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Investigation of the Relationship between Anxiety Disorder and Time Perception with Perceptional Paradigm

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Abstract

Anxiety is a pathological condition, as well as a condition that is continued in nature according to the event and situation to keep the vitality alive. For this reason, it is challenging to examine the relationship between the perception of time and the anxiety disease experienced within the limits of normality. Anxiety is one of the most studied topics today. It is also thought that the physical symptoms of anxiety affect cognitive processes. Anxiety, which is observed either alone or in combination with many disorders, shows a possible relationship between the perception of time and some findings related to the subject. These findings show us that people with anxiety disorder have a faster perception of time and a shorter perception estimation. Noticeably more significant differences were found in studies with adolescents. This study used the Beck Anxiety Scale, Zimbardo Time Perspective Inventory, Retrospective and Prospective Time Perception Paradigm, and a Demographic Information Form to collect data. As the variables thought to affect the results of the study were detectedin 44 of the 212 randomly selected participants, these participants were excluded from the evaluation, and this study was continued with the data of 168 participants. When the findings are evaluated in general, there is a significant difference between the anxiety scale scores of the sample group and the gender variable. According to this finding, it can be said that the level of anxiety varies between men and women. By looking at the 10, 20, 30, and 40-second video reactions of the participants showing anxiety symptoms; It has been determined thatanxiety impairs the time perception of individuals.

Key Words: Time Perception, Internal Clock, Retrospective Time, Prospective Time, Anxiety

DOI: 10.5281/zenodo.7740187

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Received: 8 February 2023; **Accepted:** 7 March 2023

Introduction

The etymology of anxiety is based on different origins in different sources. Whilesome of these sources accept the word “Anx,” which means a mood that can be felt independently of consciousness, as the root word of anxiety, some studies accept the word “Angh,” which implies distress and worry in Indian and Germanic languages (Ozer, 2006; Heiddgger, 2004). In essence, anxiety is a state of anxiety and worry, which is considered a vital mechanism; It is a mental and physical defense reaction against an event or fear that will threaten the survival of the living thing (Uzbay, 2002; Sévigny, Everett, and Grondin, 2003). This reaction can be observed in two parts: situational anxiety and trait anxiety (Yilmaz *et al.,* 2015).

Although most psychiatric disorders are similar in symptoms, the diagnosis groups are increasing and changing day by day (Ozen, and Temizsu, 2010). The most significant proof ofthis is the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders) published by the American Psychiatric Association (APA). Of course, the evaluation made with these books is by considering the situations in which the disorder occurs or does not occur (APA, 2013). Everything is not written in the books, and there may be an of any external stimulus that this disorders. Examples of these external stimuli are situations where the disorder occurs, whether there is an effect of an external stimulus, characteristics of the situation, results, exacerbating or mitigating conditions, or one's life (Karamustafalıoglu and Yumrukcal, 2011). The most effective reference point that guides our behaviors is our perception of time.

There is a similar mechanism that provides the perception of time in almost every living organism. With the help of this mechanism, we can interpret sensory inputs, compare them with each other, and accumulate our experiences (Baddeley, 1966). When we want to crossthe pedestrian crossing, we wait for the green light for pedestrians. While it is a series ofvisual network that allows us to see the green light come on, this is somewhat different for time perception (Amalric and Koob, 1987).

In the human body, as in many animals, there are different abilities to perceive time. The first of these is interval time estimation. The internal clock shows more flexibility in its range and operating characteristics than circadian timing. The internal clock is highly flexible with respect to the circadian rhythm and relatively inaccurate to the circadian timing mechanisms. The internal clock is scalar. That is, its standard deviation grows proportionally to the mean of the timed interval. Scalar time perception is not like this (Church, 1984; Gibbon, 1977; Silver and Bittman, 1984; Terman, *et al.,* 1984). Many studies show that the internal clock has an important place in cognitive and behavioral movements and learning. (Bech, 1975)

According to the definition of cognitive, physiological, and behavioral relations, the order and system of human behavior, thought, and life provides the internal clock. Theinternal clock is used to measure the duration, occurrence rate, and temporal sequence of events operating in the second-minute range. It causes problems in the time perception of living things where this process is interrupted. This problem causes neurological, psychological, and physiological disorders. (Church, Meck and Gibbon, 1994; Meck, 1983;Meck and Angell 1992; Meck, 1991; Figure 1).

