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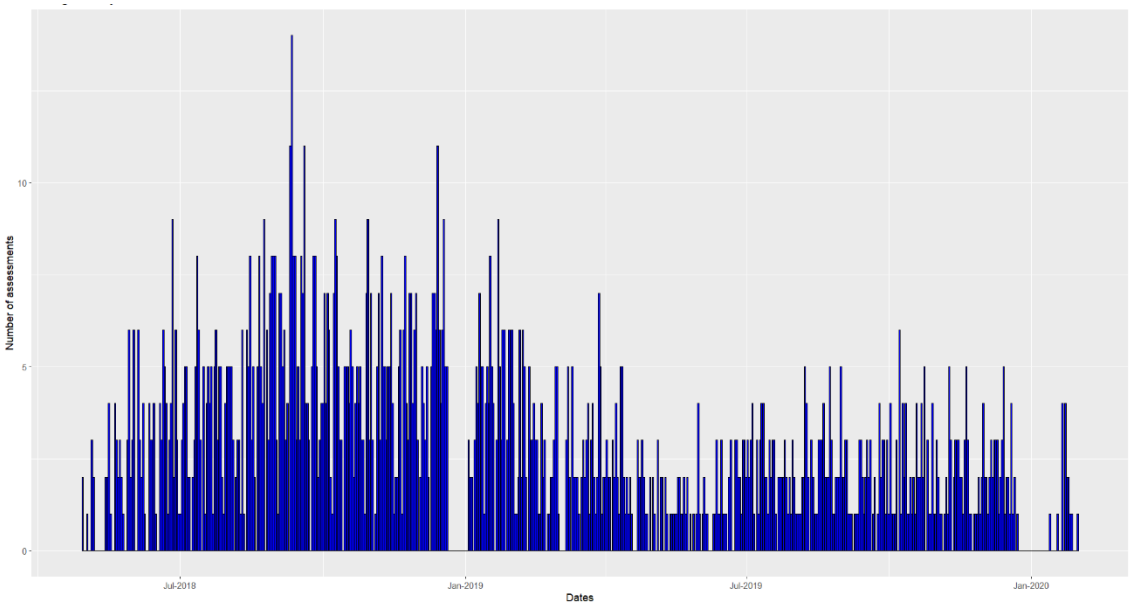
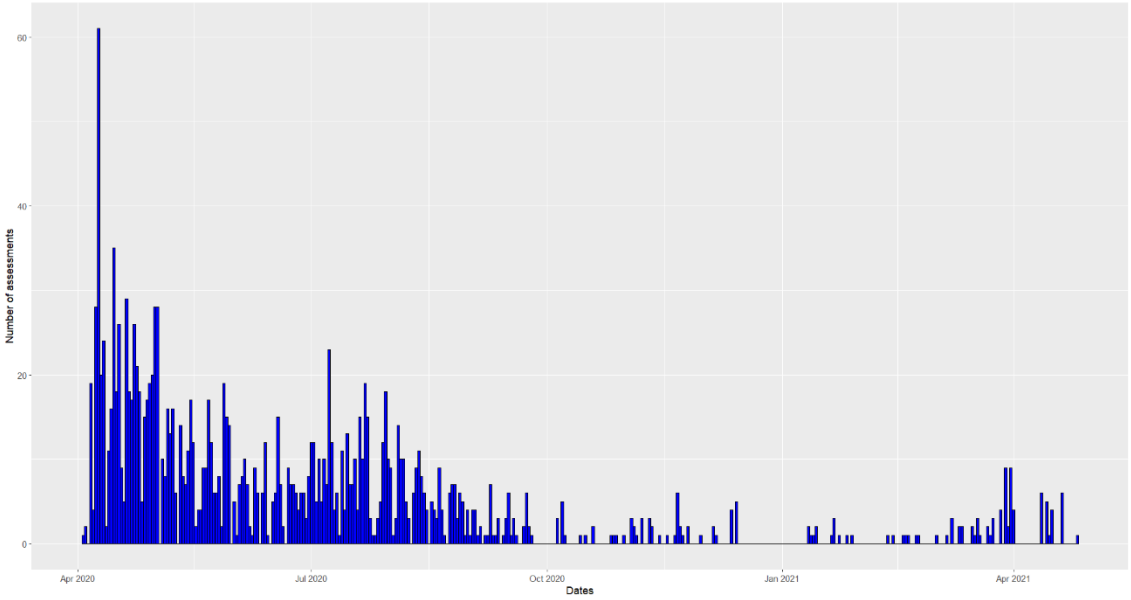
Mental health and well-being of adolescents and young adults before and during COVID-19: the impact of pandemic-related risk factors and the protective role of a cash transfer program – Silva-Jr FD et al.

Supplementary Figure S1 Histogram of assessment dates before the pandemic



Supplementary Figure S2 Histogram of assessment dates during the pandemic



http://doi.org/10.47626/1516-4446-2025-4495

Supplementary Figure S3 Smartphone-based ecological momentary assessment of daily well-being

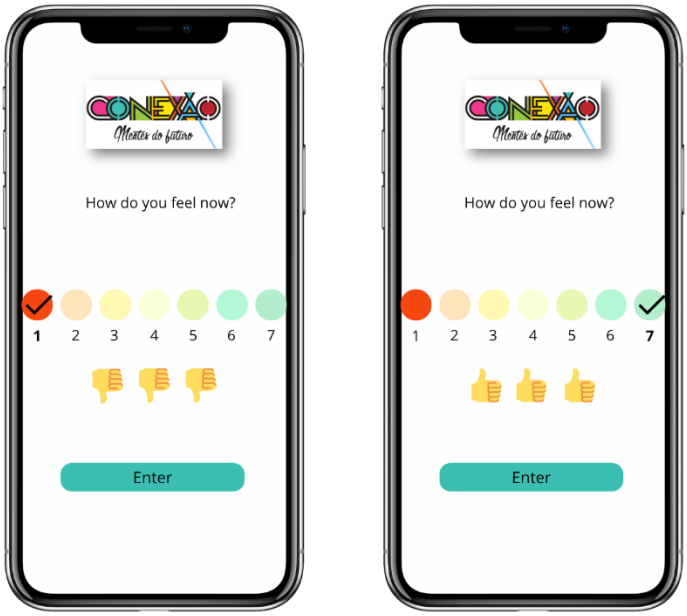


Illustration of the Brazilian High-Risk Cohort Study for Mental Conditions ecological momentary assessment app interface. Participants reported their momentary emotional state in response to the question “How do you feel now?” using a 1–7 Likert scale depicted by icons ranging from three thumbs down to three thumbs up. The app prompted up to five assessments per day over a 14-day period to capture real-time variations in mood.

