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Follow-up study of children and adolescents during the stay-at-home directive decreed during the COVID-19 pandemic: how the way lockdown is interpreted affects mental health

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Abstract

The present study is, to the best of our knowledge, the first study to follow up on the mental health of children and adolescents in Spain during COVID-19, a country in which a strict stay-at-home directive was issued as a result of the pandemic. We also explore the influence of fear of contagion and the attribution for lockdown on young people's mental health. A sample of 278 children (8 to 12 years) and adolescents (13 to 18 years) were assessed at two time points in relation to different areas linked to well-being, fear of contagion and interpretation of the stringent lockdown as (i) a Punishment, (ii) a means of Slowing the Spread of the Virus, or (iii) a way of Protecting Others. The first time point (T1) was from March 22–25, 2020 (eight to eleven days into lockdown), and the second (T2) was from April 11–14, 2020 (28 to 31 days into lockdown). The results indicate that, following the initial impact of the lockdown, the deterioration observed in the mental health of children and adolescents seemed to stabilize, despite the prolonged nature of the strict stay-at-home directive. A more negative interpretation of the lockdown and greater fear of contagion by the COVID-19 virus resulted in poorer mental health. The present study may help inform the decision-making process regarding stringent lockdown orders for children and adolescents in future pandemics and establish guidelines for providing better support both during and after health crises.

Keywords Mental health · Children · Adolescents · Lockdown attribution · COVID-19

Introduction

Although three years have passed since the start of the worldwide COVID-19 health crisis, there are still more publications focusing on the effects of the pandemic and subsequent lockdown on the mental health of adults than there are those focusing on the mental health of children and/or adolescents (Elharake et al., 2022). Nevertheless, children and teenagers may have been subject to greater pressure during the events that transpired, which may have affected their mental health due to their more limited understanding of what was happening and its consequences (Cowie & Myers, 2021).

Moreover, scarcer still are longitudinal studies that provide insight into the evolution of mental health among the younger population (Elharake et al., 2022; Giménez-Dasi et al., 2023). Loades et al. (2020) found that, unlike cross-sectional studies, longitudinal research designs enable scholars to evaluate the most plausible direction of causality between loneliness / social isolation and mental health among children and adolescents.

In addition to the smaller number of longitudinal studies that have been carried out, in several of the cross-sectional studies conducted in this field, informants were parents rather than the children/adolescents themselves (Ezpeleta et al., 2020; Stassart et al., 2021), rendering the number of those that directly assessed young people smaller still (Jones et al., 2023; Theberath et al., 2022). It is also important to analyze children and/or adolescents' responses at the moment the lockdown was imposed, in order to determine how they explained to themselves what was happening. To

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fill these gaps in the literature, the present study aims to measure the impact of lockdown at two time points in order to determine how it affected the mental health of Spanish children and adolescents.

The lockdown in Spain

Spain implemented one of the most stringent stay-at-home lockdowns as a means of slowing the spread of the COVID-19 virus, particularly in terms of the rules applying to children. Spanish children and adolescents were obliged to remain at home for six straight weeks (from March 14 to April 26, 2020). At the start of the pandemic, they were therefore faced with multiple changes and difficulties, since their education, leisure, sporting and socialization habits were drastically altered and their daily routine and structure were totally disrupted. Moreover, families in general faced many different challenges (e.g., the need to reorganize everyday life, financial concerns, fear of contagion, death of a family member and loss of childcare support systems). Moreover, this forced adaptation to sudden changes generated a huge amount of stress and psychological distress for all members of the family, increasing the likelihood of family and marital conflict (Orgilés et al., 2023; Sinko et al., 2022).

Effects of the lockdown on children and adolescents

Some studies report that the impact of the lockdown on general mental health and well-being was minimal. For example, Yue et al. (2020) found that children under the stay-at-home directive in an area with low coronavirus incidence rates in China suffered no significant level of psychological anxiety during the outbreak. For their part, when comparing pre-pandemic and post-lockdown results in a sample of Canadian children, Dabravolskaj et al. (2021) found no significant differences in either mental health or well-being.

