Some Psychological Factors of Creative Development in Family Constellation: Intelligence and Personality Traits of Artistically – Technically Gifted Adolescents

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Abstract

Purpose of the article The presented study introduces the psychological factors which influence the creative development of young people in their families, especially from psychological position – acquired of birth order – point of view. The study presents basic theoretical theses of birth orders' concept, as A. Adler and his followers introduced into psychological literature; it also brings information from empirical researches about the groups of five positions' birth order: first-born, second-born, middle-born, youngest and parents' only children in relation to their psychological characteristics. The second part is dedicated to issue of birth order in relation to creativity, intelligence and personality traits of 153 adolescents – students of the last year of high school who passed the exams for the artistic – technical study at the Faculty of Architecture (61 men, 92 women) with the average age 18.32 years.

Methodology/methods The creativity was identified by Urban's Test of Creative Thinking (2002) and Torrance Test of Creative Thinking (Jurčová, 1984a). The intelligence was identified by the nonverbal Test of General Abilities (Smith, Whetton, 1993a). The Slovak version of NEO FFI Inventory (Ruisel, Halama, 2007a) was used for the measuring of five personality dimensions. The anamnestic data (the complete family, birth order, the number of siblings, the age differences between them, three typical characteristics of the adolescent and of his/her siblings, etc.) were obtained from our Questionnaire of the Family Constellation (Szobiová, 2007a). The results were statistically processed by means of ANOVA SPSS program. The inter-group differences based on the birth-order were tested by the one-way ANOVA method as well as two-way analysis by ANOVA method and by T-test (the Leven's test of variance homogeneity). **Scientific aim** The aim of the study was to find out in what kind of families live the gifted students, what are intersexual differences in creativity, intelligence, personality traits and in what birth order live the gifted adolescents, what are their typical personality traits and also the specifics of their creativity and the level of intelligence. **Findings** The research results on the sample of 153 adolescents

showed that higher performances in the fluency and flexibility of thinking in the Torrance Creativity Test showed the women in comparison to men. The results indicate that the birth order differentiates the groups of gifted adolescents in the personality dimension openness to experience and agreeableness. Highly creative adolescents have ascribed themselves more often characteristics connected with creativity (openness to experience, originality, desire for change, aesthetic experience and interests). The findings are commented as to the implications for the role of the creativity in both sexes and for the composition research sample and for research methods too. The other findings dealing with the specifics of creativity will be more broadly discussed in the study.

Keywords: *creativity, intelligence, family constellation, birth order, psychological position in family, personality traits*

JEL Classification: J13, J24, O15

Introduction

The family belongs to the factors that strongly influence the individual's intellectual development and the creative performance. For family aspects that can cause the differences in the identification, managing and directing the child's talent belong the family genetic equipment, the parents' age in the time of child's birth, childrens' birth order, their sex and the combination of sexes, parents' occupation and working place, the amount and types of family's resources, the religious orientation etc. (Feldman, 1999a). In the existing approaches we can follow many exploring lines of the family research which aimed the different aspects.

1. Theoretical starting points

At the beginning the creativity of the outstanding individuals was explained genetically by the study of the pedigree when the „samples“ of creativity were searched across the generations. However these studies of creators and their ancestors never had brought the transparent evidence of heredity of creativity because the genetic variables cannot be separated from the variables of the influence of the family environment. It is probable that as the gained knowledge also the cultural factors are delivered from generation to generation, so the genetic material represents the basis for inborn creative behaviour: the genetically transferred characteristics can be strengthened in the family environment by learning. While the first studies of Galton investigated the families and ancestors of adult creators Cox orientated herself on the exceptionally creative young people. She found that their parents' intelligence was above the average intelligence and they also used the educational influence supporting the creativity of their children. Cox's idea that the creativity sticks in the family environment supported the examples of the families of scientists – Huxleys, writers – sisters Bröntes or musicians – Bachs (Kerr, Chopp, 1999a).

The historical biographical and case studies presented the second line of researches in the time successiveness. They brought out the fact that the creators often lost one or both parents in their childhood. In the studies of investigated geniuses (Eisenstadt, 1978, by Sternberg, 1999) more than one fourth of the subjects lost their parents until the tenth year of their life, more than two thirds until the fifteenth and almost one half until the

twenty first year of their life. The lost of the parent may play an important role in the development of their creativity and may be combined with the exceptional accomplishments. The absence of father on one side may influence the boys that evoke the strong feeling of liberation but at the same time it can evoke the strong feeling of burden: to be that person and to live according what the father would wish. The researches of the girls living separately from their mothers showed the increasing of their creativity. The importance of the parent's lost may be in a fact that it reduces the connection parent – child and evokes the earlier psychological maturity. It was evident that the single fact of the orphanhood is not decisive for the creativity but important is the way how the individual accepts it and manages it. That way has an influence if he/she will be creative or destructive: the lost of a parent can bring the earlier psychological maturing which leads to the motivation in the sense of the creative expression and to the freedom of cognition supporting the creative productivity. It seems that the mere reality dealing with a death can render a young man broader perspective to the creative growth (Kerr, Chopp, 1999b). In connection with surviving of events which can be depriving or can act as a challenge for the exceptional creativity Csikszentmihalyi (1996) states that the children can discover the creativity as the escape from the difficult situation so as a chance to escape from the life suffering. This explains that many creators (namely artists, writers, musicians) living in a conflict families where they felt unhappy were very successful in their creation. But besides a number of artists with demonstrating the conflict and misfortune in their families there are many creative productive artists namely inventors, scientists, mathematics which come from happy and well functioning families. Together with Kerr and Chopp (1999c) we assume that there exist more types of the relation between the family climate respectively parentig styles and the creative development of the children. One type is „dramatic“, „painful“ creativity arising from „troubles and worries“ in the problematic, dysfunctional families. The children find in the creativity the escape from the problems and everyday „insanity“ which they were exposed in the families but often also in themselves. On the other end of this spectrum the totally different type of the creativity can stand – the everyday creativity which is more subtle, more gentle, persistent, non-interrupted which leads to the more productive and more prosocial living and may spring and result from the happy family life.

