

## Research Articles

**Bulgarian Students' Impulsivity Differentiated by Gender, Age, and Some Scientific Areas**Stanislava Stoyanova\*<sup>a</sup>, Vaitsa Giannouli<sup>b</sup>

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**Abstract**

Impulsivity is opposed to reflexivity as a cognitive style. This study investigated the frequency distribution of impulsivity in Bulgarian students, as well as some socio-demographic (gender, age, and some scientific areas – social sciences and humanities, as well as sport) differences in impulsivity. Impulsivity opposed to Reflexivity was assessed by means of a sub-scale of the computerized test method Attitude towards Work from Vienna Test System among 141 Bulgarian students. The results revealed slightly more frequent impulsivity than reflexivity in Bulgarian students, but not any gender, age or scientific areas main effects on impulsivity/reflexivity, only their interaction effect, such that younger male students in sport were more impulsive than older male students in sport. A minor trend was found reflexivity to increase with longer sports practice. These findings may indicate the quality of taken decisions in youth.

*Keywords:* age, gender, impulsivity, reflexivity, students

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The construct of impulsivity has been examined by a plethora of studies regarding the quality of human decisions and efficacy of human behaviour (Arce & Santisteban, 2006; Pitts & Leventhal, 2012; Zadravec, Bucik, & Sočan, 2005). Impulsivity is related to timing of cognition and performance (Patton, Stanford, & Barratt, 1995), to quick effective decisions (Pitts & Leventhal, 2012), and fast acts with positive outcomes (Zadravec, Bucik, & Sočan, 2005) that is why it may be an important aspect of goal attainment in all spheres of human life. Besides, impulsivity is related to the quality of processing information (Schalling & Åsberg, 1985) that reveals its importance when studying human cognition.

Impulsivity has been defined as a cognitive style opposed to reflexivity (Kagan, Rosman, Day, Albert, & Phillips, 1964). The reflexive cognitive style means that one considers all the probable solutions before acting, and one spends more time on taking a decision and implementing it, while the impulsive cognitive style is present when someone reacts quickly to external stimuli, he/she acts without long thinking about the action and he/she chooses any form of reaction, whatever the solution to the problem follows (Kagan, Rosman, Day, Albert, & Phillips, 1964). Impulsivity is a predisposition, a tendency to act quickly without adequate planning, without forethought,

without concern for consequences of these reactions to the impulsive individual or to others (Evren & Bozkurt, 2017; Netto et al., 2016; Peters, Balbuena, Marwaha, Baetz, & Bowen, 2016). Impulsivity means acting without cognitive evaluation of an event (Tsokov, 2014) and it may take the form of perseverative behaviours (Giannouli, 2011, 2013).

Impulsivity is related not only to cognitive peculiarities. Mood instability (frequent fluctuations of mood over time) is related to impulsivity (Peters, Balbuena, Marwaha, Baetz, & Bowen, 2016). However, some models and studies of personality (Eysenck, 1987; Radoslavova & Velichkov, 2005; Schalling & Åsberg, 1985) deal with impulsivity as a part of extraversion or psychoticism, but not neuroticism.

There are few research findings regarding some socio-demographic differences in impulsivity (Netto et al., 2016; Radoslavova & Velichkov, 2005; Tamam, Paltaci, & Keskin, 2017; Wang, Tao, Fan, Gao, & Wei, 2017). Some gender differences in impulsivity have been established. Women have higher impulsivity than men (Netto et al., 2016). Bulgarian men are more functionally impulsive, while Bulgarian women are more dysfunctionally impulsive (Radoslavova & Velichkov, 2005). Bulgarian women with alcohol abuse are more impulsive than the male participants with alcohol abuse (Alexieva, 2014). It has been found that in male college students, the impulsivity discriminated chasers (those with more frequent involvement, increased persistence, and elevated monetary risk in an effort to recoup money that has been lost) from nonchasers in gambling (Ruch & Zuckerman, 2001). According to the results from some studies (Alexieva, 2014; Netto et al., 2016), women are more impulsive than men. According to some other findings (Radoslavova & Velichkov, 2005), both men and women have more expressed different types of impulsivity. Because of the controversial research findings, gender differences in impulsivity should be studied further, and they may be examined in different social groups, as suggested in the studies conducted by Alexieva (2014), Ruch and Zuckerman (2001). Such findings reveal the social importance of studying group differences in impulsivity, as well as they suggest some gender differences in students' impulsivity, too.

