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Time perception and psychopathology: Influence of time perspective on quality of life of severe mental illness

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Introduction: The study of time perception and mental illness has given priority to time estimation over time perspective. Considering Zimbardo's theory on five dimensions of time perspective, and balanced time perspective profile, this study has aimed to compare people with severe mental illness (SMI) and healthy people, with measurements of time perspective and time estimation and to assess whether the time perspective profile influences the quality of life in people with SMI.

Material and Methods: Using a quasi-experimental design, a clinical group (n=167) corresponding to four samples of severe mental disorders (major depression, bipolar disorder, schizophrenia and personality disorders) and healthy people (n=167) were compared in their performance regarding time perspective and time estimation. After, the clinical sample was grouped according to their deviation from the balanced time perspective profile (DBTP) and negative profile (DNTP). These groups were evaluated with health measures and time estimation tasks.

Results and Conclusion: Through the ANOVA, it can be seen that the time perspective profile affects health measurements. There are significant differences between the clinical sample and controls regarding time perspective and time estimation. Within the group of patients, it was observed that those who were closer to the BTP profile had better physical health, and less hopelessness (p<.05). This measurement may favor interventions related to a balanced profile. Results are discussed in relation to contribution of time perspective in the assessment, treatment and quality of life of people with SMI.

Keywords: Time Perception, Health, Quality of Life, Persons with severe mental illnesses

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Percepción del tiempo y psicopatología: Influencia de la orientación temporal en la calidad de vida de los trastornos mentales graves

Introducción: El estudio de la percepción del tiempo y trastornos mentales ha privilegiado investigaciones de estimación del tiempo por sobre la orientación temporal. Considerando la teoría de Zimbardo de cinco dimensiones de orientación temporal, y el constructo de equilibrio temporal, este estudio tiene como objetivo comparar a personas con trastornos mentales graves (SMI) y personas saludables, en medidas de orientación y estimación temporal, y además, evaluar si el perfil temporal influye en la calidad de vida relacionada a la salud de personas con SMI.

Metodología: Utilizando un diseño cuasi-experimental, un grupo clínico de 167 personas, conformado por cuatro muestras de trastornos mentales graves (Depresión Mayor, Trastorno Bipolar, Esquizofrenia y Trastornos de Personalidad), son comparadas en orientación y estimación temporal con personas saludables. Posteriormente, la muestra clínica se agrupa según su distancia del perfil equilibrado DBTP y del perfil negativo DNTP. Estos grupos son evaluados con medidas de salud y pruebas de estimación de tiempo.

Resultados y Conclusiones: Con análisis ANOVA se puede comprobar que el perfil temporal tiene importantes influencias en las medidas de salud. Existen diferencias significativas entre la muestra clínica y control, en orientación y estimación temporal. Dentro del grupo de pacientes se observa que quienes están más cerca del perfil BTP tienen mejor salud física, y menos desesperanza (p<0,05). Esta medida puede favorecer intervenciones que se relacionen a un perfil equilibrado. Se discuten los resultados en relación al aporte de la orientación temporal en la evaluación, tratamiento y calidad de vida de personas con SMI.

Palabras Clave: Percepción del tiempo, Salud, Calidad de Vida, Personas con Trastorno Mental Grave

INTRODUCTION

Severe Mental Illness (SMI) corresponds to diseases whose complexity involves risks to those suffering them and for their setting. This group of disorders shares complexity, treatment duration, reduction in quality of life incapacities criteria.[1] Thus, treatment costs[2] and high demand for service[3] for these disorders have motivated the search for psychotherapeutic solutions. In England, SMI group disorders have been included in the IAPT program (Improving Access to Psychological Therapies) to facilitate access of persons with Psychosis, Bipolar and Personality Disorder to psychology treatments according to the NICE guidelines (National Institute for Health and Clinical Excellence, see http://www.iapt.nhs.uk/smi-/). In some countries, among them Chile, the care model has been oriented towards a community model[4] in which access and pertinent treatment are emphasized, integrating the patients into the community.[5]