1.1 The climate in a family and the creativity

Some researches indicated that in the creators' families the relations between parents were more equal: the less emphasis was put on the stereotype division of the roles and the higher flexibility was admitted. The humour and the playing had the important place in the families supporting creativity and also various materials and resources to the „discovering“ behaviour of the children, various collections, hobbies and interests did not miss and they gave the opportunity to the creative expression. The families of creators mostly lived in the homes of non-conventional style, place or interior (Kerr, Chopp, 1999d; Dacey, Lennon, 2000). H. Gardner in his studies (1993, 1997) devoted to seven extraordinary creators of a modern period disclosed many signs of the family environment they were grown up. Their families were neither rich nor poor, they lived outside the cities but they were not cut off the influence of the sphere the creative individuals worked in. The family atmosphere was not extraordinary friendly but the childrens' needs were very important and it was expected that the children would accept the moral values of a family. When the interests and outstanding features were discovered in the family they were supported and encouraged. In the families where the

sources were limited the future creators obtained the higher share (Feldman, 1999b; Sternberg, 2002). Also earlier studies of B. Bloom et al. (1985) showed that in a family history of the famous creators minimally two generations had devoted to the same or very near sphere. Also retrospective interviews with the successful scientists and artists which Bloom realized show on the extraordinary parents' deposit into the development of their childrens' giftedness. We can assume that it is very important to grow up in an environment where the child has the natural access to the sphere of his interest and where he gets a plenty of encouragement and motivation. The shortage of these advantages lowers the probability that the child will enter this sphere and will continue it. On the other side the probability of the conflict between parents and a child increases if his interests and natural inclinations do not compound with the family tradition or practice (Feldman, 1999c).

It is evident from the previous part that the origin and beginnings of the creativity in a family life stay for the complicity for future years the rich field for investigation „ of the inherited correlates of creativity or the family history and climate“ (Kerr, Chopp, 1999e, p.715).

1.2 The completeness of a family and the creativity

The new researches state that the presence of both parents, their official unit and the number of children in a family belong to the family predictors that the individual connects with the perceiving of happiness as the permanent satisfaction with life (Snel, 2009). The presence of both parents is important for the child not only in an early age. More studies prove that the share of education leads to the increasing possibilities to unfold in children their creative potential because of the the optimal combination of the masculine and feminine experience (Kováč, 1982). In the connection with the parents' interaction and its effect on the development of the creativity the remarkable attention is devoted to the styles of parenting. Many nonconsistent findings exist also in this sphere but the agreement predominates in an opinion that the authoritarian parenting using pressure, subordination, conformity, critics and punishment and also the pampering as the education protecting child from disappointment without the demands to his own displays do not contribute to the development of the creativity potential (Walton, 2002). The parenting with the components of the positive emotional relation to the child from both parents, educational leading without extremes, transparent demands on one side and the remarkable freedom on the other side belong to the important predictors of the childrens' advance in creativity (Čáp, 1996). It was shown that the families of the creative individuals use uncommon parenting – they are less conventional, less rigid and they grant more flexible support to the freedom of display, independence followed by originality (Zelina, 1995). Some authors (Kerr, Chopp, 1999f) assume that the distance between a parent and a child is evident in the families of creators. „The distance“ or aloofness can be a form of the emotional space or the absence of the excessive protection which supports the freedom of the investigation and the independence. It can also refer to the conflict or the tension in the relation parent – child which can urge a child to become independent in the sense of the greater autonomy and the following creative process. Kerr and Chopp (1999g) assume that the rejecting parents' approach evokes the child's rebellion ending in the absolutely independent thinking while loving parents paradoxly support the child's tendencies to the conformity. It seems that important is the portion of the distance or aloofness which leads to the independence and autonomy. The optimal level of autonomy in the parent – child relation enables a child to feel enough

secure to be able to investigate and learn and at the same time to have opportunity to develop his own self-confidence.

The prevailing opinion is also that the creative individuals come from the complicated, instable, miserable, painful family environments. The sources of these tensions are of double character – interpersonal and intrapersonal. Interpersonal tension refers to tension between individuals, the intrapersonal arise as the consequence of the contradiction between the cognition and the emotionality or as a display of the unsufficient satisfaction of the present life conditions (Kerr, Chopp, 1999h, p.712). In the moment when the individual feels this tension he becomes motivated to overcome it (respectively the problem situation originated with it) and thus the creative process starts.

