

# Age, Gender and Disorder Related Personality Characteristics of Pediatric Patients Measured by Eysenck Personality Questionnaire

Nada Pop-Jordanova, Tatjana Zorcec

University Pediatric Clinic, Department for Psychophysiology, Skopje, Macedonia

## Original paper

### SUMMARY

The study of personality is important not only for psychology and related disciplines, but also in clinical practice. The starting point in this article is Eysenck theory of personality, based primarily on genetics and physiology which corresponds to the temperament. Main categories of temperament for Eysenck are extroversion vs. introversion, neuroticism vs. stability and psychoticism vs. socialisation. In this article, we tried to analyze personality characteristics of eight

groups of children and adolescents applying Eysenck Personality Questionnaire (EPQ). EPQ is a 90-item scale for assessing personality in children and adolescents yielding four scales: extroversion (E), Neuroticism (N), Psychoticism (P) and Socialization/Lie scale (L). The examined sample comprised: a) group with mental anorexia; b) group with rheumatoid arthritis; c) patients with cystic fibrosis; d) neurotic patients; e) patients with tension type headache; f) patients with malignancies (leukemia or solid tumors); g) children with psychosomatic

problems; f) 10 boys with ticks and h) healthy children, as a control group. Total number of examinees was  $N = 216$  (90 girls, 126 boys). It was shown that EPQ is good choice for differentiation of the main personality traits in children which help in the assessment procedure measuring extroversion, neurotic and psychopathologic traits which is useful for planning treatment options.

**Key words:** personality traits, children, disorders, Eysenck Personality Questionnaire.

## 1. INTRODUCTION

In medicine and psychology personality is defined as the characteristics that distinguish an individual, comprising physical, mental, emotional and social differences, including the specific organized pattern of behavior, thoughts and feelings (1).

The study of personality has a rich history with an abundance of theoretical aspects. The major theories include dispositional perspective (traits) but some others include psychodynamic, humanistic, biological, behavioral or social learning aspects (2).

It is thought that personality is determined by genetics and heredity in combination with the influence of environment and experience. The fundamental characteristics of personality are consistency, influence of biological process-

es, impact on behavior and actions as well as multiple expressions (thoughts, feelings, relationships and other social interactions).

The concept of personality types refers to the psychological classification of different types of individuals. It is sometimes distinguished from personality traits which is synonym to behavioral tendencies. Therefore, types involve qualitative differences between people, whereas traits are considered as quantitative differences (3).

There are practically an unlimited number of potential traits that could be used to describe personality. From the scientific aspect, factor analysis is used as a more powerful statistical technique.

Eysenck's theory of personality (4, 5) is based primarily on genet-

ics and physiology which corresponds to the temperament. Temperament is genetically based, in-born and persists stable through the life. Two main categories of temperament introduced by Eysenck are extroversion vs. introversion and neuroticism vs. stability. According Eysenck's arousal theory of extroversion, there is an optimal level of cortical arousal on which the performance depends. Arousal can be measured by skin conductance or by brain waves. In particular, mental arousal can be related to q-EEG recording and calculated by the brain-rate parameter (6).

Extroverts are chronically under-aroused and bored and they need an external stimulation for obtaining optimal level of performance. In opposite, introverts are over-aroused and they need a

peace and quiet for obtaining an optimal performance.

Neuroticism is characterized by high levels of negative affect such as depression and anxiety. According to Eysenck, neuroticism is based on activation of the sympathetic nervous system or visceral brain. This is the part of brain which is responsible for the fight-or-flight response in face of danger. Activation can be measured by heart rate, blood pressure or muscular tension. The four dimensions or axes extroversion/introversion and emotional stability/instability, define four quadrants shown on Figure 1.

As can be seen, the extroversion/introversion as well as neuroticism/emotional stability are compared with the classical types of temperament (sanguine, melancholic, phlegmatic and choleric). In the following research, Eysenck added a third category of the temperament-psychotism/socialisation. The psychological basis for psychotism is supposed to be the testosterone.

Eysenck Personality Questionnaire (EPQ) is one of the first comprehensive personality trait measures to enjoy worldwide popularity and a fairly large number of translations into different languages and which assesses the broad domains of neuroticism, extraversion, and psychoticism. The results have generally provided strong support for the universality of personality structure across a wide array of cultures and languages. There are also interesting data with regard to the relationship of these personality traits to cultural indicators (7).