In contrast, other cross-sectional studies have found associations between the lockdown and adverse emotional, psychological, somatic and behavioral effects in children and adolescents (Liu et al., 2020a, b; Nearchou et al., 2020; Ren et al., 2021). A study carried out with a representative sample of children and adolescents in Germany found more mental health problems (17.8% as opposed to 9.9%) and higher anxiety levels (24.1% as opposed to 14.9%) in comparison with the data from a longitudinal study with a representative nationwide sample carried out prior to the pandemic (Ravens-Sieberer et al., 2022). Nevertheless, the situation in Germany was different from the one in Spain. Germany had much lower (and later) contagion and mortality rates than Spain, resulting in the measures taken to slow the spread of the virus being less stringent and implemented later on. In the Spanish context, a study with children and adolescents carried out during the strict stay-at-home directive observed negative consequences for participants' mental health from 8–11 days of lockdown onwards. Both children and adolescents had poorer results than the normative, non-confined sample in terms of anger control, emotion regulation, anxiety, depression and integration and social competence (Pizarro-Ruiz & Ordóñez-Camblor, 2021).

In a recent meta-analysis on the prevalence of mental health symptoms in children and adolescents during the COVID-19 pandemic, Deng et al. (2022) found prevalence rates of 31% for depressive symptoms (19% mild, 13% moderate and 6% severe) and 31% for symptoms of anxiety (19% mild, 12% moderate and 5% severe).

Other studies have highlighted the need to pay more attention to psychological distress, particularly among young people, who tend to experience more anxiety, depression, stress and somatic symptoms than children (Liu et al., 2020b; Tang et al., 2021). Consequently, in the present study, in addition to analyzing the effect of the lockdown on Spanish children and adolescents, we also aim to explore differences in mental health between the two developmental stages studied.

Effects of attributions and fear of contagion on mental health

One relevant factor for understanding the effects of the lockdown is attribution, or in other words, how individuals explain to themselves what is happening to them. The information available is used to make causal judgements and to explain what is occurring (Fiske & Taylor, 1991). As Steins and Weiner (1999) point out, it is possible to link attributions of responsibility with mental health through emotional experiences, information processing and behaviors. However, as Fu et al. (2022) argue, no studies have empirically analyzed the impact of attributions in the context of a public health emergency, such as a pandemic and its subsequent lockdown. The way in which people (including children and adolescents) represent an event such as a lockdown not only shapes their experience (Valsiner, 2007) but also affects their mental health.

A fundamental aspect of pandemics is fear of contagion, a negative emotion associated with the way in which children adapt to negative experiences (Eisenberg et al., 2000). Consequently, in neuropsychological terms, fear of contagion is a normal reaction to an evolving threat, which prepares the individual, both physically and mentally, for an acute response to possible harm (Pappas et al., 2009). Fear probably activates the withdrawal and/or behavioral inhibition system functions (Gray & McNaughton, 2000) and tends to predict internalizing problems (such as, for example, social isolation, anxiety, depression and psychosomatic reactions) (Zhou et al., 2004). Indeed, in a study carried out in Spain with children and adolescents in which informants were

parents, fear of COVID-19 contagion was found to be linked to emotional problems (Ezpeleta et al., 2020). Jefsen et al.' s study (2021), conducted with children and adolescents receiving psychiatric treatment, found that, in some cases, anxious and nervous symptoms seemed to be directly related to fear of contagion during the pandemic. According to Pappas et al. (2009), infectious diseases generate more significant psychological distress because they are communicable, imminent and invisible. Chi et al. (2022) found that children/adolescents reported higher levels of fear than adults in relation to COVID-19. As Field and Lester (2010) point out, children/adolescent are still developing, both physically and psychologically, a circumstance that may have affected their judgment during the pandemic, leading to a more acute perception of fear of contagion by the COVID-19 virus.

Another important aspect to consider is how children/adolescents made sense of the lockdown. According to Venuleo et al. (2020), the meanings attributed to the pandemic were polysemic, oscillating between images linked to enemies and conspiracies, and those associated with strengthening solidarity, hope and the idea of rebirth. In this sense, a qualitative study carried out in Spain found that children and adolescents attached diverse meanings to the lockdown (Solé et al., 2020). Some interpreted it as a punishment imposed by order of someone with authority, viewing it as an imprisonment involving privation and the renouncement of certain privileges (e.g., I can't leave my house; it's like being in prison). Others, in contrast, saw it as a means of protecting their own health, as well as an exercise in solidarity in favor of the common good and collective well-being (avoid catching the virus and preventing other people from catching it too) (e.g., Being on lockdown means staying at home, because going out may be harmful to ourselves and others) (Martínez Muñoz et al., 2020). Whether individuals viewed lockdown as either an altruistic, health-related action or as a punishment may have had an influence on their mental health.

