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A PRELIMINARY STUDY ON THE ASSOCIATION BETWEEN ABO BLOOD TYPE AND TEMPERAMENTAL TRAITS

Alina Sanda Bălan[1,*]

[1]National University of Science and Technology POLITEHNICA Bucharest, Pitești University Centre, Str. Târgul din Vale, nr. 1, 110040, Pitești, Romania

Abstract
Human personality has a certain biological basis. Hippocrates was among the first to promote the idea, asserting that temperament is determined by a peculiar combination of four bodily humors. In 1901 the Austrian scientist Karl Landsteiner discovered the ABO blood system, and during the years researchers like Takeji Furukawa (1927), Raymond Cattell (1964), Masahiko Nomi (1971) and Hans J. Eysenck (1977) have tried to link the four blood types with personality traits. This was also the aim of our study. We have used a sample of 83 people to examine possible psychological differences between the ABO blood types. The tests we have used were The Cognitive Style Indicator, The Eysenck Personality Inventory, The Wiersma-Heymans Temperament Test and The Zuckerman-Kuhlman Personality Questionnaire. We have measured temperamental traits such as extraversion, neuroticism, impulsivity, hostility, sensation-seeking and primary versus secondary psychological functioning, but also the cognitive styles of a person. Based on the results we can draw a row profile of each blood type. Thus, the O blood type appears as a primary type, balanced, sociable and with low neuroticism. The A blood type appears as a secondary type, with low extraversion and high anxiety. The B blood type appears as extroverted and impulsive, but the general profile is different for males (high sociability) compared to females (high emotivity). The AB blood type appears as primary, with a high need for activity, with the highest tendency for planning activities and the higher score on innovative style; their neuroticism is low, whereas emotivity shows a different pattern depending on gender (with only AB females scoring high on this trait). Although, due to small sample size, only a few differences reached statistical significance, a look at the group means and the effect size coefficients support the idea that temperamental traits have a biological foundation.

Keywords: ABO blood type, personality, psychological differences, temperament.

1. INTRODUCTION

Greek physician and philosopher Hippocrates (460-370 BC) explained individual differences in temperament by the particular combination of four bodily humors (blood, phlegm, yellow bile, black bile). Although this old theory was later criticized, the biological part of our personality could never be ignored.

In 1901 the Austrian physician and scientist Karl Landsteiner discovered the ABO blood system. This system being a major biological marker, it is no surprise that during the next years many researchers have tried to link the four ABO blood types with personality traits.

*Corresponding author, E-mail address: sanda_alina.balan@upb.ro

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The ABO blood system

It is the first blood system to be discovered and, also, the most important of all immunological sanguine systems (as they are numerous other such systems, such as the Rhesus or Rh system). It is relevant for areas such as medical practice (blood transfusions, transplants), biogenetics and forensic serology (for example, for filiation expertise).

On the red blood cells membrane Karl Landsteiner found agglutinogen macromolecules, that acted like antigens; he named them A and B. He also found that blood plasma contains gamma globulins acting like antibodies (the so-called agglutinins): a (also symbolized as α, the homologue of antigen A) and b (also symbolized as β, the homologue of antigen B).

The immunological rule states that an antigen cannot coexist with its antibody, as agglutinins causes particles in the blood to coagulate (to agglutinate). There are thus four possible combinations antigen-antibody – resulting the four blood groups: A, B, AB and O (initially named by Landsteiner C – from the German word "ohne", meaning "without"; that is the reason why in some countries the O group is known as "zero").

The table below summarizes the antigens and antibodies distribution in the four blood groups of the ABO system (Isvoranu et al., 1989; Niculescu et al., 2007).

Table 1. The four blood groups in the ABO system

Blood group	Blood group phenotype	Blood group possible genotypes	Blood group Antigens (agglutinogens)	Blood group Antibodies (agglutinins)
I	O	OO	no antigens	α and β
II	A	AA or AO	A	β
III	B	BB or BO	B	α
IV	AB	AB	A and B	no antibodies

In Romania the blood groups are assigned a Latin number from I to IV (the first column in the table above), in order to better differentiate them. The *phenotype* refers to characters that are detectable through serological methods, whereas the *genotype* refers to the genetic inheritance from the parents. Blood groups are genetically determined, are inherited following well-established genetical laws (the mendelian model). The ABO blood system is controlled by genes situated on the q arm of the chromosome 9. The ABO locus has three alleles: A, B and O. Alleles A and B are codominant, whereas allele O is recessive.

