УДК: [159.963.272+616.891.4](045)

Arman Tsybulsky
Master of Psychology,
Educational and Scientific Institute of
Psychology and Social Sciences,
Interregional Academy of Personnel Management,
Kyiv, Ukraine
ORCID: 0000-0003-2185-5676
armamkorol777@gmail.com

DROWSINESS AND MENTAL EXHAUSTION CAN BE TRIGGERS OF ACCELERATION OF THE SUBJECTIVE TIME PASSAGE

This article is devoted to the study the prevalence of the experience of accelerated subjective time passage (ASTP) among the population in Ukraine in 2021 (N=74). Widespread prevalence has been found, 64,41 % of the respondents noticed the signs of the phenomenon. The origin of the experience on the basis of previous studies and analysis of the given data hypothesized. The correlation with age was analyzed. No significant correlations were found, but in the first age group (20–29 years old) there was an unnatural excess of the number of respondents who mentioned ASTP, which allowed us to assume the multi-causality of the phenomenon. The main idea put forward by the analysis of the data was the emergence of ASTP as a consequence of loss of consciousness quality. Correlations were found between the responses of participants noting ASTP and weakness, laziness, unwillingness to develop and muted consciousness (r=0.266; p=0.022). Further investigating of the relationships led to the assumption that main trigger for the occurrence of the phenomenon is drowsiness, which reduces the consciousness quality.

Keywords: *time perception, subjective time, time passage, temporal processing, sleep quality, consciousness*.

It is believed that the perception of time underlies most mental processes and is the highest mental function. The importance of the perception of time in psychology and other sciences is difficult to overestimate, because the human life is characterized by constant age changes, while the human age itself is a timeline of life. Not surprisingly, as age increases, the perception of time changes as well. Age is not the only individual characteristic interrelated with the perception of time. It is also significantly influenced by gender, age, intellect, emotional state [10; 11; 16], anxiety, motor activity, skills, work passion, etc. But in addition to individual-typological factors, the perception of time is also influenced by social factors, such as: education, social activity, social role and status, etc. The individual is part of a functional system, which is also subject to the influence of objective time. Changes and distortions in the perception of time in this regard can be seen as a consequence of any social changes, or technological influence. Probably one of such changes is the acceleration of subjective time passage (ASTP).

The purpose of this study was to determine the prevalence of the phenomenon among the population of Eastern Europe in the year 2021, as well as to suggest the emergence of this phenomenon. The preliminary analysis of the literature has led to a conclusion about prevalence of ASTP on territory of the western countries [15, p. 130–141; 12, p. 77–82]. At the same time, cultural and geographical factors can affects the perception of time. In addition, the preserved data of this study will help to outline the trend of the development of the phenomenon in society over time.

There are several main versions explaining the emergence of ASTP.

1. Physiological. Version of slowing down of physiological processes, inhibition of mental reactions, reduction of cognitive abilities, which cause an illusion of accelerated objective time [8, p. 549–560; 9]. It is obvious, that disorders of memory, attention, thinking, perception, caused by involutional processes reflect on perception of time.

2. The proportional (Ratio) version proceeds from the fact that a person evaluates time in the proportion to the time already lived. Correspondingly, increase of lived time leads to perception of lived intervals as shorter ones. This approach was followed by P. Janet (Janet, 1928) [13; 14].

3. Eventual. One of the founders of this version was P. Fraisse [14]. According to it, the estimation of the time period duration in the autobiographical scale carries out by the number of significant events that took place in this period of time. In childhood and youth there are more significant events than in old age, so time seems to slow down, and in old age it seems to speed up due to the increased volume of routine. In other words, in old age one does not have to perform as many actions under consciousness control, as in young. Most of the actions become automatic, controlled by the available skills. It is worth adding that in this case it is necessary to take into account the emotional coloring of the event [10; 11], its saturation, the awareness of participation. On the other hand, a person's participation in new impressive events in the course of life is dictated by his activity, vigor and motivation, which weaken with age.

4. Social. The influence of social factors on the perception of time is noted. Throughout life, each person adheres to certain concepts and stereotypes that can cause "time pressure". It is believed that this phenomenon is one of the causes of ASTP [15, p. 131]. Such notions and stereotypes are: the need to achieve certain goals established by society, such as school or univercity enrollment, employment, creation of a family, childbirth, retirement etc., performance of age-appropriate social roles, acquisition of social statuses. Even counting the lived years by itself forces a person adapt to the norms of age appropriate behavior. All this can cause emotional tension, the feeling of time control lack and, as a consequence, the pressure of time.

Besides the above-mentioned versions, it is also worth considering that the pace of technological development is exponentially accelerating, communication between different groups of society is intensifying, the space mastered by people is expanding, and the characteristics of the perception of space-time, chronotopes, are changing along with it. Scientific and technological progress accelerates by dint of manufacturing processes. Competition between international producers contributes to the time rationalization and performance. They, as global "pacemakers" of society, set and increase the rhythms of life. Other companies, organizations, megacities, satellite-cities, and individuals adjust to them. It can be assumed that a significant part of society does not keep up with the accelerated social pace and experiences its lag as a speeding up of subjective time passage. From this point of view we can speak about another version of emergence of experience – technological.