Time estimation (TE) is the aspect studied most in patients with severe disorders. Estimation, usually studied as a dependent measure, has shown its sensitivity to cognitive deterioration and symptom intensity.[6] The TE process is key to the person's adaptation,[7] who cognitively accumulates time units on an internal clock or marker, which may vary their response under different inner or outer circumstances.[8] This variable can be studied from the prospective and retrospective paradigms according to type of task, focusing on attention or memory processes, respectively.[9] The studies show that in bipolar psychosis advance in treatment normalizes and adjusts time estimation. However, this is underestimated in schizophrenia.[10] It has been reported that patients with depressive symptoms in bipolar and schizophrenic psychosis have a pattern of underestimation of time compared to the controls.[11] Other studies have indicated that depressive patients overestimate short intervals and adjust to long ones, while maniacs adjust to short intervals and underestimate the long ones.[12] Gil and Droit-Volet[13] have verified that the greater the depressive state of the persons, the more time is underestimated, this being explained by the slow down of the internal clock and aging.[14] Diversity of the findings has been based on the fact that a depressive affect produces subjective lowing of the passage of time but does not produce objective disorders.[15]

Another aspect of the time perception, that is time perspective (TP), is defined as the attitude towards the past, present, and future and it is even assimilated into the personality trait construct.[16] Zimbardo and Boyd[17] proposed five TP dimensions. One is the past negative (PN), which implies a negative attitude towards the past and is related with painful experiences. Another one is past positive (PP), which is a favorable attitude towards positive experiences and acquired learning in the past and present fatalistic (PF), related to pessimistic attitude regarding life. Then there is the present hedonistic (PH) which is an attitude of enjoyment and priorization of pleasure, and the future (F), defined as an attitude oriented towards achievement and planning. The individual differences would arise according to the configuration, it being observed that balanced configuration or balanced time perspective [BTP] (described as high PP, moderate F and PH, and low PF and PN)[18] mean greater well-being[19] and health.[20] On the contrary to BTP, configuration of the time dimension gives rise to the negative time profile (NTP), with less well-being and worse health. In 1967, Dilling and Rabin[21] showed that schizophrenic patients were more oriented towards the future than depressive ones but that both groups were less accurate regarding estimation and less oriented towards the future than the healthy persons. Furthermore, schizophrenic patients found it more difficult to project themselves into past and future episodes.[22] On the other hand, in accordance with the theory of Zimbardo, it was observed that PN and PF orientations and absence of F may be indicators of suicide potential.[23] According to van Beek et al.,[24] PN is the time dimension that is most related to personality disorders. However, it has been observed that it would be possible to modify time orientation in severe mental disorders. One trial has shown that applying group therapy to favor orientation towards the future achieved a decrease in suicidal ideation.[25] Another pilot study showed good results in group therapy aimed at the future from a positive perspective for patients with major depressive disorder.[26] Furthermore, the first results of the so-called time perspective therapy (TPT) developed by Zimbardo, Sword and Sword[27] for patients with severe post-traumatic stress, which could be extrapolated to other disorders, are known.

Considering that time perception is important for the evaluation, treatment and rehabilitation of severe mental disorders, this study has sought the following:

- Compare time perspective and time estimation among healthy persons and patients with Major Depression, Bipolar Disorder, Schizophrenia and Personality Disorder.

- Evaluate influence of time perspective profile on health-related quality of life indicators and time estimation in patients with severe mental disorder.

A quasi-experimental study was designed using the Montero and León classification,[28] and following the recommendations of Hartley[29] to write the article. The hypotheses were:

- Time perspective[24] and time estimation[11] differ among healthy persons and the clinical population.

- All persons with a psychiatric condition will have greater perspective towards present fatalistic and past negative and less orientation towards the future than healthy persons.[17,24]

- The clinical population closest to a BTP or balanced profile would have better indicators of health-related quality of life.[20]

- Persons from the clinical sample with negative time profile (NTP) could underestimate the estimation test.[13,20]

METHODOLOGY

Participants

The clinical sample was made up of 167 persons (30.4% men) aged 19 to 70 years, mean age 42.38 (SD=12.25) who were receiving outpatient treatment at the Hospital de La Serena, Chile. It included users with four diagnostic groups included in the SMI: Major Depression made up of 70 persons (29% men) with mean age of 45.31 (SD=13.35); Bipolar Disorder, with 42 persons (19% men) with mean age of 40.26 (SD=11.13); Schizophrenia made up of 30 persons (63.3% men) with mean age of 40.63 (SD=10.56); Cluster B Personality Disorder (Without specific diagnosis according to the registry but in accordance with DSM-IV TR criteria[30]), made up of 25 persons (16% men) with mean age of 39.84 (SD=11.70).