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Supplementary Methods

Choice of primary outcome measures

The two main outcomes of the present analyses are self-reported mental health problems, reported through the Strengths and Difficulties Questionnaire (SDQ), and mental well-being, reported through the Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS), between the pre-pandemic and pandemic periods.

Strengths and Difficulties Questionnaire (henceforth, mental health problems)

The Brazilian Portuguese 25-item self-report version of the SDQ,[1] a widely used research instrument for the detection of emotional and behavioral problems, was administered to participants. Each item was rated as: Not True (0), Somewhat True (1), or Certainly True (2). Only one option could be selected per item. Here, we used the Total Difficulties score, including 20 items ranging from 0 to 40 points, in which higher scores indicated greater mental health problems. These measures are widely acknowledged in mental health research on youth and have been considered a great mental health screening tool for youth.[2] The SDQ is freely available and requires minimal training to use, making it highly accessible for researchers and clinicians alike. Administration of the SDQ is straightforward and takes approximately 5-10 minutes to complete. Higher scores in the SDQ indicate increased severity of mental health issues, which the scale classifies as “normal,” “borderline,” and “abnormal,” identifying the risk of some diagnostic mental disorders such as anxiety and depression. Score distributions in large populations have shown that scores > 20 in the mental health problems scale are abnormal and are clinically significant for identifying at-risk youth with mental disorders.[2]

Short Warwick-Edinburgh Mental Well-being Scale (henceforth, mental well-being)

We assessed mental well-being using the Brazilian Portuguese version of the SWEMWBS, a 7-item self-report instrument that was specially developed to measure mental well-being in non-clinical samples. The SWEMWBS covers two different aspects of mental well-being: affect, the subjective experience of happiness and life satisfaction (*hedonia*), and psychological functioning (*eudaimonia*). Each item is rated on a Likert scale from 1 to 5: from 1 “Never” to 5 “All the time.” Scores range between 7 and 35, with higher scores indicating better levels of mental well-being. Changes in SWEMWBS scores reflect variations in an individual’s mental well-being and have been found provide insights into how this dimension can exist in individuals with some mental illness and their overall psychological health and resilience.[3] Twenty participants did not complete all SWEMWBS questions and were excluded from analyses involving this outcome (therefore, n=1,367 for models with mental well-being as the outcome). Both instruments have been translated and culturally adapted for use in Brazil, ensuring that their validity is maintained when used in this context.

Telephone vs Internet assessment during COVID-19

Participants providing data via telephone were more likely to be from Porto Alegre (67.0% vs 58.7%; $\chi^2 = 11.827$; $p < 0.001$) and male (64.9% vs 60.1%; $\chi^2 = 4.093$, $p = 0.043$). The mean age did not significantly differ between the telephone and Internet assessment groups (Internet, 19.8 [SD, 1.89] years vs. telephone, 19.8 [SD, 1.92] years, $t = 0.092$, $p = 927$).

Socioeconomic and demographic factors

We followed specific demographic factors: age at evaluation was calculated using birth and evaluation dates, while socioeconomic status (SES) was rated only in the pre-COVID-19 wave, administering a standard Brazilian questionnaire to caregivers/parents.[4] Sex and race (White, Black, mixed race [*pardo*], Indigenous, or Asian) were reported by a biological parent at cohort baseline. For this study, we dichotomized race as White or non-White.

Educational level was categorized into three groups: (1) Low/Unknown education (participants with elementary education, incomplete high school, or missing information), (2) High school, and (3) Higher education (technical school or university level). This variable was used as a covariate in the analyses to account for potential confounding effects of educational attainment.

Exposure to COVID-19

Exposure to COVID-19 was computed using the following two variables from the CRISIS interview, which were ascertained for the last two-week period: 'Have you been exposed to someone likely to have COVID-19? (Yes, someone who tested positive/Yes, someone with a medical diagnosis but had not been tested/Yes, someone with possible symptoms, but no diagnosis vs No, not to my knowledge) and 'Have you been suspected of COVID-19 infection? (Yes, I have tested positive/Yes, I have been diagnosed medically, but have not been tested/Yes, I have had some possible symptoms, but have not been diagnosed vs. No signs or symptoms'). A positive response to either question was computed as a single dichotomous variable: 'Exposure to COVID-19 (yes vs no).' Importantly, most of the present data were collected at the beginning of the pandemic, when COVID-19 tests were scarce in Brazil and were being prioritized to inpatient cases.

COVID-19 pandemic-related socioeconomic impact

Four questions from the CRISIS interview inquired specifically about potential negative socioeconomic effects of COVID-19. The questions, which covered the last 2-weeks, were dichotomized as follows: housing instability (To what degree are you concerned about the stability of your living situation? Very/Extremely vs. No/Slightly/Moderately); financial difficulty (To what degree have changes related to the COVID-19 crisis in your area created financial problems for you or your family? Very/Extremely vs. Not at all/Slightly/Moderately); and reduced ability to earn money (Have any of the following happened to your family members because of COVID-19: Has your ability to earn money been impaired?: Yes/No/Not Applicable). A positive response to any of these questions was considered 'Any COVID-19 financial impact'.

Positive changes

One CRISIS item investigated whether there were any positive changes in the participants' lives after the COVID-19 pandemic began: 'Has the COVID-19 crisis in your area led to any positive changes in your life?' (Some vs None).