The differentiation of ASTP occurrence versions is rather conditional. In each of them it is possible to trace the interrelation with all others. The comprehensive nature of the time perception allows to consider it in different intervals and directions. The obvious fact is that time perception, as the highest mental function, is inextricably linked with human consciousness lucidity or quality. The more "clear" consciousness is, the more accurate time perception is. The opposite extreme of consciousness lucidity is sleep – a twilight state. The more human is immersed in sleep, the less his ability to estimate time. This assumption agrees with brain wave activity studies and its connection with perception of time. Thus, it is necessary to start from the quality of consciousness in order to establish the causes of the ASTP occurrence.

Based on the definition of the phenomenon as subjective psychological, the approach to its study is based on the subjective assessments of the participants. The most accessible and quite satisfying initial requirements – internet questionnaire – was chosen as the research method. The questionnaire was developed directly for the study. Before the start of the questionnaire, hypothetical areas that could cause ASTP were identified and question blocks were formulated, the answers to which would help to outline a framework for further research in the chronopsychology area. The questions were asked at random. An anonymous survey was created in Google Forms. It called "Sense of Time" and contained in total 41 questions.

The survey was created in Russian language and was open for 7 months. At the end of the survey in November 2021, the number of participants was 74. The invitation to participate in the survey was sent out to subscribers of social networks, living mainly on the territory of Ukraine. Women were 89,2 % of them. The age of participants ranged from 17 to 62 years. There 54,1 % are married, 16,2 % are divorced, 1,4 % (1 person) is a widow, the rest were not married. 59,45 % had children and 40,55 % had no children. Correlation analysis by Spearman test, Pearson criterion, U-test was used to summarize the results. The data were summarized in Microsoft Office Excel 2007, and then analyzed using SPSS Statistics 29 to compile descriptive statistics and identify correlation relationships between responses.

The prevalence of the examining phenomenon among the participants was established. The block of questions created to discover the experience consisted of the following three:

Table 1

Percentage distribution of answers to the question "Do you notice the change in the passage of time?

Do you notice the change in the passage of time?	N	%
It seems that time has sped up	48	64,86 %
I think time has slowed down	5	6,75 %
I didn't notice anything like that	21	28,37 %

B. "Do the years fly too fast by?" with the answer choices: "Agree," "Disagree," and "I didn't think about it". Only the answer "Agree" was considered to confirm presence of the ASTP.

A. "Do you notice the change in the passage of time?". There were three answer options: "It seems that time has sped up", "It think time has slowed down" and "I didn't notice anything like that". Only the answer "It seems that time has sped up" was considered as confirmation of the ASTP presence.

Table 2

Percentage distribution of answers to the question "Do the years fly too fast by?"

Do the years fly too fast by?	N	%
Agree	61	82,43 %
Disagree	8	10,81 %
Did not think	5	6,75 %

C. "How do you feel the time?" with the options: "It runs too fast," "It stretches very slowly," and "It goes its own way". The answer "Runs too fast" was considered to confirm the ASTP presence.

Table 3

Percentage distribution of answers to the question "How do you feel the time?

How do you feel the time?

	N	%
It runs too fast	34	45,94 %
It stretches very slowly	2	2,70 %
It goes its own way	38	51,35 %

Due to the percentage of participants for each question is different, a correlation analysis was conducted. It showed a significant relationship between the answers.

Table 4

Results of Spearman correlation analysis of responses between main three questions Correlation

			Do you notice the change in the passage of time?	Do the years fly too fast by?	How do you feel the time?
Spearman	Do you notice the change in the passage of time?	Correlation coefficient	1,000	0,644**	0,515**
		Significance		<,001	<,001

Each of the questions, aimed to clarifying the presence of the phenomenon under study, evokes different associations. One has a more situational context (like, "Do you notice the change in the passage of time?"), another has more autobiographical context (like, "Do the years fly too fast by?"). It entails different understandings of the questions posed to respondents. At the same time, despite the significant correlations, some people answered all three questions differently. For example, the question "Do the years fly too fast by?" is perceived on a autobiographical scale, as the question is posed about years. It is also viewed retrospectively, as it forces one to recall the years that have passed, rather than evaluate the time that is currently passing. However, the representation of total time (RTT) is made up of retrospective and prospective assessments of time, so the percentage for all three questions was averaged and was 64,41 %. This result came close to the rate of responses to the first question A "Do you notice the change in the passage of time?" (64,86 %), which probably reflected the essence of the examining phenomenon to a greater extent. In this study, the "main three" questions were considered in aggregate and separately, as determining the presence of ASTP signs.

Table 5

Distribution of survey results by age group

		Do you notice the change in the passage of time?	
Age group	Sped up	Slowed down	Didn't notice
20-29	65%	12%	23%
30-39	59%	0%	41%
40-49	64%	4%	32%
50-62	82%	9%	9%

		Do the years fly too fast by?	
Age group	Agree	Disagree	Didn't think
20-29	94%	6%	0%
30-39	77%	17,5%	4,5%
40-49	77%	9%	14%
50-62	82%	9%	9%

		How do you feel the time?	
Age group	It runs too fast	It stretches very slowly	It goes its own way
20-29	47%	0%	53%
30-39	50%	5%	45%
40-49	55%	0%	45%
50-62	36%	9%	55%

In order to determine the dynamics of ASTP by age, the survey participants were divided into groups. The first group included 17 respondents ranging in age from 20 to 29. The second group included 22 respondents from age 30 to 39. The third group – from 40 to 49 years old – 22 people. The fourth group – from 50 to 62 years old – 11 people. Two participants were not accepted for this analysis, because one participant of 17 years of age could not be included in the first group in principle because of the large difference with the age category in psychological development, and another participant did not indicate her age in the questionnaire. The percentage of respondents who indicated ASTP in each age group demonstrates a propensity to the phenomenon as a property of age, although the correlation analysis revealed no significant difference. The results are shown in Table 5.