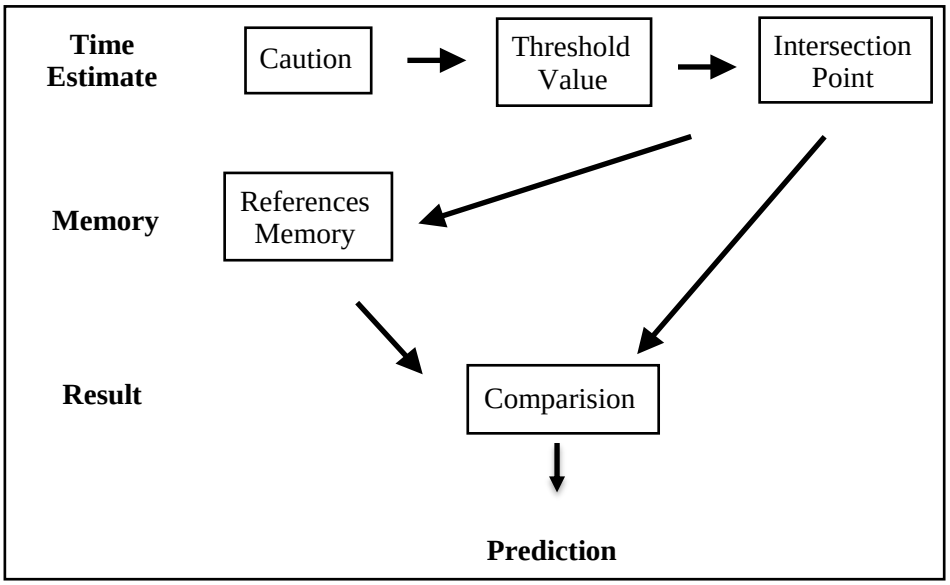

Figure 1. Human Time Perception Diagram

Scalar Time Theory is a mathematical model that describes the cognitive processes of time perception. (Gibbon, 1977; Gibbon and Church, 1984) This model allows us to grasp the quantitative models and conceptual rationale necessary to investigate the neurological and pharmacological mechanisms of temporal functioning. After the resulting stimulus rises above the threshold value, it is compared withinformation encoded into memory and recalled from previous experiences, resulting in a response. The response is performed when the stimulus is close enough (Gibbon and Church, 1990; 1992). Performance differences occur as a result of changes in clock, memory, threshold, and comparison processes. This allows time splits to explain variability in performance successfully.

McTaggart suggested in 1908 that humans can grasp time in two primary ways.According to the A series of this theory, which is defined as the A and B series of time, the form and form of time progress from the distant past of the events to the recent past, from the present to the near future, and from there to the very distant future (McTaggart, 1908).

To explain this progression from a different perspective, according to Smart, theprogression of time from the past to the future is like a cargo ship sailing through unknown seas, while moving from the past to the past is like an observer on a suspension bridge watching the flow of the river below (Smart, 1949). In this approach, which is defined as theA series, the most fundamental characteristic of time is that it is in a flow from the past to the future or from the future to the past (Ingthorsson, 1998).

According to the B series approach, time is associated with the classification of events and situations as before and after. Accordingly, the relationship between time and event; we can relate it by evaluating the priority of one situation over another (McTaggart, 1927).

To summarize, the main difference between the A-B theories of time, which is one of the most popular approaches today, is the way of evaluating the time flow. It is also the leading actor in the cause and effect relationship.

Although some studies show that anxiety and time perception are related, this is still a subject of debate in the scientific world. This research aims to contribute to the emergence of the relationship between anxiety and time perception.

Materials and Method

The research sample consists of 168 randomly selected participants who want toparticipate in the study and meet the appropriate conditions. The age ranges are between 16-52. During the research, attention was paid to variables such as socioeconomic factors, the use of drugs that are thought to affect the study, alcohol use, smoking and substance use history, hunger and satiety, sleep and hormone states (such as menstruation). These variables did not affect the research data. It was assumed that the participants answered the inventories and tests used in the research honestly and sincerely.

Particular attention to the volunteering factor in the study led to the participation of different participants in each of the data collection stages.

Demographic Information Form**:** The purpose of using the demographic information form is to obtain detailed information about the individuals who contributed to the study and determine the effects on the hypothesis. In this regard, some questions were formed to complement the data to be obtained during the experiment. Information such as age, gender, education, and so on was recorded via Google Forms.

Beck Anxiety Scale: This scale consists of 21 questions. Each

question is evaluated between 0 (never) and 3 (severe), and high scores indicate increased anxiety complaints.Thus, the total score that can be obtained from this scale varies between 0 and 63. The high total score indicates the severity of the anxiety experienced by the individual. The Turkish adaptation of the scale was carried out by Ulusoy (1993) (Savasir and Sahin 1997). It is an easy-to-apply scale that individuals can answer on their own. It is stated that the Cronbach Alpha internal consistency coefficient of the scale is 0.93, the item-total test correlation coefficients vary between 0.45 and 0.72, and the test-retest reliability coefficients are r=57 (Savasir and Sahin 1997). Within the scope of the current study, the Cronbach Alpha value of the scale was calculated as 0.90.

Past Time Perception Paradigm: They were asked to estimate time intervals of 5, 10, 20, 30, and 40 seconds that determines the participants' future time perceptions, and then they were asked to estimate how long the video lasted. Since YouTube and Google Forms are the only possible means of remote continuation of this study due to the pandemic conditions, the expected durations of the videos were randomly extended and a separate account was uploaded to YouTube. The participants were also asked to estimate only the time interval during which the image flowed (Meck, 2005).

Future Time Perception Paradigm: They were asked to estimate time intervals of 5, 10, 20, 30, and 40 seconds to determine the participants' future time perceptions. Different stimuli were presented to the participant in the designed paradigm for each time interval, each repeated three times. For this purpose, the Opensesame design program and online data collection service JATOS were used. A personal link was created and sent to each participant (Meck, 2005). After the information, a black screen appeared 3 seconds after the researcher pressed the button, and then they were asked to respond to the instructions that appeared onthe screen. After the instructions, another 3-second black screen appeared. The maximum display time of the instruction screens is two times the expected time interval. The total duration of the experiment is 15 minutes. The paradigm of the experiment is schematized below (See Diagram 2).

Process: The scales were given to the individuals participating in the study, accompanied by standard instructions. They were randomly selected and asked whether they would like to participate in the research. The volunteer participants were read the informed consent form requested by the ethics committee, and their approval was obtained. The study was carried outonline due to the Covid-19 global epidemic.