Difficulty adhering to social distancing measures

The interview included a question on problems trying to adhere to social distancing measures: (How much difficulty have you had following the recommendations for keeping away from close contact with people? None/A little/Moderate vs A lot/A great amount). We dichotomized this variable as 'Difficulty Distancing': no (no, little, or moderate difficulty) or yes (a lot or a great amount of difficulty).

Exploratory analysis: ecological momentary assessment

The Brazilian High-Risk Cohort Study for Mental Conditions EMA App was developed in partnership with a local technology company for the pre-COVID-19 wave and was then redesigned for the COVID-19 wave via a specific COVID-19 emergency grant. The app collected real-time data on mental health symptoms through up to 5 daily smartphone prompts over a 14-day period. Participants were instructed to download the app from Google Play or the Apple Store on their own devices. No monetary or other incentive was offered for completing the EMA, and the app did not provide feedback based on the participants' responses. For the COVID-19 version of the app, we introduced a button for contacting the research team if necessary. A detailed description of the EMA software and methodology can be found on the Brazilian High-Risk Cohort Study for Mental Conditions website (https://osf.io/ktz5h/).

Most app features were translated and adapted from previous EMA initiatives, such as the mMARCH protocol and the Urban Mind smartphone-based tool.[5,6] However, for the present exploratory analysis, we focused on an intuitive item developed by the Brazilian High-Risk Cohort Study for Mental Conditions team in a 2018 EMA protocol: "How do you feel now?," which could be rated graphically between three thumbs up and three thumbs down. The responses were then calculated on a 1-7 Likert scale (e.g., one thumb up and thumb down = 4)(see Supplemental Methods for app screenshots). Missing data and adherence to EMA

participation were the main methodological issues in the field.[7] Adherence to Brazilian High-Risk Cohort Study for Mental Conditions EMA was relatively low in both the pre-COVID-19 and COVID-19 waves. The main reported reasons included technological difficulties (e.g., outdated devices/systems without storage or processing capacities), Internet access difficulties (e.g., pay-per-use data contracts with providers, no access to free Wi-Fi), and engagement issues (e.g., no feedback from the App). Therefore, we restricted this exploratory analysis to participants who provided at least 7 responses to EMA prompts in each wave. Based on these criteria, 64 participants were included, who provided a total of 6,121 observations.

Supplementary Results

Attrition analyses

Participants who provided data in both waves were younger (p = 0.03), of a higher SES (p < 0.01), and more likely to be from São Paulo (p < 0.01) than those who only reported data in the pre-COVID-19 wave (Supplementary Table S1). Moreover, compared to baseline (n=2511, year 2010), participants included in the present analysis (n = 1,385) were more likely to be from São Paulo (p = 0.02), female (p < 0.01), and of a higher SES at cohort baseline (p < 0.01) (Supplementary Table S2). Finally, when we compared those who participated in the pre-COVID-19 wave but not in the COVID-19 wave (n = 322) vs. those who participated in the COVID-19 wave but not pre-COVID-19 wave (n = 210), the latter group was more likely to be from São Paulo (p < 0.01), of a higher SES at cohort baseline (p = 0.02), and with a lower parent-reported SDQ Total Difficulties score at baseline (p = 0.03) (Supplementary Table S3).

Supplementary Table S1 Attrition analysis 1 – Participants who only reported data for pre-COVID-19 wave vs participants who provided data for the pre-COVID-19 and COVID-19 waves

Variable	N	Responded in both waves n=1,385 (%)	Responded only in the pre-COVID-19 wave (missing) n=322 (%)	Statistical test
Sex: female, n (%)	1,707	665 (48.0%)	141 (43.8%)	$\chi^{2‡}$ = 1.87, p = 0.17
Age during pre-COVID wave†	1,707	**16.8 18.3 19.9**	**17.1 18.6 20.2**	**p§ = 0.028**
Site: São Paulo, n (%)	1,707	**723 (52.2%)**	**118 (36.6%)**	**$\chi^{2‡}$ = 25.29, p < 0.01**
Socioeconomic status at cohort baseline†	1,707	**15.0 18.0 21.0**	**15.0 17.0 21.0**	**p§ = <0.001**
SDQ youth self-report during pre-COVID-19 wave†	1,707	10.0 **14.0** 19.0	9.0 **15.0** 20.0	p§ = 0.560

SDQ = Strengths and Difficulties Questionnaire.
N is the number of non-missing values.
Bold type denotes statistical significance.
† In the numerical variables, the middle number is the median, the 1st quartile is on the left and the 3rd quartile is on the right.
‡ Pearson chi-square.
§ Mann-Whitney.

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Supplementary Table S2 Attrition analysis 2 – Participants who provided data for the pre-COVID-19 and COVID-19 waves vs all other participants in the BHRC study at baseline

Variable	N	Responded in both waves (n=1,385)	Did not respond in both waves (n=1,126)	Statistical test
Sex: female, n (%)	2,511	**665 (48.0%)**	**471 (41.8%)**	**$\chi^{2‡}$ = 9.59, p < 0.01**
Age at BHRCS baseline, mean years, SD†	2,511	8.7 **10.1** 11.6	8.7 **10.3** 11.7	$p^{§}$ =0.30
Site: São Paulo, n (%)	2,511	**723 (52.2%)**	**533 (47.3%)**	**$\chi^{2‡}$ = 5.88, p = 0.02**
Socioeconomic status at cohort baseline, mean SD†	2,511	**15.0 18.0 21.0**	**15.0 18.0 21.0**	**$p^{§}$ = 0.002**
SDQ parent-report at BHRCS baseline, mean SD†	2,511	8.0 **14.0** 21.0	9.0 **15.0** 21.0	$p^{§}$ = 0.251

BHRCS = Brazilian High-Risk Cohort Study for Mental Conditions; SDQ = Strengths and Difficulties Questionnaire.
N is the number of non-missing values.
Bold type denotes statistical significance.
† In the numerical variables, the middle number is the median, the 1st quartile is on the left and the 3rd quartile is on the right.
‡ Pearson chi-square.
§ Mann-Whitney.