The study by Miller et al. (2015) provides empirical evidence in support of the polivagal theory developed by Porges (2011), which posits that altruistic behavior is linked to the activation of the Parasympathetic Nervous System (PNS) and the inhibition of the Sympathetic Nervous System (SNS) (Goetz et al., 2010) and, consequently, to better mental and physical health (Thayer & Sternberg, 2006). In the context of the COVID-19 pandemic, authors such as Holmes et al. (2020) recommend developing novel interventions designed to protect mental well-being based on positive, mechanistically driven components (i.e., modifiable causal factors), such as altruism and prosocial behavior. Brooks et al. (2020) argue that the inclusion of altruism in the health messages issued by the UK government probably had a more positive effect on well-being than compulsory orders to stay at home. Feeling that others are benefiting from one's situation may make stressful circumstances easier to cope with and it seems likely that this would hold true also in relation to the stay-at-home lockdown.

The present study

The present study analyzed the mental health of children and adolescents under the stringent stay-at-home lockdown imposed during the COVID-19 pandemic. The results are presented in accordance with participants' developmental stage (children aged 8 to 12 years and adolescents aged 13 to 18 years) and gender. The study by Pizarro-Ruiz and Ordóñez-Camblor (2021) found a differential impact of the lockdown in accordance with young people's developmental stage, and several studies have found that, among children and teenagers, the lockdown had a greater impact on girls than on boys (Ravens-Sieberer et al., 2021; Zhou et al., 2020). In this sense, we expected to find poorer mental health indicators among children and adolescents as the lockdown progressed (Hypothesis 1). The second aim of the present study was to analyze gender differences in mental health changes among children and adolescents. We expected girls (both children and adolescents) to report a greater deterioration in their mental health than boys (Hypothesis 2). In response to the general lack of research in this field, our third aim was to explore how children's and adolescents' interpretation of the lockdown and their fear of contagion impacted their mental health. We expected to find that a more negative interpretation of the lockdown and greater fear of contagion by the COVID-19 virus would result in poorer mental health (Hypothesis 3).

Materials & methods

Participants

This two-wave study used a non-probability snowball sampling method. At time 1 (T1), the total sample comprised 590 participants, 325 of whom were aged between 8 and 12 years (children) and 265 of whom were aged between 13 and 18 years (adolescents). Of the children, 158 (51.7%) were girls and the mean age was 9.95 years ($SD = 1.40$). Of the adolescents, 168 (63.4%) were girls and the mean age was 15.42 years ($SD = 1.70$).

At time 2 (T2), we contacted all 590 members of the original sample once again. Of these, 278 completed the questionnaire: 147 children, with a mean age of 10.01 years ($SD = 1.34$), of which 78 (53.1%) were girls; and 131 adolescents, with a mean age of 15.35 years ($SD = 1.67$), of which 87 (65.4%) were girls. The attrition rate was 47.5%, well

within the range considered normal for this type of study (between 30 and 70%) (Bjerkeset et al., 2007).

Using Student's t tests for independent samples, we confirmed that no significant differences existed in any of the variables analyzed between those who left the study at T2 and those who completed both questionnaires (T1 and T2), in either the child or the adolescent group.

Instruments

The 188-item *Sistema de Evaluación de Niños y Adolescentes* -Evaluation System for Children and Adolescents (SENA) self-report questionnaire (Fernández-Pinto et al., 2015) measures a wide range of emotional, behavioral and contextual problems, as well as areas of vulnerability and psychological resources, in young people aged between 3 and 18 years. In the present study, we used the self-report questionnaires developed for primary (6–12 years) and secondary (13–18) school students, with the aim of ensuring that participants were able to answer all the questions adequately by themselves, without the help of an adult. Nine factors were assessed: Internalizing problems: (a) Depression ("I'm sad"), (b) Anxiety ("I'm nervous"), and (c) Somatic Complaints ("I feel sick"); Externalizing problems: (d) Rebellious Behavior ("I do what I want to do even if I am punished") and (e) Anger Control Problems ("I scream when I get cross"); Areas of vulnerability: (f) Problems with Emotion Regulation ("My mood changes a lot during the day"); and Psychological resources or protective factors: (g) Self-esteem ("I like who I am"), (h) Integration and Social Competence ("When I have problems there are people who listen to me"), and (i) Awareness of Problems ("I'm having a hard time and I need help"), which was only evaluated in relation to adolescents (it is not included in the protocol validated for children). No significant effects of gender, age, family's socioeconomic status or parents' education level have been found for any of the dimensions (Fernández-Pinto et al., 2015). In each item, participants are asked to assess the frequency with which they engage in the behavior described, using a 5-point Likert-type response scale (1 = "Never or almost never" to 5 = "Always or almost always").