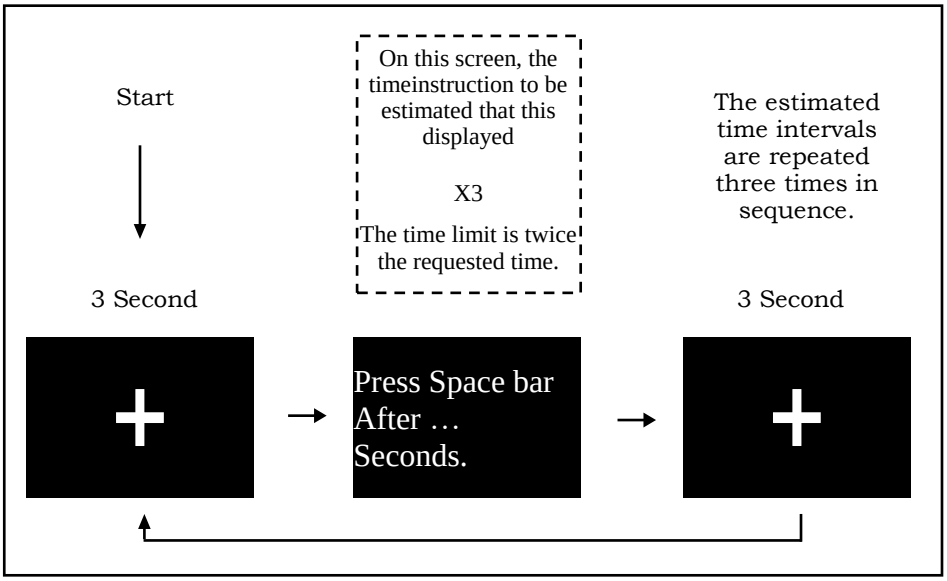

Figure 2. Future Time Forecast Paradigm Diagram

Result

Before the research analyses, the accuracy of the data entry and the compatibility of the distributions of the variables with the assumptions of multivariate statistical analysis were tested. Although different numbers of participants were studied in the tests, it was observed that the population variances were equal at all study stages, and it was decided that the two groups were comparable.

As seen in Table 1, there is a significant difference according to the results of the independent t-test applied to find out whether there is a substantial difference between the anxiety scale scores of the sample group and the gender variable. In addition, there is no significant difference between the variables of age, marital status and education level, and anxiety scale results.

Table 1. Independent t-Test Analysis Result Table for the Difference Between Age, Marital Status and Education Level Variables According to the Gender Variable of the Sample

	Beck Anxiety Scale	N	X̄	Ss.	t	Sd.	p
Gender	There are signs of anxiety	117	1,79	0,41	2,38	166	**0,02**
	No signs of anxiety	51	1,61	0,49			
Age	There are signs of anxiety	117	26	6,38	-0,743	166	0,459
	No signs of anxiety	51	26,84	7,35			
Martial Status	There are signs of anxiety	117	1,31	0,73	-1,404	166	0,162
	No signs of anxiety	51	1,49	0,88			
Level of Education	There are signs of anxiety	117	2,16	0,59	0,636	166	0,526
	No signs of anxiety	51	2,10	0,64			

p<0.05. N: Population size, X̄: Mean, Ss: The sum of squares, t: measures the size of the difference relative to the variation in your sample data value, Sd: Standard deviation, p: Significance value

As shown in Table 2 below, the results of the independent t-test applied to find the significant difference in the Past-Related Time Perception scores of the sample group according to the anxiety variable are given in the table.

Table 2. Between the Scores of the Historical Time Perception Data According to the Anxiety Variable of the Sample

	Beck Anxiety Scale	N	$\bar{X}$	Ss.	t	Sd.	p
Standard Video (Sec 5)	There are signs of anxiety	75	6,03	2,91	-1,668	49,72	0,102
	No signs of anxiety	34	7,29	3,97			
Standard Video (Sec 10)	There are signs of anxiety	75	10,20	4,41	-2,29	48,56	**0,026**
	No signs of anxiety	34	12,91	6,23			
Standard Video (Sec 20)	There are signs of anxiety	75	17,76	6,78	-2,052	48,19	**0,046**
	No signs of anxiety	34	21,53	9,69			
Standard Video (Sec30)	There are signs of anxiety	75	26,96	10,59	-2,304	53,35	**0,025**
	No signs of anxiety.	34	32,85	13,10			
Standard Video (Sec40)	There are signs of anxiety	75	37,65	12,22	-2,064	107	**0,041**
	No signs of anxiety	34	43,03	13,43			

p<0.05. N: Population size, $\bar{X}$: Mean, Ss: The sum of squares, t: measures the size of the difference relative to the variation in your sample data value, Sd: Standard deviation, p: Significance value

According to the results of the independent t-test applied to find the significant difference in the responses to the 5-second standard video according to the anxiety variable, there is no significant difference. However, there is a significant difference according to the results of the independent t-test applied to find the significant difference according to the anxiety variable of the responses given to the standard video of 10, 20, 30, and 40 seconds.

As can be seen in Table 3, the results of the independent t-test applied to find the significant difference in the Past-Related Time Perception scores of the sample group according to the anxiety variable are given in the table.

