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## THE RELATIONSHIP OF TIME PERCEPTION AND IMPULSIVENESS OF UKRAINIAN STUDENTS

**Olena Lutsenko**, Doctor of Science Psychology, Associate professor, Professor of Applied Psychology Department of School of Psychology of V.N. Karazin Kharkiv National University, 6 Svobody Sq., Kharkiv, Ukraine, 61022.

**Луценко Олена Львівна**, доктор психологічних наук, доцент, професор кафедри прикладної психології факультету психології Харківського національного університету імені В.Н.Каразіна, майдан Свободи, 6, Харків, Україна, 61022.

**Луценко Елена Львовна**, доктор психологических наук, доцент, профессор кафедры прикладной психологии факультета психологии Харьковского национального университета имени В. Н. Каразина, пл. Свободы, 6, Харьков, Украина, 61022.

ORCID - 0000-0001-9922-9523  
olena.lutsenko@karazin.ua

**Oksana Senyk**, Candidate of Psychological Sciences, Associate Professor of the Department of Psychology, Faculty of Philosophy, Ivan Franko National University of Lviv, Ukraine.

**Сеник Оксана Мирославівна**, кандидат психологічних наук, доцент кафедри психології філософського факультету Львівського національного університету імені Івана Франка, вул. Університетська 1, м. Львів, 79000

**Сеник Оксана Мирославовна**, кандидат психологических наук, доцент кафедры психологии философского факультета Львовского национального университета имени Ивана Франко, ул. Университетская 1, г. Львов, 79000.

ORCID - 0000-0003-1657-4490  
oksana.senyk@lnu.edu.ua

*Abstract. Identifying the relationship between characteristics of the individual perception of time and the personality trait of impulsivity is the problem this study is devoted to. The aim of the study is to analyze the relationships between the various components of impulsiveness as a personality trait and the characteristics of an individual minute (IM) taking into account age and gender in a sample of Ukrainian university students (62 participants aged 17-22; 11 of them are men). To assess the features of time perception, the IM method was used according to F. Halberg. As the characteristics of MI, we used the mean and standard deviation for three consecutive measurements of IM and the average error of subjective time relative to objective one in percent. Impulsivity was measured using the UPPS-P Impulsive Behavior Scale test in the Ukrainian adaptation, which reveals 5 indicators of impulsivity: negative urgency, positive urgency, lack of premeditation, lack of perseverance, and sensation seeking. For Ukrainian students, impulsivity indicators correspond to the average norms of the French sample. The mean IM is 61.3 seconds and it is in the range of 36-88 seconds, the standard deviation of 3 IM measurements is 8 seconds, the average error of the subjective time relatively to the objective one was 9%. An inverse relationship between the mean duration of IM and the impulsivity index "positive urgency" was revealed. A direct relationship between the variability of the IM, the average error of the IM in percent and the impulsivity index "lack of perseverance" was also revealed. There are no significant differences in the mean duration of IM between men and women. At the same time, women have a significantly higher variability in time estimation – the standard deviation of IM is significantly greater in them than in men. By the characteristics of the impulsiveness, women have a significantly higher indicator of positive urgency than men. Age-related differences in the features of perception of time and impulsivity were not found. It will be worth to study relations of IM with other personality peculiarities such as Big Five traits and temperament types. This would give us more insights about diagnostic usefulness of IM measurements as proxy between physiological and psychological conditions of people.*

*Keywords: time perception, individual minute, impulsiveness, negative urgency, positive urgency, lack of premeditation, lack of perseverance, sensation seeking*