The classical ABO four types are well-known, but do not cover the whole serologic diversity. As we have said, there are numerous other genetic blood systems. Also, the difference between the phenotype and the genotype creates more variation in the blood type.

Another aspect that might be relevant when analyzing blood type medical and psychological correlates is the variation resulting from the diversity of alleles A and B (Beliș et al., 1992, p. 172; Isvoranu et al., 1989, p. 78). Dungen and Hirschfeld had discovered subtypes of allele A (with A_1 and A_2 being the most common). It was also found that alleles B and O have alternative forms. If we consider these varieties, we have numerous subgroups, both for the phenotype and for the genotype.

The antigenic mosaic is very complex and estimates say there are over 30 very rare blood groups, which pose difficulties, for examples, when blood transfusion are required (Ciocan, 2012).

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The statistical distribution of the four ABO blood groups

The ABO blood type distribution varies throughout the world across regions and countries; the one common point is that this distribution is not uniform.

For Romania we have data published in an *Informatics and Biostatistics* book by Tudor Drugan and his colleagues (Drugan et al., 2004, p.187). According to this source, type O is encountered in 42% of the general population, type A represents 43%, whereas type B represents 11% and type AB only 4%. The distribution is the same for males and for females.

Looking for more recent data, we have found some percentages on various *Interne*t sources – all indicating a higher percentage of the B group; we cannot consider them, nevertheless, as they are not official data.

Looking for data from other countries, we have found that in Japan (Kanazawa, M., 2020, citing data from 1997 - *Japan Red Cross Blood Center*) it is estimated that 29.4% of people are O Type, 39.1% are A Type, 21.5% are B Type, and 10% are AB Type (approximately twice as many people with rare types than in Romania).

In Turkey 33.8% of people are O Type (4.4% O Rh-, 29.4% O Rh+), 43.8% are A Type (5.5% A Rh-, 38.3% A Rh+), 15.3% are B Type (2.1% B Rh-, 13.2% B Rh+) and 7.1% are AB Type (0.7% AB Rh-, 6.4% AB Rh+) (Canan Eren, 2019).

Personality and temperament

The term *personality* refers to our inner structure, our personal qualities or traits. These traits are enduring dispositions to react or to behave in certain ways. The term „enduring" means they are relatively stable over time, irrespective to some degree of life circumstances.

That is because personality traits have a biological basis; it is estimated that approximately 40% of the variation in personality profile is genetic. But the situation differs depending on the particular type of personality trait.

Broadly speaking, personality includes three dimensions: aptitudes (general intelligence, characteristics of attention and so on), temperament (traits such as our level of *Extraversion*, or our *Neuroticism*, or *Emotivity*) and character (traits referring to our value system, such as *Honesty*).

Character is what is developed and shaped by education and social interactions, it refers to the acquired dimension of our personality. Temperament traits are more deeply-rooted in our constitution, have a more biological (hereditary) loading, referring to an innate disposition to act in a certain way (Allport, 1981; Zlate, 2009).

The distinction is not so clear as it seems, however, because there are traits (such as *Compassion*, *Empathy* or *Agreeability*) you might think as character-ones, but that also have a genetic component. The question "Which traits are temperamental?" thus remains open. We may also say that temperament is the way we express ouselves (mainly in the affective realm, but not only), the peculiar way we bring to the world our inner life.

There are two main approaches in personality psychology: the search for the defining personality traits and the search for psychological types. Both of those has its drawnbacks (Golu, 2005) and we have considered both in our study. Thus, we have considered the blood-type psychological typology, and we have also sought to find which traits best differentiate those types. The problem of the "best" traits to choose is an old one in psychology and is linked to the problem of the structural models of personality.