In the study of K. Gardner and J. Moran (1990, by Dacey, Lennon, 2000) investigating the adaptability and the cohesion of the families in the relation to the creativity it was shown that the highest score of the creativity had the children from the families with the high adaptability so from that which manifested flexibility and freedom, supported the openness to the new experience and they granted the children the autonomy in gaining experience also for the price of their own mistakes. Mothers were not too protective and they had the opportunity for their self-realization and they flexibly created the family environment supporting the creativity. The creators' families show a tendency to have less expressed rules although they have implicit standards of the behaviour (Kerr, Chopp, 1999i; Dacey, Lennon, 2000).

From many aspects of the family life in the relation to intelligence and creativity many authors (Feldman, 1999; Sulloway, 1999; Eckstein, 2000; Bitter, 2007) rank the specific place also to the family and the sibling constellation which means the birth order of the children, their age, sex and the combination of both sexes, the number of children in the family, the relations among siblings and other aspects.

1.3 The birth order, the development of the intelligence and the creativity

The increased attention among many variables which influence the development of the intelligence and the creativity was devoted also to the birth order. Many researchers inspired by the findings of Galton, Cox, Terman and Roe which showed the primacy of the firstborns in creativity searched for the answer if the status of the first born child really facilitates or inhibits the creativity (Eisenman, 1987; Gaynor, Runco, 1992; Sulloway, 1996 by Baer et al., 2005). Despite significant effort has been made to answer this question there is only a limited agreement on correlation between birth order and creativity among the authors. Some argue that the firstborns should be less creative because of their greater inclination to the conservatism, convention and conformity (f. e. Sulloway, 1999). Others have claim that the higher proportion of the firstborns among the famous people points to their higher creativity (Altus, 1966; Schachter, 1963 by Baer et al., 2005). One possible explanation is that the family environment provides the firstborns with more opportunities to interact with adults and thus richer incentives for the creativity. The firstborns often take the role of teachers of their younger siblings. In this way they gain experience with the role of the expert and the authority. Another explanation can be that their parents communicate their higher expectations and aspirations to them more directly.

The empirical studies support both fore mentioned views. Some provide evidence for lower creativity of the firstborns in comparison with other birth positions (e. g. Eisenman, 1964; Seay, 1985 by Baer et al., 2005). In the same time other researches portrayed the firstborns as more creative (Eisenman, 1987; Eisenman, Schussel, 1970; Schubert, Wagner, Schubert, 1977 by Baer et.al., 2005; Fernald, Solomon, 1987; Roe, by Prentky, 1989; Kerr, Chopp, 1999j). Other researches yet showed insignificant difference in creativity among the firstborns and other birth positions (e.g. Wilks, Thompson, 1979 by Baer et al., 2005). Results of the research dedicated to the „revision“ of the relationship between the creativity and the birth order realized by Baer et al. (2005) with 359 university students of management showed that the intellectual development of the firstborns benefits from the presence of the younger siblings of close age. This means that the firstborns were able to solve their tasks more creatively if they lived with more siblings in similar age or with siblings with opposite sex.

Another view on this correlation brought the research of Albert (by Dacey, Lennon, 2000). Its results infer that children that had a big age gap (more than 7 years) were able to experiment more independently of each other. That is deemed to be more conducive for creativity. From what has been stated is obvious that the findings about the relation of the sibling constellation and the creativity are significantly contradictory.

1.4 The relationship between the intelligence and the birth order

It has been a subject of research from the era of Galton. It has proven that there is a majority of first born geniuses and famous scientists in the famous families of the era. Even Roe (by Prentky, 1989) found out that from 64 scientists there were 39 first born, whilst their IQ was in scope 122 – 177, what is significantly higher than the general average. Many further researches have showed later that the firstborns often appear among outstanding scientists (Simonton, 1999). As far as the family size is concerned, it was found out that the gifted children came from families with less members than the average family of the population (Kerr, Chopp, 1999k). Laznibatová in Slovakia (1997) found out in a research focused on 145 intellectually gifted children, that most of them lived in families with two children and 67% of them were first-born and 30% only child. Eckstein (2000) summarizing from the analyses of 151 studies that the first-borns were found to have the highest IQ, followed by only-children. There are mixed findings pertaining to family size. Averagely creative people were found in higher size families (Kerr, Chopp, 1999l). That is why it is difficult to state how the family size contributes to creativity. The first-borns, as mentioned earlier, are bestowed with a status that provides them with space and attention that may be benefiting their creativity. Simonton (1999) noticed that the birth order as well as loss of a parent often presents itself as a factor for achievement of high social status and extraordinary performance.

1.5 The personality traits and birth order

From the researches that were dedicated to comparison of personality traits in the sense of the Big Five factors from the view of birth order was implied that the firstborns were more diligent than their younger siblings, whilst the younger ones were kinder in speech and more open to experience. The firstborns were more anxious and more prone to anger; those born later were more self-confident and more impulsive in comparison with the first-born ones. Sulloway (1999) explores this in researches based on meta analyses as well as in those which focus on birth order in relationship to openness to

experience. That is a trait connected with creativity. He stresses that this dimension encompasses characteristics that are possible to divided into two contrasting groups. One of them reflects intellect (adjectives as *intelligent, perceptive, curious, creative, cultured*) and the other group reflects non-conformity (adjectives as: *daring, courageous, non-conventional, original, independent, liberal*). That's why it is not a surprise that the intellectual component had more to do with IQ and that it is higher at firstborns and only-children. Also Costa and McCrae (by Hřebíčková, Urbánek, 2001) showed some correlation of openness with methods finding intelligence and found out more significant correlation with creativity.