Eysenck Personality Questionnaire was applied also in researches involving children and adolescents. For example, Littlefield and coll.[8] examined the relation between changes in problematic alcohol involvement and personality (measures of impulsivity, neuroticism, and extraversion) from ages 18 in a cohort of college students at varying risk for alcohol use disorders and showed that alcohol use was associated with

changes in neuroticism and impulsivity scores.

No differences between school-age children who stutter and controls in personality factors related to neuroticism or anxiety were found. This conclusion is based on multiple tests procedures in which Eysenck Personality Inventory was also applied (9, 10).

Associations between personality and cortisol rhythms were examined in adolescents

using multilevel growth curve modeling. Neuroticism (N) and introversion (I) were significantly and differentially associated with features of diurnal cortisol patterns (11).

Concerning ADHD children low reactive control and high extraversion were hypothesized to be related with a reactive response system based on approach tendencies. Early in life, this system may appear as reactive control, but later it develops into extraversion trait. Negative emotionality and neuroticism were hypothesized to share similar neural propensity to avoidance-related affect and behavior. High levels of extraversion and high levels of neuroticism, conscientiousness, and agreeableness appeared to be related to externalizing disorders. Consequently, effortful and reactive processes appear to be distinct forms of behavioral control that can be externally validated by other personality/temperament traits, executive function, and ADHD symptoms (12).

Basic personality traits and specific behavior characteristics were assessed in 39 adolescent patients having chronic tension-type headache. The scores obtained by patients in personality questionnaires were compared with averages scores for normal sample of healthy pupil in the same ages. In this study no signs of emotional instability, were found. The behavior of children with headache was described as prosocial, non-aggressive, and ambitious, aimed at the achievement of superior results at school and life although already quite successful in their

studies. Tensions arising from the school setting seem to be important factors triggering tension-type headaches (13).

EPQ is used in a study which examined the link between child-adult emotional bonds and personality characteristics. A sample of Pakistani adolescents aged between 13 and 14 completed the Emotional Attachment Scale and the Eysenck Junior Personality Questionnaire. Adult subjects to whom the adolescent subjects were predominantly emotionally attached were also asked to complete the Eysenck Adult Personality Questionnaire. The obtained results indicated that children tend to develop emotional attachments to those parents whose personality scores correlate significantly positively with theirs; however, if they attach to nonparent adults, no significant association between their personality scores and those for adults were found. (14).

Personality questionnaire scores obtained by children and adolescents receiving some psychological treatment at a health facility were examined using EPQ. The scores were compared with those of regular school children of the same age, who were not in treatment ( $n = 30$ ). The children in treatment obtained higher scores on psychoticism, lower scores on extraversion, and similar scores on neuroticism and dissimulation by comparison with regular students (15).

A reliability generalization was conducted on the psychoticism (P), extraversion (E), neuroticism (N) and lie (L) scales of the Junior Eysenck Personality Questionnaire (J-EPQ) in more of twenty studies with children. Score reliability was found to vary significantly both between and within scales. N and L provided the most reliable scores (with median reliabilities of 0.80 and 0.79 respectively) followed by E (median reliability=0.73) and P (median reliability=0.68). Scale length was the best predictor of score reliability, but sample gender makeup, lan-

P	F=1,13	P=0.35
E	F=2.54	P=0.02**
N	F=0.94	P=0.47
L	F=2.73	P=0.01**

**Table 1:** ANOVA for girls

P	F=0.84	P=0.56
E	F=4.16	P=0.0003**
N	F=0.84	P=0.56
L	L=1.85	P=0.08

**Table 2:** ANOVA for boys

guage of administration, and the amount of variation in the ages of children in each sample were also significant predictors of reliability for various J-EPQ scales. Consequently, it may be concluded that the reliability of this psychometric instrument is satisfactory (16).

In our previous research, we also used EPQ in the assessment of some pediatric disorders (headache, cystic fibrosis and mental anorexia) (17, 18, 19). Our patients with tension-type headache did not showed significant differences in EPQ results compared with control. However, EPQ showed very good sensitivity especially for differentiation extrovert from introvert children. This finding is important concerning mental arousal as an indicator for the application of different biofeedback modalities.

The objective of this study was to analyze and compare the four personality characteristics measured with Eysenck Personality Questionnaire (EPQ) including five additional most common child disorders, and the relations with age and sex.

