Disrupting times in the wake of the pandemic: Dispositional time attitudes, time perception and temporal focus

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Abstract

Introduction: The COVID-19 pandemic has majorly disrupted many aspects of people's lives, provoking psychosocial distress among students. People's positive and negative attitudes towards the past, present and future were a dispositional pre–COVID-19 reality. Faced with a pandemic, people have reported disruptions

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in the speed of passing time. People can shift their attention more towards the past, present or future when major changes in society occur. These aspects of psychological time would be key to understanding the quality of psychosocial adjustment to the pandemic. We hypothesized that dispositional time attitudes impact psychosocial distress because they would trigger situational changes in our time perception and temporal focus.

Methods: One hundred and forty-four university students in Uruguay responded to self-report questionnaires online while in-person classes were cancelled. Students reported on shifts in temporal focus, changes in time awareness and dispositional time attitudes. Reactive psychological, social and learning environment distress were reported.

Results: Students reported substantial changes in time perception and temporal focus. A correlation matrix showed significant relationships between time attitudes, focus and awareness. For example, psychological distress was correlated with negative time attitudes, slower passage of time, boredom, blurred sense of time and shifting focus to the past. Mediation models were derived. The indirect effect of time attitudes on psychological distress was significant through past focus.

Discussion: Dispositional time attitudes would impact students' capacity to cope with the pandemic. Situational shifts in temporal focus and perception were prevalent and can be viewed as temporal coping mechanisms in the wake of powerful societal change. Our mediation models showed that those with negative time attitudes experienced more psychological distress because they shifted their attention to the past. Future directions for research and practical implications are discussed.

Introduction

Living through a pandemic

The COVID-19 pandemic has led to massive closures and regulations that have profoundly disrupted the rhythm of people's lives. Government officials have imposed life-saving restrictions, obliging people to follow along and act in a socially responsible manner. To flatten the curve of infection, any activity involving social contact has been subject to restrictions including work, school and social environments. With school closures, children have been sent home to learn from a distance, a shift that has not only been difficult for the children but also for

their parents, especially those from low-income households (Cluver et al., 2020). Millions have lost access to employment with a prevalence rivalling the Great Depression (Crayne, 2020). Others have been able to work from home using virtual platforms but experience difficulty in structuring their work–home lives. Those in essential professions like nursing have been maintained but the pandemic has put workers at higher risk of contracting the virus and has decreased job satisfaction (Soto-Rubio et al., 2020). Such changes to the structure of daily life have led to a rise in feelings of social dissatisfaction and loneliness (Ammar et al., 2020). Mental health struggles have shot up with anxiety and depression, increasing up to seven-fold (Salari et al., 2020). An ongoing and critical mental health crisis was declared (Salari et al., 2020), and young people were the hardest hit from a psychosocial standpoint (American Psychological Association, 2020; Huang and Zhao, 2020).

The pandemic has disrupted the structure of our daily lives and has impacted our relationship with time in many respects. For example, a new repetitive normal of staying at home and avoiding human contact quickly became routine and a burden. Many people have reported that their COVID-19 experience has been intolerably boring (Cellini et al., 2020; Cravo et al., 2021; Droit-Volet et al., 2020; Martinelli et al., 2020; Ogden, 2020). For many, the shift could have led them to experience enduring empty time that drags on without a goal and with nothing interesting to do (Wittmann, 2020). Research conducted prior to the pandemic showed that the experience of long-term unemployment was associated with waiting time, future uncertainty and a loss of control over time (Nielsen et al., 2021). For many the restructuring of daily life could evoke a sort of Groundhog Day impression where the same day repeats again and again, with little novelty or excitement and without concerts, barbeques and birthday parties (Wittmann, 2020). Research conducted outside of the COVID-19 context suggested that events like birthday parties, weddings and college graduations are temporal rituals that meaningfully contribute to shaping the identity of individuals (Shoham, 2021), but now such events have been cancelled because of restrictions on social gatherings. Without events to punctuate one's experience and times passage, specific days of the week can lose meaning: Sunday and Monday blend together, and we have no idea what day in the week it is (Wittmann, 2020). The last two decades were characterized by a rapid proliferation of digital technologies in social and work life; today's virtual connection technologies bring our busy states of schedule-packed work environments to perfection (Wajcman, 2015). These changes to the temporal structure could impact all groups of people, but specific restrictions influence groups of people differently. For example, a parent who is unemployed and needs to care for their children who are now staying home would have different hardships than a college student who can no longer attend class and be involved in social activities. The current study focuses on how the COVID-19 pandemic

relates to distress among an undergraduate student body. We will take into account psychological, social and learning distress caused by COVID-19–related restrictions (e.g. school closures) and the ways in which aspects of psychological time can be related to distress levels.