Eckstein (2000) summarised results from empirically - based 151 studies in birth order from 1960 - 1999. He mentions the differences between personality traits and birth order typologies that reached at least 0.05 probability levels. For the reason of insufficient empirical validation he comprised only those studies that were dwelling on differences depending on chronological birth order. Those are deemed to be important factor influencing personality. Every child in a family has its *own unique birth position* that makes its own unique perspective. However, the birth position only enables the child the opportunity, never the certainty that the child will have particular types of experience. The birth order belongs to the important factors that influence personality. It shows general tendency of the child to create its own interpretations and interaction patterns of unique experience (Adler, 1995; Dreikurs - Fergusson, 2005).

In total there are five basic positions of birth order: 1 the oldest first-born child, 2 second-born child, 3 middle child, 4 the youngest child, 5 only-child. From the results of analyses of Sulloway (1999) and Eckstein (2000) came out the most frequent attributes of the specific birth orders. Given the specific focus of our contribution, we are stating here just the personality traits that are relevant to correlation of birth order to creativity and intelligence.

1.5.1 The first-born

The oldest one: at the first place in *productivity* (considering other birth positions), *the highest IQ* (followed by only-children), the highest school success rate, *highly motivated to achieve*, the most represented in the learning groups of people, *the most scared in new situations*, the most easily influenced by authority, *conforming to parental values, dependent of approval of others*, most likely to become leaders, *vulnerable in stress*. Further traits of firstborns in comparison with other groups that showed significance at least in two empirical researches were: the highest *self-esteem and self-discipline, responsibility and conscientiousness, being conservative toward change*, the highest percentage of Type A behavior and coronary heart diseases (along with only-children), highest percentage of frightening dreams, higher narcissism, the highest percentage of women in leaderships positions (Eckstein, 2000; Sulloway 1999).

1.5.2 The second-born

The second-born ones become sooner *independent* from their parents, they have a higher propensity towards setting themselves free from the family, breaking away from its influence. They tend to identify themselves less with the family values, they are *more independent* and try to break-through in areas which the first-born sibling has no interest (Sulloway, 1999). If the older sibling identify himself with one of the parents, the second-born has got a tendency to identify with the other parent (Sulloway 1999), or emulates those characteristics of the parent that the first-born overlooked (Čechová,

1999). He is much *more capable to deal with problems* than the first-born (Leman, 1997). The children that are second in birth order do not have as many problems as the first-borns or only-children and they are *less anxious* (Sulloway, 1999). The position of *the second-born of two children* is usually influenced by the position of the first-born one. However the first-born may be perceiving his/her position the second-born is *almost always in opposition* in one of the basic directions. This tends to be true even in the case of twins. They could be feeling like they are racing and forever trying to catch up with the first one (Bitter, 2007).

1.5.3 The middle-born

The middle-ones: have the least psychic problems, they are social, cordial; they have the strongest feelings of lacking belonging, they can be feeling oppressed, or being done wrong to, they can be ambitious, *rebellious*, they can judge and show where fairness and justice lie. They are oriented towards their contemporaries and *independent* of their families. They often seek the affirmation of their uniqueness amongst their friends. Because they are in a position between older and younger siblings they can communicate effectively and they are able to compromise. They are *sensitive to fairness*. They incline towards diplomacy and cooperation, and towards strategies that reflect their disposition to settling disputes amongst their siblings. They are *successful in team sports*, they *can cooperate well* with older and younger people. They compete in areas in which their older siblings showed no interest (Eckstein, 2000).

1.5.4 The youngest child

The youngest ones: If they come from small families they are most prone to psychiatric disorders. They are empathetic, and the most likely to be an alcoholic (Eckstein, 2000). If there is a 7-year difference between the youngest child and their older sibling they behave as only-child. They are fearful, *anxious in new situations* (similarly to the oldest ones), they are the most popular ones (amongst other positions), the most represented amongst writers (especially autobiographers and family historians), overrepresented in activities involving social interplay, they have *interest in people*. Some other characteristics of the youngest ones in comparison with other groups according to their birth order that showed significant difference at least in two empirical researches (Eckstein, 2000) were: *the highest self-esteem*, *the lowest IQ*, they are cognitively specific, spoiled, the most affiliative, the most disturbed at losing a parent during childhood. They often *want to be unique and if they have talent they can become good entertainers* (Bitter, 2007). They are *good observers*. They can easily become *dependent on others* until their adulthood. They can be lacking in *self-sufficiency*, because the others always sort everything out for them (Leman, 1997; Čechová, 1999).

1.5.5 The only child

The only child, similarly to the oldest one, gets the undistracted attention of adults, they have no adversary. They typically have *a strong need for achievement* and also *high ambition and drive* (Eckstein, 2000; Bitter, 2007). The only children are the most likely ones to be *studying at university* compared with other birth positions and they have the most behavior problems. From the other characteristics: they have the lowest need for affiliation, but they have the highest need for affiliation under stress. They have the highest percentage of Type A behavior and coronary heart diseases (along with the first-born ones). They can be selfish and the most likely to have psychiatric disorders.