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Numerous authors have spoken of a factor structure in personality; some have proposed a three-factor model, others a five-factor model. Zuckerman and his associates conducted a comparative study analyzing the *Three Factor* model proposed by H. J. Eysenck (scales: *Extraversion; Neuroticism; Psychoticism*), the *Big Five* - P. T. Costa and R. McCrae's version (scales: *Neuroticism*, *Extraversion*, *Openness*, *Agreeableness*, and *Conscientiousness*) and the *Alternative Five* of M. Zuckerman and D. M. Kuhlman (scales: *Neuroticism-Anxiety*; *Extraversion-Sociability*; *Impulsive Sensation Seeking*; *Aggression-Hostility; Activity*). They compared the factors and found that *Extraversion* and *Neuroticism* were quite similar across the models, while *Psychoticism* represented a factor that included *Conscientiousness* and *Impulsive Sensation Seeking* factors. A fourth factor was defined by *Agreeableness* and *Aggression-Hostility*. *Openness*, a distinct factor on *Big Five*, did not show convergence with the other factors (Zuckerman et al., 1993). All those models of personality structure generally show convergence, but the most widely accepted is the five-factor approach.

ABO blood type and personality differences

It seems that it all began in 1916, when a Japanese physician, Kimata Hara, conducted some research on the relation between blood groups and temperament (but little could we find about his contribution). Approximately a decade later, in 1927, another Japanese man, a professor and educational psychologist named Takeji Furukawa, published the article *The study of temperament through blood type*. The interest in Japan for the topic was renewed in 1971, when Masahiko Nomi began to write many articles on this subject, including *You are your bool type* (1988).

But it was not only "a Japanese problem" (Evans, 2012), as some skeptical called it.

A famous British-American psychologist, Raymond Cattell, did research on this topic. In 1964, in the *American Journal of Human Genetics* was published the article *Blood groups and personality traits*, written by R. Cattell, H. Young and J. Hundleby.

But the most notable contribution is, perhaps, that of the German-born English psychiatrist and psychologist Hans J. Eysenck. Well-known for his personality theories, Eysenck has done his own research and wrote papers like *The biological basis of personality* (1967), *Differences in personality between Japanese and English* (1977, in collaboration with S. Iwawaki), *The biological basis of cross-cultural differences in personality: blood group antigens* (1982).

In the last-mentioned paper Eysenck considers cross-cultural differences regarding the traits of neuroticism, extraversion and psychoticism, in correlation with the frequency of blood group antigens. Among other data, Eysenck analyzed figures for blood groups for both Japan and England. He found in Japan a significantly higher proportion of persons with the AB blood group and a smaller value for the ratio group A / group B; he also found that Japanese people have higher scores on *Introversion* and *Neuroticism*. Considering other countries, he noticed that the Nordic European countries are low both in blood group B proportion and in the *Anxiety-Neuroticism* dimension, and countries like Japan, Taiwan or Egypt, are high on both blood group B proportion and the *Anxiety-Neuroticism* dimension. This finding is considered a support of „the implication of genetic factors in the causation of differences in personality" (Eysenck, 1982, p. 531).

During the years, various authors compared the four ABO groups using psychological measures like *Eysenck Personality Inventory* (EPI, H. Eysenck), *Sixteen Personality Factors* (16PF, R. Cattell), *Minnesota Multiphasic Personality Inventory* (MMPI, Hathaway & McKinley), *Myers-Briggs Type Indicator* (MBTI, Myers & Briggs) or *NEO-PI-R* (the most commonly used *Big Five* personality test, designed by Costa & McCrae).