Supplementary Table S3 Missing data: pre-COVID-19 AND during COVID-19

Variable	N	Responded to pre-COVID-19 wave but not during COVID-19 wave (n=322)	Responded to COVID-19 wave but not pre-COVID-19 wave (n=210)	Statistical test
Sex: female, n (%)	532	**141** (43.8%)	93 (44.3%)	$\chi^{2‡}$ = 0.01, p = 0.91
Age at BHRCS baseline†	532	9.0 **10.3** 11.8	8.6 **10.3** 11.8	$p^{§}$ = 0.247
Site: São Paulo, n (%)	532	**118 (36.6%)**	**127 (60.5%)**	**$\chi^{2‡}$ = 29.05, p < 0.01**
Socioeconomic status at cohort baseline†	532	**15.0 17.0 21.0**	**16.0 18.0 21.0**	**$p^{§}$ = 0.018**
SDQ parent-report at BHRCS baseline†	532	**10.0 15.0 21.1**	**8.0 14.0 20.0**	**$p^{§}$ = 0.028**

BHRCS = Brazilian High-Risk Cohort Study for Mental Conditions; SDQ = Strengths and Difficulties Questionnaire.
N is the number of non-missing values.
Bold type denotes statistical significance.
† In the numerical variables, the middle number is the median, the 1st quartile is on the left and the 3rd quartile is on the right.
‡ Pearson chi-square.
§ Mann-Whitney.

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Supplementary Table S4 Mixed model for COVID-19 predictors on mental health problems without interactions

				95%CI				
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**df**	**t**	**p**
(Intercept)	(Intercept)	6.842	1.68	3.561	10.136	1538.738	4.068	**< 0.001**
Time	COVID-19 – Pre-COVID-19	1.256	0.18	0.892	1.618	2501.666	6.782	**< 0.001**
Sex	Male – Female	3.381	0.29	2.805	3.958	1372.089	11.460	**< 0.001**
Race	White – Non-white	-0.480	0.30	-1.067	0.106	1372.171	-1.597	0.110
Age at evaluation	Age at evaluation	0.319	0.07	0.166	0.471	1570.867	4.094	**< 0.001**
SES Score	SES score	-0.040	0.03	-0.104	0.023	1372.202	-1.247	0.212
Site	Porto Alegre–São Paulo	-0.035	0.31	-0.644	0.572	1376.290	-0.114	0.909
Educational level	Low/Unknown – High school	-1.662	0.34	-2.336	-0.989	1373.125	-4.820	**< 0.001**
Educational level	Low/Unknown – Higher education	-2.855	0.50	-3.837	-1.872	1386.499	-5.678	**< 0.001**
COVID-19 finance impact	No – Yes	0.939	0.30	0.339	1.539	1373.175	3.060	**0.002**
Exposure to COVID-19	No – Yes	0.927	0.45	0.044	1.810	1373.993	2.051	**0.040**
Difficulty distancing	No – Yes	2.590	0.36	1.869	3.312	1372.134	7.009	**< 0.001**
Cash transfer	No – Yes	-0.099	0.38	-0.846	0.647	1376.170	-0.260	0.795

Model S4: number of observations: 2,770; groups: ident 1,385; R-square: 0.647; random components ICC: 0.588.
Bold type denotes statistical significance.

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Supplementary Table S5 Model for pre-COVID-19 and pandemic-related predictors on mental health problems as measured by the Strength and Difficulties Questionnaire with significant non-longitudinal interactions included

				95%CI				
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**df**	**t**	**p**
(Intercept)	(Intercept)	5.432	1.71	2.079	8.781	1666.3518	3.168	**0.001**
Time	COVID-19 – Pre-COVID-19	3.965	0.72	2.556	5.374	1430.540	5.499	**< 0.001**
Sex	Male – Female	3.695	0.32	3.051	4.339	2017.356	11.202	**< 0.001**
Race	White – Non-white	-0.101	0.33	-0.758	0.554	2017.178	-0.303	0.761
Age at evaluation	Age at evaluation	0.322	0.07	0.170	0.475	1576.511	4.136	**< 0.001**
SES score	SES score	-0.011	0.03	-0.082	0.060	2017.250	-0.305	0.760
Site	Porto Alegre – São Paulo	0.037	0.34	-0.641	0.716	2008.450	0.108	0.913
Educational Level	Low/Unknown education – High school	-1.619	0.38	-2.372	-0.867	2015.491	-4.203	**< 0.001**
Educational Level	Low/Unknown education – Higher education	-2.787	0.55	-3.874	-1.700	1990.169	-5.007	**< 0.001**
COVID-19 finance impact	No – Yes	1.316	0.34	0.646	1.986	2015.254	3.838	**< 0.001**
Exposure to COVID-19	No – Yes	1.664	0.50	0.678	2.650	2013.316	3.295	**0.001**
Difficulty distancing	No – Yes	3.407	0.41	2.600	4.214	2017.236	8.246	**< 0.001**
Cash Transfer	No – Yes	-0.525	0.42	-1.358	0.306	2009.299	-1.233	0.217
Time ✻ Sex	COVID-19 – Pre-COVID-19 ✻ Male – Female	-0.626	0.29	-1.202	-0.050	1372.867	-2.126	**0.033**
Time ✻ Race	COVID-19 – Pre-COVID-19 ✻ White – Non-White	-0.756	0.30	-1.342	-0.169	1372.843	-2.518	**0.011**
Time ✻ Cash transfer	COVID-19 – Pre-COVID-19 ✻ No – Yes	0.848	0.37	0.110	1.587	1372.849	2.247	**0.024**

