminating. According to their argumentation, performance results from previously acquired knowledge and skills, attention, interests, motivation, competitiveness, temperament or anxiousness. On the other hand, Gottfredson (2005) observes that inborn abilities are the main condition of future achievement when equal opportunities to learn are presented.

4.3. Heredity and Environment in the Development of Abilities

The relative importance of inborn and environmental factors has been dealt with by researchers in the field of behavioural genetics (Plomin, Thompson, 1993, Bouchard, McGue, 1998, Bouchard, McGue, 2003, Plomin, Price, 2005). For example, a correlation in an IQ around 0.75 has been found in twins reared apart (Bouchard, McGue, 2003), which can be, according to these authors, considered as the direct estimation of heritability of intellectual ability. Other authors present similar estimations around 0.7 (Eysenck, Barret, 1993, Neisser et al. 1996). Bouchard and McGue (2003) point out that estimations of IQ heritability change during development – until middle adulthood, they rise dependently on age. This phenomenon can be explained, for example, by an active genotype-environment correlation (Scarr, McCartney, 1983, see below).

There are studies addressing heritability of other than intellectual abilities. Bouchard et al. (1995) indicate that performance in sports is influenced by an advantageous genotype; this assumption is based on varying inter-individual responses on relatively short-term exercise. Baker and Horton (2004), however, point out that long-term practice can level previous differences.

According to Sloboda (1996), a valid instrument for measuring inborn musical ability does not exist and therefore it is difficult to estimate its heritability, in spite

of this e.g. Coon and Carey (1989) suppose a larger influence of shared environment than heritability.

4.4. Limits of Heritability Estimations

It is necessary to add that heritability estimates, to a large extent based on studies into twins, usually over-represent middle classes and neglect extremes in environment, which can lead to underestimation of the shared environmental influence (Bouchard, McGue, 2003).

Most of these results are difficult to apply at high levels of ability or achievement; according to Plomin and Thompson (1993), it cannot be inferred from the same origin of average and high level ability. For the explanation of extremes it is essential to study the so-called group heritability and to research more specific groups, not just general population. We should recognize that research into heritability uses descriptive statistics, it says “what is, rather than predicts what could be or prescribes what should be” (Plomin, Price, 2005, p. 114). Heritability is sometimes (especially in the popular press) viewed as irreversible fate; however, it is more accurate to perceive it not as static, but as being in a mutual interaction with the environment. Scarr and McCartney (1983) speak about three types of such an interaction: 1) a passive genotype-environment correlation stems from the genetic similarity of parents and children when parents tend to create an environment corresponding to genetic potential, 2) an evocative genotype-environment correlation is based on specific genes causing behaviour, which supports their influence, 3) an active genotype-environment correlation supposes that a genotype actively seeks and changes the environment to reveal its potential.

4.5. Biological Correlates of High Ability

The relationship between giftedness and an atypical brain configuration is often seen as the proof of inborn differences of the gifted. Winner (2000) mentions a more symmetric brain organization of the gifted at mathematics, music and visual arts. Oerter (2003) refers to the differences in the brain structure between exceptional musicians and non-musicians.

Howe et al. (1998) point out that these differences usually occur in case of individuals consistently engaged in a particular activity since early childhood, which, according to them, again indicates a prevailing influence of long-term practice.

4.6. Abilities and Achievement

A crucial problem, a concurrently accepted solution which can remarkably influence the lives of many people, is to delimit the relationship between inborn ability and achievement. Although Gottfredsson (1997) claims that an IQ is the

best single predictor of future educational, occupational, economic or social outcomes, we should understand that a certain level of intelligence may be a necessary but not a sufficient condition of future high achievement. A correlation between an IQ and performance at school is usually found (about 0.5), which explains about 25 percent of variance in school performance; a similar relationship has been discovered between an IQ and the overall length of education (about 0.55), or job performance (about 0.54) (Neisser et al. 1996). Although these correlations are strong and significant, there is still large space left for other influences, especially those determining engagement in a particular activity. Gagné (2004) mentions decreasing correlations between IQ and school performance; at elementary school about 0.7, at high school about 0.5, at college about 0.3–0.4. Gagné interprets these relationships as a proof of the importance of inborn abilities; we believe that these findings can be equally seen as evidence of the increasing importance of environmental factors in the long-term perspective. Final achievements may be more malleable than is generally thought; we assume that changeable factors should be more emphasized in the process of education, for although not everybody can be on the top, anybody, including society as a whole, can profit from going as far as possible. At present, we can hardly predict where this highest point is in case of a particular individual; the only way of finding out is to support students who want to attempt to reach it.