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Some of conducted studies had an unclear or poorly designed methodology, used small sample sizes and / or had lower proportions of participants with rare blood types (B, AB); also, while findings for blood types O and A were fairly consistent, results for the rare groups were somewhat contrasting, all this leading to scientific controversy. For example, some authors have reported blood type AB as being introverted, others described the group as extroverted; but this may be explained somehow, as Furukawa (1930) reported blood type AB as showing contradictory traits.
Out of the numerous studies, we will cite here two, with opposite findings.
Rogers and Ian Glendon found no significant relationships between blood types and personality within a normal population (360 blood donors). As psychological measures they used a version of the *Big-Five Personality Inventory* developed by Goldberg, and a scale measuring *Optimism* (Rogers and Ian Glendon, 2003).
Masayuki Kanazawa, a research associate at *Human Science ABO Center* from Tokyo, Japan, published a study analyzing data from two large-scale surveys (total N was close to 3000) examining the association between blood type and personality. Kanazawa used an AI (*Amazon Machine Learning*) software to analyze the data. He found that there is a "real", "clear and significant relationship" between self-reported ABO phenotypes and personality characteristics, and this was not due to self-fulfillment prophecy phenomena. He also found that gender and age are intervening variables (Kanazawa, 2020).

The classical description of the four ABO types
Many authors described the core psychological characteristics of each blood type.
Masayuki Kanazawa, analyzing the descriptions proposed by Japanese psychologists like Sato, Miyazaki and Watanabe (1991), Yamazaki and Sakamoto (1991, 1992), Watanabe (1994), came to the conclusion that they were consistent with the classical ABO description of Masahiko Nomi (1978) (Kanazawa, 2020).
Below we have summarized this ABO blood group typology.
The *O type* is a social, popular, often big-hearted individual. He is a person that values the opinion of others and so seeks to live in peace with everybody. His emotions are usually stable, is a diplomatic, phlegmatic type. These characteristics allow the O type to be a trusty person. The O type is also a person of action, being purpose oriented.
The *A type* is an introverted individual. His neuroticism is high, is often worried about things (this corresponds, broadly, with the melancholic temperament). At work is a good executant, serious, meticulous, conscientious, often perfectionist.
The *B type* is an outgoing, sanguine, cheerful, optimistic and charming individual. He is unconventional and individualistic; tends to follow his own ideas and rules. In action he is practical, pragmatic (the prototype of a tradesman).
The *AB type* has, simultaneously, the temperament traits of both A and B type, depending on the situation. An AB individual is both outgoing (like the B type) and shy (like the A type), both calm and fragile and so on. This is the reason why he is often perceived as dual, unpredictable, hard to be understood. An AB is mainly an introverted and intuitive person, both empathic and rational, both sensitive and critical. AB persons are good at planning activities and are hard-working people. They reflect the prototype of a science man, but also the prototype of an artist or craftsman.

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2. MATERIALS AND METHODS

The objective of our study is to examine possible psychological differences between the ABO blood types.

Our general hypothesis is that people belonging to different ABO groups would have different scores on some psychological measures (mostly, temperament traits).

Participants

We have used a sample of 83 people. Respondents were students attending psychology classes and relatives or friends of those who have voluntarily chosen to take part in this study. The participants filled in the measures in paper and pencil format.

We must also say that in the process of data collection we have found an unexpected high proportion of young people who did not even know their ABO phenotype (the Rh type being even more rarely known)! We were contradicted by this finding, that even the most used of the blood systems is little known by Romanians.

The initial sample size was 95, but 12 cases were discarded because of high scores on measures of social desirability (two of the tests we have used had a desirability measure, intended to detect bias in self-report). Of the remaining 83 cases, 15 (18.07%) are males and 68 (81.93%) are females. As for their ages (valid N=77), they vary from 14 to 58 years (M=29.34, SD=11.01), with a slight positive asymmetry (skewness=.873), indicating that most of the participants are young people.

In our sample, 36 persons have blood type O (31 females, five men), 25 persons have blood type A (22 females, three men), 12 persons have blood type B (10 females, two men) and 10 persons have blood type AB (five females and five men).

Measures

We have measured mainly temperament traits such as extraversion, neuroticism, impulsivity, hostility, sensation-seeking and primary versus secondary psychological functioning, but also the cognitive styles of a person. The tests we have used were *The Cognitive Style Indicator*, *The Eysenck Personality Inventory*, *The Wiersma-Heymans Temperament Test* and *The Zuckerman-Kuhlman Personality Questionnaire*.