Psychological time is an extremely vast and complex topic that has drawn widespread multidisciplinary interest for over five centuries (Stolarski et al., 2018). Contemporary frameworks on psychological time suggest that the experience of time can be organized into at least three interdependent dimensions (Wittmann and Lehnhoff, 2005): (1) time-estimation abilities which is measured by the precision of estimating clock time, (2) time awareness which is the subjective impression of time as moving quickly or slowly and (3) time perspective refers to 'the often non-conscious personal attitude that each of us holds towards time and the process whereby the continual flow of existence is bundled into time categories that help to give order, coherence, and meaning to our lives' (p. 51) (Zimbardo and Boyd, 2008). Time perspective is therefore a broad concept with multiple dimensions including (a) time attitudes which refer to the positive or negative emotions that one holds towards the past, present and future (Mello et al., 2016) and (b) temporal focus which refers to the amount of cognitive time one spends thinking about the past, present or future (Shipp et al., 2008).

Psychological time can refer to either dispositional traits or state-like reactions. Time perspective is a trait-like disposition that would be relatively stable over a lifespan and influence how people react to situations. The way that people perceive the speed of passing time would change according to the situation (e.g. time slowing in a waiting situation or flying when having fun) (Rutrecht et al., 2021; Witowska et al., 2020a, 2020b). Similarly, the amount of time that people spend thinking about the past, present or future would also change according to context (e.g. a traumatic past event that replays in the mind or staying in the present while on vacation) (Holman and Silver, 2006). In this article, firstly we will focus on how dispositional time perspectives could influence how well students are able to cope with the pandemic. Secondly, we will propose that temporal focus and time awareness could shift because of the powerful context induced by the COVID-19 pandemic. These shifts would also influence how well students are coping with the pandemic. Finally, we will articulate these concepts. We will propose that dispositional time perspectives would influence state-like reactions in temporal focus and time awareness which would in turn influence how well students are coping with the pandemic.

Dispositional time attitudes: A pre–COVID-19 reality

Peoples' time perspective, considered a trait-like disposition, would impact their reaction to the COVID-19 experience (Bisson and Grondin, 2020; Grondin et al., 2020). Time perspective, a dispositional, cognitive and motivational construct,

refers to the way in which people organize experience into temporal frames relating to the past, present and future (Zimbardo and Boyd, 1999) to which we can add the dimension of attitude. Time attitude refers to positive or negative emotions that people hold towards these time frames (Mello and Worrell, 2015). Zimbardo and Boyd (1999) elaborated a popular model of time perspective, the Zimbardo Time Perspective Inventory (ZTPI) which typically includes five dimensions: future, present hedonist, present fatalist, past negative and past positive dimensions. Another model was subsequently elaborated in order to improve the validity and reliability of measurement called the Adolescent and Adult Time Inventory–Time Attitudes (AATI-TA). The theoretical underpinnings of the AATI-TA were designed to be more clear-cut and outline a 3 × 2 cross table, orientation × attitude, which renders six dimensions: past positive, past negative, present positive, present negative, future positive and future negative (Mello et al., 2016; Mello and Worrell, 2015). There is a certain degree of overlap across the AATI-TA and the ZTPI. The past positive and past negative converge across the two models. Like the AATI-TA future positive, the ZTPI future dimension implicitly has a positive emotional connotation but focuses on planning and delay of gratification. Unlike the AATI-TA, there is no future negative typically included in the ZTPI. The ZTPI present fatalist dimension is associated with negative emotionality but has both present and future components (e.g. my actions in the present are futile because the future is governed by fate). The Zimbardo Time Perspective Inventory's present hedonism would be associated with positive emotions, but main features also include impulsivity and sensation seeking which can be maladaptive (Worrell et al., 2018). Therefore, moderate present hedonism is considered ideal, whereas there is no downside in high positive-present time attitudes (Zimbardo and Boyd, 1999). Though the ZTPI boasts more publications, we opted to use the AATI-TA in the current study because of the improved psychometric qualities, clear theoretical framework and meaningful relationships with widespread outcomes especially among student bodies.