The first age group stands out from the general orientation at least regarding questions A and B. A weak relation between the perception of time and age was established in some other studies [7, p. 337]. However, no information was found about a possible increase in the number of respondents noting ASTP between the ages of 20 and 29. Taking into consideration that the correlation of perception of time with age is determined retrospectively and over long intervals of lifetime (over 5 or 10 years) it was especially strange to find such indicators in still young people. Insofar it was suggested that the circumstances of ASTP occurrence could be a combination of several factors occurring in the process of growing up. That is the age can be the reason of occurrence and gradual acceleration of the subjective time passage only as an indicator of some or other factors influencing the perception of time addition. If we take into account the probable multicausality of ASTP, then the excessive percentage in the first age group can be associated with such an additional factor.

Sleep disorders are associated with age. They can induce chronic drowsiness and decrease the quality of consciousness while awake. There are different reasons for a decrease in the sleep quality. For example, physiological changes, increased anxiety, stress, excessive use of gadgets, childbirth (more often for women), social jetlag. Studies have shown that ASTP does not develop by itself with age [15]. The existing lifelong dependence on age is weak. It may indicate other age-related triggers of the phenomenon. For example, the development of sleep disorders.

One of the causes of daytime sleepiness is the so-called "social jetlag" – descrepancy of the internal clock, which obeys endogenous rhythms, with schedules of social activity. As a result of this phenomenon, a person feels exhaustion, "muted" consciousness, decreased efficiency, motivation, decreased concentration, ability to remember, drowsiness, irritability and other symptoms. They arise as a consequence of sleep deficit, as well as the accumulation of this deficit and the inability to adjust to a comfortable schedule dictated by endogenous rhythms. A person's tendency to fall asleep and wake up early or late is called a chronotype. The best known chronotypes among the general population are the early waking – "larks" and the late waking – "owls". Less well known is the middle, most adapted and flexible chronotype, the "pigeons".

M. Wittmann suggested that "owls" are most susceptible to the effects of social jetlag, because most of the social interaction schedules are adapted to larks and pigeons. That is, owls experience more symptoms of jetlag. Some of the questions in this study were asked in order to establish the chronotype of the participants (according to their subjective assessment), as well as the symptoms of jetlag.

The question asking to attribute oneself to a certain chronotype, "Who are you?", showed results close to the average results of the study with the Horne-Ostberg questionnaire [3, p.183–186]. In the present study the distribution according to chronotypes was as follows: larks – 14,1 %, owls – 32,1 % and pigeons – 48,7 %.

Among all the questions that were asked to determine the presence of social jetlag symptoms, namely:

1. Do you like to sleep?
2. Are excessive feelings of irritation, anger, aggression a problem for you?
3. Do you suffer from sleep disorders?
4. Have you noticed any deterioration in your health in recent years?
5. Do you have unreasonable anxiety, worry or fear?

no significant correlations were found with any of the chronotypes. However, by dividing the respondents into those who had and those who had not marked ASTP, the following results were found (see Table 6).

Table 6

Distribution of chronotypes in the groups of people who noticed ASTP and those who did not notice it

	ASTP	Without ASTP
Larks	16,6 %	11,5 %
Owls	35,5 %	30,8 %
Easily adjust to any rhythm (pigeons)	47,9 %	57,7 %

Thus, it was revealed that those who marked the ASTP tended to belong to the extreme chronotypes, and those who did not mark it - to the "pigeons". This is confirmed by the correlation of chronotypes with the answers to the question "How do you feel the time?" (r=0,237; p=0,042), which is clearly demonstrated on the bar chart (look Fig. 1). It shows that people who consider themselves as "owls" more often admit that "It runs too fast", and those who easily adjust to any rhythm (pigeons) choose answer that time "It goes its own way" (question C). At the same time, those who answered "no" and "other" to the question "do you like to sleep?", roughly defining the presence of chronic sleep pressure, were distributed between 22,23 % "Larks" and 77,77 % "Easily adjust to any rhythm". That is, all 100 % of "owls" responded that they like to sleep, hence, they experience drowsiness and sleep pressure. In addition, there was also a significant correlation (r=0,300; p=0,009) between those who responded that they liked to sleep and those who agreed that "the years fly too fast by". This can also be seen in the relationship map (look Fig. 1).

These results are consistent with the results of M. Wittmann's study and confirm that owls, indeed, are more affected by social jetlag. They were also found to be more likely to experience ASTP.

However, owls were not the only ones who responded that they like to sleep. Moreover, sleepiness became apparent the only marker of jetlag – none of the other symptoms were associated with chronotypes. At the same time, all those who responded that they liked to sleep (75,7 % of respondents) also demonstrated a significant correlation with age (r=0,369; p=0,001). Therefore, other significant age-related variables may be the causes of drowsiness.