The SENA has been found to have adequate psychometric properties in terms of validity, test–retest reliability and internal consistency, in both the normative and clinical populations (Sánchez-Sánchez et al., 2016). It has also been found to have good convergent and divergent validity with a wide range of other assessment instruments, including the BASC-2 (Behavior Assessment System for Children) (Reynolds & Kamphaus, 2004), BRIEF-P (Behavior Rating Inventory of Executive Function-Preschool Version) (Bausela-Herreras & Luque-Cuenca, 2017), BRIEF (Behavior Rating Inventory of Executive Function) (Goldstein & Naglieri, 2014), PAI-A (Personality Assessment Inventory- Adolescent) (Meyer et al., 2015), TAMAI (Multifactorial Adaptive Test of Childhood Adaptation) (Hernández-Guanir, 2009), CECAD (Educational-Clinical Questionnaire: Anxiety and Depression) (Lozano González et al., 2013) and STAXI-CA (State-Trait Anger Expression Inventory for children and adolescents) (del Barrio et al., 2004). The reliability values found in this study, at both pretest and posttest, are presented in Table 1.

To assess how children and adolescents interpreted the lockdown, three ad hoc statements were designed, with which participants were asked to state their level of agreement on a 5-point Likert-type scale (1 = "Not at all" to 5 = "Very much"). The statements were: "Staying at home is like a punishment" (Punishment); "Staying at home is a means of slowing the spread of the virus" (Slowing the

Table 1 Reliability: Internal consistency at pretest and posttest and test–retest value of the SENA factors in the sample of children and adolescents

SENA dimensions	Children			Adolescents		
	T1	T2		T1	T2	
	Cronbach's α	Cronbach's α	Intraclass Correlation Coefficient	Cronbach's α	Cronbach's α	Intraclass Correlation Coefficient
Depression	.858	.874	.727	.912	.914	.897
Anxiety	.861	.886	.821	.888	.894	.834
Somatic Complaints	.753	.750	.792	.825	.825	.845
Rebellious Behavior	.749	.756	.816	.745	.745	.862
Anger Control Problems	.871	.889	.824	.872	.872	.834
Emotion Regulation Problems	.976	.883	.788	.914	.914	.874
Self-esteem	.838	.811	.738	.867	.867	.929
Awareness of Problems	-	-	-	.804	.804	.822
Integration and Social Competence	.853	.863	.818	.855	.855	.892

"Awareness of Problems" is not included in the SENA questionnaire for children. $p \leq .0001$

Spread of the Virus) and "Staying at home helps stop other people from catching the virus" (Protecting Others).

Fear of contagion was assessing using the "I'm afraid of catching COVID" item, with participants once again being asked to state their level of agreement on a 5-point Likert-type scale (1 = "Not at all" to 5 = "Very much").

Procedure

The questionnaires were administered at two time points over a web platform (https://www.onlineencuesta.com/), with news of the project being disseminated over the Internet, social media, and press. The battery of instruments took approximately 15 min to complete. At T1, participants answered between March 22 and 25, 2020 (eight to eleven days into lockdown), and at T2, they answered between April 11 and 14, 2020 (28 to 31 days into lockdown). The research project was approved by the Research Ethics Committee at the University of Burgos (IR 22/2020) and complied with all the ethical requirements established for research with humans. All parents and legal guardians gave their voluntary consent for their children to participate in the study, which was presented to them as an exploration of the effects of the lockdown on children and adolescents.

Data analysis

To check the existence of possible differences between T1 and T2 in the general sample (Hypothesis 1) and in the gender-segregated samples (Hypothesis 2) in terms of Depression, Anxiety, Somatic Complaints, Anger Control Problems, Emotion Regulation Problems, Rebellious Behavior, Self-esteem and Integration and Social Competence, we performed Student's t-tests for related samples. The effect sizes were calculated using Cohen's d and interpreted in accordance with Cohen's criteria (Cohen, 1992).

Moreover, a canonical correlation was performed using four variables (one linked to fear of the virus and three linked to how participants interpreted the lockdown) as predictors of the nine (adolescents) or eight (children) mental health variables, in order to assess the shared multivariate relationship between the two sets of variables, i.e., between fear of the virus/interpretation of the lockdown and mental health, as evaluated at T2 (Hypothesis 3).