Some age group differences in some types of impulsivity have also been established. Dysfunctional impulsivity slowly diminishes with the age increase in Bulgaria (Radoslavova & Velichkov, 2005). It has been stated that impulse control disorders might be underdiagnosed in young adult populations (Tamam, Paltaci, & Keskin, 2017). Similarly, less than 1% of Bulgarian youth aged 18-20 years old described themselves as impulsive answering the question "Who am I?" (Baltadzhieva, 2014, p. 229).

Age differences seem to be related to the year of study differences, because typically the academic year increases as people grow old. The students from the first semester have higher impulsivity, as well as non-local students, and younger students (up to 22 years) (Netto et al., 2016). The college students as a young, and naturally more impulsive group, are at-risk for exposure to violence and other traumatic situations, as well as for developing PTSD (Netto et al., 2016). The lifetime prevalence of at least one impulse control disorder in Turkish students in the fourth and fifth year of medical school was 11.2% - 7.9% (Tamam, Paltaci, & Keskin, 2017).

Some studies have found only some minor differences in impulsivity regarding the students' semester and the students' age (Netto et al., 2016). No school year differences were found in school students' impulsivity (Wang, Tao, Fan, Gao, & Wei, 2017). Because of the controversial findings regarding the age differences in impulsivity, they should be studied further.

The differences in impulsivity among young people with various occupations and students in different specialties have also been studied and it has been established that impulsivity is associated with vocational participation in 18-25 year-old emerging adults (Cairns, Kavanagh, Dark, & McPhail, 2017). The specialists in helping occupations in Bulgaria rarely are impulsive (Boyadjieva, 2014, p. 540). The students in Bulgaria who study law and public administration tend to be more impulsive and risky-prone than the students who study economic specialties, because of the first group being more present-hedonistic oriented than the latter group (Slavchov & Virmozelova, 2007). The students from the Exact Sciences presented the highest prevalence of low impulsivity, and the students from Human Science/Arts presented the highest prevalence of high impulsivity (Netto et al., 2016). Impulsivity is high among athletes (Mastroleo, Scaglione, Mallett, & Turrisi, 2013).

Such findings suggest the existence of more socio-demographic differences in the different types of impulsivity that should be further studied and analysed.

The *aim* of this study is to investigate the frequency distribution of the levels of impulsivity in Bulgarian students, as well as to differentiate them by means of the social – demographic categories (gender, age, and the scientific area). The scientific areas refer to the students' study areas of social sciences and humanities, as well as sport.

The *hypothesis* stated that impulsivity would be more expressed in Bulgarian students than reflexivity and some socio-demographic differences in impulsivity would exist, according to the gender, age and some scientific areas - such that female students would be more impulsive than male students, younger students would be more impulsive than older students, and the students in the areas of social sciences and sport would be highly impulsive. This hypothesis is based on the research findings by Boyadjieva (2014), Cairns, Kavanagh, Dark, and McPhail (2017), Mastroleo, Scaglione, Mallett, and Turrisi (2013), Netto et al. (2016), Radoslavova and Velichkov (2005), Slavchov and Virmozelova (2007).

## Method

In order to verify the hypothesis through empirical data, a within-subject and factorial experimental design was used. This method permits the study of the effects of several independent variables on the dependent variables. The independent variables were gender, age and scientific areas. The dependent variable was impulsivity versus reflexivity.

### Participants

An empirical (rational) method was used for sample selection – a purposefully selected sample (Droesbeke, 2006, p. 27). The participants were selected to be university students. The invitation for participation in the study reached only the students in social sciences and sport who voluntarily agreed to participate. 141 participants were studied by means of the computerized test method AHA (“Attitude towards Work”) from Vienna test system. They were from 20 to 30 years old, mean age 22.2 years old,  $SD = 2.9$  years.

Their social and demographic characteristics are presented in Table 1 and Table 2.

The factor experimental design in this study was 2 X 2 X 2, i.e. eight groups of participants were studied in total and they were described in Table 2.