Research unquestionably shows that time perspectives are a meaningful inter-individual difference determinant of a wide array of behaviours in the fields of mental health, education and wellbeing (e.g. Stolarski et al., 2018). Positive time attitudes towards the past, present and future as measured by the AATI-TA would be related to improved physical activity, self-concept (Konowalczyk et al., 2018), self-esteem (Donati et al., 2019), self-efficacy (McKay et al., 2015), positive attitudes towards school (Alansari et al., 2013) and dimensions of wellbeing (Andretta et al., 2014; Jurišević et al., 2017). As time attitudes are an important inter-individual difference, we would expect therefore that time attitudes could be meaningfully related to students' reaction to the pandemic. One empirical study conducted in Sweden found that individuals with high ZTPI past positive and high ZTPI future positive showed better adherence to government regulations, as well as those who scored high on the Carpe Diem Scale and the Dark Future

Scale (Sobol et al., 2020). This could suggest that trait-like aspects of psychological time would be related to students' reaction to the pandemic but no research has investigated the extent to which dispositions towards time, that is, the balance of time orientations, are associated with psychosocial wellbeing (Stolarski et al., 2020; Witowska et al., 2020a, 2020b). Furthermore, relationships with the AATI-TA specifically have not yet been investigated within the scope of COVID-19 research.

People had developed attitudes towards time before the onset of the COVID-19 pandemic. Much like personality traits, this inter-individual difference would influence how well people are able to cope with the hardships induced by the COVID-19 pandemic and associated regulations. According to the American Psychological Association (APA), the pandemic has caused major psychological strain on populations worldwide with increases in anxiety, depression and sleep problems. Though all age ranges would be experiencing difficulties, the APA reports that young people such as high school or college students were the hardest hit. Regulations have also caused social detriments with, for example, increases in feelings of social isolation, loneliness and social dissatisfaction; a total of 80% of students reported that school closures are causing them stress (American Psychological Association, 2020). Within this challenging context, the focus needs to be drawn to individuals identified as those who would suffer the most because of their vulnerabilities (Holmes et al., 2020; VanderWeele, 2020). Though young people would be less vulnerable to developing severe symptoms of COVID-19, the age group would be the most vulnerable towards the psychosocial collateral damage provoked by regulations including school closures (APA, 2020). In order to understand this group specifically, it would therefore be important to focus on student bodies from a psychosocial standpoint. Holding positive attitudes towards the past, present and future could influence the extent to which students would successfully cope with psychological, social and learning distress due to the pandemic.

Shifts in temporal focus

People generally have a trait-like time perspective orientated towards the past, present and future, but the powerful context of the COVID-19 pandemic may have caused people to shift their focus towards some of these time frames more than usual. Temporal focus may shift when contexts are powerful enough. For example, the September 11th terrorist attacks impacted people's temporal focus such that future orientation decreased over the three years following the attacks (Holman and Silver, 2006). Temporal focus refers to the amount of attention or cognitive time people spend thinking about the past, present or future. Temporal focus is a subset within the context of time perspective that is exclusively concerned with the degree to which people spend time in each dimension,

independent of temporal depth or attitude (Shipp et al., 2008). Under normal conditions, focusing overly on the past would be maladaptive, that is, evading present-moment demands for future goals. Present-orientated people would be more satisfied but also engage in more procrastination and idleness. Future focus would be best associated with achievement in life and work (Shipp and Aeon, 2019). In the current context, it would be essential to know if this holds and if the temporal adjustment would be related to psychological adjustment in context. For example, maybe the future has become dark and therefore focusing attention on a far-reaching goal would no longer be instrumental. With the current impoverished circumstances, maybe people are gaining positive emotion by spending more cognitive time in the past. Investigating potential shifts under impactful conditions would also help inform us about the trait-like or state-like nature of people's orientation towards time frames.

Changes in time perception

Time perception refers to people's perception and judgement of the duration of chronological time passing, for example, feeling time speed up or slow down, or over- or under-estimating a given duration. Research before the pandemic evidenced that those who score high on the present hedonist orientation and high on future felt time passing more quickly (Wittmann et al., 2015). The first studies to assess time perception during the pandemic have evidenced that approximately 80% of people felt that time had either gone by more quickly or more slowly in the wake of COVID-19 (Droit-Volet et al., 2020; Ogden, 2020). This refers to a retrospective judgement of the duration of passing time where participants are asked to think back on experience and report on how they felt time passage (Zakay and Block, 1997). In cases where more free time translates to monotony and boredom, time would be slow in the moment, but looking back on experience retrospectively, people would feel that time flew (Avni-Babad and Ritov, 2003). This is because there would be little to remember, that is, few distinct temporal markers or episodic traces to be recorded in long-term memory. For people whose occupation was moved online, as was the case for many students or employees, we could imagine that their lives became more routine and less punctuated, but they still had a task load of obligations to meet (e.g. attending class and working on projects). When such people look back on their experience, the monotony would impoverish the quantity of episodic traces in memory and therefore a majority would feel that time sped up (Wittmann, 2020). In contrast, students who felt time slow down would be more often getting bored, not benefiting from their free time, suffering in the learning environment, socially dissatisfied and struggling with mental health (Cellini et al., 2020; Martinelli et al., 2020; Ogden, 2020).