## 2. METHODOLOGY AND SAMPLE

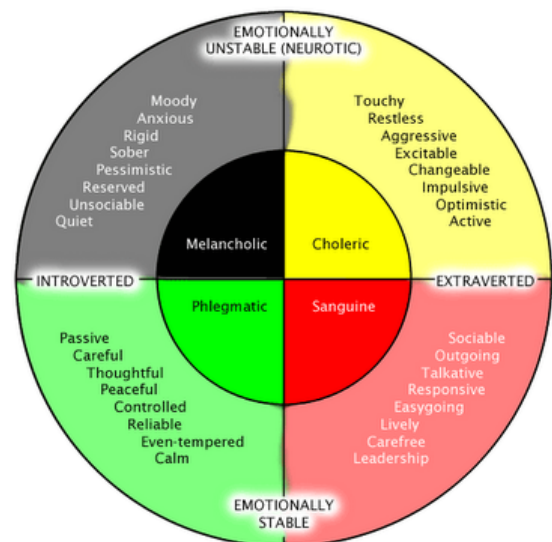
The EPQ is a 90-item scale for assessing broad aspects of personality in children and adolescents. The items are scored on a dichotomous scale (yes = 1, no = 0). The EPQ yields four scales, Eysenck's three factors of personality: Extraversion, Neuroticism, and Psychoticism, and a Lie scale to verify valid responding. The validation and reliability of the Macedonian version of the test was performed many years ago in connection with fuzzy rezoning expert

systems (20, 21, 22). The scoring of the results is computer-aided.

The sample of this study comprised eight groups of examinees: a) fifteen girls (mean age  $12,07 \pm 1,8$ ) and five boys (mean age  $11,1 \pm 2,2$ ) with mental anorexia; b) six boys (mean age  $11,53 \pm 14,2$ ) and ten girls (mean age  $10,31 \pm 10,2$ ) with rheumatoid arthritis; c) 15 boys (mean age  $14,31 \pm 8,2$ ) and 15 girls (mean age  $12,31 \pm 5,82$ ) with cystic fibrosis; d) 15 boys (mean age  $12,02 \pm 3,18$ ) and 15 girls (mean age  $13,88 \pm 8,08$ ) with neurotic manifestations; e) 15 boys (mean age  $12,99 \pm 1,79$ ) and 15 girls (mean age  $11,65 \pm 38,79$ ) with tension type headache; f) 10 boys (mean age  $9,03 \pm 5,6$ ) and 10 girls (mean age  $12,59 \pm 8,10$ ) with malignancies (leukemia or solid tumors); g) 10 boys (mean age  $9,03 \pm 5,6$ ) and 10 girls (mean age  $8,95 \pm 2,16$ ) with psychosomatic problems; f) 10 boys (mean

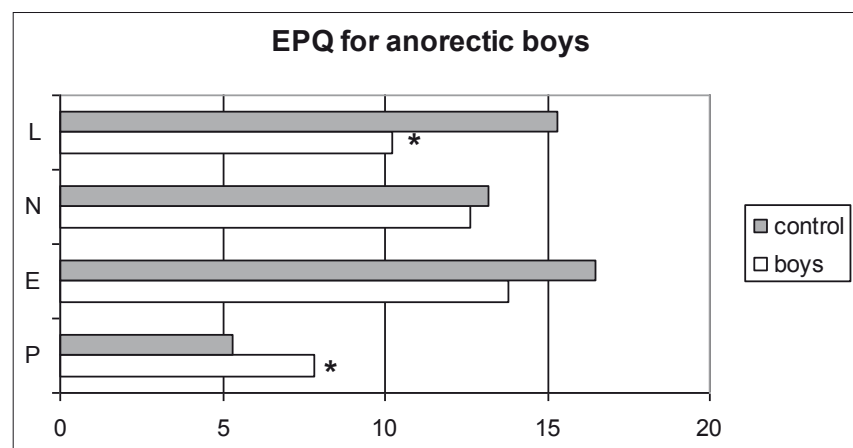
age  $10,14 \pm 2,1$ ) with ticks and h) healthy children, 20 boys (mean age  $8,95 \pm 2,16$ ) and 20 girls (mean age  $11,77 \pm 3,8$ ) as a control group. Total number of examinees was  $N= 216$  (90 girls, 126 boys).