The Cognitive Style Indicator was developed by Eva Cools and Herman Van den Broeck (2007) and was translated and adapted to Romanian using an academic sample by professor Beatrice Adriana Balgiu from *The University POLITEHNICA Bucharest* (2017).

The questionnaire is an 18-items self-report measure of the cognitive styles (defined broadly as the way we perceive, process and structure information). It is important to note that it does not measure cognitive performance, but a general approach to information processing, a personal preference in dealing with the world.

Each item is assessed on a 5-point Likert scale (1–does not fit me at all; 5–it fits me totally). Items are grouped on three scales, identifying three cognitive styles: objective (4 items), planning (7 items) and innovative (7 items).

The objective style and the planning style tend to correlate, as they are part of the larger analytic dimension. The *objective style* refers to the tendency to reflect, to look at facts, to analyze logically, rationally and to focus on details. The *planning style* refers to the tendency to organize the environment and personal activities, with a preference for the sequential, the structured and the

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conventional. On the other side, the *innovative style* refers to the preference for novelty, flexibility, innovation and the value given to the subjective feeling and personal significance of things.
All the scales show good internal consistency, with alpha Cronbach's coefficients ranging between .72 and .85 (Balgiu, 2017).

The Eysenck Personality Inventory (EPI) was developed by Hans J. Eysenck and S.B.G. Eysenck (1964) and is based on H. J. Eysenck's personality theory.
We have used the *A form* of this test, adapted to Romanian population. It includes 57 forced-choice (yes/no) items, grouped in three scales: *Extraversion*, *Neuroticism* and *Lie* (this last scale is a validation scale, used to eliminate subjects that respond randomly or have a high social desirability). The test has good psychometric properties; the test-retest stability coefficients vary between 0.84 and 0.94 (Minulescu, 2005).
The *Extraversion* scale measures traits like sociability, dominance, aggressivity, impulsivity and risk-taking. High scores indicate an optimistic, sociable person, with numerous social contacts, which is involved in many group activities and in need for change and novelty. Low scores indicate an introverted person; the typical introvert is quiet, mostly distant, prone to introspection and likes order and planification in his life. Many people are ambivert on this trait, meaning somewhere between the two ends of the spectrum.
The *Neuroticism* scale measures emotional instability versus emotional stability. The scale includes items referring to the general predisposition to feel anxiety, worry, concern, depression in stressful situations. High scores indicate emotional lability, hyper-reactivity, a person that often complains, worries and often has somatic symptoms such as headaches. Low scores indicate a well-adjusted person, calm, stable, with a high self-control, not easily disturbed.

The Wiersma-Heymans Temperament Test. G. Heymans and E.D. Wiersma were two Dutch philosophers and psychologists that, in the first part of the XX century, postulated that temperament is mainly inherited and proposed a typological perspective on personality. Their typology was empirical, based on responses to a 90 items-questionaire. Later on, other versions were proposed for the initial questionnaire and the initial typology was further developed by French philosopher and psychologist René Le Senne.
The questionnaire used in our research has 21 forced-choice items, grouped under three dimensions: activity, emotivity and secondary versus primary functioning. *Emotivity* scale refers to the intensity of emotional reactions, the sensitivity to certain situation or events. An emotional person is easily impressed, although not necessarily vulnerable. *Activity* scale refers to preference toward being involved in various activities, the need for having something to do, even if there is something hard or boring. *Primary versus secondary functioning* scale (also known as *Resonance*) points the opposition between primary reaction type (an immediate, short-time reaction to emotional events; the tendency to live in the present) and secondary reaction type (late reaction, persistence of affects and impressions, tendency to ruminate, to live in the past, in the memory realm).
Scores on these dimensions tend to correlate with similar measures; for example, the primary versus secondary functioning resembles the impulsivity – reflection opposition.