Inclusion criteria for the clinical group were: Being diagnosed according to the protocol for admission to the psychiatry unit, with DSM criteria, by a psychiatrist in one of the generically pre-defined groups for this study with SMI (Major depression disorder, bipolar disorder in all its spectrum, schizophrenia of all the group B personality disorders and types). By definition, all the patients who were admitted to specialty outpatient treatment were admitted if their admission condition was severe, they were at risk or the treatment received in primary care had not been effective. Date of diagnosis and onset of treatment between 10 years and 18 months prior to admission. All the participants had received usual outpatient treatment according to the clinical guidelines, which consists in the corresponding pharmacotherapy (antipsychotics, antidepressants, atypical antipsychotics, mood stabilizers and benzodiazepines). Persons over 18 years of age. Symptomatic stability and absence of acute episode in the last four months.

Given that each diagnosis could be expressed differently in estimation and time perspective, and as our aim was to evaluate the differences between groups that were comparable in age and gender to contrast the first hypothesis, it was decided to recruit a sample of 167 healthy persons matched in age and gender with each clinical group. Control group 1 was made up of 70 persons (29% men) with Depression, with a mean age of 39.53 (SD=14.57). Control group 2 for Bipolar Disorder was made up of 84 persons (19% men), mean age 37.38 (SD=13.05). Control group 3 for Schizophrenia was made up of 60 persons (63.3% men) mean age 35.50 (SD=9.58). Control group 4 for Personality Disorder (Cluster B) was composed of 50 persons (16% men) mean age 40.12 (SD=12.73).

Both samples (clinical and control) were recruited incidentally and voluntarily. The project was approved by the human ethics committee of the University of Granada, recognized and approved by the hospital where the study was performed. All the participants signed the informed consent.

Instruments

- Zimbardo Time Perspective Inventory, ZTPI,[17] version modified and adapted for Chile by Oyanadel, Buela-Casal and Pérez-Fortis.[31] The Chilean study maintains the factor structure of the original version with five factors: PP, PN, PH, PF and F. Its reliability by Cronbach's Alpha goes from 0.59 for PP and 0.80 for PN. It is made up of 56 items and has a response scale of 1 to 5. A total score is not obtained since the dimensions are considered theoretically different.[32] The clinical utility of the 56-item version has been manifested.[24]

- Health indicators: Besides the sociodemographic data, the following were recorded: Body Mass Index (BMI), cigarettes/day, alcohol/week, and frequency of physical exercise/month as well as frequency of physical diseases and drugs of common use.

- Stanford Sleepiness Scale (SSS), in its validated and adapted version in Spain.[33] This scale is used to evaluate subjective state of sleepiness by self-evaluation from very active and alert to almost asleep. The Spanish study shows that it is sensitive to pharmacotherapy with 0.88 reliability.

- Health Questionnaire, SF-36. Modified and adapted version for the Chilean population.[34] The questionnaire includes 8 measurements of Physical and Mental Health. It has two summary measurements of Physical and Mental Health, which jointly measure health-related quality of life (HRQL). The SF-36 is shown to have high reliability according to Cronbach's Alpha betweens its scale in range of 0.82 to 0.91.

- The Beck Hopelessness Scale (BHS), in its translation to Spanish.[35] Scale that evaluates present and future negative thoughts, and negative expectations of the person on his/her future and coping capacity. Its 20 items provide a total score of hopelessness and three factors: Affective factors of feelings regarding the future; Motivational factor that implies loss of motivation; Cognitive factor, regarding expectations about the future.

- Time Estimation: Four measurements were obtain with the Casio G-7700 chronometer, with 99.99% accuracy and time unit: 1/1000: Retrospective time estimations (RTE); Prospective measure of production at 10 second (E10) and 60 seconds (E60) empty interval.

Procedures

The participants were evaluated in two sessions with 7 to 15 day interval in the usual sites where they were attended. ZTPI was applied in the first session and the remaining tests in the other one in the following order: Health Indicators, SSS, SF-36, BHS, RTE, E10 and E60. The evaluation room was located in the hospital facilities in noise-free conditions and standard conditioning was maintained. The controls were evaluated under the same conditions and instructions. The effect of the pharmaco-therapy was controlled with the SSS sleepiness test, with no significant differences being found between patients and controls.