5. Malleable Factors in the Development of High Achievement

An answer to the question of what significance inborn abilities have in the development of high achievement will be probably an ongoing subject of controversies because it can notably influence the fact to whom and what opportunities are given in the process of education and even later in professional career. Other factors, usually considered as facilitators of this development, are accepted more unambiguously.

5.1. Personality

5.1.1. *Motivation and Implicit Theories*

Systematic cultivation and motivation related to this process are generally acknowledged as some of the most important variables determining future performance.

According to Dweck and Leggett (1988), implicit theories of abilities compose a crucial part of achievement motivation. Wentzel and Wigfield (1998) present

a broader overview of implicit beliefs considered to make a difference here. In their first category, they mention beliefs in competence or ability to handle various tasks or activities (ability beliefs, expectancy of success, self efficacy), the second category includes beliefs in control (internal, external or unknown control); the third category encompasses subjective task values (interest, attainment and utility values).

The significance of achievement for an individual is often described by the so-called goal orientations. Mastery orientation resumes goals to accomplish an activity, whereas performance orientation sums up goals to demonstrate ability or to outperform others. Performance orientation is usually further differentiated according to one's tendencies to attain success (performance/approach orientation) or to avoid failure (performance/avoid orientation). Mastery and performance/approach are considered as favourable orientations for they facilitate activity, whereas the performance/avoid orientation is generally considered as disadvantageous because it impedes activity.

We should differentiate what individuals try to achieve something (their particular goals) and why they attempt to achieve it (their goal orientations). People usually pursue various goals originating either in the individual or in the context. Social interests often come forward and prevail over educational goals (Wentzel, Wigfield, 1998).

5.1.2. Creativity

Creativity is sometimes mentioned as one of the essential characteristics of giftedness (Renzulli, 1986, Monks, 1993); other authors do not attribute such importance to creativity. For example, Tannenbaum (2005) suggests differentiating between creative versus proficient producers of thoughts and tangibles or performers of artistry and human services. Whereas the former bring something new without the necessity to comprehend all the knowledge of a domain, the latter are characterized by comprehensive mastering of their field (e.g. philosopher vs. teacher of philosophy). Similarly, Ericsson et al. (1993) speak about expert and eminent performance. Experts are distinguished by acquiring current knowledge, whereas eminent creators produce something new, which alters the domain. Olszewski-Kubilius (2000) refers to the differences in the evaluation of child and adult achievement. Fast and precise grasp of a domain is used as a criterion of giftedness during childhood; in case of adults, creative productivity is valued in the first place. These two qualities often do not occur simultaneously in the same person; Olszewski-Kubilius (2000) attributes it to the differences in family environment. Cohesive, conventional and child-centred nurture supports exhibition of giftedness in childhood, creative adults often come from families with tense relationships and non-conventional nurture.

5.2. Social Influences

5.2.1. *Family Environment*

In the development of high achievement the family environment is naturally of great importance. According to Davis and Rimm (2004), parents should demonstrate positive expectations, provide support and appeal, emphasize improvement without a necessity to be the best and avoid stressing their child too much. If the parental expectations are too low, a child does not often attempt to surpass them, whereas if the parental expectancies are too high, a child can sense that trying to comply is futile (Butler-Por, 1993). Parents of successful children often arrange early contact of their child with a domain and, later actively participate in the development of their child's potential and even when the child assumes control over his or her career, they keep providing emotional and material support (Bloom, 1985). The socio-economic status of the family and the so-called marginality or isolation of family from the prevailing social context, which can foster unconventionality and adult creativity, are also influential. Family history, traditions or experience with education may have an effect on the development of a gifted child as well (Olszewski-Kubilius, 2000).

The relationships between siblings play an important role, especially when the levels of their ability or achievement are markedly different (Rimm, 2004).

5.2.2. *Peers*

Later, typically during adolescence, the importance of peers grows. They can influence the development either in a positive or negative way dependently on a concrete individual, a domain of interest and peers themselves (Rimm, 2004). It seems that if an adolescent sees his or her relationships with peers engaged in the same activity as satisfying, his or her own engagement is facilitated. In the other way, if they sense that development of their gifts disturbs social relationships, continuation of their effort may be endangered (Patrick et al., 1999).

5.2.3. *Teacher and Educational Environment*

A teacher or a coach becomes a very important person influencing a child's development after systematic education is initiated. The requirements for an ideal teacher should be diverse, dependently on the level of the child. At the very beginning, an essential attribute of a good teacher is his or her enthusiasm, ability to support, motivate a child and arouse in her or him a lasting interest in the domain. Only later the importance of a teacher's knowledge of the domain and ability to share this knowledge grows (Bloom, 1985).