The Zuckerman-Kuhlman Personality Questionnaire (ZKPQ, revised form). This questionnaire was developed by M. Zuckerman, M. Kulhman, J. Joireman, P. Teta & M. Kraft in 1993 and was

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adapted to Romanian population by professor A. Opre (2010). Alpha Cronbach coefficients for the Romanian version were good, varying between .71 and .87.
It is a five-factor test, measuring five psychological dimensions: *Sociability*, *Impulsive sensation seeking*, *Anxiety-Neuroticism*, *Aggressivity-Hostility* and *Activity*. A sixth scale was added to validate the responses (*Infrequency*, detecting random responses and socially desirable ones).
There are 99 true-false items. The *Sociability* scale includes 17 items and measures preference for social interaction versus preference for solitary activities, as well as tolerance to social isolation. *Impulsive sensation seeking* scale includes 19 items that measure both the *Impulsivity* trait (lack of planning, the tendency to act on impulse) and the *sensation seeking* trait (the general need for sensations, rush, the unpredicted, change and novelty). The *Anxiety-Neuroticism* scale includes 19 items referring to the tendency to feel strained, worried, upset, as well as indecision, lack of self-confidence and intolerance to being criticized. The *Aggressivity-Hostility* scale (17 items) refers to the tendency to express aggressivity verbally, to be impatient with others, rude, revengeful, hateful. The *Activity* scale (17 items) refers to the general need for activity, restlessness when there is nothing to do, as well as preference for varied and hard work, for energy-consuming activities.

3. RESULTS AND DISCUSSIONS

Results

We have analyzed the data using SPSS software, version 23. Scores on the personality scales had aproximatelly normal distributions, alowing for parametric procedures. We have used the univariate *Analysis of Variance* to analyze comparatively the mean scores on each personality dimension, depending on the ABO group. Below we present the main *descriptive statistics* data and results on *F-tests*, including eta-squared effect-size coefficients.

Results on *The Cognitive Style Indicator*

On each scale the score was computed as the mean of the items and could vary between 1 to 5. The means we have obtained for the whole sample are high, around the value of 4 points, indicating the current use of those strategies, interchangeably, depending on context. For most of the subjects, there is not a dominant cognitive style (scores are similar on all scales).
Some differences were noticed considering the blood type, as can be seen in the table below.

Table 2. Results on the Cognitive Style Indicator: Descriptives and F-test

	Blood type	Mean	F	p	Eta squared
Objective style	0	4.20	4.109	.009	.14
	A	4.15			
	B	3.39			
	AB	4.05			
	Total	4.05			
Planning style	0	3.99	3.477	.020	.12
	A	3.89			
	B	3.26			
	AB	4.31			
	Total	3.89			
Innovative style	0	4.06	2.121	.104	.08
	A	3.93			
	B	3.47			
	AB	4.10			
	Total	3.94			

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Thus, on the *objective scale*, the B type has the lowest score (3.39, compared with the total mean of 4.05; F=4.01, p=.009). This is in line with their description as being self-centered. On the *planning scale*, the AB type has the highest score (4.31), and the B type the lowest score (3.26); the result was again significant (F=3,47, p=.020). This is in line with the description of the AB type as being a good planner, as well as the description of the B type as valuing freedom. On both scales the effect size coefficients are moderate.
On the *innovative scale*, although, results are mixed, as the B type has paradoxically the lowest score (3.47). The AB has the highest score (4.10), indeed, as it was predicted by their description as being sensitive and intuitive. However, the compared means do not differ significantly (p=.104), although the effect size is moderate.

Results on *The Eysenck Personality Inventory*
Scores on EPI are presented in *Table 3*. For *Neuroticism* we have found a total mean of 11.02, close to the normative mean for the Romanian population (12). As expected, the A blood type has the highest score (M=12.84), and also the B type (M=12.08) scores above the other types; the differences are not statistically significant, mainly because of the very small sample sizes, and effect size coefficients are rather small.