Results

Differences in accordance with age and gender

Children (aged 8 to 12 years)

Table 2 shows the results pertaining to changes in children's mental health dimensions between T1 and T2. Significant differences were observed only for Anxiety and Anger Control Problems, with a small effect size. For both these variables, the mean at T2 was lower than the mean at T1.

The same analyses were carried out once again separately for each gender group. As shown in Table 3, no significant differences were observed for girls between T1 and T2. Among boys, significant differences were observed only in the variables Anxiety and Anger Control Problems, with small effect sizes. In both variables, the means were lower at T2 than at T1.

Adolescents (aged 13 to 18 years)

As with children, Table 4 shows the results pertaining to changes in adolescents' mental health dimensions between T1 and T2. Scores for Awareness of Problems increased, whereas those for Rebellious Behavior decreased significantly, albeit with small effect sizes.

Next, we analyzed the differences between T1 and T2 separately for boys and girls (Table 5). Among boys, Rebellious Behavior was observed to decrease, with a small effect size. Among girls, Awareness of Problems increased significantly, also with a small effect size.

Table 2 Means differences between T1 and T2 among children (aged 8 to 12 years)

SENA Dimensions	T1		T2		*t*	*p*	*d*	95% CI
	M	(SD)	*M*	(SD)				
Depression	1.66	0.52	1.70	0.57	-0.879	.381	0.07	-0.12, 0.05
Anxiety	2.38	0.83	2.27	0.81	2.153	**.033**	**0.13**	0.01, 0.22
Somatic Complaints	1.65	0.54	1.68	0.56	-0.834	.406	0.05	-0.11, 0.04
Rebellious Behavior	1.97	0.80	1.92	0.79	1.014	.312	0.06	-0.05, 0.15
Anger Control Problems	2.41	0.78	2.31	0.81	2.076	**.040**	**0.13**	0.01, 0.21
Emotion Regulation Problems	2.25	0.80	2.20	0.86	0.938	.350	0.06	-0.06, 0.17
Self-esteem	4.31	0.57	4.26	0.56	1.037	.302	0.09	-0.04, 0.13
Integration and Social Competence	4.06	0.59	4.00	0.68	1.615	.108	0.09	-0.02, 0.15

Note. In bold $p \leq .05$

Table 3 Means differences between T1 and T2 in accordance with gender, among children aged 8 to 12 years

SENA Dimensions	Boys						Girls					
	T1	T2	*t*	*p*	*d*	95% CI	T1	T2	*t*	*p*	*d*	95% CI
	M (SD)	*M* (SD)					*M* (SD)	*M* (SD)				
Anxiety	2.44 (0.85)	2.29 (0.78)	2.005	**.049**	**0.18**	0.00, 0.30	2.33 (0.80)	2.25 (0.84)	1.083	.282	0.10	-0.07, 0.23
Depression	1.67 (0.53)	1.70 (0.50)	-0.489	.626	0.06	-0.16, 0.10	1.65 (0.52)	1.69 (0.62)	-0.752	.454	0.07	-0.15, 0.07
Somatic Complaints	1.65 (0.48)	1.65 (0.51)	-0.034	.973	0.00	-0.11, 0.11	1.65 (0.60)	1.71 (0.60)	-1.081	.283	0.10	-0.17, 0.05
Anger Control Problems	2.49 (0.78)	2.33 (0.75)	2.271	**.026**	**0.21**	0.02, 0.31	2.34 (0.78)	2.29 (0.86)	0.746	.458	0.06	-0.09, 0.19
Emotion Regulation Problems	2.37 (0.82)	2.25 (0.84)	1.568	.122	0.14	-0.03, 0.28	2.15 (0.87)	2.16 (0.88)	-0.113	.910	0.01	-0.17, 0.15
Rebellious Behavior	1.92 (0.76)	1.86 (0.77)	0.873	.386	0.08	-0.08, 0.21	2.01 (0.83)	1.97 (0.80)	0.581	.563	0.05	-0.10, 0.19
Integration and Social Competence	4.01 (0.57)	3.94 (0.63)	1.070	.288	0.12	-0.06, 0.19	4.11 (0.60)	4.04 (0.73)	1.208	.231	0.10	-0.04, 0.17
Self-esteem	4.28 (0.64)	4.25 (0.54)	0.335	.739	0.05	-0.12, 0.17	4.33 (0.51)	4.27 (0.61)	1.291	.201	0.11	-0.03, 0.16