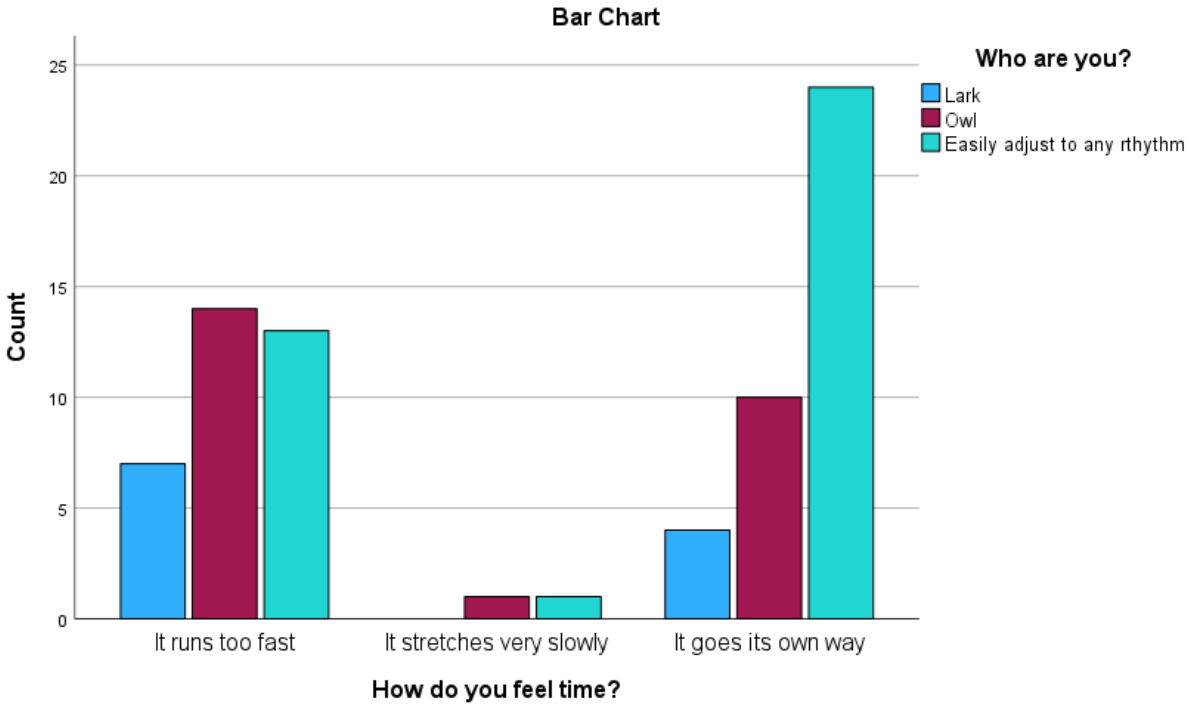

Figure 1. Bar Chart chronotypes and responses to the question "How do you feel the time?"

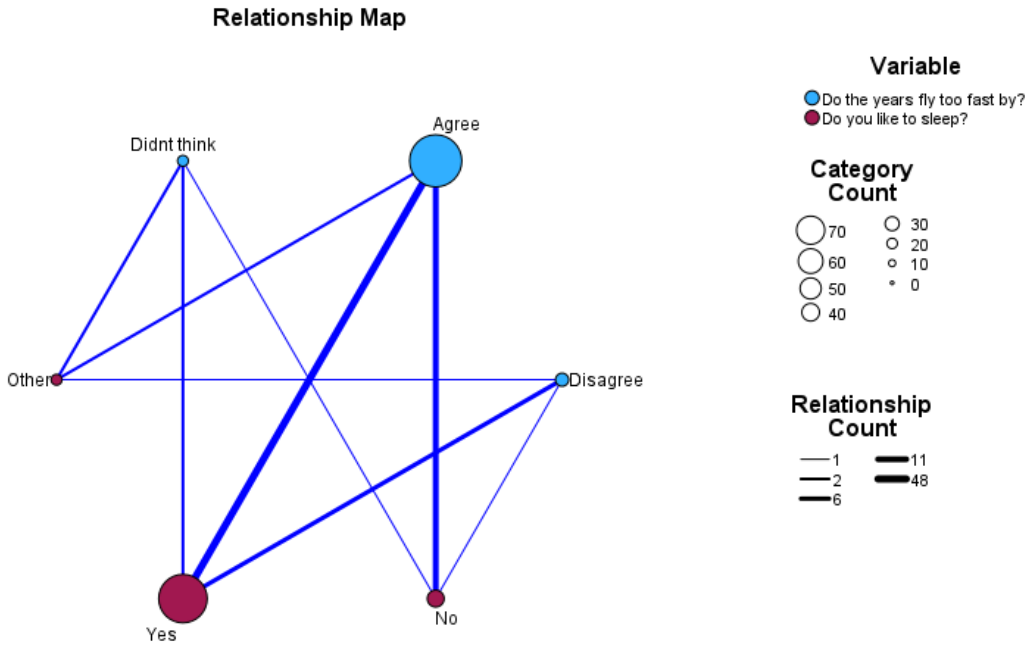

Figure 2. Map of relationships between those who responded that they like to sleep and those who agree that the years go by too fast

Thus, it was found that age can be a confounder, which is an indicator of decreased sleep quality, while namely drowsiness and decreased lucidity of consciousness can be the causes of subjective time acceleration.

To test this conclusion, correlations between age, drowsiness, and complaints about sleep quality were analyzed. The analysis showed significant correlations (look Table 7) between age and sleep disorders as well as with drowsiness.

Table 7

Significant correlations between age, drowsiness, and sleep quality complaints

Correlation			
	Age	Do you suffer from sleep disorders?	Do you like to sleep?
Pearson's coefficient	1	0,271*	0,369**
Two-way significance		0,021	0,001
N	73	73	73

It is worth adding that the questions showed no correlation with age: "Who are you?", which offers to indicate your own chronotype, that confirms a constant tendency to fall asleep earlier or later (its genetic basis) [6, p. 45–54], as well as " Have you noticed any deterioration in your health in recent years?" (with answers "Weakness, laziness, unwillingness to develop, "muted" consciousness", "Last years I am haunted by constant illnesses", "No, nothing has changed" and "Other"). Therefore, we can conclude that the symptoms of desynchronosis voiced in the questionnaire are not related to the chronotype. In fact, some of them are dependent on age, but not on the chronotype itself.