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Time ⁎ SES score	COVID-19 – Pre-COVID-19 ⁎ SES score	-0.058	0.03	-0.122	0.004	1373.476	-1.811	0.070
Time ⁎ Difficulty distancing	COVID-19 – Pre-COVID-19 ⁎ No – Yes	-1.632	0.36	-2.353	-0.910	1372.872	-4.420	**< 0.001**
Time ⁎ COVID-19 finance impact	COVID-19 –Pre-COVID-19 ⁎ No – Yes	-0.756	0.30	-1.353	-0.158	1372.857	-2.472	**0.013**
Time ⁎ Exposure to COVID-19	COVID-19 – Pre-COVID-19 ⁎ No – Yes	-1.477	0.44	-2.355	-0.599	1372.946	-3.287	**0.001**

Post-hoc comparison

Time	**Difficulty distancing**	**Time**	**Difficulty distancing**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	No	Pre-COVID-19	No	-1.334	0.303	-4.401	1762	**< 0.001**
COVID-19	No	COVID-19	Yes	-3.407	0.413	-8.246	2018	**< 0.001**
COVID-19	No	Pre-COVID-19	Yes	-3.109	0.487	-6.388	2571	**< 0.001**
Pre-COVID-19	No	COVID-19	Yes	-2.073	0.484	-4.284	2580	**< 0.001**
Pre-COVID-19	No	Pre-COVID-19	Yes	-1.775	0.413	-4.296	2018	**< 0.001**
Time	**Exposure to COVID-19**	**Time**	**Exposure to COVID-19**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	No	Pre-COVID-19	No	-1.257	0.271	-4.637	1851	**< 0.001**
COVID-19	No	COVID-19	Yes	-1.664	0.505	-3.295	2014	**0.006**
Time	**Finance Impact**	**Time**	**Finance impact**	**Difference**	**SE**	**t**	**df**	**p**
COVID-19	No	COVID-19	Yes	-1.317	0.343	-3.838	2016	**< 0.001**
COVID-19	No	Pre-COVID-19	Yes	-1.457	0.434	-3.361	2732	**0.004**
Time	**Sex**	**Time**	**Sex**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	Male	COVID-19	Female	-3.695	0.330	-11.202	2018	**< 0.001**
COVID-19	Male	Pre-COVID-19	Female	-3.900	0.431	-9.055	2738	**< 0.001**
Pre-COVID-19	Male	COVID-19	Female	-2.864	0.432	-6.633	2736	**< 0.001**

Number of observations: 2,770; participants included = 1,385; R-square: 0.661; random component intraclass correlation coefficient: 0.609.
Bold type denotes statistical significance.

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Supplementary Table S6 Mixed model for COVID-19 predictors on mental well-being without interactions

				95%CI				
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**df**	**t**	**p**
(Intercept)	(Intercept)	24.614	1.423	21.835	27.394	1459.254	17.297	**< 0.001**
Time	COVID-19 – Pre-COVID-19	0.262	0.186	-0.101	0.627	2174.476	1.412	0.158
Sex	Male – Female	-2.006	0.245	-2.486	-1.527	1355.083	-8.173	**< 0.001**
Race	White – Non-White	0.280	0.250	-0.208	0.769	1355.156	1.121	0.262
Age at evaluation	Age at evaluation	-0.004	0.066	-0.133	0.124	1471.757	-0.068	0.946
SES score	SES score	0.049	0.027	-0.003	0.102	1355.133	1.826	0.068
Site	Porto Alegre – São Paulo	-0.464	0.258	-0.970	0.040	1357.671	-1.797	0.072
Educational level	Low/Unknown – High school	0.350	0.287	-0.211	0.911	1355.671	1.217	0.223
Educational level	Low/Unknown – Higher education	1.220	0.418	0.402	2.038	1364.047	2.915	**0.003**
COVID-19 finance impact	No – Yes	-0.547	0.255	-1.047	-0.048	1355.697	-2.142	**0.032**
Exposure to COVID-19	No – Yes	-0.322	0.376	-1.057	0.412	1356.261	-0.857	0.392
Difficulty distancing	No – Yes	-1.236	0.307	-1.835	-0.636	1355.103	-4.025	**< 0.001**
Cash transfer	No – Yes	0.185	0.317	-0.433	0.805	1357.558	0.586	0.558

Model S5: number of observations: 2,734; groups: ident 1,367; R-square: 0.422; random component intraclass correlation coefficient: 0.388.
Bold type denotes statistical significance.

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Supplementary Table S7 Model for pre-COVID-19 and pandemic-related predictors of mental well-being as measured by the Short Warwick-Edinburgh Mental Well-being Scale with significant non-longitudinal interactions included

				95%CI				
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**df**	**t**	**p**
(Intercept)	(Intercept)	25.543	1.47	22.668	28.418	1663.452	17.348	**< 0.001**
Time	COVID-19 – Pre-COVID-19	-1.573	0.79	-3.122	-0.023	1390.170	-1.983	**0.047**
Sex	Male – Female	-2.126	0.29	-2.700	-1.552	2343.218	-7.235	**< 0.001**
Race	White – Non-white	-0.043	0.29	-0.628	0.541	2342.816	-0.146	0.883
Age at evaluation	Age at evaluation	-0.005	0.06	-0.134	0.124	1472.643	-0.077	0.938
SES score	SES score	0.026	0.03	-0.037	0.089	2343.126	0.799	0.424
Site	Porto Alegre – São Paulo	0.029	0.30	-0.573	0.632	2328.708	0.095	0.924
Educational level	Low/Unknown education – High school	-0.005	0.34	-0.677	0.665	2340.465	-0.017	0.986
Educational level	Low/Unknown education – Higher education	0.319	0.49	-0.645	1.284	2297.754	0.647	0.517
COVID-19 finance impact	No – Yes	-0.916	0.30	-1.513	-0.319	2340.085	-2.997	**0.002**
Exposure to COVID-19	No – Yes	-0.597	0.44	-1.476	0.280	2336.616	-1.329	0.184
Difficulty distancing	No – Yes	-1.380	0.36	-2.097	-0.662	2343.067	-3.754	**< 0.001**
Cash transfer	No – Yes	0.680	0.37	-0.058	1.418	2330.278	1.797	0.072
Time ⁎ Sex	COVID-19 – Pre-COVID-19 ⁎ Male – Female	0.239	0.32	-0.391	0.870	1356.011	0.740	0.459
Time ⁎ Race	COVID-19 – Pre-COVID-19 ⁎ White – Non-white	0.649	0.32	0.005	1.292	1355.994	1.971	**0.048**
Time ⁎ Site	Porto Alegre – São Paulo	-0.989	0.33	-1.646	-0.331	1356.138	-2.940	**0.003**