The current study and context

Without a doubt, the pandemic continues to affect lives across the globe, and research urgently needs to focus on the topic. This study was conducted in Uruguay, a small country with one of the best epidemiological situations on the continent regarding COVID-19–related deaths and deaths per capita by November 2020 among the undergraduate student body. Unlike many countries, the Uruguayan government never imposed any lockdown measures but rather has made recommendations and trusted that people would act responsibly. Many restaurants and shops were closed in the first months of the pandemic, but most reopened by the second semester of 2020. Nevertheless, many aspects of life were disrupted, including those particularly important to young people: restrictions on social gatherings (parties, concerts and sports) and university closures. The COVID-19 situation continues to evolve in Uruguay and across the globe in 2021 with second and third waves of restrictions and the beginnings of vaccination campaigns (Sistema Nacional de Emergencias, 2021).

Students' relationship with time, be it awareness, focus or perspective, could provide valuable insight into how students adapt to the context of a global pandemic. Entering into the COVID-19 era, individuals would have already developed time attitudes that would impact psychological and social distress levels. Temporal focus and time awareness would be impacted by the strong context of COVID-19. These reactive aspects of our relationship with time would be influenced by our dispositional time attitudes which in turn, influence levels of COVID-19 distress. More specifically, the following hypotheses were laid out: (a) time attitudes are correlated with dimensions of pandemic distress (psychological and social due to school closures), (b) slower passage of time, boredom and blur are correlated with pandemic distress and time attitudes, (c) high focus on the past and low focus on the present or future are correlated with levels of pandemic distress and time attitudes, and (d) dimensions of temporal focus and time awareness mediate the relationship between time attitudes and pandemic distress.

Methods

Population and procedure

This study was carried out among 144 undergraduate university students in Uruguay, whose first language was Spanish. Questionnaires were administered online while the schools were closed. The COVID-19 questionnaire was added to an investigation already underway and received ethical approval from a university's relevant board. Age ranged from 18 to 46 years old ($M = 22.03$, SD = 3.903). The majority of students (70%) identified as female ($n = 101$), 29% as male ($n = 42$) and one person identified as other. Only 5% of students had a child under their care ($n = 7$).

Measures

Reactions to the pandemic. We used a multi-dimensional COVID-19 questionnaire in the current study to measure time awareness, temporal focus and three dimensions of pandemic distress. We added a series of questions about vulnerability levels using a yes/no format. This questionnaire prompted students to think about the ways in which COVID-19 had impacted their lives and respond to a series of affirmations using a 5-point Likert-type scale ranging from (1) totally disagree to (5) totally agree.

The four following items measured shifts in time awareness: (a) my days pass more slowly, time extends; (b) my days pass more quickly, time flies; (c) I am bored more often and (d) I more frequently forget the days of the week.

Shifts in *temporal focus* were measured with the following three items: (a) I spend more time thinking about my life in the past, (b) I concentrate more on the present and (c) I spend more time thinking about my life in the future.

Dimensions of *pandemic distress* were measured by the three following scales: (a) *psychological distress* included seven items tapping signs of anxiety, depression and sleep disturbances ($\alpha = 0.86$), (b) *social distress* included four questions about missing people, insufficient contact, isolation and general dissatisfaction ($\alpha = 0.71$), and (c) *learning distress* with four items referring to a negative impact on learning, missing in-person classes and demotivation in coursework and studies ($\alpha = 0.80$). These three scales were also analysed in Loose and Vásquez-Echeverría (2021) but this is the first time any time-related variable was presented.

Dispositional time attitudes. Time attitudes were measured by the ATTI-TA in Spanish (Vásquez-Echeverría et al., 2020). The ATTI-TA prompted students to consider their attitude in general with no reference to the pandemic context. The 30 included items relate to a 3×2 cross table orientation (past, present and future) x valence (positive and negative). Dimensional scores are rendered as past positive ($\alpha = 0.89$), past negative ($\alpha = 0.85$), present positive ($\alpha = 0.91$), present negative ($\alpha = 0.87$), future positive ($\alpha = 0.90$) and future negative ($\alpha = 0.83$). We also calculated composite positive and negative time attitudes scale scores, that is, a scale score equating to the average of positive attitudes towards the present, past and future. Time attitudes are often used to create person-centred time profiles using latent profile analyses. The two profiles that emerge the most reliably and that have the most meaningful relationships with outcomes are dubbed 'positive' and 'negative'. These two profiles correspond to people who score high in past, present and future positive or high past, present and future negative, respectively. Therefore, in some of the latest research on time attitudes (e.g. Froiland et al., 2020), researchers have been opting to calculate composite scores like we did in the current study. This technique echoes analyses that could come out of profiling,

but allows for consistency by using variable-centred approaches. Also, when elaborating the mediation models, it was in our interest to collapse the six dimensions into two to reduce the number of possible parameters and yield a more parsimonious design.