Statistical analysis

The data are analyzed with the SPSS program. After the initial study and descriptive analyses, the balanced time perspective profile deviation or DBTP[36] was calculated, using the following formula:

$$DBTP=\sqrt{(oPN-ePN)^2+(oPP-ePP)^2+(oPF-ePF)^2+(oPH-ePH)^2+(oF-eF)^2}$$

Where oPN is optimum score for PN (past negative) and ePN is score observed in participant. DBPT=balanced time perspective profile. For the other variables, the values are: oPN=1.95; oPP=4,60; oPF=1.50; oPH=3.90; oF=4.00

With equal calculation, the emotional stress profile deviation of negative time perspective profile -DNTP- is accessed[27]:

$$DNTP=\sqrt{(nPN-ePN)^2+(nPP-ePP)^2+(nPF-ePF)^2+(nPH-ePH)^2+(nF-eF)^2}$$

In this case, nPN is the value for the negative profile and ePN is the observed score. The expected values for NTP are: nPN=4.35; nPP=2.80; nPF=3.30; nPH=2.65; nF=2.75. In both calculations, the closer the value is to 0, the closer the profile to BTP or NTP.

The TE scores are transformed into directional errors.[20] Being close to 1 implies more accuracy of TE, less than 1 under estimation and greater over-estimation.

In the first analysis, the TP and TE measurements plus DBTP and DNTP of each clinical group were compared with the control group using the T test in accordance with the distribution of the data. Then, in order to verify the third and fourth hypotheses, it was decided to segment the

clinical sample in groups with similar time profile, which is useful in the comparison of quality of life,[20] according to whether they belonged to the first quartile close to BTP (which is the ideal profile) or NTP (which is the most negative profile). The groups closest to BTP and NTP were called group BTP and group NTP. The rest of the sample was not included in these groups, that is, those who were not close to either the balanced profile or to the negative one formed a third intermediate group that would be at risk of tending towards one profile or the other, therefore, it was called RISK. Pearson's correlation between the variables measured in the three groups is described and ANOVA analysis has been performed to evaluate the influence of the time profile regarding health and estimation measurements.

RESULTS

The means of the clinical groups compared to the control group were examined for the first objective. Table 1 shows the results for all the groups. It stands out that the PN dimension was greater in all the clinical groups, this being significantly greater in Major Depression [t$_{(138)}$=4.066; p=0.000] and Bipolar Disorder [t(82)=3.744, p=0.000]. In addition, it can be observed that PP was significantly less in patients with Major Depression, Bipolar Disorder and Personality Disorder. Furthermore, PF was superior to the controls in the clinical groups, this being significantly greater in Major Depression and Schizophrenia. PH was superior in all the clinical groups except for Schizophrenia. The F dimension did not achieve significant differences between the clinical group and control group. Regarding DBTP and DNTP, it was observed that DBTP was significantly greater in all the clinical groups in Major Depression [t$_{(138)}$=4.664; p=0.000], Bipolar Disorder [t(82)=3.340; p=0.001] and Personality Disorder [t(48)=2.249, p=0.029]. Regarding DNTP, this coefficient was greater in all the controls and significantly greater in comparison to Major Depression and Bipolar Disorder. In regards to the estimation tests, ERT and E10 tended to be underestimated in the clinical group versus controls, but this difference did not reach statistically significant levels. E60 is underestimated by the Major Depression group [t(138)=-2.454, p=0.015] and Bipolar Disorder [t(138)=4.066, p=0.000]. These results would support the first hypothesis as it is verified that TP and TE differ between healthy persons and those with severe mental disorders. However, the second hypothesis was partially verified, it being seen that persons with disorders have greater orientation towards PF and PN, but there are no data that support less F perspective than healthy persons. (Table 1).