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Time ⁎ Educational level	Low/Unknown education – Higher education	1.803	0.52	0.771	2.836	1356.541	3.412	**< 0.001**
Time ⁎ Cash transfer	COVID-19 – Pre-COVID-19 ⁎ No – Yes	-0.987	0.41	-1.793	-0.181	1355.995	-2.392	**0.016**
Time ⁎ SES score	COVID-19 – Pre-COVID-19 ⁎ SES score	0.047	0.03	-0.022	0.117	1356.425	1.323	0.186
Time ⁎ Difficulty distancing	COVID-19 – Pre-COVID-19 ⁎ No – Yes	0.287	0.40	-0.501	1.077	1356.009	0.713	0.476
Time ⁎ COVID-19 finance impact	COVID-19 – Pre-COVID-19 ⁎ No – Yes	0.738	0.33	0.082	1.393	1356.000	2.199	**0.028**
Time ⁎ Exposure to COVID-19	COVID-19 – Pre-COVID-19 ⁎ No – Yes	0.551	0.49	-0.410	1.513	1356.067	1.120	0.263

Post-hoc comparison

Time	**Cash transfer**	**Time**	**Cash transfer**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	No	Pre-COVID-19	No	-0.886	0.32	-2.766	1601	**0.034**
Time	**Finance impact**	**Time**	**Finance impact**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	No	COVID-19	Yes	0.917	0.30	2.997	2340	**0.0165**
Time	**Site**	**Time**	**Site**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
Pre	Porto Alegre	Pre	São Paulo	0.9599	0.30	3.112	2330	**0.0113**
Time	**Education**	**Time**	**Education**	**Difference**	**SE**	**t**	**df**	**p**
Pre	Low/Unknown education	Pre	Higher education	-2.123	0.49	-4.280	2292	**< 0.001**
COVID-19	Low/Unknown education	Pre	Higher education	-1.676	0.54	-3.069	2692	**0.0326**
COVID-19	High school	Pre	Higher education	-1.682	0.50	-3.335	2709	**0.0130**
Pre	High school	Pre	Higher education	-1.417	0.44	-3.188	2300	**0.0218**

Model 2: number of observations: 2,734, groups: ident 1,367; R-square: 0.434; random component intraclass correlation coefficient: 0.396.
Bold type denotes statistical significance.

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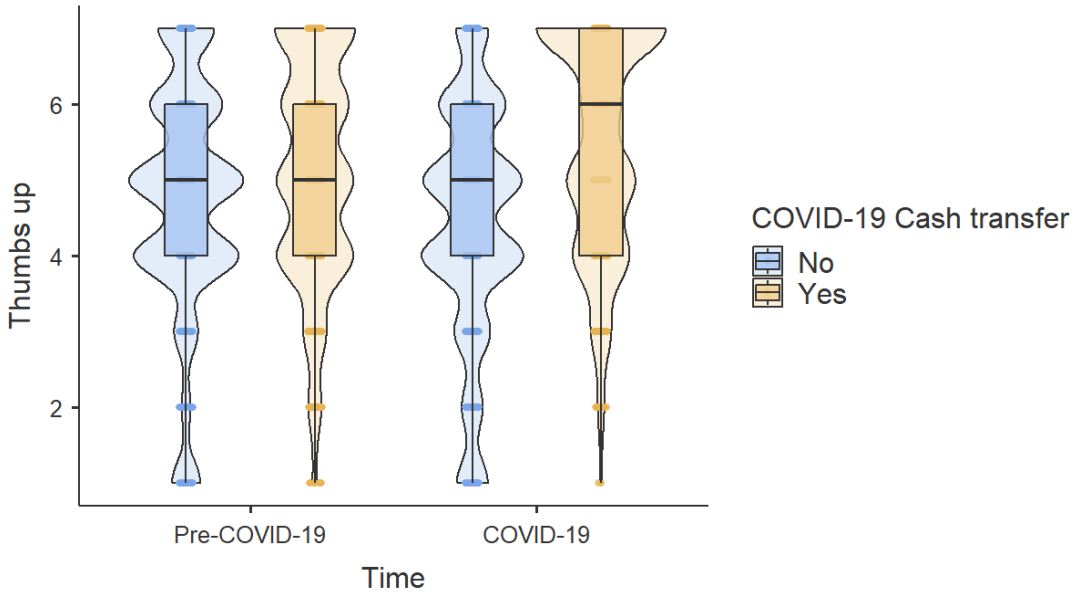
Supplementary Figure S4 Violin plot figure: exploratory analysis – Pre-COVID-19 vs COVID-19 waves and the effect of an emergency cash transfer program on the mental well-being of young people using ecological momentary assessment



http://doi.org/10.47626/1516-4446-2025-4495

Supplementary Table S8 Mixed model for predictors of thumbs up assessment (ecological momentary assessment)

				95%CI				
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**df**	**t**	**p**
(Intercept)	(Intercept)	1.716	1.11	-0.401	3.889	182.659	1.541	0.124
Time	COVID-19 – Pre-COVID-19	-0.076	0.06	-0.208	0.051	542.333	-1.135	0.257
Sex	Male – Female	0.787	0.26	0.277	1.298	58.515	2.938	**0.004**
Age at evaluation	Age at evaluation	0.036	0.04	-0.052	0.123	333.504	0.811	0.417
Educational level	Low/Unknown – High school	-0.436	0.42	-1.243	0.369	60.616	-1.030	0.307
Educational level	Low/Unknown – Higher education	-0.414	0.47	-1.322	0.492	59.089	-0.870	0.387
Cash transfer	No – Yes	-0.656	0.34	-1.313	0.002	61.131	-1.898	0.062
Time ⁜ Cash transfer	COVID-19 – Pre-COVID-19 ⁜ No – Yes	0.330	0.06	0.207	0.453	6107.497	5.256	**< 0.001**

Post-hoc comparison

Time	**Cash transfer**	**Time**	**Cash transfer**	**Difference**	**SE**	**df**	**t**	**$P_{Bonferroni}$**
COVID-19	Yes	Pre-COVID-19	Yes	-0.254	0.08	Inf	-2.991	**0.016**

Model S6: number of observations: 6,121; groups: ident 64; R-square: 0.553; random component intraclass correlation coefficient: 0.512.
Bold type denotes statistical significance.