*Анотація. Визначення взаємозв'язку між особливостями індивідуального сприйняття часу і особистісної рисою імпульсивності є проблемою, якій присвячено це дослідження. Метою дослідження є аналіз зв'язків між різними складовими імпульсивності як риси особистості та особливостями індивідуальної хвилини (ІХ) з урахуванням віку і статі на вибірці українських університетських студентів (62 учасники віком 17-22, з них 11 чоловіків). Для оцінки особливостей сприйняття часу використовувався метод ІХ за Ф. Халбергом. Як характеристики ІХ використовувалися середнє і стандартне відхилення за трьома послідовними вимірюваннями ІХ і середня помилка суб'єктивного часу щодо об'єктивного у відсотках. Імпульсивність вимірювалася за допомогою тесту Шкала імпуль-*

сивної поведінки (*UPPS-P Impulsive Behavior Scale*) в українській адаптації, яка виявляє 5 показників імпульсивності: негативну нагальність, позитивну нагальність, брак далекоглядності, брак наполегливості, пошук вражень. В українських студентів показники імпульсивності відповідають середнім нормам французької вибірки. Середня ІХ становить 61,3 секунди і знаходиться в діапазоні 36-88 секунд, стандартне відхилення 3-х вимірювань становить 8 секунд, середня помилка суб'єктивного часу щодо об'єктивного склала 9%. Був виявлений зворотний зв'язок середньої тривалості ІХ і показника імпульсивності «позитивна нагальність». Також виявлений прямий зв'язок варіабельності ІХ, середньої помилки ІХ у відсотках і показника імпульсивності «брак наполегливості». Відсутні істотні відмінності в середній тривалості ІХ між чоловіками і жінками. У той же час жінки мають достовірно більшу високу варіабельність в оцінці часу – стандартне відхилення ІХ у них значно більше, ніж у чоловіків. За особливостями імпульсивності жінки мають значимо вищий показник позитивної нагальності, ніж чоловіки. Вікові відмінності в особливостях сприйняття часу і імпульсивності не встановлені.

**Ключові слова:** сприйняття часу, індивідуальна хвилина, імпульсивність, негативна нагальність, позитивна нагальність, брак далекоглядності, брак наполегливості, пошук вражень

**Анотація.** *Определение взаимосвязи между особенностями индивидуального восприятия времени и личностной чертой импульсивности является проблемой, которой посвящено это исследование. Целью исследования является анализ связей между различными составляющими импульсивности как черты личности и особенностями индивидуальной минуты (ИМ) с учетом возраста и пола в выборке украинских университетских студентов (62 участника возрастом 17-22, из них 11 мужчин). Для оценки особенностей восприятия времени использовался метод ИМ по Ф. Халбергу. В качестве характеристик ИМ использовались среднее и стандартное отклонение по трем последовательным измерениям ИМ и средняя ошибка субъективного времени относительно объективного в процентах. Импульсивность измерялась с помощью теста Шкала импульсивного поведения (UPPS-P Impulsive Behavior Scale) в украинской адаптации, которая выявляет 5 показателей импульсивности: негативную срочность, позитивную срочность, недостаток дальновидности, недостаток настойчивости, поиск впечатлений. У украинских студентов показатели импульсивности соответствуют средним нормам французской выборки. Средняя ИМ составляет 61,3 секунды и находится в диапазоне 36-88 секунд, стандартное отклонение 3-х измерений составляет 8 секунд, средняя ошибка субъективного времени относительно объективного составила 9%. Была выявлена обратная связь средней длительности ИМ и показателя импульсивности «позитивная срочность». Также выявлена прямая связь вариабельности ИМ, средней ошибки ИМ в процентах и показателя импульсивности «недостаток настойчивости». Отсутствуют существенные различия в средней длительности ИМ между мужчинами и женщинами. В то же время женщины имеют достоверно более высокую вариабельность в оценке времени – стандартное отклонение ИМ у них значимо больше, чем у мужчин. По особенностям импульсивности женщины имеют значимо более высокий показатель позитивной срочности, чем мужчины. Возрастные различия в особенностях восприятия времени и импульсивности не выявлены.*

**Ключевые слова:** восприятие времени, индивидуальная минута, импульсивность, негативная срочность, позитивная срочность, недостаток дальновидности, недостаток настойчивости, поиск впечатлений

**1. Introduction.** Human – his/her mental and somatic state – obeys biological rhythms and, at the same time, the individual specificity of biorhythms reflects the characteristics of a particular individual, this is an integral part of our nature.