The increase of sleep complaints with age can be clearly seen in the histogram (look Fig. 2) and in Table 7, where the answer "I often wake up in the middle of the night" becomes more frequent with age. Also the age of 40–49 years old is the majority of insomnia sufferers.

Consequently, not only drowsiness, but also other triggers of decrease in the quality of consciousness can be the cause of the occurrence of ASTP.

Hypothesis of the ASTP occurrence as a consequence of mental exhaustion. The questionnaire included a block of questions aimed at establishing a relation between some experiences and disorders and ASTP. It consisted of the following questions:

1. Do you like to sleep?
2. Do you suffer from sleep disorders?
3. Do you have unreasonable anxiety, worry or fear?
4. Are excessive feelings of irritation, anger or aggression a problem for you?
5. Have you noticed any deterioration in your health in recent years?

People who responded that time had sped up were also prone to answer the question, "Have you noticed any deterioration in your health in recent years?" that they became weak, lazy, received muted consciousness and lost the desire to develop (r=0,266; p=0,022) (look Figure 2). Hence, they experienced signs of mental exhaustion. In total, there were 56,8 % of such people. At the same time, those complaining of mental exhaustion noted that they experienced irritation, anger and aggression (r=0,247; p=0,034).

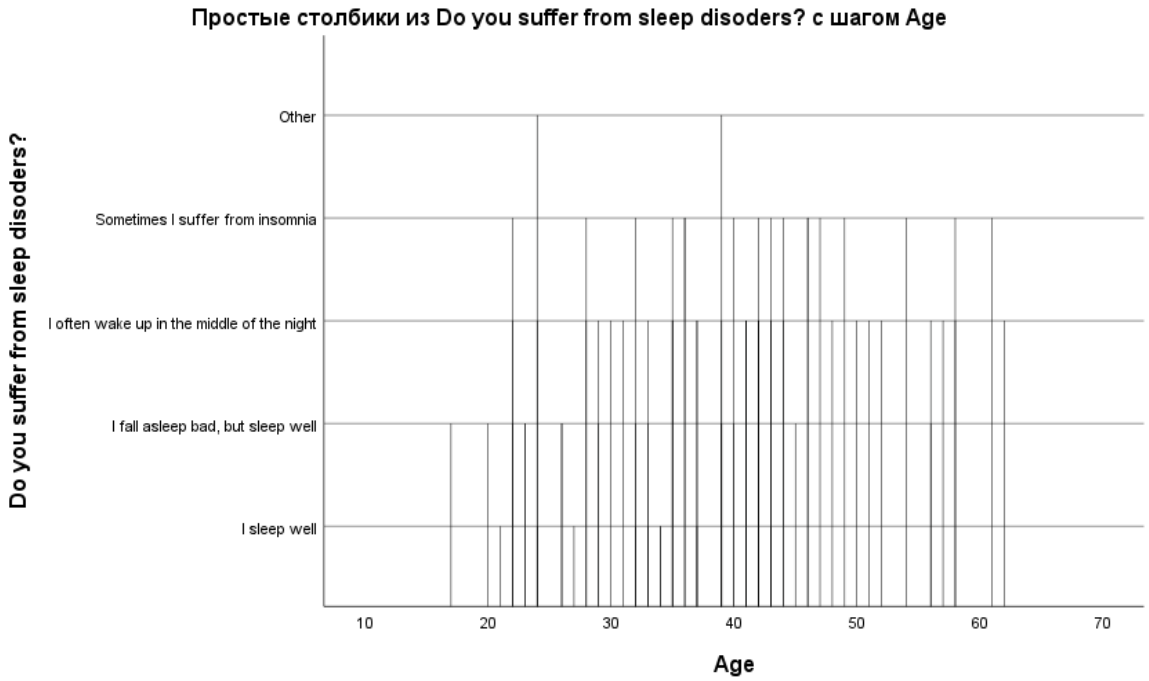

Figure 3. Histogram showing an increase in sleep quality complaints with age

Table 8

Distribution of answers about sleep quality by age group

	20–29 years	39–39 years	40–49 years	50–62 years
1.I sleep well	13,63 %	20,83 %	4 %	0,0 %
2.I fall asleep bad, but sleep well	31,81 %	16,66 %	16 %	9,09 %
3. I often wake up in the middle of the night	27,27 %	37,5 %	44 %	63,63 %
4.Sometimes I suffer from insomnia	22,72 %	20,83 %	36 %	27,27 %
5.Other	4,54 %	4,16 %	0,0 %	0,0 %

Further analysis revealed a correlation between those who experience irritation, anger and aggression and those who report unreasonable anxiety, worry and fear (r=0,241; p=0,039). In total, 68,9 % of all respondents answered the question, "Do you have unreasonable anxiety, worry or fear?" in the affirmative. In this regard, we can assume that increased anxiety, as well as irritability and aggression, on a permanent basis force to waste mental energy, deprive the opportunity to fully restore the reserve of strength both during waking and sleep. This leads to exhaustion, and at the same time to a decrease in the quality of consciousness and to an accelerated subjective time passage. Consequently, various events or personality traits can be the causes of mental exhaustion. While directly connected with ASTP is the reduction of quality of

consciousness, which can be measured by means of functions characterizing consciousness, mental processes, brain wave activity, etc.