Patients were in stable condition or in total remission when Eysenck Personality Questionnaire (EPQ) was applied. Prior consent was obtained from both children and parents.

**Figure 1.** Four dimensions of personality [5]

## 3. RESULTS AND DISCUSSION

Firstly, we analyzed a variance of all obtained scores for psychoticism (P) extroversion (E), neuroticism (N) and honesty (L) scales. The null hypothesis for ANOVA is that the mean (average value of the dependent variable) is the same for all groups. On the Ta-

**Figure 2.** EPQ for anorectic boys

ble 1 obtained results for one way ANOVA for girls are shown. It is clear that for girls only E and L scores showed significant difference in variance. For boys, only results for E scale showed significant variance.

This result is very helpful having in mind that extroversion as an important personality characteristic related to the mental arousal is specific in different disorder for both girls and boys.

Secondly, we analyzed the correlation between scores for all scales and age. The hypothesis was that maybe the maturational processes of the central nervous system influences the different personal characteristics evaluated by the four scales in EPQ. Obtained results showed that only moderate positive correlation (Pearson's coefficient  $r = 0.28$ ) existed between age and L scale. It means that with growing, children intended to give the answers which are socially more preferable. Other personality characteristics stay stable during childhood and adolescence.

The next step of the analysis was to find the differences in the obtained scores for P, E, N and L scales for children with different disorders. For this purpose we used Student t-test.

Obtained results showed that for the group of anorectic patients only for boys t-test was significant ( $p < 0.01$ ) for L and P scale. It means that anorectic boys compared to control group are more honest an-

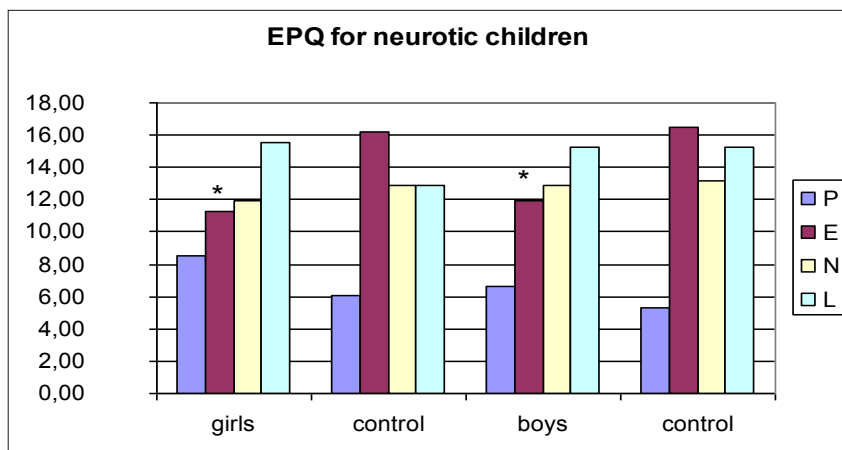


Figure 3. EPQ for neurotic children

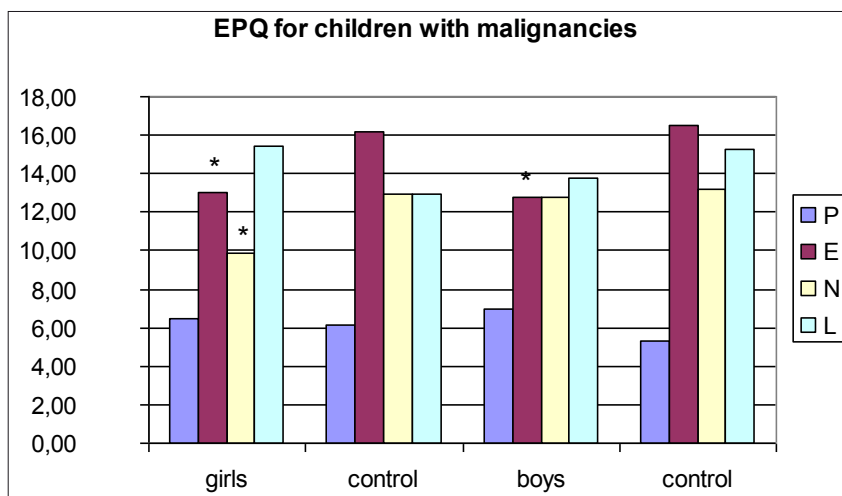


Figure 4. EPQ obtained for children with malignancies

swering the questions, and also that they have more pronounced psychopathologic traits. The second finding is very logical if we know the follow-up and the long term prognosis for anorectic boys is more serious concerning other psychopathological manifestations (borderline, depression etc).