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Supplementary Table S9 Sensitivity analyses **–** Models restricted to participants who reported data in the first 6 months of COVID-19 pandemic on mental health problems

				95%CI				
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**df**	**t**	**p**
(Intercept)	(Intercept)	5.447	1.76	1.991	8.899	1536	3.080	**0.002**
Time	COVID-19 – Pre-COVID-19	4.058	0.74	2.612	5.503	1331	5.483	**< 0.001**
Sex	Male – Female	3.642	0.33	2.978	4.305	1874	10.717	**< 0.001**
Race	White – Non-White	-0.009	0.34	-0.688	0.669	1874	-0.027	0.978
Age at evaluation	Age at evaluation	0.309	0.08	0.151	0.466	1450	3.827	**< 0.001**
SES score	SES score	0.004	0.03	-0.067	0.077	1874	0.131	0.896
Site	Porto Alegre – São Paulo	-0.182	0.35	-0.884	0.518	1866	-0.509	0.611
Educational level	Low/Unknown – High school	-1.590	0.39	-2.369	-0.810	1872	-3.980	**< 0.001**
Educational level	Low/Unknown – Higher education	-2.715	0.57	-3.836	-1.594	1846	-4.729	**< 0.001**
COVID-19 finance impact	No – Yes	1.352	0.35	0.659	2.044	1872	3.810	**< 0.001**
Exposure to COVID-19	No – Yes	1.469	0.52	0.440	2.496	1871	2.789	0.005
Difficulty distancing	No – Yes	3.488	0.42	2.663	4.311	1874	8.262	**< 0.001**
Cash transfer	No – Yes	-0.428	0.43	-1.277	0.420	1865	-0.986	0.324
Time ⁕ Sex	COVID-19 – Pre-COVID-19 ⁕ Male – Female	**-0.623**	0.302	-1.214	-0.032	1279	-2.060	**0.040**
Time ⁕ Race	COVID-19 – Pre-COVID-19 ⁕ White – Non-White	**-0.778**	0.309	-1.382	-0.174	1279	-2.518	**0.012**

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Time ⁕ Cash transfer	COVID-19 – Pre-COVID-19 ⁕ No – Yes	**0.856**	0.383	0.108	1.604	1279	2.235	**0.026**
Time ⁕ SES Score	COVID-19 – Pre-COVID-19 ⁕ SES score	**-0.071**	0.033	-0.136	-0.006	1280	-2.146	**0.032**
Time ⁕ Difficulty distancing	COVID-19 – Pre-COVID-19 ⁕ No – Yes	**-1.594**	0.375	-2.327	-0.860	1279	-4.242	**< 0.001**
Time ⁕ COVID-19 finance impact	COVID-19 – Pre-COVID-19 ⁕ No – Yes	**-0.690**	0.314	-1.305	-0.075	1279	-2.194	**0.028**
Time ⁕ Exposure to COVID-19	COVID-19 – Pre-COVID-19 ⁕ No – Yes	**-1.418**	0.466	-2.330	-0.506	1279	-3.038	**0.002**
Time ⁕ Site	COVID-19 – Pre-COVID-19 ⁕ Porto Alegre – São Paulo	**0.029**	0.316	-0.589	0.648	1279	0.093	0.926
Time ⁕ Educational Level	COVID-19 – Pre-COVID-19 ⁕ Low/Unknown – High school	**-0.090**	0.354	-0.783	0.602	1279	-0.256	0.798
Time ⁕ Educational Level	COVID-19 – Pre-COVID-19 ⁕ Low/Unknown – Higher education	**-0.198**	0.495	-1.165	0.767	1280	-0.402	0.688

Post-hoc comparison

Time	Sex	Time	Sex	Difference	SE	t	df	$P_{Bonferroni}$
COVID-19	Male	COVID-19	Female	-3.642	0.34	-10.717	1875	**< 0.001**
COVID-19	Male	Pre-COVID-19	Female	-3.853	0.44	-8.731	2548	**< 0.001**
Pre-COVID-19	Male	COVID-19	Female	-2.809	0.44	-6.338	2546	**< 0.001**
Pre-COVID-19	Male	Pre-COVID-19	Female	-3.019	0.34	-8.883	1875	**< 0.001**

Post-hoc comparison

Time	Difficulty distancing	Time	Difficulty distancing	Difference	SE	t	df	$P_{Bonferroni}$
COVID-19	No	Pre-COVID-19	No	-1.319	0.31	-4.232	1626	**< 0.001**
COVID-19	No	COVID-19	Yes	-3.488	0.42	-8.262	1875	**< 0.001**
COVID-19	No	Pre-COVID-19	Yes	-3.213	0.49	-6.459	2394	**< 0.001**
Pre-COVID-19	No	COVID-19	Yes	-2.169	0.49	-4.388	2404	**< 0.001**

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Pre-COVID-19	No	Pre-COVID-19	Yes	-1.894	0.42	-4.486	1875	**< 0.001**

Post-hoc comparison

Time	COVID-19 finance impact	Time	COVID-19 finance impact	Difference	SE	t	df	$P_{Bonferroni}$
COVID-19	No	COVID-19	Yes	-1.352	0.35	-3.810	1872	**< 0.001**
COVID-19	No	Pre-COVID-19	Yes	-1.528	0.44	-3.438	2542	**0.003**

Post-hoc comparison

Time	Exposure to COVID-19	Time	Exposure to COVID-19	Difference	SE	t	df	$P_{Bonferroni}$
COVID-19	No	Pre-COVID-19	No	-1.2314	0.275	-4.476	1728	**< 0.001**
COVID-19	No	COVID-19	Yes	-1.4686	0.527	-2.789	1871	**0.032**

Model S7: number of observations: 2,582; participants included = 1,291; R-square: 0.665; random component intraclass correlation coefficient: 0.604
Bold type denotes statistical significance.