Table 3. Results on EPI: Descriptives and F-test

Group scores

		Mean	F	p	Eta squared
Neuroticism	0	10.22	1.741	.165	.06
	A	12.84			
	B	12.08			
	AB	8.10			
	Total	11.02			
Extraversion	0	10.39	.942	.425	.04
	A	9.40			
	B	11.50			
	AB	10.00			
	Total	10.20			

Extraversion

Blood type	gender	Mean
0	male	10.00
	female	10.26
A	male	7.50
	female	9.50
B	male	17.50
	female	10.30
AB	male	9.40
	female	10.60
Total	male	10.54
	female	10.04

For *Extraversion*, we have found a total mean of 10.02, close to the normative limit introvert - ambivert (10.5). As expected, the types A (M=9.40) and AB (M=10) have the lowest scores, whereas types B (M=11.50) and O (M=10.39) have the highest scores. Differences are not significant, but in line with the ABO type description. On this dimension we find notable differences between males and females in the A group (M_{males}=7.50, $M_{females}$=9.50) and in the B group (M_{males}=17.50, $M_{females}$=10.30).

Results on *The Wiersma-Heymans Temperament Test*
On the *Temperament test* scores are presented in *Table 4*.
For *Emotivity* we have found unexpected results, that can be better understood if we analyze the influence of gender. Thus, we can notice that B females (M=5.10) and AB females (5.80) have the highest scores of all eight subgroups. The lowest scores are those of males belonging to the same

*Corresponding author, E-mail address: sanda_alina.balan@upb.ro

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groups, B (M=2.50) and AB (M=1.40)! Some samples were extremely low, but this difference between males and females needs further attention.

Table 4. Results on The Temperament test: Descriptives and F-test

Group scores

		Mean	F	p	Eta squared
Emotivity	0	3.94	.641	.591	.02
	A	4.12			
	B	4.67			
	AB	3.60			
	Total	4.06			
Activity	0	4.17	.844	.474	.03
	A	3.60			
	B	3.25			
	AB	4.00			
	Total	3.84			
Primary reaction	0	4.00	1.127	.343	.04
	A	3.28			
	B	3.67			
	AB	4.00			
	Total	3.73			

Emotivity

Blood type	gender	Mean
0	male	3.00
	female	4.13
A	male	4.00
	female	4.18
B	male	2.50
	female	5.10
AB	male	1.40
	female	5.80
Total	male	2.46
	female	4.41

For the *Activity* scale the mean scores of the four types are pretty close, with the highest means for O type (4.17) and AB type (4.00). This is in line with the classical description of those types. Types O and AB also have the highest scores on *Primary reaction*, but the differences are small.

Results on The Zuckerman-Kuhlman Personality Questionnaire

Data for the results on *ZKPQ* scales are presented in *Table 5*.

Table 5. Results on ZKPQ test: Descriptives and F-test

Group scores

		Mean	F	p	Eta squared
Sociability	0	6.92	1.066	.368	.04
	A	5.24			
	B	6.42			
	AB	6.20			
	Total	6.25			
Anxiety	0	8.06	2.345	.079	.08
	A	11.12			
	B	9.92			
	AB	7.30			
	Total	9.16			
Impulsivity and sensation seeking	0	9.25	.076	.973	.00
	A	9.68			
	B	9.92			
	AB	9.30			
	Total	9.48			

Sociability

Blood type	gender	Mean
0	male	8.00
	female	6.81
A	male	6.50
	female	5.14
B	male	12.50
	female	5.20
AB	male	5.60
	female	6.80
Total	male	7.54
	female	6.03

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Aggressivity and hostility	0	6.53	.251	.860	.01
	A	6.40			
	B	7.42			
	AB	6.60			
	Total	6.63			
Activity	0	8.69	1.492	.223	.05
	A	7.64			
	B	6.33			
	AB	8.70			
	Total	8.04			

On the *Sociability* dimension, the O type has the highest score (M=6.92) and the A type has the lowest score (M=5.24). Considering also the participants' gender, we find the highest sociability in B males (M=12.50) and O males (M =8.00), and the lowest in A females (M=5.14) and B females (M=5.20). The *Anxiety* scores highest in the A group (M=11.12) and B group (M=9.92) and lowest in the O group (M=8.06) and AB group (M=7.30). *Impulsivity and sensation seeking* is similar in all groups, the highest mean being in the B group (9.92). This group also has the highest scores on the *Aggressivity and hostility* dimension (M=7.42), although the difference from other groups is pretty small. On the *Activity* scale, the highest scores are for the AB group (M=8.70) and O group (M=8.69), and the lowest for the B type (M=6.33).