Subjective duration of an individual minute (IM) is one of the criteria for the state of a person's biological rhythms. In healthy people, the value of IM is a relatively stable indicator that characterizes the endogenous organization of time and adaptive abilities of the body. In particular, people who have good adaptation skills feel IM that is very close to, or even longer than, astronomical. Reduced adaptation is characterized by a decrease of IM approximately by one-quarter (Кузнецов, Алехин, Самохина, Моисеева, 1985; Halberg, 2006; Портнова, 2007). For example, it is known that during oncological or cardiac diseases the duration of IM decreases (Halberg, 2006).

Kuznetsov, Alyohin, Samohina, Moiseyeva (1985) and Portnova (2007) wrote that mentally unbalanced people, especially those who have attempted suicide, often experience a reduction of IM nearly by half of it.

People who suffer from various types of depressive disorders also feel IM as reduced (Кузнецов, Алехин, Самохина, Моисеева, 1985). In the opposite, D. E. Kornbrot, R. M. Msetfi and M. J. Grimwood (2013) found that depressed subjects more accurately estimated the amount of time that had passed than non-depressed patients; non-depressed subjects overestimated the passing of time. This difference was hypothesized to be because depressed subjects focused less on external factors that may skew their judgment of time. The authors termed this hypothesized phenomenon «depressive realism».

With some time perception deficit connected problems of children's reading (Plourde, Gamache, Laflamme & Grondin, 2017), ineffective decision making (Wittmann & Paulus, 2008), certain problematic behavior, e.g. procrastination (Mccown, 1986), personality disorders, addictive behavior disorders, and pathological gambling (Moreira, Pinto, Almeida & Barbosa, 2016).

"Coronary" Type A behavior was found to show greater variability and absolute error than do Type B in the production time intervals of a 60- or 300-sec duration (Warner & Block, 1984). Interestingly that obese subjects had significantly faster rates of subjective time than their nonobese counterparts. Rate of subjective time was independent of locus of control and subject sex. Results of the study support the role of physiological factors in the etiology of obesity and reveal what may be a common mechanism in the etiology of both obesity and time perception based on hypothalamic function (Faulkner & Gutsch, 1986).

B. I. Tsukanov (2007) found out relationships between time-types of people and types of Pavlov's temperaments. This author distinguished several 'time-types' among people, who underestimate, overestimate time or correctly perceive it. However, studies showing a relationship of time perception peculiarities and personality traits are not numerous.

According to Buchwald & Blatt (1974) the high-extraverted subjects underestimated and the high-introverted subjects overestimated time. Quite opposite results were obtained by Rammsayer (1997), who found that there was a tendency for extraverts to overestimate time and to make less accurate time judgments relative to introverts. Furthermore, he revealed that participants with higher psychoticism scores were less prone to overestimation of time intervals and showed better accuracy of temporal reproductions than participants with lower psychoticism scores. He also revealed no indication of a linear relationship between neuroticism and time estimation.

The same conflicting information is found regarding gender in the perception of time (Rammsayer & Rammstedt, 2000). These researchers think that many findings on sex-related differences in time estimation may be primarily caused by unreliable psychophysical methods for assessment of timing performance and lack of control for personality traits that are likely to moderate estimation of time. They did not find gender differences directly, however by stepwise multiple regression analyses they revealed that the personality traits Openness to Experience and Dysfunctional Impulsivity account for 45% of the total variance of individual variability in temporal reproductions in the male sample, as compared to only 5% in the female sample.

On the other hand, researchers agree that subjective perception of the passing of time tends to speed up with increasing age in humans. This often causes people to increasingly underestimate a given interval of time as they age (Dreher, Meyer-Lindenberg, Kohn & Berman, 2008).