Table 3. Independent t-Test Analysis Result Table for the Difference Between Scores of the Sample's Historical Time Perception Data According to the Anxiety Variable

	Beck Anxiety Scale	N	$\bar{X}$	Ss.	t	Sd.	P
Future Time Forecast (Sec5)	There are signs of anxiety	61	3,88	1,07	1,06	87	0,292
	No signs of anxiety	28	3,60	1,34			
Future Time Forecast (Sec10)	There are signs of anxiety	61	7,46	2,33	0,154	87	0,878
	No signs of anxiety	28	7,37	2,65			
Future Time Forecast (Sec20)	There are signs of anxiety	61	14,41	4,47	-1,786	87	0,078
	No signs of anxiety	28	16,33	5,22			
Future Time Forecast (Sec30)	There are signs of anxiety	61	23,15	7,17	-0,228	87	0,774
	No signs of anxiety	28	23,66	9,01			
Future Time Forecast (Sec40)	There are signs of anxiety	61	32,08	8,59	-0,388	39	0,700
	No signs of anxiety	28	33,08	12,35			

p<0.05. N: Population size, $\bar{X}$: Mean, Ss: The sum of squares, t: measures the size of the difference relative to the variation in your sample data value, Sd: Standard deviation, p: Significance value

According to the results of the independent t-test applied to find a significant difference in the reactions given to the video containing 5, 10, 20, 30, and 40 seconds of stress stimulus according to the anxiety variable, there is no significant difference.

As seen in Table 4, no significant difference was found between the future-oriented time perception paradigm response and the anxiety variable according to the independent t- test results applied to find the significant difference in the Future Time Perception Paradigm scores of the sample group according to the anxiety variable.

Table 4. Independent t-Test Analysis Results Table for the Difference Between Future Time Perception Data and Beck Anxiety Inventory

	Beck Anxiety Scale	N	$\bar{X}$	Ss.	t	Sd.	p
Stressed Video (Sec5)	There are signs of anxiety	75	5,15	1,98	-1,402	40,2	0,169
	No signs of anxiety	34	6,18	4,07			
Stressed Video (Sec10)	There are signs of anxiety	75	9,51	2,62	-1,31	48	0,197
	No signs of anxiety	34	10,44	3,77			
Stressed Video (Sec20)	There are signs of anxiety	75	19,21	7,11	-1,881	45,4	0,066
	No signs of anxiety	34	23,15	11,22			
Stressed Video (Sec30)	There are signs of anxiety	75	28,08	8,39	-0,812	107	0,419
	No signs of anxiety	34	29,41	6,82			
Stressed Video (Sec40)	There are signs of anxiety	75	35,76	9,15	-0,962	107	0,338
	No signs of anxiety	34	37,68	10,65			

$p<0.05$. N: Population size, $\bar{X}$: Mean, Ss: The sum of squares, t: measures the size of the difference relative to the variation in your sample data value, Sd: Standard deviation, p: Significance value

As can be seen from Table 5, the difference between the groups was not found significant according to the results of the (ANOVA) analysis applied to test the difference between the means of the 5, 10, 20, 30-second standard videos of the Historical Time Perception Data according to the educational status variable.

According to the results of the (ANOVA) analysis applied to test the difference between the averages given to the 40-second standard videos according to the variable of educational status, the difference between the groups was found to be significant.

As can be seen from Table 6, the difference between the groups was not found significant according to the results of the (ANOVA) analysis applied to test the difference between the means of the Historical Time Perception Data given to the 5, 30, and 40 seconds standard video according to the marital status variable.

According to the results of the (ANOVA) analysis applied to test the difference between the averages of the Historical Time Perception Data given to the video containing 10 and 20 seconds of stress stimulus, according to the marital status variable, the difference between the groups was found to be significant.

Table 5. ANOVA Analysis Result Table Used to Determine the Difference Between Educational Status and the Past Time Perception Paradigm

		N	$\bar{X}$	Ss.		Ss.	Sd.	Ms.	F	P
Standard Video (Sec5)	High School	10	7,10	2,18	Between Groups	13,91	2	6,95	0,62	0,535
	University	69	6,55	3,57	In-Group	1172,67	106	11,06		
	Master	30	5,90	3,02	Total	1186,58	108			
	Doctorate	0	-	-						
	Total	109	6,42	3,31						
Standard Video (Sec10)	High School	10	11,6	3,98	Between Groups	64,32	2	32,16	1,20	0,304
	University	69	11,5	5,53	In-Group	2830,44	106	26,70		
	Master	30	9,80	4,59	Total	2894,77	108			
	Doctorate	0	-	-						
	Total	109	11	5,18						
Standard Video (Sec20)	High School	10	20,9	6,89	Between Groups	144,21	2	72,10	1,14	0,323
	University	69	19,4	8,62	In-Group	6686,33	106	63,07		
	Master	30	17,2	6,45	Total	6830,55	108			
	Doctorate	0	-	-						
	Total	109	18,9	7,95						
Standard Video (Sec30)	High School	10	28,7	8,12	Between Groups	657,51	2	328,7	2,46	0,090
	University	69	30,5	12,1	In-Group	14114,04	106	133,1		
	Master	30	24,9	10,8	Total	14771,56	108			
	Doctorate	0	-	-						
	Total	109	28,8	11,7						
Standard Video (Sec40)	High School	10	40,3	5,93	Between Groups	1043,40	2	521,7	3,32	**0,04**
	University	69	41,3	13,3	In-Group	16616,70	106	156,7		
	Master	30	34,3	12	Total	17660,11	108			
	Doctorate	0	-	-						
	Total	109	39,3	12,7						

p<0.05. N: Population size, $\bar{X}$: Mean, Ss: The sum of squares, Sd: Standard deviation, Ms: Mean of squares, F: A ratio of two variances, p: Significance value