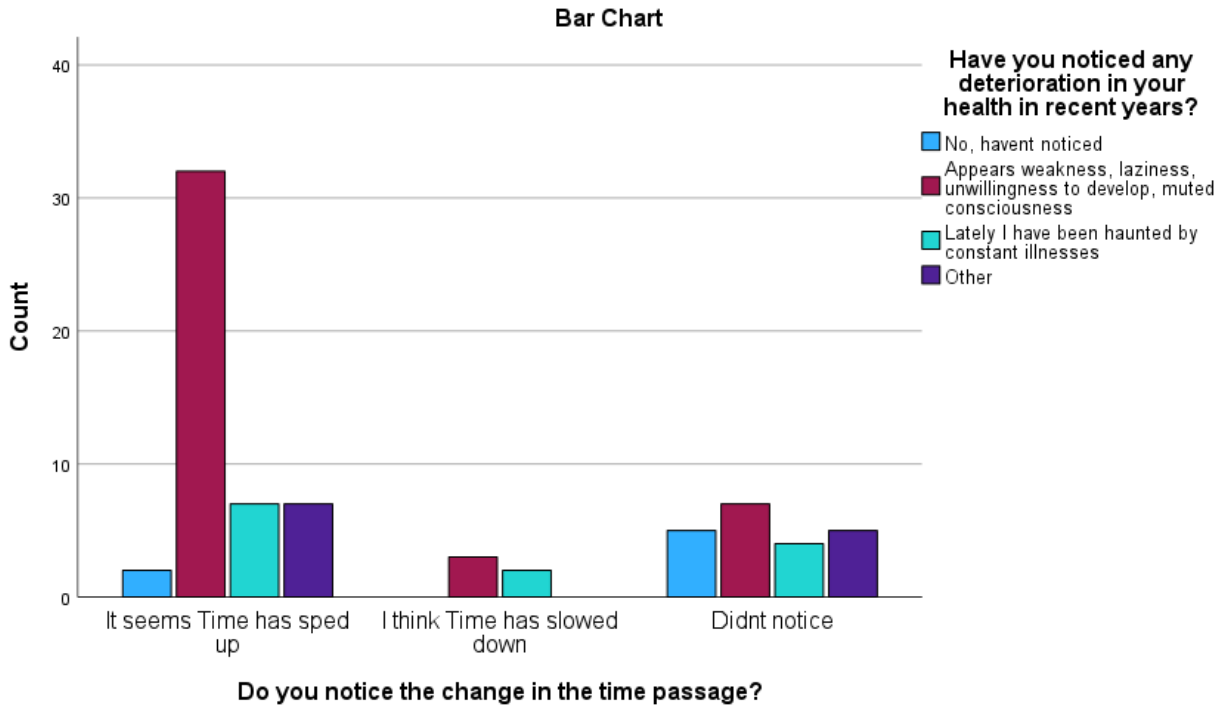

Figure 4. Bar chart showing links between "time has sped up" responses and complaints of weakness, laziness, unwillingness to develop, and "muted" consciousness

There was revealed a significant correlation of unreasonable anxieties, worries and fears with the female gender (r=0,325; p=0,005). Similarly, women were found to be prone to respond that the years fly by too quickly (r=0,312; p=0,007) and to note more often a significant negative event (such as death of a loved one, divorce, failed pregnancy, etc.) in their lives (r=0,279; p=0,016). It looks as if women are more prone to be emotional, anxious, susceptible as a consequence of which they loose their mental energy, which leads to exhaustion and accelerated time passage. However, the indicators of the correlation analysis of the present study need to be further verified in more detailed studies.

The results of the literature studies confirmed that there are differences between women and men in the levels of certain types of anxiety. They are largely due to physiology and sexual functions. Moreover, physiological sex differences are also determined at the level of brain structure: in the amygdala, hippocampus, prefrontal cortex – areas related to emotions and anxiety. Triggers of exacerbation of generalized anxiety disorder (GAD), social anxiety disorder (SAD), panic disorder and depression are often menstrual periods, pregnancy, postpartum period. It is related with fluctuations of levels female hormones, as progesterone and estrogen. However, signs of a greater propensity for women to anxiety were established already before their entry into puberty. It was found that by the age of 6, girls are twice as likely as boys to experience anxiety disorders [1, p. 69–76], hence, they are more predisposed to situational and chronic diagnoses of anxiety disorders [1, p. 497] on a genetic basis.