According to our **general hypothesis**, the duration of an IM, as an indicator of the organization of human biological rhythms, should be associated with many basic personality characteristics, rooted in the features of the functioning of the nervous system. According to our **experimental hypothesis**, the features of the perception of time, namely, the features of the sensation of the duration of a minute, are associated with impulsiveness as a personality trait that reflects the speed (pace, urgency) of an individual's response to various life situations.

Nowadays studying impulsiveness is relevant because its components connected with different psychopathological states and problematic behaviors. As Billieux et al. (2012) cited the negative urgency has been related to substance dependence, compulsive buying, cyber addictions, problem gambling, and eating disorders; positive urgency has been related to alcohol abuse, problem gambling, and risky sexual behaviors; lack of perseverance has been related to the occurrence of obsessive thoughts and procrastination-related behaviors and may represent an important dimension of predominantly inattentive subtypes of attention-deficit hyperactivity disorder; lack of premeditation has been closely related to antisocial personality, psychopathic features, and the involvement in behaviors dangerous to health such as smoking; and sensation seeking has been associated with drug and alcohol use, gambling, delinquent acts, dangerous use of the mobile phone (i.e., phoning while driving) etc. Lower levels of perseverance and high negative urgency were correlated with higher depression and anxiety (Billieux et al., 2012).

By Wittmann, Jokic, Pfeifer (2019) longer duration in the minute range are paradigmatic as the ecologically valid situations are sensitive to inter- and intra-individual variations in subjective time. Namely, individuals with higher levels of self-reported impulsivity felt more irritated in a waiting situation and in turn overestimated its duration (feel a slower passage of time). Regarding intra-individual differences, these authors showed that silence after body-related depth relaxation led to longer duration estimates than the same period of silence following a seminar.

In the other research Jokic, Zakay & Wittmann (2018) revealed that negative affect and an impulsive present orientation are related to an overestimation of duration and the feeling of a slower passage of time while waiting.

In Mueller, Berger, Tucha & Falter (2014) research the self-rated impulsivity and time perspective were found to be strongly related, but no relationship was found for impulsivity and perceptual simultaneity time processing tasks. The relationship between time processing and impulsivity seems to be selective to certain timing functions and not relevant to very short timescales like for perceptual simultaneity.

J. R. Daugherty (2011) found that time perception was only weakly correlated with individual differences and intertemporal behavior. That is why he propose the idea, that impulsivity mediates the relationship between time perception and intertemporal health behaviors, like hours of sleep slept per night, sociosexual orientation, and frequency of eating breakfast. His finding suggests that how time is perceived influences intertemporal behavior indirectly by influencing impulsivity.

So we can observe rather different approaches regarding relationships between time perception and personality traits, including impulsiveness. Hereof **the aim of our research** was to investigate relationships between IM duration and impulsiveness personality trait with taking into account age and gender in the sample of Ukrainian university students.

## 2. Materials and methods

### 2.1. Participants and research procedure

Sample consisted of the Ukrainian students of School of Psychology of V.N. Karazin Kharkiv National University. All the participants were Caucasians. They were 62 students, age ranged from 17 to 22 years (mean, 18,3 years; SD, 0,8), among them were 11 men and 51 women. Research was conducted during one Psychophysiology practical learning session and all participants voluntarily agreed to take part in the research. As a gratification they got additional scores for their module assessment of the Psychophysiology course. Students measured IM 3 times consistently and then filled out the test of impulsiveness. Interpretation of the results was discussed with participants after finishing research.