Table 6. ANOVA Analysis Result Table Used to Determine the Difference between the Past Time Perception Paradigm and the Marital Status

		N	$\bar{X}$	Ss.		Ss.	Sd.	Ms.	F	p
Standard Video (Sec5)	Single	93	6,23	3,11	Between Groups	54,58	2	27,29	2,55	0,082
	Married	11	6,64	3,67	In-Group	1132,00	106	10,67		
	Divorced	0	-	-	Total	1186,58	108			
	Other	5	9,60	5,13						
	Total	109		3,31						
Standard Video (Sec10)	Single	93	10,77	4,93	Between Groups	161,67	2	80,83	3,13	**0,048**
	Married	11	10,82	5,67	In-Group	2733,09	106	25,78		
	Divorced	0	-	-	Total	2894,77	108			
	Other	5	16,60	6,66						
	Total	109	11,05	5,18						
Standard Video (Sec20)	Single	93	18,59	7,44	Between Groups	437,89	2	218,94	3,63	**0,03**
	Married	11	17,73	9,65	In-Group	6392,65	106	60,30		

	Divorced	0	-	-	Total	6830,55	108			
	Other	5	28,00	9,67						
	Total	109	18,94	7,95						
Standard Video (Sec30)	Single	93	28,74	11,22	Between Groups	160,95	2	80,47	0,58	0,560
	Married	11	27,00	14,35	In-Group	14610,60	106	137,83		
	Divorced	0	-	-	Total	14771,56	108			
	Other	5	33,80	15,53						
	Total	109	28,80	11,70						
Standard Video (Sec40)	Single	93	39,04	12,74	Between Groups	136,35	2	68,17	0,41	0,663
	Married	11	39,45	11,68	In-Group	17523,75	106	165,31		
	Divorced	0	-	-	Total	17660,11	108			
	Other	5	44,40	17,52						
	Total	109	39,33	12,79						
Stressed Video (Sec5)	Single	93	5,52	2,96	Between Groups	1,47	2	0,73	0,09	0,913
	Married	11	5,18	2,14	In-Group	859,66	106	8,11		
	Divorced	0	-	-	Total	861,13	108			
	Other	5	5,20	1,30						
	Total	109	5,47	2,82						
Stressed Video (Sec10)	Single	93	9,75	2,89	Between Groups	4,50	2	2,25	0,24	0,787
	Married	11	10,36	4,54	In-Group	993,05	106	9,36		
	Divorced	0	-	-	Total	997,56	108			
	Other	5	9,40	2,19						
	Total	109	9,80	3,04						
Stressed Video (Sec20)	Single	93	20,25	8,80	Between Groups	82,16	2	41,08	0,53	0,588
	Married	11	20,27	7,56	In-Group	8168,69	106	77,06		
	Divorced	0	-	-	Total	8250,86	108			
	Other	5	24,40	10,88						
	Total	109	20,44	8,74						
Stressed Video (Sec30)	Single	93	28,45	8,12	Between Groups	44,87	2	22,43	0,35	0,703
	Married	11	27,64	7,67	In-Group	6734,37	106	63,53		
	Divorced	0	-	-	Total	6779,24	108			
	Other	5	31,20	4,44						
	Total	109	28,50	7,92						
Stressed Video (Sec40)	Single	93	36,49	10,01	Between Groups	211,36	2	105,68	1,14	0,323
	Married	11	33,18	7,51	In-Group	9813,68	106	92,58		
	Divorced	0	-	-	Total	10025,04	108			
	Other	5	40,80	2,59						
	Total	109	36,36	9,63						

$p<0.05$. N: Population size, $\bar{X}$: Mean, Ss: The sum of squares, Sd: Standard deviation, Ms: Mean of squares, F: A ratio of two variances, p: Significance value

Relationships Between Variables

Correlation analysis was performed to determine the relationship between anxiety symptoms and time perception responses. There is a low and negative correlation between the 10 and 20-second standard video estimates of the Beck Anxiety Scale and the Historical Time Perception test. High level and positive direction between the 5-second

standard video estimate of the Historical Time Perception test and the 10-second standard video estimate of the same test; There is a moderate and positive correlation between the 20, 30, and 40-second standard video predictions.

There is a moderate and positive correlation between the 5-second standard video estimation of the Retrospective Time Perception test and the same test's video estimation value, including 5, 10, 20, and 30-second stress stimulus. There is a weak and positive correlation between the 5-second standard video estimate of the Retrospective Time Perception test and the 40-second video estimate of the same test, including the stress stimulus. There is a weak and negative correlation between the 5-second standard video prediction of the Retrospective Time Perception test and the 5-second response time of the Future Time Perception Paradigm.

There is a high and positive correlation between the 10-second standard video estimate of the Retrospective Time Perception test and the response time of 20, 30, and 40 seconds of the same test. There is a moderate and positive correlation between the 10-second standard video estimate of the Retrospective Time Perception test and the 5-, 10, 20, 30, and 40-second video estimate containing the stress stimulus.