Statistical design

In order to reveal interrelationships between variables, we carried out Pearson's correlation analyses. Age may impact the other variables studied and act as a confounding factor, so we added age into the correlation matrix. Based on these correlations, we derived logical mediation models wherein positive or negative time attitudes were considered as distal factors (X), changes in temporal focus or time awareness as mediators (M) and dimensions of pandemic distress as outcomes (Y). We only drew up models under the following conditions: X => Y, X => M and M => Y. If correlations reveal that age acts as a confounding factor within models, we will add it as a control variable. In other words, there will be a direct effect in all models, and we will test for the significance of the indirect effect.

Analyses were conducted with SPSS 20 and the PROCESS macro (Hayes, 2017). We used G*Power to calculate the sensitivity of correlational analyses. With power set at 0.80 and 144 participants, we could detect an effect size of 0.28 with alpha set at 0.01 or an effect size of 0.22 with alpha set at 0.05. Note that we were only interested in detecting small (0.20) to medium (0.50) effect sizes in order to better guarantee a practical usefulness of any positive results. All analyses were two-tailed. There were less than 1% of missing values, and imputation with the mean was used at the item level. Kurtosis and skewness for the six dimensions of time attitudes and the three dimensions of pandemic distress indicated that distributions were sufficiently normal (between ±2) (George and Mallery, 2010).

To respond to our first three hypotheses and draw up pertinent mediation models, we first carried out Pearson correlations (Table 1). Significance levels are typically set to $p < 0.05$. To resolve the risk of Type I errors (incorrect rejection of null hypothesis) within multiple comparisons, an alpha-level adjustment such as the one suggested by Bonferroni is often employed. This, however, increases the possibility of Type II errors (false acceptance of null hypothesis), especially in larger correlation matrices. Therefore, we decided to choose a conservative alpha level of $p < 0.01$ and present correlations when significant at this level. We nevertheless report alpha levels of $p < 0.05$ in the tables.

Though ideally mediation models should be reserved for longitudinal data (Hayes, 2017), the unprecedented nature of the COVID-19 pandemic rendered this type of collection impossible. Therefore as stated in the measures section, we opted to ask students to consider their time attitudes in general with retrospective judgement. Time attitudes are conceptualized as a relatively stable dispositional individual difference that do not change according to (the COVID-19) context,

Table 1. Pearson correlations between time attitudes, temporal focus, time perception and pandemic distress.

	Temporal focus			Time perception				Pandemic distress			Age
	Past	Present	Future	Slower	Faster	Boredom	Blur	Psychological	Learning	Social	
TAS past negative	0.182*	−0.059	0.208*	0.068	0.049	0.060	0.178*	0.195*	0.030	0.006	−0.015
TAS past positive	−0.079	0.058	−0.086	−0.031	0.032	0.022	−0.060	−0.128	0.000	−0.027	0.017
TAS present negative	0.296**	−0.158	0.073	0.041	0.143	0.050	−0.041	0.347**	0.113	0.013	0.042
TAS present positive	−0.377**	0.315**	0.051	0.079	−0.094	−0.024	−0.036	−0.370**	−0.088	−0.090	0.116
TAS future negative	0.308**	−0.208*	−0.134	0.047	0.080	0.216*	0.195*	0.291**	0.120	−0.032	−0.045
TAS future positive	−0.245**	0.249**	0.227*	0.084	−0.020	−0.054	−0.110	−0.293**	−0.076	−0.055	0.180*
Positive time attitudes	−0.295**	0.261**	0.075	0.054	−0.032	−0.022	−0.088	−0.334**	−0.068	−0.072	0.131
Negative time attitudes	0.336**	−0.179*	0.079	0.068	0.118	0.133	0.138	0.359**	0.111	−0.003	−0.005
Psychological distress	0.371**	−0.169*	0.170*	0.218**	0.063	0.328**	0.265**	1			
Learning distress	0.223**	−0.089	−0.045	0.199*	0.030	0.286**	0.265**	0.447**	1		
Social distress	0.073	0.052	0.125	0.294**	−0.098	0.373**	0.151	0.425**	0.319**	1	
Age	−0.130	0.163	−0.039	0.062	0.047	−0.114	−0.224**	−0.102	−0.078	−0.172*	