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Supplementary Table S10 Sensitivity analyses **–** Models restricted to participants who reported data in the first 6 months of COVID-19 pandemic on mental well-being

				95%CI				
Names	**Effect**	**Estimate**	**SE**	**Lower**	**Upper**	**df**	**t**	**p**
(Intercept)	(Intercept)	25.190	1.52	22.212	28.161	1534	16.528	**< 0.001**
Time	COVID-19 – Pre-COVID-19	-1.360	0.80	-2.927	0.208	1294	-1.694	0.091
Sex	Male – Female	-2.082	0.30	-2.672	-1.490	2150	-6.876	**< 0.001**
Race	White – Non-White	-0.197	0.30	-0.801	0.407	2149	-0.636	0.525
SES score	SES score	0.019	0.03	-0.046	0.084	2150	0.572	0.567
Site	Porto Alegre – São Paulo	0.202	0.31	-0.419	0.824	2137	0.635	0.526
Educational level	Low/Unknown – High school	0.011	0.35	-0.684	0.707	2147	0.032	0.974
Educational level	Low/Unknown – Higher education	0.285	0.50	-0.710	1.280	2104	0.559	0.576
COVID-19 finance impact	No – Yes	-0.865	0.31	-1.482	-0.248	2146	-2.738	**0.006**
Exposure to COVID-19	No – Yes	-0.685	0.46	-1.600	0.230	2144	-1.461	0.144
Difficulty distancing	No – Yes	-1.391	0.37	-2.123	-0.657	2150	-3.704	**< 0.001**
Cash transfer	No – Yes	0.705	0.38	-0.047	1.457	2135	1.828	0.068
Age at evaluation	Age at evaluation	0.008	0.06	-0.125	0.143	1364	0.131	0.896
Time ⁎ Sex	COVID-19 – Pre-COVID-19 ⁎ Male – Female	0.171	0.32	-0.466	0.809	1263	0.525	0.600
Time ⁎ Race	COVID-19 – Pre-COVID-19 ⁎ White – Non-White	0.924	0.33	0.271	1.576	1263	2.766	**0.006**
Time ⁎ Cash transfer	COVID-19 – Pre-COVID-19 ⁎ No – Yes	-1.125	0.41	-1.930	-0.319	1263	-2.728	**0.006**

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Time ⁎ SES score	COVID-19 – Pre-COVID-19 ⁎ SES score	0.054	0.03	-0.015	0.124	1263	1.509	0.132
Time ⁎ Difficulty distancing	COVID-19 – Pre-COVID-19 ⁎ No – Yes	0.194	0.40	-0.596	0.985	1263	0.480	0.632
Time ⁎ COVID-19 finance impact	COVID-19 – Pre-COVID-19 ⁎ No – Yes	0.686	0.34	0.021	1.351	1263	2.017	**0.044**
Time ⁎ COVID-19 exposure	COVID-19 – Pre-COVID-19 ⁎ No – Yes	0.604	0.50	-0.380	1.589	1263	1.199	0.231
Time ⁎ Site	COVID-19 – Pre-COVID-19 ⁎ Porto Alegre – São Paulo	-1.144	0.34	-1.809	-0.477	1263	-3.352	**< 0.001**
Time ⁎ Educational level	COVID-19 – Pre-COVID-19 ⁎ Low/Unknown – High school	0.579	0.38	-0.170	1.329	1263	1.510	0.131
Time ⁎ Educational level	COVID-19 – Pre-COVID-19 ⁎ Low/Unknown – Higher education	1.660	0.53	0.616	2.703	1263	3.107	**0.002**

Post-hoc comparison

Time	**Cash transfer**	**Time**	**Cash transfer**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	No	Pre-COVID-19	No	-1.11875	0.32	-3.440	1486	**0.003**

Post-hoc comparison

Time	**COVID-19 finance impact**	**Time**	**COVID-19 finance impact**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	No	COVID-19	Yes	0.8658	0.31	2.738	2146	**0.037**
Time	**Race**	**Time**	**Race**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	Non-White	Pre-COVID-19	Non-White	-1.0184	0.38	-2.657	1422	**0.0478**
Time	**Site**	**Time**	**Site**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	Porto Alegre	Pre-COVID-19	São Paulo	-1.1281	0.38	-2.950	1427	**0.0194**
Pre-COVID-19	Porto Alegre	Pre-COVID-19	São Paulo	0.9414	0.31	2.956	2138	**0.0189**
Time	**Education level**	**Time**	**Education level**	**Difference**	**SE**	**t**	**df**	**$P_{Bonferroni}$**
COVID-19	Low/Unknown	Pre-COVID-19	Higher education	-1.754	0.56	-3.136	2492	**0.026**
Pre-COVID-19	Low/Unknown	Pre-COVID-19	Higher education	-1.945	0.51	-3.802	2100	**0.002**
COVID-19	High school	Pre-COVID-19	Higher education	-1.743	0.51	-3.384	2517	**0.010**
Pre-COVID-19	High school	Pre-COVID-19	Higher education	-1.353	0.45	-2.965	2108	**0.045**

Model S8: number of observations: 2,548; participants included = 1,274; R-square: 0.456; random component intraclass correlation coefficient: 0.417.
Bold type denotes statistical significance.

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