There is a moderate and negative correlation between the 10-second standard video prediction of the Retrospective Time Perception test and the 5-second response time of the Future Time Perception Paradigm. There is a high and positive correlation between the 20-second standard video estimate of the Retrospective Time Perception test and the 30- and 40-second response time of the same test. There is a moderate and positive correlation between the 20-second standard video estimate of the Retrospective Time Perception test and the video estimate containing the 5, 10,30, 40-second stress stimulus. A high level and positive correlation between the 20-second stress stimulus video prediction value.

There is a moderate and negative correlation between the 20-second standard video prediction of the Retrospective Time Perception test and the 5-second response time of the Future Time Perception Paradigm. There is a high and positive correlation between the 30-second standard video estimate of the Retrospective Time Perception test and the 40-second response time of the same test. There is a moderate and positive correlation between the 30-second standard video estimate of the Retrospective Time Perception test and the 5-, 10, 20, 30, 40-second video estimate containing the stress stimulus. There is a weak and negative correlation between the 30-second standard video prediction of the Retrospective Time Perception test and the 5-second response time of the Future Time Perception Paradigm.

There is a moderate and positive correlation between the 40-second standard video estimate of the Retrospective Time Perception test and the 5-, 10, 20, 30, and 40-second video estimate containing

the stress stimulus.There is a weak and negative correlation between the 40-second standard video prediction of the Retrospective Time Perception test and the five and 10-second response timeof the Future Time Perception Paradigm. here is a moderate and positive correlation between the 5-second video prediction of the Retrospective Time Perception test and the 10, 20, 30, 40-second video prediction value of the same test. There is a weak and negative correlation between the 5-second stress video prediction of the Retrospective Time Perception test and the five and 30-second response time of the Future Time Perception Paradigm.

Between the 10-second stress stimulus video prediction and the same 20 and 40- second video prediction value of the Retrospective Time Perception test, moderately and positively, the video prediction containing the 10-second stress stimulus and the same 30- second video prediction value is high and positive. A clear relationship is seen. There is a weak and negative correlation between the 10-second stress video prediction of the Past Time Perception test and the 10-second response time of the Future Time Perception Paradigm. There is a moderate and positive correlation between the 20-second stress stimulus video prediction of the Retrospective Time Perception test and the 30- and 40-second video prediction value. There is a weak and negative correlation between the 20-second stress video prediction of the Retrospective Time Perception test and the five and 10-second response timeof the Future Time.

Perception Paradigm

There is a moderate and positive correlation between the 30-second video predictionof the Retrospective Time Perception test and the 40-second video prediction value of the same test. Between the 30-second stress video prediction of the Historical Time Perception test and the five and 10-second response time of the Future Time Perception Paradigm; moderate and negative; there is a low and negative correlation between the response time of 20, 30, and 40 seconds. There is a low and negative correlation between the 40-second stress video prediction of the Past Time Perception test and the 5, 10, 20, and 30 second response time of the Future Time Perception Paradigm.

Between the 5-second response time of the Future-Looking Time Perception Paradigmand the 10-second response time of the same test; There is a moderate and positive correlationbetween the response time of 20, 30, and 40 seconds. Between the 10-second response time of the Future Time Perception Paradigm and the 20- and 30-second response time of the same test; There is a moderate and positive relationship between the response time of 40 seconds. There is a high and positive correlation between the 20-second response time of the Future Time Perception Paradigm and the 30- and 40-second response time of the same test. There is a high and positive correlation between

the 30-second response time of the Future Time Perception Paradigm and the 40-second response time of the same test.

Table 7. Correlation chart between the Past Time Perception Paradigm and Beck Anxiety Inventory