Note: TAS: Time Attitude Scale. *$p < 0.05$, **$p < 0.01$.

meaning that time attitudes would be developed prior to the onset of the pandemic. When assessing temporal focus and time awareness, we specifically prompted students to consider how these aspects *changed* because of the current context. We therefore found it justified to conduct these analyses in addition to the correlation analyses which are appropriate for cross-sectional data.

Results

Among our 144 participants, 17% reported having health vulnerabilities and 33% lived with a vulnerable person. A number of students (8%) lost their job because of the pandemic and 6% were now working less. Some students (16%) reported that they were able to continue working normally and that their job involved contact with people. Most students (67%) were living with someone who was working in a job that involved contact with people. The majority of students (88%) reported that they had sufficient access to healthcare services. One person reported having come into direct contact with someone with COVID-19.

Many people reported changes in temporal focus and time awareness. Many students agreed that they were now focusing more on the past (22%), present (40%) or future (60%). 12% agreed that time had slowed, 55% that time was moving faster, 48% that they were experiencing more boredom and 60% that they were forgetting the day of the week more often.

In response to our first hypothesis (a) (X => Y), positive time attitudes were correlated with lower psychological distress ($r = -0.33$), whereas negative time attitudes were correlated with higher psychological distress ($r = 0.36$). In terms of specific dimensions, present negative ($r = 0.35$), present positive ($r = -0.37$), future negative ($r = 0.29$) and future positive ($r = -0.29$) dimensions were significantly correlated with psychological distress, whereas the past dimensions were not. Time attitudes were not correlated with social distress or with learning distress even at the 0.05 significance level.

In response to our second hypothesis (b) (X => M and M => Y where time awareness is M), slower passage of time was correlated with higher psychological ($r = 0.22$) and social distress ($r = 0.29$). Boredom correlated with higher psychological ($r = 0.33$), learning ($r = 0.29$) and social distress ($r = 0.37$). A blurred sense of time was correlated with psychological ($r = 0.27$) and learning distress ($r = 0.27$) and age ($r = -0.22$). Faster passage of time was not correlated with pandemic distress. Time awareness and time attitudes were not correlated at the $p < 0.01$ level, meaning that there were no significant correlations X => M for time awareness.

We then responded to our third hypothesis (c) (X => M and M => Y where temporal focus is M). In terms of X => M, shifting temporal focus to the past was correlated with both negative ($r = 0.34$) and positive time attitudes ($r = -0.30$). More specifically, past focus was correlated with present negative ($r = 0.29$),

present positive ($r = -0.37$), future negative ($r = 0.31$) and future positive ($r = -0.25$) dimensions. Present focus was correlated with positive time attitudes ($r = 0.26$) and more specifically the present positive ($r = 0.32$) and future positive ($r = 0.25$) dimensions reached $p < 0.01$ significance. Shifting focus to the future was not correlated with time attitudes. In terms of M => Y, past focus was correlated with higher psychological ($r = 0.37$) and learning distress ($r = 0.23$). Shifting focus to the present or the future was not correlated with psychological, learning or social distress.

We drew upon the results cited above to design mediation analyses fulfilling conditions (X => Y, X => M and M => Y). We did not consider individual dimensions of time attitudes (e.g. past positive) as X to simplify models and avoid redundancy. Positive and negative time attitude scale scores as individual long-term traits fulfilled our conditions as a distal factor (X). Psychological distress was the dimension of pandemic distress to fulfil our requirements as an outcome (Y) because it was correlated with both X and M. Focus on the past fulfilled our requirements for a mediator (M) as short-term adjustment of temporal orientation which is related to individual time attitudes as trait. Time awareness did not fulfil our conditions for M because of the lack of relationship with time attitude scale scores. To recap, based on results from correlations, we advanced that low positive or high negative time attitude scale scores (X) would lead to psychological distress (Y) because of shifting focus to the past (M). As age was only correlated with a sense of blurred time and blurred time was not included in any mediation model, we did not include age as a control variable.