Bultler-Por (1993) considers the impact of factors influencing achievement in

school. She sees curriculum and teaching methods, attitudinal factors of child and teacher variables as especially important. When a gifted child performs under his or her potential, it can be due to inappropriate methods of teaching and uninteresting curriculum, a teacher's excessive demands to conform, a child's negative attitude to school (sometimes supported by parents or peers), or failure of school to stimulate a child properly.

Classroom climate may be very important for the enhancement or reduction of a student's commitment. Ames and Archer (1988) suppose that it is much more convenient when goals aimed at mastery prevail over those aimed at performance in the classroom.

5.3. Other Influences

5.3.1. Relative Age Effect

In connection with the usual practices to group children born in the same school or calendar year, a so-called relative age effect (Baker et al., 2003, Musch, Grondin, 2005) is mentioned here. Children born later in a particular period can be disadvantaged in comparison with their older peers and statistically achieve less.

5.3.2. Chance

Some authors (Tannenbaum, 2005, Gagné, 2004) mention chance or luck as an important factor in the successful development of giftedness. Even this variable may be influenced by the activity of an individual. Out of control are above all innate qualities and the environment the child is born into (Gagné, 2004). On the other hand, a possibility of good luck is increased e.g. through active seeking, an unconventional life style or an ability to recognize opportunities.

All the mentioned influences will, of course, cause a various impact on a particular individual and their mutual cooperation will be necessary for successful development; their share can be in case of different individuals and various contexts, which should be always taken into consideration, although general trends obviously exist.

6. Conclusion

In our article we have summarized some of the current research on giftedness, achievement, their relationship and factors influencing their development. This issue is indeed very multifaceted and it is difficult to deal with it in an unbiased way. Our main goal was not only to point out the complexity of these phenomena

but above all to highlight their changeability. We believe that it is useful to emphasize the malleable factors as nurture, learning, practice or motivation in our thinking about this problem, for it seems to be possible that from the long-term point of view these aspects (after reaching the threshold level of inborn abilities) play a crucial role. According to the definition of giftedness which in the Czech Republic is mandatory for admission of students into special classes and admission procedures used for higher levels of education, the inborn abilities are presently accentuated here. We suppose that such a simplification (mainly due to not including motivational factors) can be in some cases unsuitable or even disserviceable.

Overemphasizing of inborn abilities can negatively affect the level of engagement, which is a necessary condition of future high achievement. This approach may be discriminating for potentially successful individuals who are for various reasons not identified as gifted. An individual's capability to deal with problems and uncertainties which emerge during his or her development, may be undermined because possible failure can be interpreted as a lack of potential and lead to underachievement. Selecting potentially achieving students based on inborn abilities (i.e. tests of general study abilities) may disadvantage motivated students, who could possibly reach better results than more able but disinterested students.

It would be appropriate to include a wider range of identification methods aimed at productivity and motivation.

6.1. Possibilities of Intervention

According to these assumptions, we consider Renzulli's talent pool identification plan (Davis, Rimm, 2004) as exceptionally suitable, intending to offer adequate educational opportunities to as many pupils and students as possible. It recommends using a wide variety of criteria, not only test-based selection, but also creative productivity, nominations by peers, parents, teachers or even self-nomination and so on. In comparison with the usually used threshold levels considering about 3-5 percent of children as gifted, higher openness in this model is advised. Up to 25 percent of children should be accepted to enrichment programmes. When accepted, students are further being watched for signs of productivity, advanced interests, creativity or task commitment. Unsuccessful students leave and new applicants are accepted.

Renzulli recommends basing programmes aimed at support of adequate development of able students on his Enrichment Triad Model (Renzulli, Reis, 2005), which consists of three parts. The so-called Type I includes general exploratory activities usually not being part of standard curriculum; Type II consists of group training activities, aimed at the development of creative thinking and problem

solving, learning skills or familiarizing the student with methods used in his or her particular domain; in Type III the student selects and solves a real problem according to his or her interests. The main goal of this approach is to stimulate a process of lifelong learning in children and students leading to creative and productive activity during adulthood.

And this should be one of the main goals of anybody who can influence a child's development. However - as we could see above - the process of successful development of a child's potential is a blend of many ingredients and our influence on it is limited. We believe that the best thing we can do is to support the one really necessary flavour - a decision of a particular individual to engage in a lifelong attempt to (as Nietzsche says) "become who he or she is."

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