### 2.2. Measures

#### 2.2.1. IM measuring

Today there are number of methods for determining the peculiarities of a person's perception of time. They are divided into methods for estimating duration, reproduction and measurement (Кузнецов, Алехин, Самохина, Моисеева, 1985; Портнова, 2007; Цуканов, 2007). The classical method of measurement was proposed in 1969 by the founder of chronobiology F. Halberg (1969). By this method participant starts count seconds from 1 to 60 mentally under the command of the experimenter. The figure 60 participant says aloud. The real time is recorded with a stopwatch. The person can independently press the stopwatch button and close his/her eyes during the measurement. For reliability, IM should be measured three times in a row, after that it should be find the average value. We chose the method of measuring subjective time because of its strong connection with people's practical activity. It means that people very regularly need to measure what time it takes to reach some point (e.g. walk across the road, drive vehicle or to hold up the breath to dive under an obstacle or walk under a smokiness) or to plan something (e.g. tolerate or inflict acute pain when it is impossible to avoid it during medical manipulations) etc. We measured the individual minutes in the group version - the students turned on and off the stopwatch on smartphones, closed their eyes during the countdown, having previously prepared a finger above the start / stop button. The minute was measured three times in a row. The following measurements were fixed: 1) three primary values of IM is seconds, 2) mean between them and 3) variability index - standard deviation. We used the last indicator by our assumption that not only the central tendency, but also the MI variability (i.e. its stability / instability) can serve as an important characteristic of the subjective perception of the time of a person.

One more rather known method of time perception analysis is to measure the mean error of subjective time comparing to objective physical time in percents (Цуканов, 2007). We conducted this measurement for mean IM, marked it as  $\Delta$  IM Mean% and counted by formula:  $\Delta$  IM Mean% =  $(|60 - \text{IM Mean}|) / 60 * 100$ .

#### 2.2.2. Impulsiveness

Impulsivity is a multifaceted construct. Lynam et al. (2006) have developed the UPPS-P, a 59-item scale measuring 5 impulsivity components: negative urgency, positive urgency, lack of premeditation, lack of perseverance, and sensation seeking. The short French version of UPPS-P Impulsive Behavior Scale of 20 items was made by Billieux, J. et al. (2012) and adapted in Ukraine by O. Senyk with colleagues at Ivan Franko National University of Lviv and at Ukrainian Catholic University. Assessment of each test item based on 4-point Likert scale from 4 ("I agree strongly") to 1 ("I disagree strongly"). So in Ukrainian version the minimal possible score is 4 and the maximum one is 16 for each scale. There are no norms yet for Ukrainian version of UPPS-P, but French short version equipped with norms which can be used for general orientation. We are giving here several items of this test as examples: "My thinking is usually careful and purposeful", "In the heat of an argument, I will often say things that I later regret", "I finish what I start", "I quite enjoy taking risks", "When overjoyed, I feel like I can't stop myself from going overboard".

Negative urgency, defined as the tendency to experience strong reactions, frequently under the condition of intense negative affect; positive urgency, which was conceptualized as the tendency to act rashly in an intense positive affective state; premeditation, defined as the tendency to take into account the consequences of an act before engaging in that act; perseverance, defined as the ability to remain focused on a task that may be boring and/or difficult; and sensation seeking, considered as a tendency to enjoy and pursue activities that are stimulating or exciting and openness to trying new and unconventional experiences (Billieux et al., 2012).

### 2.3. Statistical analysis

The STATISTICA 7.0 software package was used for all analysis. Nonparametric methods of analysis were mostly used because scales of impulsiveness base on ordinal measurement scale and three of them were not distributed normally (by Lilliefors test). Correlation analysis was done by Spearman method. Friedman ANOVA and Kendall Coefficient of Concordance were used for additional analysis of IM features. Means and Standard Deviations were also used for additional description of obtained data. Box and whiskers plots were used for graphical analysis of the data.

## 3. Results

### 3.1. Descriptive statistics

In the present study we obtained results which show that students in general perceive IM near physical minute, but some of them have considerable deviation from the mean, median or mode – see table 1. Values of impulsiveness components (see table 1 as well) are comparable with middle norms of French sample of French short version of this test.