Using PROCESS, we drew up two mediation models, one for positive attitudes and the other for negative attitudes (Figures 1 and 2). A shift in focus to the past was entered in a mediator. These models rely on a regression-based approach. Non-standardized beta coefficients are reported. R^2 in these models refers to the amount of variance explained in Y by X and M taken together. Path a refers to the effect of X on M. Path b refers to the effect of M on Y while controlling for X. Path c refers to the direct effect of X on Y, and path c' refers to the effect of X on Y
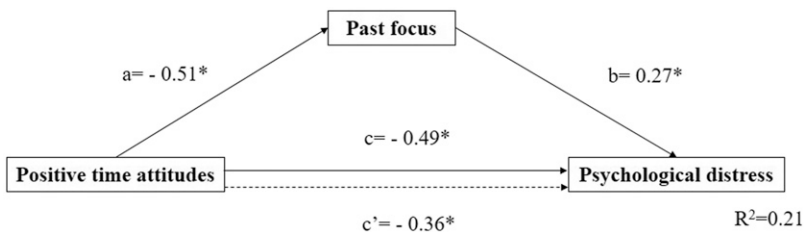

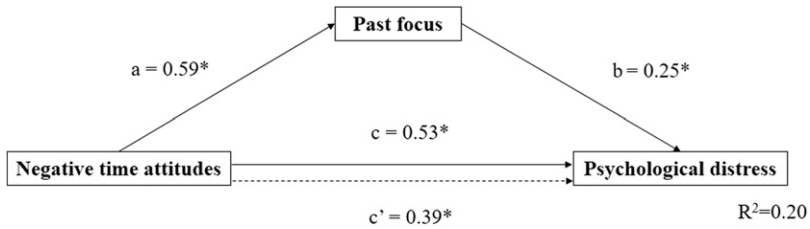**Figure 1.** Positive time attitudes as determinants of psychological distress through past focus.

Figure 2. Negative time attitudes as determinants of psychological distress through past focus.

while controlling for M. The significance of the indirect effect a × b is tested using 10,000 bootstrapped samples and 95% confidence intervals. In Figure 1, the indirect effect of positive time attitudes on psychological distress was significant through focus on the past (B = −0.14, SE = 0.05, 95% CI = −0.25, −0.05). Likewise in Figure 2, the indirect effect of negative time attitudes on psychological distress was significant through past focus (B = 0.15, SE = 0.06, 95% CI = 0.05, 0.28).

Discussion

The way that people experience time would be key in navigating through the terrible crisis of the COVID-19 pandemic. We studied three different forms of psychological time: dispositional time attitudes, changes in time awareness and shifts in temporal focus. We put forward their relationship with psychological, social and learning distress caused by the pandemic. We investigated a possible articulation between dispositional time attitudes and reactive shifts in temporal focus among undergraduate college students in Uruguay.

Felt passage of time

Like previous studies from Italy, France, and the United Kingdom (Cellini et al., 2020; Droit-Volet et al., 2020; Martinelli et al., 2020; Ogden, 2020, 2021), we found that felt passage of time had changed considerably (by 67%) after the onset of the COVID-19 pandemic. In contrast to these other studies, which assessed subjective reports in the general population, our student cohort reported more often (55%) that time was moving faster and only in 12% of the cases that time had slowed down. This faster passage of time occurring among students could be because they still had to engage in schoolwork, meaning they had ways to occupy their time. When looking back on experience, without the events to punctuate their life, they would have fewer temporal markers, that is, fewer relevant events to store in long-term memory (e.g. last Sunday's barbecue). This would contribute

to the impression that time flew by. Similar to the aforementioned three studies, many felt boredom (48% in our study) and 60% forgot the day of the week more often: a sign that the relative lockdown in Uruguay led to time disorientation due to the lack of structure defining individual days among college students. Similar to findings in the earlier studies, the feeling of time passing slower, boredom and a blurred sense of time were related to psychological and social distress. In light of this, and as a form of intervention, one could encourage students to fill their time with enjoyable activities and punctuate their week in ways that remain possible, for example, calling a friend every Friday at noon or eating tacos on Tuesdays for dinner.

Shifting temporal focus

As a result of the crisis situation, we found that many students reported shifting their temporal focus, meaning that they changed the amount of attention or cognitive time they spent in the past, present or future. Shifts in temporal focus also occurred following the powerful context of the September 11th terrorist attacks because values and priorities were impacted. Following the attacks, most people reported focusing more on the past or present rather than turning towards the future (Holman and Silver, 2006; Holman et al., 2016). In contrast to these findings, most of our students reported that they were now thinking more about the future (60%) followed by the present (40%) since the onset of COVID-19, whereas only 22% shifted their focus to the past. Though the content of these thoughts can be considered (e.g. experiencing future anxiety or hope), a strong focus on the future is instrumental in planning, moving forward and problem-solving, all meaningful activities which in turn are protective factors against psychological distress (Wittmann, 2020). Present orientation can be related to higher wellbeing, whereas focusing on the past would be univocally maladaptive (Shipp et al., 2008). We found that students who focused more on the past felt more psychological distress and learning distress. Focus on the past leads to distress when people ruminate about negative experiences or feel guilt or regret, and this tends to occur in traumatic situations (Holman and Silver, 1998).