		BAS	STD 5	STD 10	STD 20	STD 30	STD 40	STR 5	STR 10	STR 20	STR 30	STR 40	FT 5	FT 10	FT 20	FT 30	FT 40
Beck Anxiety Scale	r	1															
	P																
	N	168															
Standard Video (Sec5)	r	-0,149	1														
	P	0,122															
	N	109	109														
Standard Video (Sec10)	r	-0,257**	0,869**	1													
	P	0,007	0,000														
	N	109	109	109													
Standard Video (Sec20)	r	-0,224*	0,681**	0,855**	1												
	P	0,019	0,000	0,000													
	N	109	109	109	109												
Standard Video (Sec30)	r	-0,178	0,629**	0,768**	0,871**	1											
	P	0,064	0,000	0,000	0,000												
	N	109	109	109	109	109											
Standard Video (Sec40)	r	-0,167	0,599**	0,714**	0,799**	0,900**	1										
	P	0,083	0,000	0,000	0,000	0,000											
	N	109	109	109	109	109	109										
Stressed Video (Sec5)	r	-0,150	0,404**	0,503**	0,524**	0,572**	0,545**	1									
	P	0,118	0,000	0,000	0,000	0,000	0,000										
	N	109	109	109	109	109	109	109									
Stressed Video (Sec10)	r	-0,094	0,384**	0,492**	0,475**	0,490**	0,512**	0,472**	1								
	P	0,332	0,000	0,000	0,000	0,000	0,000	0,000									
	N	109	109	109	109	109	109	109	109								
Stressed Video (Sec20)	r	-0,154	0,535**	0,670**	0,711**	0,681**	0,674**	0,432**	0,586**	1							
	P	0,110	0,000	0,000	0,000	0,000	0,000	0,000	0,000								
	N	109	109	109	109	109	109	109	109	109							
Stressed Video (Sec30)	r	-0,026	0,348**	0,474**	0,556**	0,599**	0,620**	0,349**	0,704**	0,566**	1						
	P	0,790	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000							
	N	109	109	109	109	109	109	109	109	109	109						
Stressed Video (Sec40)	r	-0,048	0,211*	0,391**	0,467**	0,547**	0,627**	0,436**	0,547**	0,473**	0,565**	1					
	P	0,027	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000						
	N	109	109	109	109	109	109	109	109	109	109	109					
Future Time Forecast (Sec5)	r	0,119	-0,265*	-0,369**	-0,354**	-0,284**	-0,269*	-0,212*	-0,206	-0,277**	-0,315**	-0,265*	1				
	P	0,266	0,013	0,000	0,001	0,007	0,011	0,048	0,054	0,009	0,003	0,013					
	N	88	88	88	88	88	88	88	88	88	88	88	88				
Future Time Forecast (Sec10)	r	0,061	-0,115	-0,202	-0,206	-0,176	-0,227*	-0,188	-0,239*	-0,279**	-0,312**	-0,251*	-0,782**	1			
	P	0,569	0,284	0,059	0,054	0,101	0,034	0,080	0,025	0,009	0,003	0,018	0,000				
	N	88	88	88	88	88	88	88	88	88	88	88	88	88			
Future Time Forecast (Sec20)	r	-0,132	-0,016	-0,059	-0,101	-0,112	-0,164	-0,171	-0,112	-0,141	-0,226*	-0,232*	0,626**	0,842**	1		
	P	0,218	0,882	0,585	0,351	0,300	0,126	0,111	0,259	0,191	0,034	0,030	0,000	0,000			
	N	88	88	88	88	88	88	88	88	88	88	88	88	88	88		
Future Time Forecast (Sec30)	r	-0,038	-0,028	-0,080	-0,139	-0,154	-0,205	-0,268*	-0,139	-0,135	-0,262*	-0,270*	0,594**	0,771**	0,855**	1	
	P	0,722	0,795	0,457	0,197	0,153	0,055	0,012	0,196	0,211	0,013	0,011	0,000	0,000	0,000		
	N	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	
Future Time Forecast (Sec40)	r	-0,055	-0,080	-0,042	-0,083	-0,140	-0,194	-0,181	-0,120	-0,128	-0,239*	-0,193	0,475**	0,671**	0,739**	0,869**	1
	P	0,609	0,461	0,701	0,443	0,192	0,070	0,092	0,264	0,235	0,025	0,072	0,000	0,000	0,000	0,000	
	N	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88

p<0.05. r: Correlation coefficient, p: Significance value, N: Population size, Sec: second, BAS: Beck anxiety scale, STD: Standard video, STR: Stressed video, FT: Future time forecast

Conclusion and Discussion

There is a similar mechanism that provides the perception of time in almost every living organism. With the help of this mechanism, we can interpret sensory inputs, compare them with each other, and accumulate our experiences (Baddeley, 1966). There are a number of psychological and biological approaches to understanding the characteristics of the clocks that work within us (Block and Zakay, 1997).

Although anxiety is not a pathological condition, it is a condition that varies in nature according to the event and situation

to keep the vitality alive. Therefore, it is challenging to examine the relationship between the perception of time and the anxiety experienced within the limits of normality. This aspect has been the subject of examination by many disciplines and scientists throughout history and has been accepted as a reference point in many theories (Buccheri, Gesu and Saniga, 2000). In this study, it has been attempted to shed light on this challenging subject.

There is a significant difference between the anxiety scale scores of the sample group and the gender variable. According to this finding, it can be said that the level of anxietyvaries between men and women. However, when we look at the reactions given to thestandard video of 10, 20, 30, and 40 seconds, a significant difference is observed against the anxiety variable. By looking at the participants' 10, 20, 30, and 40-second video reactions showing anxiety symptoms, anxiety impairs individuals' time perception. In addition, the (ANOVA) analysis applied to test the difference of the responses given to the 40-second standard videos according to the variable of educational status shows us that there is asignificant difference between the groups. It is an indisputable fact that man is not only a psychological being but must be examined biologically and socially throughout the period of research on any subject. Therefore, it can be predicted that approaching the issue from many perspectives with different disciplines will yield more accurate results in future studies.

In addition, one of the most negative aspects of this study is that it had to be carriedout online due to COVID-19, so standard laboratory conditions could not be met. The reliability of the test was limited by the sincerity of the participants in the sample during data collection.

The most critical variables to be considered when working on a subject that can be quickly affected by variables such as the perception of time are the age range where the data was collected and environmental factors. It is a known fact that some substances such as age, an increase in body temperature, blood pressure, room temperature, ingested caffeine, alcohol,nicotine, and medical drugs accelerate the perception of time and affect the internal clock (Baddeley, 1966; Hoagland, 1933; Wearden *et al.,* 1993; Fraisse, 1984). Although such variables were tried to be evaluated, they could not be obtained. In addition, since a standard experimental environment could not be created, it is thought that external stimuli such asroom temperature and blood sugar adversely affect the quality of the obtained data.