For the second objective, Table 2 shows that PN is moderately and negatively related with mental health, physical role, physical quality of life and body pain. In other

Table 1	Means (M). Standard Deviations (SD) and Statistics (t) of the comparison of the measurements of time perspective between mental disorders and healthy persons

	Depression Group (n=70)		Control Group (n=70)		
Variables	M	SD	M	SD	t
Past Negative	3.96	0.84	3.32	1.01	4.066***
Past Positive	3.31	0.87	3.80	0.93	-3.251**
Present Fatalistic	2.82	0.92	2.43	0.90	2.543*
Present Hedonistic	3.30	0.80	3.26	0.89	0.300
Future	3.56	0.87	3.72	0.80	-1.123
DBTP	3.31	0.82	2.65	0.87	4.664***
DNTP	2.20	0.73	2.78	0.73	-4.660***
Retrospective estimation	0.95	0.39	1.06	0.43	-1.516
Estimation 10 s.	0.72	0.26	1.27	3.44	-1.325
Estimation 60 s.	0.68	0.37	0.82	0.30	-2.454*

	Bipolar Group (n=42)		Control Group (n=42)		
Variables	M	DT	M	DT	t
Past Negative	4.13	0.95	3.27	1.14	3.744***
Past Positive	3.03	1.06	3.55	1.09	-2.196*
Present Fatalistic	2.59	0.94	2.27	0.97	1.522
Present Hedonistic	3.51	0.94	3.33	1.01	0.820
Future	3.67	0.80	3.48	0.91	1.020
DBTP	3.51	0.81	2.93	0.81	3.340**
DNTP	2.48	0.62	2.87	0.85	-2.400*
Retrospective estimation	0.88	0.32	1.03	0.45	-1.828
Estimation 10 s.	0.73	0.41	0.75	0.32	-0.235
Estimation 60 s.	0.54	0.29	0.77	0.31	-3.420**

	Schizophrenia Group (n=30)		Control Group (n=30)		
Variables	M	DT	M	DT	t
Past Negative	3.59	1.28	3.08	0.99	1.731
Past Positive	3.46	1.15	3.49	1.03	-0.118
Present Fatalistic	2.72	0.71	2.30	0.75	2.237*
Present Hedonistic	3.54	0.88	3.56	0.71	-0.054
Future	3.79	0.78	3.53	0.87	1.198
DBTP	3.04	1.08	2.57	0.81	1.917
DNTP	2.64	0.99	2.72	0.95	-0.333
Retrospective estimation	1.03	0.51	1.06	0.38	-0.277
Estimation 10 s.	1.10	0.98	0.82	0.35	1.449
Estimation 60 s.	0.79	0.64	0.74	0.34	0.356

	TDP Group Cluster B (n=25)		Control Group (n=25)		
Variables	M	DT	M	DT	t
Past Negative	3.83	0.98	3.37	1.01	1.609
Past Positive	2.93	0.87	3.79	0.89	-3.443**
Present Fatalistic	2.96	1.01	2.44	0.99	1.838
Present Hedonistic	3.72	0.89	3.08	1.02	2.370*
Future	3.40	0.77	3.56	0.85	-0.696
DBTP	3.44	1.00	2.84	0.90	2.249*
DNTP	2.37	0.57	2.68	0.84	-1.545
Retrospective estimation	1.09	0.76	1.19	0.50	-0.564
Estimation 10 s.	0.96	0.53	0.87	0.45	0.650
Estimation 60 s.42	0.61	0.30	0.76	0.34	-1.590

* p< 0.05; ** p<0.01; *** p<0.001

words, in a person with greater negative perspective to the past, mental health was worse, the emotional states affected activities more, the persons perceived greater body pain and their physical quality of life was more negative. PN perspective was more weakly related with vitality and mental quality of life. When orientation to PN increased,

| Table 2 | Means and standard deviations of the health related variables and their correlations with the time dimensions: Past negative (PN); Past positive (PP); Present fatalist (PF); Present hedonist (PH). Future (F); Deviation from balanced time perspective (DBTP); Deviation from negative time perspective (DNTP) or emotional stress |