Dispositional time attitudes

Students who were disposed to negative attitudes towards time were experiencing more psychological distress due to the pandemic in terms of feelings of anxiety, sadness and sleep disturbances. Though we were the first to investigate psychological distress related to the COVID-19 crisis specifically in relationship to time attitudes, others have demonstrated that negative time attitudes contribute to lower wellbeing among students (Andretta et al., 2014; Juriševič et al., 2017). The COVID-19 situation has taken a catastrophic toll on the mental health of people

worldwide, with anxiety and depression increasing up to seven-fold among populations (Salari et al., 2020) and youth being among the hardest hit (American Psychological Association, 2020). As we found that time attitudes were meaningfully related to distress levels, we could help students reshape their time attitudes to improve their mental health.

Articulating dispositions and reactions

Additionally, we found that the students with a high negative and low positive attitude towards the past, present and future were now focusing more on the past. With our mediation models, we were able to show that the situational focus on the past can be seen as triggered by a long-term dispositional attitude to cognitively structure life events within time frames that are charged with negative rather than positive affect. These models show that a positive time attitude is protective against an overly strong past focus, which in itself is related to psychological distress. In other words, a negative time attitude is detrimental to psychological wellbeing as it predisposes students to focus more on the past, which in turn leads to more psychological distress. With this knowledge, we could encourage students with negative time attitudes to focus on the present or the future in order to dampen the negative impact of their dispositional time attitude on the psychological distress they are experiencing as a result of the pandemic situation. As we were the first to show an articulation between dispositional time attitudes and reactive shifts in time orientation, this could be an interesting line of investigation for future studies.

Limitations, future directions and conclusions

This articulation would best be studied using a longitudinal design, and our study was limited by its transversal nature. Increasing sample size would have allowed us to detect small effect sizes though the practical usefulness of such effects could be questionable. Broadening sampling techniques would be necessary, as our study was limited to a Uruguayan student cohort meaning that our results would not necessarily translate to the general population. As regulations differ across regions worldwide, it would be interesting to investigate to what extent these results can be generalized to other countries or populations. The COVID-19 crisis has been negatively impacting student populations, causing distress in their mental health, social wellbeing and learning in the university setting. Positive time attitudes would be a meaningful inter-individual difference impacting psychological wellbeing. Many students reported changes in the way they felt time pass and how they were focusing on the past, present and future, which were related in many instances to the distress they were feeling as a result of the pandemic. Our study was the first to put forward that there would be an articulation between dispositional time attitudes and reactive temporal focus such that those who hold negative time attitudes would feel more psychological distress in a crisis situation

because they shift their focus to the past. As time is an extremely vast concept that reaches far beyond time attitudes, temporal focus and time awareness (Stolarski et al., 2018), there is a large uncharted territory of research on how COVID-19 has impacted peoples' relationship with time or how peoples' relationship to time prior to COVID-19 has impacted their COVID-19 experience. Our study adds to the emerging literature on time during the pandemic in showing how time attitude (positive or negative) and time focus (concentrating more on the past, present, or future) are related to subjective states of distress among students, that is, anxiety, depression and sleep disturbances. A positive rather than negative attitude towards time and a less pronounced focus on the past led to lower psychological stress levels among students. Psychological distress was also related to feeling states of a slower passage of time, to more boredom and to a feeling that time has blurred.

There are many follow-up questions to our study related to the use of digital media. Will students as they enter the work force prefer virtual work because they got used to it during their studies? Would working online and being constantly connected change how we split our work and home lives? Might those who were already used to structuring their time in virtual work prior to the pandemic fare better than those who are now working from home for the first time? People are making new habits in the context of COVID-19 like ordering products online and subscribing to online entertainment services. To what extent will these consumer trends remain in the long-term once restrictions ease as vaccinations campaigns become more effective? To what extent will the psychosocial damage caused to so many people last into the future? The time of the pandemic will lead to many changes in our daily routines which will structure our future lives and time awareness. With this study, we aimed to capture some facets of the transition process we are witnessing on a global scale.

Declaration of conflicting interests

Funding

Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The protocol was validated by the Ethical Committee of Investigation in Psychology at the University of the Republic of Uruguay.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

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