Table 1

*Social and Demographic Characteristics of the Participants Studied With a Computerized Test Method*

Sub-group	<i>n</i>	%
<b>Gender</b>		
Male	47	33.3
Female	94	66.7
<b>Scientific areas</b>		
Social sciences and humanities	109	22.7
Sport	32	77.3

Table 2

*Frequency Distribution of the Interaction of Gender, Scientific Area, and Age Group of the Participants*

Gender	Scientific area	Age	<i>n</i>	%
Male	Sport	up to 22 years old	15	10.6
Female	Sport	above 22 years old	1	0.7
Male	Social sciences	up to 22 years old	7	5.0
Female	Social sciences	above 22 years old	42	29.8
Male	Sport	above 22 years old	14	9.9
Female	Sport	up to 22 years old	2	1.4
Male	Social sciences	above 22 years old	11	7.8
Female	Social sciences	up to 22 years old	49	34.8

Because of the small number of female participants who studied sport, as well as the small number of male participants who studied social sciences in the sample (see Table 2), they were not compared with the other sub-groups of participants when the interaction effects of gender, scientific area and age group were studied.

The average period of sports practice was 10.12 years,  $SD = 3.81$  years among the students in Sport.

## Instruments

When self-reported, impulsivity is over-estimated as compared to reports based on behavioural measures (Maraz et al., 2016). Based on these suggestions, a behavioural measure of impulsivity was used.

The computerized test method AHA ("Attitude towards Work") from Vienna test system was applied. Its subtest "Comparing surfaces" assesses impulsiveness/reflexivity. The participant saw on the monitor of a computer two similar figures at the same time and the participant chose among three possible answers (right figure/left figure/no decision – both figures have the same sizes) for deciding about which one of two simultaneously presented surfaces was larger (Kubinger, Ebenhöf, Karner, & Sommer, 2003). A low score is a mark of impulsiveness and a high score is a mark of reflexivity (Kubinger et al., 2003). The score is based on the "Sum of incorrect answers", the "Sum of correct answers" and the "Sum – no decision" applying a formula (Kubinger et al., 2003). The raw score was transformed in percentiles for the studied sample of Bulgarian university students.

Data were statistically processed by means of SPSS 16 applying descriptive statistics for establishing the frequency distribution of impulsivity; Spearman correlation coefficient for examining the connections between the

studied variables; Mann-Whitney U non-parametric test and chi-square analysis for the group comparisons. The effect size was computed as suggested by Vasilev (2014).

## Results

The scores on impulsivity / reflexivity were not normally distributed (Kolmogorov – Smirnov test of normality = 0.108,  $df = 141$ ,  $p < .001$ ).

Table 3 presents the frequency distribution of impulsivity versus reflexivity.

Table 3

*Frequency Distribution of Levels of Impulsivity and Reflexivity*

Levels of Impulsivity or Reflexivity	<i>f</i>	%
Extremely impulsive (percentiles up to 16)	36	25.5
Very impulsive (percentiles from 16.1 to 25)	7	5.0
More impulsive than reflexive (percentiles from 25.1 to 50)	33	23.4
More reflexive than impulsive (percentiles from 50.1 to 75)	22	15.6
Very reflexive (percentiles from 75.1 to 86)	20	14.2
Extremely reflexive (percentiles above 86)	23	16.3

Impulsive students slightly prevailed over reflexive students (see Table 3) – about 53.9% of students were impulsive. The frequencies of the levels of impulsivity/reflexivity differed significantly ( $\chi^2(5) = 22.702$ ,  $p < .001$ ).

Age did not correlate significantly with the scores on Impulsiveness / Reflexivity (Spearman rho(139) = 0.120,  $p = .157$ ).

There were not any significant gender differences in impulsivity (Mann-Whitney  $U = 2011.500$ ,  $p = .388$ ).

There were not any significant differences in impulsivity between the students in sport and the students in social sciences and humanities (Mann-Whitney  $U = 1691.500$ ,  $p = .796$ ).

The study of interaction effects between gender, age (grouped up to 22 years old and above 22 years old), and scientific area revealed some statistically significant differences in impulsivity only between male students in sport up to 22 years old ( $N = 15$ , Mean rank = 11.87) and male students in sport above 22 years old ( $N = 14$ , Mean rank = 18.36) in their impulsivity (Mann Whitney  $U = 58.000$ ,  $p = .040$ ,  $Z = -2.052$ , the effect size  $r = 0.173$ , i.e. small effect size). Older male students in sport were more reflexive than younger male students in sport.

There was a trend a longer time period of sports practice to correlate with slightly higher reflexivity (Spearman rho(29) = 0.329,  $p = .066$ ), but this correlation coefficient was not significant.