Note. In bold $p \leq .05$

Predictors of mental health

Finally, the canonical correlation analysis of fear of the virus and interpretation of the lockdown as predictors of children's mental health at T2 revealed four functions with squared canonical correlations (R_c^2) of 0.276, 0.155, 0.096 and 0.040 for each successive function. Overall, the complete model of all the functions was statistically significant according to Wilks' criterion ($\lambda = 0.530$, $F_{(32, 499.45)} = 2.928$, $p \leq 0.0001$). For the set of four canonical functions, the r^2 effect size was 0.470, which indicates that the complete model explained 47% of the shared variance of all variables.

The dimension reduction analysis indicated (as stated earlier) that the complete model (functions 1 to 4) was statistically significant. Function 2 to 4 was also statistically significant ($F_{(21, 391.07)} = 2.133$, $p = 0.003$). Functions 3 to 4 and 4 did not explain a statistically significant percentage of the shared variance of all variables ($F_{(12, 274.00)} = 1.687$, $p = 0.069$ and $F_{(5, 138.00)} = 1.162$, $p = 0.331$, respectively).

When the R_c^2 effects for each function were analyzed, only the first two functions were found to be significant in the context of the present study (explaining 27.6% and 15.5% of the shared variance, respectively). After the removal of the previous ones, the final two functions only explained 9.6% and 4% of the remaining variance.

Table 6 shows the structure coefficients for functions 1 and 2 (r_s), the squared structure coefficients (r_s^2) and the communality values (h^2) of the two functions for each variable. If we look at the coefficients of function 1, we see that the relevant criterion variables were Depression and Anxiety, whereas Emotion Regulation Problems, Somatic Complaints, and Self-esteem contributed at a secondary level to the synthetic criterion variable. This conclusion is supported by the result of the r_s^2. Moreover, all the structure coefficients of the mental health variables were aligned, with the exception of Self-esteem and Integration and Social Competence. This indicates that all were positively correlated with each other, with the exception of these two variables which correlated positively between themselves, but did so inversely with the other mental health variables.

In terms of the set of predictor variables of function 1, those linked to interpretations of the lockdown as a Punishment and as a means of Slowing the Spread of the Virus contributed most to the synthetic predictor variable. Since the structure coefficient for interpreting the lockdown as a Punishment was negative, it correlated positively with all the SENA variables except Self-esteem and Integration and Social Competence. Viewing the lockdown as a means of Slowing the Spread of the Virus was negatively associated with the SENA variables, again with the exception of Self-esteem and Integration and Social Competence. Since these findings support the theoretically expected association between interpretation of the lockdown and children's

Table 4 Means differences between T1 and T2 among adolescents (aged 13 to 18 years)

SENA Dimensions	T1		T2		*t*	*p*	*d*	95% CI
	M	(SD)	*M*	(SD)				
Depression	1.96	0.78	2.02	0.82	-1.343	.837	0.07	-0.14, 0.02
Anxiety	2.78	0.86	2.76	0.86	0.335	.738	0.02	-0.09, 0.13
Somatic Complaints	2.11	0.77	2.17	0.82	-1.243	.216	0.07	-0.16, 0.03
Rebellious Behavior	2.01	0.86	1.88	0.79	2.512	**.013**	**0.16**	0.03, 0.22
Anger Control Problems	2.36	0.81	2.29	0.79	1.366	.174	0.09	-0.03, 0.18
Emotion Regulation Problems	2.38	0.95	2.43	0.97	-1.040	.300	0.05	-0.17, 0.05
Self-esteem	3.72	0.80	3.71	0.83	0.206	.837	0.01	-0.07, 0.08
Awareness of Problems	2.36	0.75	2.50	0.83	-2.399	**.018**	**0.18**	-0.24, -0.02
Integration and Social Competence	3.81	0.63	3.80	0.65	0.216	.829	0.02	-0.06, 0.08

Note. In bold $p \leq .05$

mental health, we labeled function 1 "Mental health in accordance with Attribution". The function indicates that interpreting the lockdown as a Punishment was linked to higher levels of psychopathology, and interpreting it as means of Slowing the Spread of the Virus was linked to better mental health.