	M	SD	PN	PP	PF	PH	F	DBTP	DNTP
SA-RTE ESTIMATION	0.97	0.47	0.05	0.07	0.00	0.05	0.05	-0.05	-0.05
10 S. ESTIMATION	0.83	0.55	-0.03	0.14	0.06	0.08	0.05	-0.12	0.05
60 S. ESTIMATION	0.65	0.41	0.02	0.08	-0.00	-0.02	0.18*	-0.04	-0.07
AGE	42.38	12.25	0.07	-0.02	-0.02	0.00	-0.08	-0.03	-0.17*
SCHOOLING	3.16	0.70	-0.03	0.16*	-0.09	-0.03	0.12	-0.13	0.13
NUMBER CHILDREN	1.84	1.79	0.18*	-0.18*	0.08	0.09	-0.18*	0.24**	-0.11
OCCUPATION	2.30	1.26	0.01	-0.02	0.03	-0.07	0.21**	-0.08	-0.10
SMOKING	1.74	1.13	-0.04	0.13	0.06	0.12	0.16*	-0.09	0.12
ALCOHOL	1.42	0.65	-0.03	0.01	-0.09	0.15*	-0.00	-0.09	0.09
BMI	26.37	4.82	0.06	-0.01	-0.02	-0.13	-0.14	0.07	-0.14
EXERCISE	2.37	1.40	-0.06	0.02	-0.14	-0.12	0.22**	-0.05	0.18*
DISEASES	0.89	1.12	0.02	-0.00	-0.03	-0.06	-0.12	-0.01	-0.10
DRUGS	3.16	1.67	0.05	-0.01	0.01	-0.27**	-0.13	0.16*	-0.04
SLEEPINESS	3.64	1.91	0.08	-0.22**	0.22**	-0.07	-0.48***	0.31***	-0.30***
EDB HOPELESSNESS	8.13	5.28	0.01	-0.24**	0.38***	-0.22**	-0.37***	0.37***	-0.25**
EDB AFFECTIVE	1.69	1.74	-0.01	-0.18*	0.23**	-0.22**	-0.32***	0.29***	-0.17*
EDB MOTIVATIONS	3.03	2.42	0.01	-0.23**	0.42***	-0.6*	-0.35***	0.36***	-0.26**
EDB COGNITIVE	2.54	1.42	0.04	-0.14	0.34***	-0.21**	-0.26**	0.31***	-0.24**
PHYSICAL FUNCTION	75.78	21.70	-0.07	0.07	-0.19*	0.05	0.09	-0.20*	0.07
PHYSICAL ROLE	49.14	28.10	-0.23**	0.03	-0.20**	0.08	0.32***	-0.31***	0.21**
BODY PAIN	52.98	30.59	-0.21**	-0.04	0.02	0.04	-0.09	-0.06	0.14
GENERAL HEALTH	58.38	17.29	-0.08	-0.19*	-0.15*	0.10	0.05	0.01	0.16*
VITALITY	39.32	13.80	-0.17*	-0.13	0.08	-0.20*	-0.01	-0.02	-0.17*
SOCIAL FUNCITON	49.57	21.89	-0.06	0.01	0.06	-0.01	0.10	-0.01	0.01
EMOTIONAL ROLE	49.12	29.96	-0.13	-0.05	-0.20**	0.06	0.23**	-0.21**	0.07
MENTAL HEALTH	49.13	14.76	-0.26**	0.09	0.04	0.02	0.17*	-0.21**	0.14
PHYSICAL HRQL	59.07	15.12	-0.26**	-0.04	-0.20**	0.10	0.15	-0.24**	0.24**
MENTAL HRQL	46.79	15.17	-0.19*	-0.03	-0.05	-0.01	0.19*	-0.16*	0.03

SA-RTE: Subject age-retrospective time estimation; HRQL: health related quality of life; SA: subject age; NC: number of children of the subject; YSC: years of schooling; TAB: tobacco; OH: alcohol consumption; BMI: body mass index; FPE: frequency of physical exercise; SSS: sleepiness; PF: physical function:PHY.R.: physical role; PAIN: body pain; GENH: General Health; VITAL: vitality; SCF: social function; ER: emotional role; MH: mental health; PSS: physical health summary; MHS: mental health summary; EDBT: Hopelessness; EDBA: Negative feelings of the future; EDBM: loss of motivation; EDBC: Expectation and negative thoughts of the future; RTE: retrospective time estimation; E10, estimation of 10 seconds; E60, estimation of 60 seconds; TET: time execution of questionnaire tasks.
* p<0.05; ** p<0.01; *** p<0.001