Only-children have shown to be the most likable next to the youngest ones, the most cooperative, the most trusting, and they have shown the strongest gender identity – they were *the least androgynous*. The development of only-children and first-borns is up until a point similar, that's why some authors club the two groups together (e.g. Philips, Philips, 2000). Leman (1997) also notes that only-children have common characteristics with first-borns only that the characteristics show in a more accentuated form (the perfectionism of first-borns could be increased to a form of superperfectionism of only-children).

1.6 The birth order and creativity

It is possible to identify different views on impact of birth order and creative abilities in different studies. The first-born ones scored significantly higher in tests of divergent thinking in researches of Lichtenwalner and Maxwell (1969, by Runco, Bahleda, 1986). The researches of Eisenman and Schussel came with similar conclusions (1970, ibidem). Runco and Bahleda (1986) also found significant *corelation between birth order and test results in divergent thinking. The only children showed the best results, followed by the oldest children, followed by the youngest ones only than came those middle-born ones*. Prime place of the first-born ones as opposed to the youngest ones were shown in the results of Yarial (1985). The research of sibling constellation that was carried out by Fernald and Solomon (1987) indicated that women with higher degree of creativity were mostly first-born.

Dacey and Lennon (2000) reckon that although several older researches state that the first-borns and only-children have in plenty of activities higher expectancy for success, the newer researches lean towards higher non-conventionality and thus also towards higher creativity of the later-born ones. Only-children and first-born ones are mostly in contact with adults from their birth on. Younger siblings have at least one child that significantly influences their mental development. Only-children and first-born ones owing to closer identification with their parents and parental values often apply more traditionalistic attitude towards problems. That's why children with significantly older or younger sibling could be encouraged to develop their own creativity, if there are possibilities for independent creative activity. Contrary to that Baer et al. (2005) reckon that the first-borns with greater age difference from their siblings leave their childhood world too soon and that limits their creativity.

The conclusions from the fore mentioned studies gave us a starting point for formulation of expectations regarding correlation of birth order with intelligence, creativity and personality.

2. Problem

From the summary of the different studies it is clear that the focus was mainly on the firstborns and the only children. In this study whose results we are presenting we wanted to examine whether there is a connection between the position of an individual in the sibling constellation which is specified by the birth order and his creativity, intelligence and personality traits (in the sense of the Big Five personality factors). We wanted to bring more clarity to the lot of inconsistent examinations regarding the birth order and the effect on the intelligence, creativity and personality traits. In this study we examined specifically the birth order in the sibling constellation from the gender differences and personality traits.

3. Research issues

The previous studies have provided us with inconsistent findings regarding the birth order and creativity (Roe, Runco, Bahleda, Yarial, Fernald, Solomon, Dacey, Lennon, Baer et al.). We have asked ourselves a question whether *the only children and first-borns will have a higher score in the tests of creative thinking in comparison with the second-born, middle and the youngest in the family*. In connection to some of the previous findings (Sulloway, 1999; Eckstein, 2000; Bitter, 2007) we have also assumed, that *the first-borns and the only children will have a higher score in intelligence tests*. Also on the basis of the findings in the literature we have expected that *the first borns will be more agreeable and more neurotic* (Dreikurs, Grey, 1997; Čechová, 1999; Bitter, 2007). We have assumed that the *second-born children will be more emotionally stable, less anxious and agreeable*. Also we expected that *middle and youngest children will be more agreeable in comparison with first-born and only children*. Apart from that, we wanted to find out, whether *highly creative and highly intelligent adolescents will perceive themselves differently* – whether they will ascribe themselves different personal traits.

3.4 Sample

The sample consisted of 153 adolescents who were applying for study at the Faculty of Architecture (61 males and 92 females). The sample consisted mainly from secondary school graduates from different parts of Slovakia, who were interested in studying various technical and art subjects. The average age was 18.37 years (standard deviation 1.23 years). Within the talent examination we were looking into intellectual and creative abilities of the applicants, apart from other skills. After the talent examination have been administered other methods within the scope of broadly designed research. Students have been made aware, that the results will be used strictly for the research purposes.

4. Methods

To acquire the data about the general levels of intellectual and creative abilities as well as anamnestic data and personal qualities following tests, questionnaires and inventories have been used:

4.1 The measuring of intelligence

For measuring intelligence has been used General Ability Tests – GAT (Smith, Whetton; adapted by M. Jurčová, 1993b). These tests detect the ability to understand and adapt to new situations, recognize important moments and understand new parts of situation in their mutual connection.

Non-verbal test GAT looks into the ability to think logically, which includes *accurate perception* of all relevant aspects of the situation as well as recognizing similarities, differences and causalities. This test contains two types of tasks: first one requires classification of shapes and the second one contains different analogies, series and patterns with various difficulty.

Spatial test GAT requires creation of accurate visual-spatial images, that can be manipulated and it is possible to compare them with the real situation. This test requires coding, transformation – rotation and comparison of complex visual pictures. It measures

the ability of the visual-spatial thinking, creation of visual-spatial images in the mind and the ability to manipulate them mentally.