The influence of age and gender. In our study *the age* of the participants correlates directly with the *Planning* tendencies and with the *Activity* need, and negatively with *Anxiety* and *Neuroticism*, as well as with *Extraversion* and *Impulsivity*. ANCOVA procedure with age as a covariate shows no effect of age on the relation blood type-personality measures.
Participants gender was also considered as a possible intervening (moderator) variable. In our sample, females differ from men on some psychological measures. Data show females to have a higher *Anxiety*, higher *Neuroticism* (a gender difference in personality that is constant cross-nationally), higher *Emotivity*, and also lower *Extraversion* and lower *Sociability*. Two-way ANOVA with gender as a second factor showed some interaction effect between gender and blood type. For blood groups A, B and AB the general profile appears different for males and females. As we have discussed, the highest *Emotivity* is found in AB females and B females, whereas the lowest *Emotivity* is found in AB males and B males. Another interaction effect is evidenced for *Sociability*: for the blood group B, men have a mean score that is nearly double from that of females.

Discussion

Test results allow us to draw a profile for each blood type.
The *O blood type* appears as extroverted, sociable, calm. In this group we have found the highest scores on *Extraversion* (EPI) and also (for O males) on *Sociability* (ZKPQ), as well as low scores on *Anxiety* (ZKPQ). The O type has the highest scores on *Primary reaction* and a high need for activity (as shown by results on the *Activity* scales).
The *A blood type* appears as a secondary type, with low extraversion and high anxiety. As expected, individuals belonging to this group have the highest scores on both *Neuroticism* dimension (EPI) and *Anxiety* (ZKPQ). They also have low *Extraversion* (EPI) and *Sociability* (ZKPQ), and this hold especially for A females.

*Corresponding author, E-mail address: sanda_alina.balan@upb.ro

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The *B blood type* has high *Neuroticism* (EPI) and also high *Anxiety* (ZKPQ), *Anxiety* being one of the facets of the broader *Neuroticism* trait. Type B has also the highest mean both for *Impulsivity and sensation seeking* and *Aggressivity and hostility* (ZKPQ), although the difference from the other groups is pretty small. Their *Activity* level is below the mean, as well as their *planning* tendencies and the preference for the *objective cognitive style*. Other traits vary considerably with gender: type B males are extroverted and sociable, whereas type B females have low scores on both traits. On the other hand, type B males have the lowest score on *Emotivity*, whereas type B females have the highest score on *Emotivity*!

The *AB blood type* appears as a primary type, with a high need for *Activity*, with the highest tendency for *planning* activities and the highest score on the *innovative cognitive style*. The AB group is mainly introverted, having the lowest mean score on *Extraversion* (EPI). Their *Anxiety-Neuroticism* is low, whereas *Emotivity* shows a different pattern depending on gender (AB females have very high scores on this trait, whereas AB males have very low mean scores). *Emotivity*, as defined by the test's authors, is different from *Neuroticism*, so results do not contradict each other.

4. CONCLUSIONS

Giving the above-mentioned type descriptions, we can say that our study confirms, at least in part, the classical theory of Masahiko Nomi (1978).

The types described do not cover, of course, the diversity of personality structure. The typological perspective presents only a prototype, many variations being possible.

In studies conducted in general population we can only have access to the most common biological markers: ABO type, Rh type – and even this data is not known by a vast part of Romanian population. We are aware of the importance of other serological systems, as well as of the polymorphism of the ABO system and, thus, the variation resulting in individual temperaments.

In spite of these, our research asserts that blood type is linked to our personality.

Results on different scales support and complement each other, justifying our effort to use different psychological measures. The differences we have obtained, although usually were not statistically significant, are in line with the classical ABO type description. The lack of statistical significance is mainly because of the small (and unequal) sizes of our samples. The computed effect size coefficients are, nevertheless, small to medium; that is encouraging for us to continue our research, using larger samples and other types of self-reported personality measures.

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