Table 1. Descriptive statistics of research variables

	Mean	Median	Mode	Min.	Max.	25th percentile	75th percentile	Std.Dev.
<b>IM (mean between 3 measures)</b>	61,3	60,0	63,0	36,0	87,7	57,7	64,7	7,9
<b>IM (SD between 3 measures)</b>	6,7	4,9	3,61	0,58	26,9	3,6	9,0	5,4
<b>Δ IM Mean%</b>	9,0	5,3	5,0	0	46,1	3,3	12,2	9,7
<b>Negative urgency</b>	10,2	10,5	11,0	4,0	16,0	8,0	12,0	2,9
<b>Positive urgency</b>	11,6	12,0	multiple	6,0	16,0	10,0	13,0	2,0
<b>Lack of premeditation</b>	8,4	8,0	9,0	4,0	16,0	7,0	10,0	2,4
<b>Lack of perseverance</b>	8,2	8,0	8,0	4,0	13,0	6,0	9,0	2,4
<b>Sensation seeking</b>	11,4	12,0	9,0	6,0	16,0	9,0	13,0	2,6

Positive urgency and sensation seeking are most pronounced components of impulsiveness and lack of premeditation and lack of perseverance are the least pronounced ones.

Peculiarities of three consequent measures of IM showed on the Fig. 1. First measurement has most scatter in our sample and third has the least one.

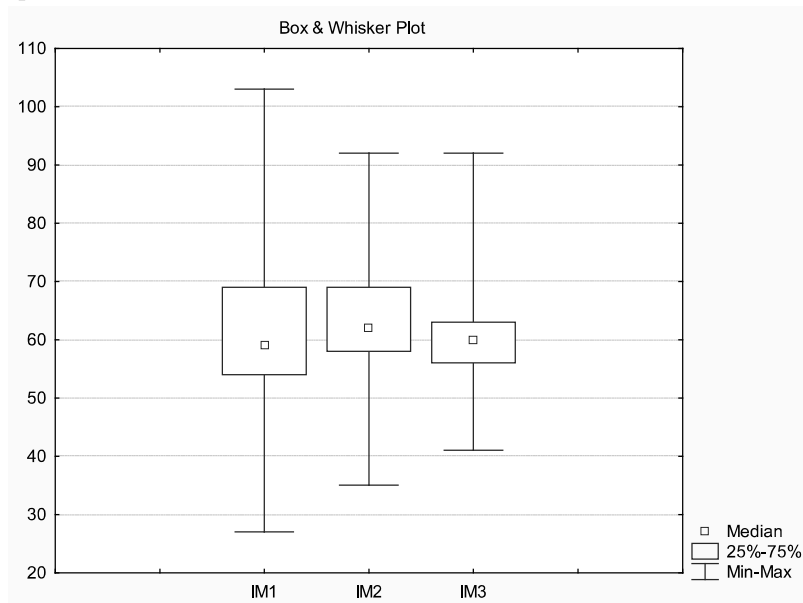


Fig. 1. Box and whisker plot of tree consequent IM measurements

Among impulsiveness components most scattered were negative urgency and lack of premeditation as have been shown on the Fig. 2. The least scattered one was lack of perseverance.