In relation to function 2, the coefficients shown in Table 6 suggest that the only relevant criterion variables were Anger Control Problems and Self-esteem. In this function, these variables were inversely associated with each other. Interpreting the lockdown as a means of Protecting Others was the dominant predictor, and was negatively associated with the other interpretations analyzed. If we look at the structure coefficients for the entire function, we see that interpreting the lockdown as a means of Protecting Others was positively associated with Self-esteem and negatively associated with Anger Control Problems. We therefore labeled this function "Mental Health in accordance with Altruistic Lockdown".

Finally, the canonical correlation analysis of fear of the virus and interpretation of the lockdown as predictors of adolescents' mental health at T2 also revealed four functions with squared canonical correlations (R_c^2) of 0.452, 0.316, 0.270 and 0.186 for each successive function. Overall, the complete model of all the functions was statistically significant according to Wilks' criterion ($\lambda = 0.640$, $F_{(36,\ 443.94)} = 1.556$, $p = 0.023$). For the set of four canonical functions, the r^2 effect size was 0.360, which indicates that the complete model explained 36% of the shared variance of all variables.

Only the complete model (functions 1 to 4) was statistically significant. Functions 2 to 4, 3 to 4 and 4 did not explain a statistically significant percentage of the shared variance of all variables ($F_{(24,\ 345.74)} = 1.117$, $p = 0.322$; $F_{(14,\ 240.00)} = 0.978$, $p = 0.476$; $F_{(6,\ 121.00)} = 0.723$, $p = 0.632$, respectively). When the R_c^2 effects were analyzed for each function, only the first function was found to be significant (explaining 45.2% of the shared variance).

If we look at the coefficients of function 1 (Table 6), we see that the relevant criterion variables were Depression, Emotion Regulation Problems, and Awareness of Problems, whereas Anxiety and Self-esteem contributed at a secondary level to the synthetic criterion variable. As with the sample of children, all the structure coefficients of the mental health variables were positive, with the exception of Self-esteem and Integration and Social Competence, which were inversely associated with the other mental health variables.

In terms of the set of predictor variables of function 1, those linked to interpretation of the lockdown as a Punishment and as a means of Protecting Others contributed most to the synthetic predictor variable. Since the structure coefficient for interpreting the lockdown as a Punishment was negative, it correlated positively with all the SENA variables except Self-esteem and Integration and Social Competence. Viewing the lockdown as a means of Protecting Others was negatively associated with the SENA variables, again with the exception of Self-esteem and Integration and Social Competence.

These findings also support the theoretically expected association between interpretation of the lockdown and adolescents' mental health, and we labeled function 1 "Mental health in accordance with Attribution". The function indicates that interpreting the lockdown as an Altruistic Act was linked to better mental health, and interpreting it as a Punishment was linked to higher levels of psychopathology.

Discussion

The results of the present study indicate that, at the start of the lockdown (T1) both children and adolescents had poorer mental health (see the study by Pizarro-Ruiz & Ordóñez-Camblor, 2021), but that levels tended to stabilize and the results regarding the majority of psychological indicators remained unchanged at T2. Among children, no changes were observed between the start of the lockdown

Table 5 Means differences between T1 and T2 in accordance with gender, among adolescent aged 13 to 18 years

SENA Dimensions	Male						Female					
	T1	T2	*t*	*p*	*d*	95% CI	T1	T2	*t*	*p*	*d*	95% CI
	M (SD)	*M* (SD)					*M* (SD)	*M* (SD)				
Anxiety	2.54 (0.94)	2.53 (0.86)	0.074	.941	0.01	-0.21, 0.23	2.91 (0.79)	2.88 (0.83)	0.385	.701	0.05	-0.10, 0.15
Depression	1.81 (0.79)	1.88 (0.81)	-0.767	.447	0.11	-0.20, 0.09	2.04 (0.77)	2.10 (0.82)	-1.098	.275	0.09	-0.16, 0.05
Somatic Complaints	1.97 (0.81)	1.98 (0.82)	-0.136	.892	0.02	-0.21, 0.19	2.19 (0.75)	2.27 (0.81)	-1.562	.122	0.13	-0.20, 0.02
Anger Control Problems	2.46 (0.85)	2.33 (0.81)	1.180	.244	0.17	-0.09, 0.34	2.31 (0.79)	2.27 (0.78)	0.752	.454	0.07	-0.07, 0.16
Emotion Regulation Problems	2.28 (1.01)	2.26 (0.95)	0.186	.853	0.03	-0.18, 0.22	2.43 (0.92)	2.53 (0.98)	-1.471	.145	0.12	-0.23, 0.04
Rebellious Behavior	2.19 (0.95)	1.96 (0.86)	2.297	**.026**	0.35	0.03, 0.42	1.91 (0.80)	1.84 (0.75)	1.307	.195	0.11	-0.04, 0.18
Integration and Social Competence	3.76 (0.71)	3.80 (0.68)	-0.499	.620	0.07	-0.16, 0.01	3.83 (0.59)	3.81 (0.64)	0.676	.501	0.05	-0.06, 0.11
Self-esteem	4.05 (0.69)	3.98 (0.77)	1.159	.253	0.17	-0.06, 0.20	3.54 (0.80)	3.57 (0.84)	-0.634	.528	0.05	-0.12, 0.06
Awareness of Problems	2.41 (0.82)	2.49 (0.84)	-0.868	.390	0.13	-0.28, 0.11	2.34 (0.71)	2.50 (0.83)	-2.334	**.022**	0.26	-0.29, -0.02