Significant difference in obtained scores was found also in the group of children with neurotic manifestations. The scores for extroversion were significantly lower ( $p < 0.01$ ) for both girls and boys in comparison to the control. Considering the mental arousal theory it can be interpreted that neurotic children are more aroused than healthy ones.

For these children we used peripheral biofeedback treatment (electrodermal conductivity or pulls detector devices) in order to obtain mental relaxation.

The group of children with malignancies (leukemia or solid tumors) was evaluated in the period of remission, when children were disposed to the psychological evaluation. In this group, we found significantly lower scores for extroversion for both girls and boys in comparison to healthy children. It means that children

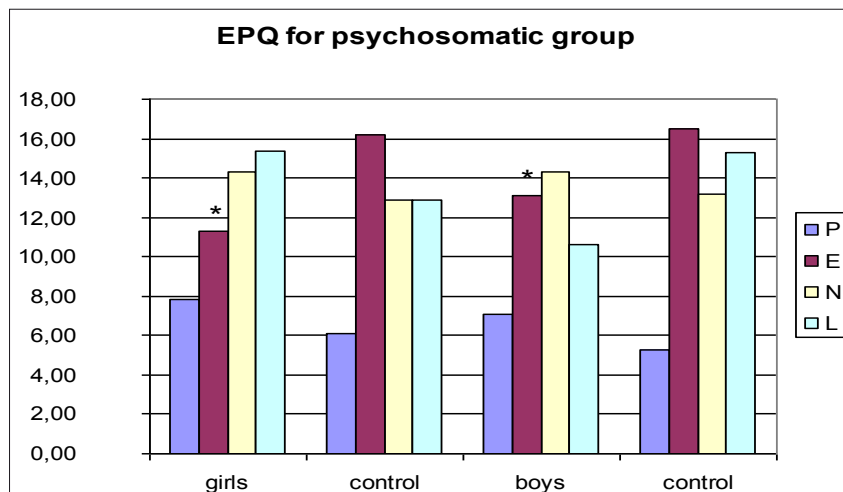


Figure 5. EPQ for psychosomatic group

with malignant diseases are more aroused than healthy children. In addition, ill girls showed significantly lower scores for neuroticism ( $p < 0.01$ ).

The examined groups of children with Cystic Fibrosis, Rheumatoid arthritis, Headaches as well as boys with Tics did not show significantly different results for P, E, N and L scales in comparison to the healthy group.

On the Figure 5 the results for EPQ obtained for children diagnosed to have some "psychosomatic problem" (i.e. somatoform manifestations provoked by emotional instability or stress) are presented. Obtained results show that significant difference ( $p < 0.01$ ) exists in extroversion level, in comparison to the control group. It is very similar finding to the obtained results for neurotic children which are in accordance to the hypothesis that high mental arousal could be transformed in somatic symptoms.

Finally, the differences in obtained scores between girls and boys, (calculated with Student t-test), in all groups was analyzed. The statistics showed that only L scores in control group and in group with rheumatoid arthritis were significantly different between girls and boys ( $p < 0.05$ ). These results can be interpreted by the pronounced simulation of the answer in boys.

#### 4. CONCLUSIONS

Eysenck personality questionnaire is a good choice for differentiation of the main personality traits in children. The results help in the assessment procedure as well as in the choice of treatment options. The last is influenced by the mental arousal which is strongly related to personality characteristics of the subject.

The obtained results showed that the variances in the scores are significantly different only for E and L scores for girls and in L scores for boys.

A moderate correlation between L scale and age is obtained. It can be interpreted as the influ-

ence of maturity to the choice of more socially preferable answers. The other traits are not related to the age of children.

Anorectic boys showed significantly lower L scores and higher psychopathologic traits in comparison to healthy ones. Neurotic and psychosomatic group showed lower extroversion scores which was the indication for applying peripheral biofeedback modality in the treatment.

The group with malignancies showed lower extroversion and lower neurotic traits especially in girls in comparison to healthy children.