4.2 The identification of creativity

TTCT: Incomplete figures from Torrance's Figural Test of Creative Thinking, which have been standardised for Slovak conditions by Jurčová (1984b). This is well known and proved testing method, which contains 10 incomplete pictures as a basis for sketching interesting subjects or pictures that no-one can think of. Each picture requires complete and interesting story, as well as a smart and unusual title. In this test, which is revealing the individual's tendency for structuration and integration we have been evaluating three indicators of creativity:

Fluency – the number of relevant, adequate answers;

Flexibility – the number of diverse solutions, indicating different tendencies in solving the tasks, the change in approach, the ability to change the thinking pattern;

Originality – the score is determined by small statistical frequency, number of unique or rare responses.

The fluency score was given by the number of acceptable answers. Points for the flexibility have been given to the creations that belonged to different categories (these do not have the same level of generality and depend from the occurrence frequency of given subject). The originality has been evaluated on the scale between 0 and 3 points, depending on the occurrence frequency of the individual topics within the researched subject. Zero point were given the answers, that were present in more than 5 % cases, 3 points were awarded to clever and unusual answers, that occurred in less than 1 % cases.

TSD-Z (Urban's Creative Thinking Test, the Slovak form adapted by Kováč, 2002) enables qualitative evaluation of creativity and includes cognitive and personal attributes as well. This test is *relatively independent from cultural influences and knowledge*. Aside from the *components of divergent thinking* (*fluency* – number of elements, *flexibility* – new various elements; *originality* – unconventionality; *sensitivity to problems* – aesthetics; *complexity of view*, etc.), it examines *some personal creativity dimensions*: courage to take risks, the overcoming barriers and obstacles, engagement in the topic, persistence, concentration, humour, playfulness, emotionality etc. The test is based on the principle of uncompleted shapes, figures that do not make sense, which is then given to them by finishing the drawing. There are 5 figures that are closed in a frame, the sixth figure is outside of the frame. In total there are evaluated 14 different aspects and the final score is limited by 72, which means that this is the exact test evaluation.

4.3 The measuring of Personality dimensions

For measuring personality dimensions has been used the *NEO FFI* (Costa, McCrae, 1989, the Slovak form adapted by Ruisel (1998) and by Ruisel and Halama (2007b). The inventory measures five personality dimensions (with 12 items in each) including various personality characteristics:

Neuroticism (covers the degree of resistance against psychological distress) includes: anxiety, depression, hostility, impulsiveness, vulnerability, emotional lability.

Extraversion (measures quantity and intensity of energy directed outwards into the social world) includes: affection, sociability, activity, assertiveness, positive emotions.

Openness to experience (expresses the degree of openness to new experience, appreciation to aesthetic experiencing), phantasy, to values and changes).

Agreeableness (includes the quality of relationships to other people: trust, empathy, altruism, care for others)

Conscientiousness (looks into the degree of organisation: the sense of accuracy, systematic approach, reliability, purposefulness, persistence).

In Slovak form are used scales between 1 and 5, whereas the overall score for each dimension is between 1 – 60.

4.4 Anamnestic data

These have been extracted from the *Family Constellation Questionnaire* (Szobiová, 2007b). The entries included in the questionnaire were: sex, age, number of children in the household, the birth order, birth order of siblings who has raised the student up to the age of 7 years (e.g. by both parents, mother, father, grandparents or others – needed to indicate who was it). The students had to write down also age differences between the siblings, 3 typical qualities of themselves and their siblings. We have also asked whether they had a step-brother or a step-sister, a disabled sibling or a deceased sibling in their family.

Extracted data have been statistically processed using the methods of descriptive statistics. We have anticipated that there might be differences in the personality characteristics between males and females so we tested the differences with T- test (Leven's test of variance homogeneity). The differences in the birth order groups (firstborn, single children, second born, middle and youngest) have been tested by one-way ANOVA method and as well as two-way analysis.

5. Results

At first the average values, standard deviations, distribution curves of the performances of the adolescents in the intelligence and creativity tests have been measured. After that the performances of men and women have been compared and lastly were compared the results dependent on the birth order (at first born, single children, second-born, middle and youngest ones). As the first results are presented the intersexual differences, which have been obtained by testing the differences of averages of two groups by the Leven's test of variance homogeneity.

5.1 Intersexual differences

Table 1.: Means and standard deviations, group medians and differences in the test of creativity and intelligence of men and women

	Men		Women			
	(N= 61)		(N= 92)			
TESTs	M	SD	M	SD	t	P
URB	37,18	9,06	37,86	7,92	-0,497	0,620
TOR	28,72	8,09	29,43	7,71	-0,549	0,584
NONV	25,88	3,69	26,40	3,70	-0,846	0,399

	Men		Women			
	(N= 61)		(N= 92)			
FLUE	8,03	1,84	8,68	1,74	2,215	0,028
TESTs	M	Group median	M	Group median	U	Sig.(2- tailed)
FLEX	6,57	6,59	7,25	7,55	2103,50	0,008
ORIG	14,09	14,66	13,37	12,70	6809,00	0,305
SPA	72,27	73,44	71,54	73,55	2752,500	0,842

Notes: URB - Urban Creative Tinking Test, TOR - Torrance's Figural Test of Creative Thinking, FLEX - flexibility, ORIG - originality, NONV - nonverbal test GAT, SPA - spatial test GAT

From the table 1 it is clear that women in our study group are different from their peers because they have better ability to produce the number of ideas in the figural area. Better performance of women in the flexibility in the Torrance test has been shown in the overall higher score what means that they have more developed ability to create higher number of different solutions which are pointing towards capability to change the approach to given tasks or change the thinking directions or resist the tendency to use usual solution.