this indicated less health in these two features. In regards to PP perspective, measurements of hopelessness were related negatively, that is, those with a higher PP perspective tended to have less total affective and motivational aspects of hopelessness as well as less sleepiness. On the contrary to that expected, general health decreased in the patients if PP increased. In the case of present fatalistic perspective or PF, it was observed that there was a positive and relevant relation with the hopelessness measurements (Table 2).
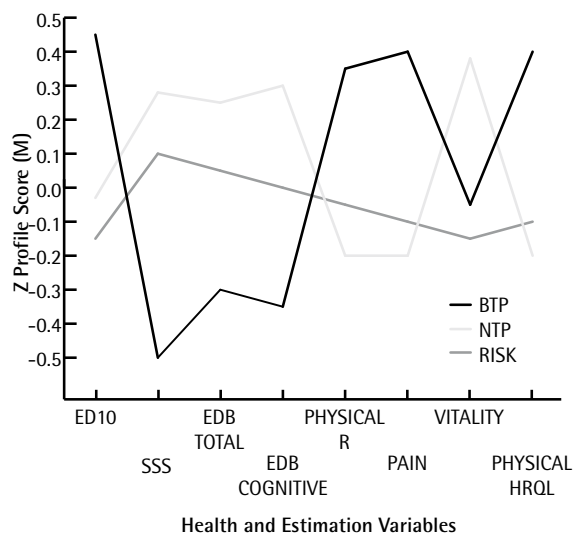
All the M difference with p<0.0 5 are significant; NTP: negative time profile; RISK: time profile at risk; BTP: balanced time profile. ED10: prospective estimate 10 seconds; SSS: Stanford Sleepiness Scale; EDBTOTAL: Hopelessness; EDBCOGNITIVE: Expectations and negative thoughts of the future. PAIN: body pain; VITALITY: Comparison energy v/s tiredness; PHYSICAL-HRQL: Physically related quality of life

Figure 1	Difference (M) between time profiles in variables of estimation, hopelessness and SF-36

Being oriented to the future (f) was significantly related with less sleepiness and less total affective, motivational and cognitive aspects of hopelessness. A positive, but weak, relation was found with smoking, and a moderate one with frequency of performing physical exercise. Greater F perspective was related with better health in physical role, emotional role, mental health and quality of life in mental health. Regarding DBTP, it was observed that with as deviation from BTP increased, a significant relationship was found with greater sleepiness, total affective, motivational and cognitive aspects of hopelessness. Important relationships were also observed with less health in physical role, emotional role, mental health, quality of life in physical and mental health. Deviation of the negative time profile or DNTP indicated a relationship in which the patients that most deviated from NTP also had less total affective, motivational and cognitive aspects of hopelessness. On the other hand, DNTP implied greater health and physical role, general health and quality of life in physical health.

The profiles were established according to that established in the statistical analysis section. BTP was made up of 36 patients (58.3% men), with an average age of 42.08 (SD=12.08) years. The RISK group was made up of 89 patients (18% men), with a mean age of 42.49 (SD=12.10). NTP groups 42 patients (33.3% men), with a mean age of 42.40 (SD=12.54). To evaluate the third and fourth hypotheses, the

profiles were subjected to ANOVA with the measurements made. There is a time profile in E10 [$F_{(2,164)}$=5.63; p=0.004]; Sleepiness (SSS) [$F_{(2,164)}$=6.65, p=0.002]; Hopelessness (EDBTOTAL) [$F_{(2,164)}$=3.09, p=0.048]; Cognitive hopelessness or negative expectations of the future (EDBCOGNITIVE) [$F_{(2,164)}$=3.768, p=0.025]; Physical role (PHYSICAL R) [$F_{(2,164)}$=3.628, p=0,029]; Body pain (PAIN) [$F_{(2,164)}$=4.30, p=0.015]; Vitality [$F_{(2,164)}$=4.44, p=0.013] And physical health related quality of life (PHYSICAL-HRQL) [$F_{(2,164)}$=4.404, p=0.014].

In figure 1, except for the first variable, it is seen that NTP obtained a better score in sleepiness, hopelessness and negative expectation of the future, followed by RISK and BTP. Regarding the physical and mental health measurements, it was observed that in relation to four significant measurements, BTP obtained a better score, that is, better health. The first variable, E10, underestimated the RISK group more, followed by NTP. BTP was that which E10 most overestimated. This would support the third hypothesis of this study, which mentions better score in the health measurements for the BTP group. However, the fourth hypothesis that implied a tendency to underestimate in NTP could not be supported.