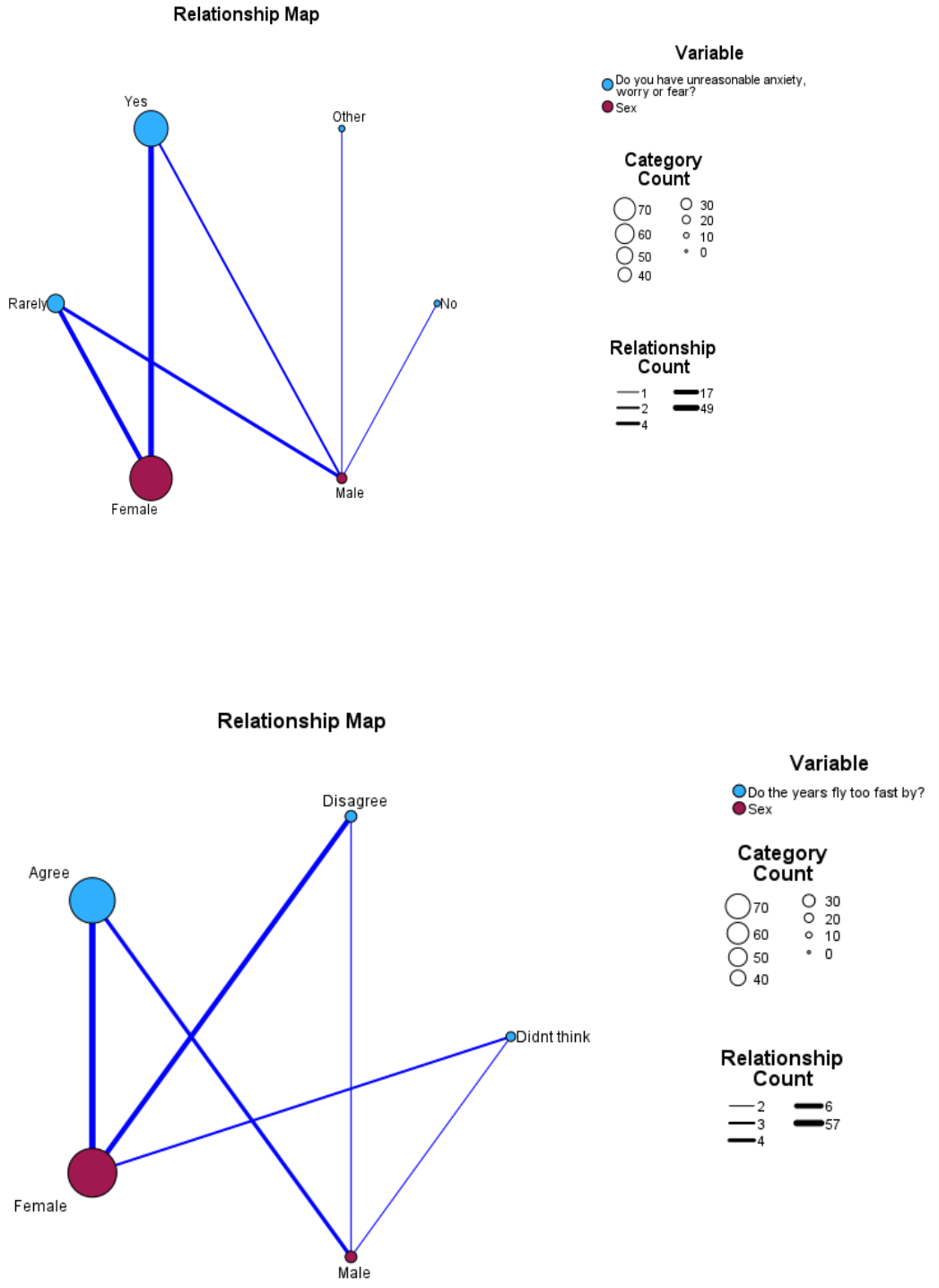

Figure 5. Relationship maps between gender and anxiety and ASTP

As a result of scientific searches, it has been established that this predisposition may be a consequence of specific choices of control strategies and metacognitive beliefs that lead to emotional problems [5, p. 89]. Girls, and subsequently women, are more likely than boys to believe that anxiety and worry are out of control, and thus they are susceptible to "worry about worry" (metaworries), but not to counteract anxiety [5, p. 87]. Some studies establish a greater tendency to rumination in women [5, p. 85; 1, p. 497; p. 501], which is sometimes seen as an ineffective strategy for dealing with the symptoms of depression. However, at the same time, this

propensity suggests that women are susceptible and prone to losing control over their negative and unwanted thoughts. According to the National Comorbidity Survey, women are more susceptible to most anxiety disorders (PD, Agoraphobia, GAD, PTSD), twice as likely as men to experience symptoms of some phobias and fears. Differences between women and men are less pronounced in cases of SAD and OCD. All together it looks as if women, genetically more prone to anxiety, can be more susceptible to the influence of stress, mental exhaustion, decrease in the quality of consciousness and speeding up of the subjective time passage. It is believed that aggression is a method of suppressing anxiety and fears, an unconscious mechanism of counteraction to them. The triggering of such a mechanism is caused by a stressful situation associated with a dangerous, threatening environment [6]. For example, such situation can be experience of significant negative event. People who have experienced it involuntarily perceive the environment differently, not as it was before. The traumatic experience forces them to perceive the world as dangerous. Accordingly, women, who are more prone to ruminations, anxiety and fears, find it more difficult to cope with the consequences of this experience. Anxiety becomes chronic. Symptoms of mental exhaustion correlate with ASTP ($r=0,233$; $p=0,049$).

In the present study, it was found that among the surveyed predominantly residents of Ukraine in 2021, the majority (64,41 %) experience an acceleration of subjective time passage (ASTP). These results are close to the results of a Dutch study conducted in 2007, which showed that 78,7 % of participants believe that time passes "fast" or "very fast" [15, p. 136].

According to the results of the distribution respondents who noted ASTP by age, it was suggested that ASTP has multiple causes.

The search and study of scientific works devoted to the perception of time allowed to establish an inseparable relation between human consciousness and the perception of time. One of the characteristic states of low quality of consciousness (when it is present) is the state of superficial sleep. Starting from this extreme, it was suggested that in the state of daytime sleepiness, as well as in the state of sleep, the perception of time can be distorted, which on a permanent basis entails ASTP.