Generally, EPQ could be used in clinical assessment of different groups of patients especially for measuring extroversion, neurotic and psychopathologic traits which is useful for planning treatment procedures.

#### REFERENCES

1. Bradberry T. The Personality Code. New York: Putnam, 2007.
2. Engler B. Personality Theories. Houghton Mifflin, 2006.
3. Montgomery S. People Patterns—A Modern Guide to the Four Temperaments, 2002.
4. Eysenck HJ. The biological basis of personality. Springfield, IL: Thomas, 1967.
5. Eysenck HJ, and Eysenck MW. Personality and individual differences: A natural science approach. New York: Plenum, 1985.
6. Pop-Jordanova N, Pop-Jordanov J. Spectrum Weighted EEG Frequency ("Brain-rate") as a Quantitative Indicator of Mental Arousal, *Prilozi*, 2005; 26(2): 35-42.
7. Eysenck HJ and Eysenck SBG. The Eysenck Personality Questionnaire-Revised. Sevenoaks: Hodder & Stoughton, 1991.
8. Littlefield AK, Sher KJ, Wood PK, Is "Maturing out" of Problematic Alcohol Involvement Related to Personality Change? *J Abnorm Psychol*. 2009; 118(2): 360-74.
9. Howell P, Signs of developmental stuttering up to age eight and at 12 plus, *Clin Psychol Rev*, 2007; 27(3): 287-306.
10. Furnham A, Davis S, Involvement of social factors in stuttering: A review and assessment of current methodology, *Stammering Res*, 2004; 1(2): 112-22.
11. Hauner K, Adam E, Mineka S, Doane L, DeSantis A, Zinbarg R, Craske M, and Griffith J, Neuroticism and In-

- troversion are Associated with Salivary Cortisol Patterns in Adolescents, *Psychoneuroendocrinology*, 2008; 33(10): 1344-56.
12. Martel M, Nigg J, Lucas R. Trait Mechanisms in Youth with and without Attention-Deficit/Hyperactivity Disorder, *J Res Pers*, 2008; 42(4): 895-913.
13. Mandic Z, Baraban D, Boranic M, Chronic Tension-Type Headache in School-Aged Children – Personality Traits and Behavior, *Coll. Antropol*, 2003; 27 Suppl. 1:159-66.
14. Maqsd M. Eysenck's theory of personality and child-adult emotional attachments, *Motivation and Emotion*, 1981; 1(5): 75-83.
15. Porrata JL, Rosa A, Mendez V. Scores on the Eysenck personality questionnaire for a sample of children and adolescents receiving psychological treatment in Puerto Rico., *Psychol Rep*, 2003; 93(1):35-40.
16. Caruso J, Edwards S. Reliability generalization of the Junior Eysenck Personality Questionnaire, *Personality and Individual Differences*, 2001; 31(2): 173-84.
17. Pop-Jordanova N, Boskovska V, Avramovska V. Psychosomatic assessment of preadolescents with tension type headache, *Paediatr Croat*, 1998; 42: 33-7.
18. Pop-Jordanova N, Fustic S, Zorcec T. Psychological aspects of children with cystic fibrosis, *Paediatr Croat*, 2001; 45: 111-5.
19. Pop-Jordanova N. Psychophysiology and therapy of anorexia nervosa in childhood, *International J of Psychophysiology*, 1998; 30, 1-2: 142.
20. Bozinovski S, Martinovska C, Bozinovska L, Pop-Jordanova N. Expert system with fuzzy logic in analysis of the personality characteristics, *Proceedings, I Congress for Medical Informatics, Beograd*, 1990: 237- 241
21. Pop-Jordanova N, Boskovska V. EPI and EPQ: The fuzzy reasoning expert systems in the pediatric psychodiagnostic, *Second Baltic Sea Conference on Psychosomatic Medicine, June 11-14, Ronneby, Sweden, H.2*, 1995.
22. Bozinovski S, Martinovska C, Bozinovska L, Pop-Jordanova N. MEXYS 2: A fuzzy reasoning expert system based on the subject emotions consideration, *MIE 91, Wien*, 1991:423-426. In Adlassnig K.P., Grabner G., Bengtsson S., Hausen R. (Eds), *Medical Informatics Europe*, Springer-Verlag, Wien.

Corresponding author: prof Nada Pop-Jordanova, PhD. University of Skopje, Macedonia.