CONCLUSIONS

This research had two objectives. The first one was to compare time perspective and time estimation between patients and controls. The second one was to evaluate if the time profile of the person with SMI affects the measurements of estimation and quality of life. Both were satisfactorily fulfilled when studying the four hypotheses proposed for this investigation.

It was observed that time estimation and time perspective in fact differed between the clinical and healthy groups.[11,24] In the clinical groups, PN and PF scores were better, this being characteristic of mental disorders.[17,32] This verifies that the past negative perspective and present pessimistic attitude played an important role in understanding SMI. In this sense, history of psychopathology would shape the time perspective as a trait that contributes to the symptoms. It is interesting that the only significant difference in Schizophrenia with the control group was for the present fatalistic dimension (PF), which may be related with the concepts indicated by Otto Dörr[37] regarding the break caused by the disease in the experience of the present. Attention is also drawn to the fact that there were no significant differences in the future (F) dimension in any of the groups, since its absence has been related with low indexes of health and suicidal risk.[38] It is possible that the usual treatment helps to consider the future, which needs to be substantiated. Regarding time estimation, there was a tendency towards low scores in the clinical samples, this

only being significant in E60, above all in the bipolar subjects. This substantiates previous findings of accelerations of the internal clock.[11,12] This verifies the hypothesis of differences in patients and controls. The second hypothesis was only partially proven because although the PN and PF are greater in patients, F does not differ significantly.

The BTP, NTP and RISK groups were useful for the second objective, observing that which theoretically was expected of BTP[18] that should have better measurements of well-being and health.[20,32] The NTP profile had poor indicators of health as was expected,[19] all of which verifies the third hypothesis. Greater underestimation was expected in the NTP group, however the RISK group was the one with the greatest underestimation, so that the fourth hypothesis was not fulfilled. Greater levels of hopelessness in the NTP group that could slow down the internal clock could be inferred, versus acceleration corresponding to excitability and anxiety in the RISK group.[37] This difference occurred in E10, where attentional processes are more involved,[12] it being possible that the greater difference of overestimation in BTP would be related to an increase of awareness of time as proved by the relation of BTP and Mindfulness.[39]

This study provides empirical support that time perspective plays an important role in persons with SMI. Its evaluation in patients with severe conditions may favor actions that lead to a BTP profile and may lead to better quality of life. With the time profile, different therapeutic actions can be established according to risk. For example, in regards to the NTP, hopelessness should be worked with, reducing the suicidal risk it entails.[38] It need to be studied if persons with SMI would benefit from time perspective therapy, as occurs in severe post-traumatic stress disorders.[27] It has been verified that measurement of estimation depends on the time profile in both persons from the clinical sample and healthy controls.[20] Thus, the way that the person with SMI estimates a time period gives information on his/her health status and attitude towards life.[40]

This study has some limitations that are characteristics of a quasi-experimental study, for example recruitment type. No information has been found on whether the results are maintained or vary according to the treatment, and future studies that verify this are needed. Furthermore, specifications with a larger sample are needs for each disorder described. On the other hand, it would be useful to incorporate objective health measurements, for example, immunological studies, and not only subjective measures and of review of documents.

In conclusion, those with severe mental illnesses (SMI) differ in time perspective and time estimation regarding healthy persons. Past negative perspective and present pessimistic attitude are maintained as characteristics of the entire clinical sample. Attention is called to the fact that Schizophrenia only differs from healthy persons in attitude to the present. On the other hand, all the disorders conserve an orientation to the future that is similar to healthy persons, but a fatalistic and pessimistic attitude are added. Persons with SMI that approach BTP, that is, who more positively evaluate their past, show more optimism in the present, are oriented to plans and goals, allow time to enjoy pleasant moments, and have a better quality of life than the others, with more activation, physical health and optimism. This could be of importance so that persons with Major Depression, Bipolar Disorder, Schizophrenia and Personality Disorders could be evaluate in their time profile, at least considering this as a tool to establish risk and strategies that would moderate their time profile towards a balanced one, a synonym of better health and quality of life.

CONFLICT OF INTERESTS

The authors declare they have not conflict of interests for this current article.

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