Establishing links between chronotypes and consequences of social jetlag allowed to conclude that the cause of subjective time acceleration may not be social jetlag itself, or belonging to the most vulnerable chronotype (owls), but namely drowsiness, which reduces the quality of consciousness, slows reactions, reduces cognitive and conative abilities. A rough estimate of this study suggests that drowsiness is experienced by 75,7 % of the population. However, it has been suggested that drowsiness may develop not only as a consequence of social jetlag, but also as we get older. This assumption has been tested, finding an increase in drowsiness as well as a decrease in sleep quality with age. At the same time, sleep disorders, namely insomnia, are considered as comorbid disorder with anxiety [11].

Elevated anxiety has been assumed as one more reason, capable to cause ASTP. Unreasonable anxiety, worry and fears was noted in 68,9 % of the respondents. This can lead to such consequences as weakness, laziness, unwillingness to develop and "muted" consciousness. In other words, anxiety can reduce conative functions and quality of consciousness. Such complaints have shown a significant correlation with speeding up of the subjective time. At the same time, increased anxiety is considered to be more women characteristic, as indicated by the results of this study. This suggests that women are more prone to ASTP over their lifetime.

To summarize, this study found correlations between time perception, gender, age, emotionality and anxiety, but it is suggested to admit decrease in the quality of consciousness as the root cause that united these factors.

An unresolved issue was the increased number of respondents noting ASTP in the first age group (20–29 years old), which led to the assumption of a multi-cause phenomenon. One of the reasons for the decrease in the quality of consciousness at this age can be suspected the influence of technological progress, namely the excessive use of gadgets. As is known, the use of gadgets not only takes a significant proportion of objective time, but also causes anxiety [2; p.104–115], aggression, reduces the quality of sleep [18, p. 23–27]. The mechanisms of this effect are probably similar to those of age. For example, a decrease in melatonin production that occurs both with age and with the use of gadgets shortly before sleep. It leads to sleep disturbances and therefore daytime drowsiness and decreased lucidity of consciousness. However, the direct correlations of gadget use and subjective time acceleration need to be investigated in detail.

REFERENCES

1. Anderson, J. C., Williams, S., McGee, R., & Silva, P. A. (1987). DSM-III disorders in preadolescent children: Prevalence in a large sample from the general population. *Archives of general psychiatry, 44 (1), 69–76.*

2. Armitage, R. (2007). Sleep and circadian rhythms in mood disorders. *Acta Psychiatrica Scandinavica, 115, 104–115.*

3. Ashbrook, L. H., Krystal, A. D., Fu, Y. H., & Ptáček, L. J. (2020). Genetics of the human circadian clock and sleep homeostat. *Neuropsychopharmacology, 45 (1), 45–54*.

4. BaHammam, A. S., Almestehi, W., Albatli, A., & AlShaya, S. (2011). Distribution of chronotypes in a large sample of young adult Saudis. *Annals of Saudi medicine, 31 (2), 183–186.*

5. Bahrami, F., & Yousefi, N. (2011). Females are more anxious than males: a metacognitive perspective. *Iranian journal of psychiatry and behavioral sciences, 5 (2), 83*.

6. Cannon, W. B. (1929). Bodily Changes in Pain, Hunger, Fear and Rage, 2nd edn, New York. NY. Appleton.

7. Coelho, M., Ferreira, J. J., Dias, B., Sampaio, C., Martins, I. P., & Castro-Caldas, A. (2004). Assessment of time perception: The effect of aging. Journal of the International *Neuropsychological Society, 10 (3), 332–341*.

8. Craik, F. I., & Hay, J. F. (1999). Aging and judgments of duration: Effects of task complexity and method of estimation. *Perception & Psychophysics, 61 (3), 549–560*.

9. Draaisma, D. (2004). Why life speeds up as you get older: How memory shapes our past. Cambridge University Press.

10. Droit-Volet S., Meck, W. H. (2007). How emotions colour our perception of time. *Trends in cognitive sciences, V. 11. № 12, 504–513*.

11. Droit-Volet S. Time perception, emotions and mood disorders. (2013). *Journal of Physiology-Paris, V. 107. № 4. 255–264.*

12. Droit-Volet, S., & Wearden, J. H. (2015). Experience Sampling Methodology reveals similarities in the experience of passage of time in young and elderly adults. *Acta Psychologica, 156, 77–82*.

13. Fraisse P. Eléments de chronopsychologie. (1980). *Le travail humain, 353–372.*

14. Fraisse, P. (1963). The psychology of time.

15. Friedman, W. J., & Janssen, S. M. (2010). Aging and the speed of time. *Acta Psychologica, 134 (2), 130–141*.
16. Gilliland, A. R., Hofeld, J., & Eckstrand, G. (1946). Studies in time perception. *Psychological Bulletin, 43 (2), 162*.
17. Hjetland, G. J., Skogen, J. C., Hysing, M., & Sivertsen, B. (2021). The association between self-reported screen time, social media addiction, and sleep among Norwegian University students. *Frontiers in public health, 9, 794–307*.
18. Ivana, I., Murniati, M., & Putri, N. R. I. A. T. (2021). The Relationship Between Gadget Usage and Adolescent Sleep Quality. *Journal of Public Health for Tropical and Coastal Region, 4 (1), 23–27*.

Бібліографічний опис для цитування:
Tsybulsky A. Drowsiness and mental exhaustion can be triggers of acceleration of the subjective time passage. *Психологічний журнал*. Умань: ВПЦ «Візаві», 2023. Вип. 10. С. 64–78.