Humankind, who tries to define time, to dominate from time to time, to hold it tight like a child who does not want to lose his toy after a certain age, and not to send it somewhere; In the future, as in the past, time will continue to produce ideas and make discoveries on issues such as solving the mystery of time, time is

important for human beings and hidden in our mortal body. With each new piece of information, we will get closer to solving the uncertainty behind time, and we will get a little closer to watching the colorful and beautiful stones at the bottom of the clear water clouded by time.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Amalric M, Koob G. Depletion of dopamine in the caudate nucleus but not in nucleus accumbens impairs reaction-time performance in rats: The Journal Of Neuroscience 1996; 7: 2129-2134.

American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (5th ed.) 2013.

Baddeley A. Time-Estimation at Reduced Body-Temperature. The American Journal Of Psychology 1966; 79(3), 475.

Bech P. Depression: influence on time estimation and time experiments. Acta Psychiatr. Scand 1975; 51:42-50.

Block R, Zakay D. Prospective and retrospective duration judgments: A meta analytic review. Psychonomic Bulletin & Review 1997; 4(2): pp.184-197.

Buccheri R, Gesu VD, Saniga M. Studies on the structure of time: From physics to psycho(patho)logy. New York, NY: Kluwer Academic/Plenum Publishers 2000.

Church, R. Properties of the Internal Clock. Annals Of The New York Academy Of Sciences 1984; 423): 566 - 582.

Church R, Meck W, Gibbon J. Application of scalar timing theory to individual trials. Journal Of Experimental Psychology: Animal Behavior Processes 1994; 20(2): 135-155.

Fraisse, P. Perception and Estimation of Time. Annual Review Of Psychology 1984; 35(1): 1-37.

Gibbon J. Scalar Expectancy Theory and Weber's Law in Animal Timing, Psychological Review 1977; 84: 279-325.

Gibbon J, Church RM. Sources of variance in an information processing theory of timing. Animal cognition 1984; pp. 465–488.

Gibbon J, Church R. Representation of time. Cognition 1990; 37(1-2): 23-54.

Gibbon J, Church, RM. Comparison of variance and covariance patterns in parallel and serial theories of timing, J. Expt. Anal. Behav. 1992; 57: 393-406.

Heidegger M. Varlık ve Zaman. İdea Yayınevi 2014.

Hoagland H. The physiological control of judgements of duration: evidence for a chemical clock, J.Gen. Psychol. 1933; 9: 267-287.

Ingthorsson RM. the Unreality of Time. Axiomathes 1998; 3: 287-306.

Karamustafalıoğlu O, Yumrukçal, H. Depresyon ve anksiyete bozuklukları. Şişli Etfal Eğitim ve Araştırma Hastanesi Tıp Bülteni 2011; 45(2): 65-74.

McTaggart, JE. The Unreality of Time. Mind: A Quarterly Review of Psychology and Philosophy 1908; 17, 456-473.

McTaggart, JE. The Nature of Existance (ed. C.D. Broad), vol. 2. Cambridge: Cambridge University Press 1927.

Meck WH. Selective adjustment of the speed of internal clock and memory processes. Journal of experimental psychology. Animal behavior processes 1983; 9(2), 171–201

Meck WH, Angell KE. Repeated Administration of Pyrithiamine Leads to a Proportional Increase in the Remembered Duration of Events, Psychobiology 1992; 20: 39-46.

Meck WH. Modality-Specific Circadian Rhythmicities Influence Mechanisms of Attention and Memory for Interval Timing, Learn. Motiv. 1991; 22: 153-179.

Meck W. Neuropsychology of timing and time perception. Brain and Cognition 2005; 58(1): pp.1-8.

Özer Ş. Anksiyete ve Anksiyete Bozukluklarının Kısa Tarihçesi. Türkiye Psikiyatri Derneği Yayınlar 2006; s: 3-4.

Özen DŞ, Temizsu E. Anksiyete ve Depresif Bozukluklarda Örtüşen ve Ayrışan Belirtiler. Psikiyatride Güncel Yaklaşımlar 2010; 2(1).

Savaşır I, Şahin NH. Bilişsel- Davranışçı Terapilerde Değerlendirme: Sık Kullanılan Ölçekler. Ankara, Türk Psikologlar Derneği Yayınları 1997.

Sévigny M, Everett J, Grondin S. Depression, attention, and time estimation. Brain and Cognition 2003; 53(2): pp.351-353.

Silver R, Bittman EL. Reproductive mechanisms: interaction of circadian and interval timing. Annals of the New York Academy of Sciences 1984; 423: 488–514.

Smart JJC. The River of Time. Mind: A Quarterly Review of Psychology 1949.

Terman M, Gibbon J, Fairhurst S, Waring A. Daily Meal Anticipation: Interaction of Circadian and İnterval Timing, Ann. N.Y. Acad. Sci. 1984; 423: 470-487.

Ulusoy M. Beck Anksiyete Ölçeğinin Psikometrik Özellikleri: Uzmanlık Tezi, Bakırköy Ruh ve Sinir Hastalıkları Hastanesi 1993.

Uzbay İ. Anksiyetenin Nörobiyolojisi. Klinik Psikiyatri Dergisi 2002; 5: 5-13.

Wearden JH, Penton-Voak IS. Feeling the heat: body temperature and the rate of subjective time, revisited, Q.J. Exp. Psychol B. 1993.

Yılmaz S, Bilgiç A, Hergüner S. Anksiyete Bozukluğu Tanısı Alan Ergenlerde Anksiyete ve Anksiyete Duyarlılığının Disosiyatif Belirtiler Üzerine Etkileri. Çocuk ve Gençlik Ruh Sağlığı Dergisi 2015; 22(1): 29-36.