## Discussion

The findings supported partly the hypothesis (Impulsivity would be more expressed in Bulgarian students than reflexivity and some socio-demographic differences in impulsivity would exist). Impulsivity was more frequent than reflexivity among the participating students. The participating students studied in the areas of social sciences and sport that were characterized by impulsivity, as found by [Mastroleo, Scaglione, Mallett, and Turrisi \(2013\)](#) for sport, as well as by [Netto et al. \(2016\)](#) for social sciences. There were not found any significant differences in students' impulsivity among these scientific areas. The previous studies of impulsivity in Bulgaria ([Slavchov & Virmozelova, 2007](#)) or abroad ([Netto et al., 2016](#)) found some differences in impulsivity between students in other specialties, not sport compared with social sciences and humanities.

Impulsivity was expressed slightly more frequently than reflexivity that suggests that the students may be more flexible, ready to make quick decisions ([Pitts & Leventhal, 2012](#)), to act fast with positive outcomes ([Zadravec, Bucik, & Sočan, 2005](#)), and to expect and accept novelties in their life ([Raine, Reynolds, Venables, Mednick, & Farrington, 1998](#)). Some other researchers have also found that younger people tend to be more impulsive ([Radoslavova & Velichkov, 2005](#)), especially younger students (up to 22 years) ([Netto et al., 2016](#)). It has also been found that impulsivity characterizes even the students in their last years of study ([Tamam, Paltaci, & Keskin, 2017](#)).

The students often are youth ([Bezlatnyy, 2011](#); [Nikolov, Georgiev, & Madolev, 2007](#); [Vancheva, 2003](#)) i.e. the same age group, that may explain why there were not found any significant relationships between age and the students' impulsivity. The participating students were from 20 to 30 years old that is within the scope of youth age, according to [Abramova \(2000, pp. 519-520\)](#), [Bezlatnyy \(2011, p. 50\)](#), [Nedeva \(2007, p. 342\)](#), [Tair \(2007, p. 503\)](#), [Volkov \(2006, p. 159\)](#), [Ward \(2005\)](#).

It was not supported that younger students would be more impulsive than older students, but it has been found that older male students in sport were more reflexive than younger male students in sport. [Netto et al. \(2016\)](#) found only minor students' age differences in impulsivity, and another study of some types of impulsivity in Bulgaria found some age differences in one type of impulsivity ([Radoslavova & Velichkov, 2005](#)). This study had some limitations related to the sample size and the range of the age of the sample (inclusion of students only aged from 20 to 30 years old). Some age periodizations include a broader range for the youth age ([Abramova, 2000](#); [Bezlatnyy, 2011](#); [Tair, 2007](#); [Volkov, 2006](#); [Ward, 2005](#)).

In difference with some previous research findings ([Netto et al., 2016](#); [Radoslavova & Velichkov, 2005](#); [Tamam, Paltaci, & Keskin, 2017](#); [Wang, Tao, Fan, Gao, & Wei, 2017](#)), any significant differences were not found in impulsivity among the male and female students. Female students were not more impulsive than male students. However, the previous studies found some gender differences in Bulgaria in different types of impulsivity ([Radoslavova & Velichkov, 2005](#)) or among alcohol abusers ([Alexieva, 2014](#)), not among Bulgarian students' impulsivity. The study of more types of impulsivity and more social categories of participants may reveal more socio-demographic differences in impulsivity. The use of more methods of study may reveal some consequences from impulsivity for different aspects of human behavior.

## Conclusion

This study established prevalence of impulsivity over reflexivity among Bulgarian university students, as well as no socio-demographic differences (gender, age and scientific areas) in Bulgarian students' impulsivity. However, it was found that younger male students in sport were more impulsive than older male students in sport that suggested interaction between age, gender and scientific area.

Impulsivity may be important for the quality of taken decisions, students' career realization and human social behaviour. The finding about the prevalence of impulsivity among students may mean more attention deficits in youth, because some authors report impulsive people as more easily distracted (Schalling & Åsberg, 1985), inattentive (Popov et al., 2016; Whiteside & Lynam, 2001) and with some difficulties in accuracy and precision of information processing (Schalling & Åsberg, 1985; Zdravec, Bucik, & Sočan, 2005). The above findings support that mental health studies and cares should take into account human impulsivity as an important factor in research among young adults and especially in university students.

Future research should further clarify if the above findings regarding impulsivity are similar or different in other cultural contexts.

The studies and interventions focused on impulsivity may improve the knowledge about its manifestations and the possibilities to be directed for more efficient social functioning.

## Competing Interests

Stanislava Stoyanova is the Editor of Psychological Thought and Vaitza Giannouli is a member of the Editorial Board of Psychological Thought. However, the authors were not involved in the review of the present paper nor in the final editor decision.

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