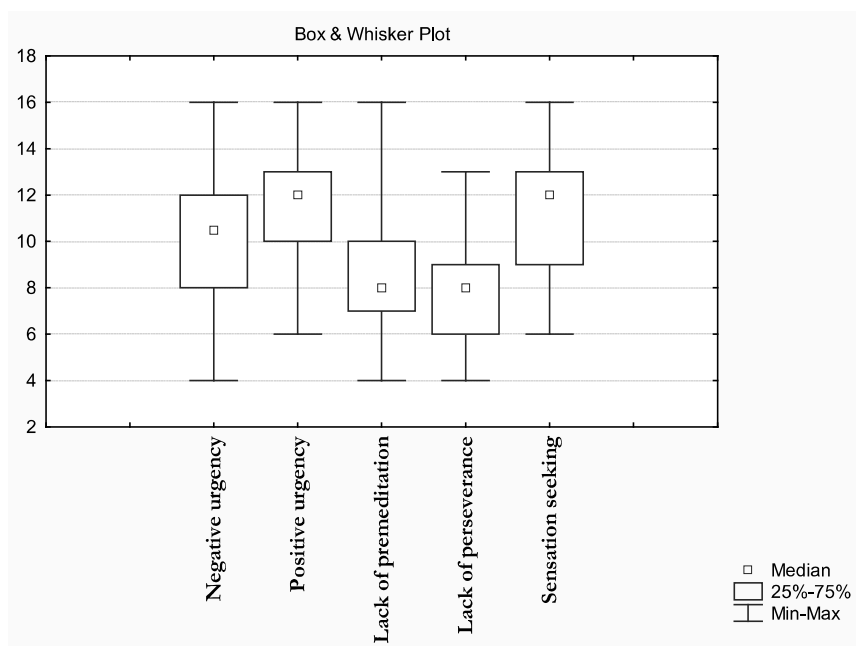


Fig. 2. Box and whisker plot of impulsiveness scales

### 3.2. Correlation analysis

#### 3.2.1. Correlation analysis of IM features

We conducted Spearman Rank Order Correlations between three consequent IM measurements and found that they have weak significant connections – see table 2.

Table 2. Spearman correlation analysis of IM measurements

	Valid	Spearman	t(N-2)	p-level
<b>IM1 &amp; IM2</b>	62	0,31	2,49	0,015
<b>IM1 &amp; IM3</b>	62	0,30	2,40	0,019
<b>IM2 &amp; IM3</b>	62	0,29	2,38	0,020

We conducted additional analysis if three IM measurements by Friedman ANOVA and Kendall Coefficient of Concordance to better understand IM features – see table 3.

Table 3. Friedman ANOVA and Kendall Coeff. of Concordance of IM measurements

ANOVA Chi Sqr. (N = 62, df = 2) = 4,212245 p = 0,12171 Coeff. of Concordance = 0,03397 Aver. rank r = 0,01813				
	Average rank	Sum of ranks	Mean	Std.Dev.
<b>IM1</b>	1,9	119,0	61,4	12,9
<b>IM2</b>	2,2	137,0	62,2	9,7
<b>IM3</b>	1,9	116,0	60,2	8,5

Friedman ANOVA is an analogue for the parametric repeated measures ANOVA, it is used to detect differences across multiple test attempts. There are no significant differences between three IM measurements. Kendall's coefficient of concordance is a non-parametric statistic. It is a normalization of the statistic of the Friedman test, and can be used for assessing agreement among raters. Kendall's W ranges from 0 (no agreement) to 1 (complete agreement). If we think about our study participants as experts who assess time intervals of 1 minute, we can see that there is no agreement among them about minute duration, so they are quite different in their assessments. In spite of the participants in general came to rather similar and close to objective conclusion about IM duration in its three measurements (IM1, IM2 and IM3 have no statistical differences), in the same time participants demonstrated so large individual variance between their assessments, that Kendall's coefficient had not find concordance in their opinions.

#### 3.2.2. Correlation analysis of IM features with impulsiveness scales

It was found inverse relationship between IM mean and positive urgency by Spearman rank order correlation analysis:  $\rho = -0,25$ ;  $p = 0,048$ . So, people who have higher level of positive urgency at the same time have lower IM estimation. In the contrary, people who have lower level of positive urgency have higher IM estimation, i.e. they perceive longer IM.

We found that variability of IM (IM SD) positively correlates with lack of perseverance:  $\rho = 0,26$ ;  $p = 0,045$ . Namely when people have higher lack of perseveration, they assess IM in very different way and their perception of time is less stable. In the contrary, if people have higher perseveration, they have more stable perception of time.

The mean error of subjective time from objective physical time in percents was significantly connected also with lack of perseverance:  $\rho = 0,32$ ;  $p = 0,0012$ .