When comparing the groups of men and women in the personality inventory NEO FFI (table 2) the women in comparison with men have reached higher average values in two dimensions, but the statistical significance of variance has not been confirmed.

Table 2.: Means, standard deviations and t-values in inventory NEO-FFI broken down to men (N=61) and women (n=92)

Dimensions	Men (N=61)		Women (N=92)			
NEO-FFI	M	SD	M	SD	t	p
Neuroticism (N)	29,54	5,76	30,82	7,21	-1,166	0,245
Extraversion (E)	44,03	5,47	45,01	5,91	-1,031	0,304
Openness (O)	43,41	6,55	43,77	5,85	-0,357	0,721
Agreeableness (A)	43,03	4,65	43,09	5,98	-0,072	0,943
Conscientiousness (C)	45,26	7,07	44,75	6,47	0,462	0,645

This result is different from our previous results. Women and men in this sample have scored lower in the neuroticism dimension which means that they are more emotionally stable (compare with: Szobiová, Kuklišová, 2005; Szobiová 2007c). Women in our sample have lower level of neuroticism in comparison with other women in few other researches (Ficková, 2000; Hřebíčková, Urbánek, 2001; Szobiová, Hřebíčková, 2006). The average values of extraversion are higher in comparison with our previous researches. The difference in extraversion in favour of women has not been statistically significant. Men in this sample were similarly agreeable as women whereas in the conscientiousness dimension the women have scored higher however not significantly.

5.2 Differences by birth order

The results by birth order have been compared together for the whole sample. The results of variance analysis are shown in the table 3. They are showing that in none of the creativity and intelligence tests the differences between the groups by the birth order have been shown significant. In the personality dimensions of inventory NEO FFI has been found the statistical significance in *agreeableness* ($p = 0.052$). The adolescents who were born in their families as the youngest ones had the tendency to be more emphatic, more altruistic, showing more trust and caring about others ($M = 47.00$; $SD = 4.10$) in comparison with first-born ($M = 43.04$, $SD = 5.85$), only children ($M = 42.67$; $SD = 5.36$) and second born ($M = 42.16$; $SD = 5.32$), but not with the middle ones ($M = 46.13$; $SD = 4.01$). The differences between the groups of the youngest and first-born were on the level of $p = 0.037$; between the group of youngest and single children $p = 0.024$; between the group of second born and youngest $p = 0.010$.

Similar tendencies for significance have been shown in the *openness to experience* dimension ($p = 0.068$). Middle siblings ($M = 39.75$; $SD = 8.12$) have been less open than first born ($M = 44.82$; $SD = 5.94$) $p = 0.030$ and only children ($M = 44.82$; $SD = 5.51$) $p = 0.032$.

Table 3.: The significance of differences (one-way ANOVA) in the results of creativity, personality dimensions NEO FFI and intelligence tests between first-born (N=45), second-born (N=51), middle (N=8), youngest (N=10) and only children (N=39)

TESTS	Variance	Sum of Squares	df	Mean square	F	Sig.
URBAN´S test	Between Groups	139,730	4	34,932	,491	,742
	Within Groups	10533,146	148	71,170		
	Total	10672,876	152			
TORRANCE´S Test	Between Groups	157,120	4	39,280	,631	,641
	Within Groups	9218,423	148	62,287		
	Total	9375,542	152			
FLUENCY	Between Groups	10,806	4	2,701	,825	,511
	Within Groups	484,580	148			
	Total	495,386	152			
FLEXIBILITY	Between Groups	4,461	4	2,321	,818	,448
	Within Groups	95,863	148	2,714		
	Total	100,342	152			
ORIGINALITY	Between Groups	69,758	4	34,879	1,019	,370
	Within Groups	1160,614	148	34,016		
	Total	1230,192	152			
NONVERBAL. Test	Between Groups	65,718	4	16,429	1,209	,309
	Within Groups	2010,400	148	13,584		
	Total	2076,118	152			

TESTS	Variance	Sum of Squares	df	Mean square	F	Sig.
SPATIAL TEST	Between Groups	40,255	4	20,261	,489	,616
	Within Groups	1406,168	148	41,357		
	Total	1445,702	152			
ONEUROTICISM	Between Groups	77,281	4	19,320	,426	,789
	Within Groups	6707,661	148	45,322		
	Total	6784,941	152			
EXTRAVERSION	Between Groups	77,605	4	19,401	,581	,677
	Within Groups	4942,408	148	33,395		
	Total	5020,013	152			
OPENNESS	Between Groups	324,422	4	81,105	2,236	,068
	Within Groups	5367,343	148	36,266		
	Total	5691,765	152			
AGREEABLENESS	Between Groups	278,011	4	69,503	2,403	,052
	Within Groups	4280,198	148	28,920		
	Total	4558,209	152			
CONSCIENTIOUSNESS	Between Groups	67,921	4	16,980	,372	,829
	Within Groups	6762,759	148	45,694		
	Total	6830,680	152			

Two-way analysis (Table 4.) has shown that the birth order differentiates the groups in the personality dimension of agreeableness $F(4,143) = 2.434$ $p = 0.050$. In this dimension the interaction between sex and the birth order has not been identified.