#### 3.3. Age and gender impact

We conducted Mann-Whitney U Test to search differences in IM features and impulsiveness between men and women. It was found that women have higher IM variability and higher positive urgency then men. Namely, IM SD:  $\text{Mean}_{\text{women}} = 7,2$ ;  $\text{Mean}_{\text{men}} = 4,8$ ;  $U = 173,5$ ;  $p = 0,048$ . Positive urgency:  $\text{Mean}_{\text{women}} = 11,9$ ;  $\text{Mean}_{\text{men}} = 10,2$ ;  $U = 155,0$ ;  $p = 0,020$ .

Age-related differences in the features of perception of time and impulsiveness were not revealed since the sample was uniform in age.

### 4. Discussion

The mean error of subjective time comparing to objective physical time in percents in our research was 9%, but in other studies it was measured in the scope of 14-17% (Цуканов, 2007). We think that because our sample consisted of university students of 2<sup>nd</sup> learning year, they have a lot of learning activity, high cognitive load, so they have an optimal level of information processing and, that is why, small error of time perception. As Kent, Van Doorn & Britt Klein (2019) written, short-time memory and intelligence performance relate to the seconds/minutes time intervals, while audio-visual perception relates to the milliseconds intervals, fluid intelligence relates to hours, long-time memory relates to days and crystal intelligence relates to months. Our participants (students) were at that condition when they intensively train and develop their short-time memory and intelligence performance.

We did not find significant differences in the average duration of IM between men and women. This fact corresponds with the views of Rammsayer & Rammstedt (2000) and Prenger (2005) that there is no clear evidence of sex differences involving memory, attention, or other cognitive processes associated with interval timing.

We have found that women are more impulsive then men in only one impulsiveness component – positive urgency. Concerning sex, Billieux et al. (2012) found that women had higher urgency (both positive and

negative), lower premeditation, and lower sensation seeking than men. This difference can be due to cross-cultural specificity or smaller size of participants sample in our study. But because positive urgency was higher in women sample in both studies, we can infer that women are more impulsive in situations of positive excitement and this is a cross-culturally stable trait.

In our earlier pilot study, we identified a relationship between IM and the level of psychophysiological adaptation of a person (adaptive reserves of the body), measured using an analysis of heart rate variability (Луценко, 2017). In this study we found that shorter IM connected with higher positive urgency. As positive urgency related to several psychopathological states and problematic behaviors (i.e. alcohol abuse, problem gambling, risky sexual behaviors – Billieux et al., 2012), now we got an additional evidence that short IM is an indicator of maladaptation state.

Our results about correlation between shorter IM and higher positive urgency are consistent with research of Lehockey, Winters, Nicoletta, Zurlinden and Everhart (2018). These authors found that higher behavioral activation system scores were associated with overestimation time bias scores for positive stimuli, while behavioral inhibition system scores were not correlated with overestimation time bias scores. Behavioral activation / inhibition systems are the components of behavior reinforcement system. In both states (in positive urgency and in increased activation of behavioral activation system in response to positive stimuli) positive expectations are prevail for the subject. This can be evolutionary adaptive mechanism but in modern world it can work inappropriately because in nowadays complex social systems long term strategies are mostly successful.

### 5. Conclusion

The peculiarities of time perception and their relationship with personality traits are in the locus of great attention in psychology and related sciences. Many aspects of this problem are still unclear and have different interpretations by different researchers. All this closely connected with people's practical activity and so need to further scientific development and joining in general conception.

**Limitations of the research.** The women were most part of the sample of this study so the results can have some gender bias. Sample limited only by students-psychologists of one Ukrainian University so it can have local features. IM was measured by participants themselves in group manner so it can have measurement error and is not as accurate as it could have been in individual measurement with experimenter.

**Prospects of the research.** It will be worth to study relations of IM with other personality peculiarities such as Big Five traits and temperament types. This would give us more insights about diagnostical usefulness of IM measurements as proxy between physiological and psychological conditions of people.

### Література

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