Table 4.:The results of interaction between sex and birth order in the personality dimension of agreeableness using ANOVA method (two-way analysis)

Source			Unit method				
			Sum of Squares	df	Mean Square	F	Sig.
A	Main effects	Corrected Model	311,591 (a)	9	34,621	1,166	,321
		Sex	16,053	1	16,053	,541	,463
		Birth Order	289,174	4	72,293	2,434	0,050
	2-way interaction	Sex * BO	31,940	4	7,985	,269	,898
	Error	4246,618	143	29,697			
	Total	288402,000	153	66,676			
	Corrected Total	4558,209	152				

Note: A - Agreeableness, BO - Birth Order

Table 5.: The results of interaction between sex and birth order in the personality dimension of openness to experience using ANOVA method (two-way analysis)

Source			Unit method				
			Sum of Squares	Df	Mean Square	F	Sig.
O	Main effects	Corrected Model	506,777 (a)	9	56,309	1,553	,135
		Sex	19,969	1	19,969	,551	,459
		Birth Order	384,324	4	96,081	2,650	,036
	2-way interaction	Sex * BO	174,764	4	43,691	1,205	,311
	Error	5184,988	143	36,259			
	Total	296905,000	153				
	Corrected Total	5691,765	152				

Note: O - openness to experience, BO - Birth Order

Also in the personality dimension of *openness to experience* has been shown in the two-way analysis that the groups of adolescents differentiate significantly by the birth order $F(4,143) = 2.650$ $p = 0.036$. The interaction of sex and birth order has not been examined.

5.3 Characteristics of creative and intelligent adolescents according to their own description

In attempt to get a more complex picture about the creativity and intelligence of adolescents extreme groups (mean + 1SD) have been created, which were based on the results in the test of creativity and intelligence. After that those groups have been compared with the Family Constellation Questionnaire, which included some open questions, apart from other subjects, inquiries about three subjectively assigned typical traits. These subjective adolescent characteristics have been divided into number of categories, dependent on the frequency of occurrence, and then a quantitative analysis has been carried out. In summary we can say, that *the highly creative adolescents* ($N = 20$) have ascribed themselves mainly following characteristics: openness to new experiences, originality, spontaneity, sensitivity, inventiveness, desire for change, aesthetics experiences and interests, creativity. These characteristics were not present in the group of adolescents which creativity was under average level. The second field of our research was looking at the characteristics of sociability, openness, creating relationships, extraversion, gregariousness, warmth and positive emotions. These attributes have been assigned by adolescents, who have been the most creative in contrast to under mean creative students, who have attributed themselves opposite characteristics: moodiness, nervousity, closeness, aggression, impertinence. Highly creative students had more often following traits: strictness with themselves, perseverance and ardour, hardworking in comparison with the under mean creative students. *Highly intelligent adolescents* ($N = 22$) have ascribed most often following characteristics: accuracy, diligence, hardworking, studiousness, purposefulness, conscientiousness, goal-striving, ambition, reliability and wisdom. They had also

qualities connected with the relationships to others such as: friendliness, empathy, sociability, talkativeness, humour, solidarity, honesty, reliability. Highly intelligent individuals have also shown a critical eye on their qualities: laziness, indecisiveness, impatience, short-temper, stubbornness, imprudence and bad timekeeping.

Conclusion

The results of this research do not support the findings about the primariness of first-borns and the only children in the area of intelligence and creativity, neither the findings, that they are more creative than their later born siblings.

We have found out, that the birth order differentiates the groups of adolescents in the personality dimension of openness to experience that is in general connected with intelligence and creativity (Costa, McCrae, 1989). It became apparent that first-born and only children are more open to new experience than adolescents born as “middle”.

Our expectations have been confirmed in the dimension of agreeableness and the dependency on the birth order. The youngest children and middle ones are more agreeable than first borns, second born and single children.

The women in our sample have been in comparison with men more fluent ($t=2.215$; $p = 0.028$) and more flexible ($U = 213.5$; $p = 0.008$) what means that they have more developed ability to create higher number of different solutions and it is easier for them to change the direction of thinking.

Highly creative adolescents have ascribed themselves more often characteristics connected with creativity (openness to experience, originality, desire for change, aesthetic experience and interests), highly intelligent individuals have ascribed themselves characteristics of a different type: accuracy, diligence, hardworking, studiousness, purposefulness, goal-striving, conscientiousness, ambition, reliability and wisdom.

The findings of our research are showing that some of our expectations have not been fulfilled due to a number of possible reasons. One of them could be that this was very specific group of adolescents – the art and technical type of study is interesting for students from various birth orders, who have more developed abilities and personality qualities, that will enable them to be more likely successful at the talent examination. We assume that women who want to succeed in the competition in the art and technical type of study need to have some characteristics of intellect and creative abilities comparable with men. Our research has confirmed it (and the women are even better in the figural fluency and flexibility). The answer to the question why some of our expectations have not been met requires a deeper analysis of our sample and used methods. In some of the tests (e.g. in the spatial test) have talented adolescents reached supernormal results, which means, that tests, who are able to differentiate standard population, were very easy for them. Not only these circumstances need to be taken in to the account in the future research studies.

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