Note. In bold $p \leq .05$

(T1) and later on in that period (T2, approximately one month later) in six out of the eight variables studied: Depression, Somatic Complaints, Rebellious Behavior, Emotion Regulation Problems, Self-esteem and Integration and Social Competence. However, a decrease was observed in Anxiety and Anger Control Problems, both with a small effect size. Among adolescents, no changes were observed in seven of the nine variables studied: Depression, Anxiety, Somatic Complaints, Anger Control Problems, Emotion Regulation Problems, Self-esteem and Integration and Social Competence. Rebellious Behavior was observed to decrease and Awareness of Problems was perceived to increase, with a small effect size. It would have been enriching to compare these results with those of other studies evaluating changes in mental health among youngsters during the stringent stay-at-home lockdown, in order to determine whether, as in our study, indicator levels stabilized and even improved in some cases. Unfortunately, however, we were unable to find any longitudinal studies that followed up with children and/or adolescents during the time they were confined to their homes during the COVID-19 pandemic. Nevertheless, Giménez-Dasi et al's (2023) longitudinal study with parents of children from 3 to 11 years of age also shows that there were no differences in results comparing scores obtained a month before lockdown (T1) and a year after lockdown (T3). These authors do find some improvements between lockdown (T2) and return to school (T3) in hyperactivity and impulsivity, emotional regulation and willingness to study.

In our case we did find differences in the evolution of the variables studied, along with a differential impact of attributions of the lockdown between children aged 8 to 12 years and adolescents aged 13 to 18 years. Studies such as the one conducted by Ravens-Sieberer et al. (2021) also found differences in the impact of the pandemic in accordance with age, reporting that younger children seemed to be more affected by the situation than their older counterparts. In contrast, other authors such as Vallejo-Slocker et al. (2020) found no differences in global SDQ (Strengths and Difficulties Questionnaire) scores between children (aged 8–11 years) and adolescents (aged 12–18 years) following the stringent stay-at-home lockdown in Spain. They did, however, observe differences between the two groups in terms of quality of life during the lockdown. In light of the above, future studies exploring the long-term consequences of lockdown processes or abrupt changes in young people's social interactions on their mental health would do well to analyze the outcomes of these two age groups separately. Undoubtedly, further research is required into the differences between these two development stages in terms of mental health, in order to enable authorities to palliate more effectively the effects of possible future disruptions in the social interaction processes of children and adolescents.

Table 6 Canonical solution for fear of contagion and interpretation of the lockdown as predictors of mental health in children and adolescents

	Children					Adolescents	
	Function 1		*Function 2*			*Function 1*	
Variable	r_s	r_s^2 (%)	r_s	r_s^2 (%)	h^2 (%)	r_s	r_s^2 (%)
Depression	-.983	96.63	.144	02.07	98.70	-.867	75.17
Anxiety	-.727	52.85	.300	9.00	61.85	-.471	22.18
Somatic Complaints	-.495	24.50	.136	1.85	26.35	-.432	18.66
Rebellious Behavior	-.418	17.47	.189	3.57	21.04	-.337	11.36
Anger Control Problems	-.423	17.89	.697	48.58	66.47	-.310	9.61
Emotion Regulation Problems	-.688	47.33	.227	5.15	52.48	-.605	36.60
Awareness of Problems						-.562	31.58
Self-esteem	.447	19.98	-.528	27.88	47.86	.462	21.34
Integration and Social Competence	.420	17.64	-.279	7.78	25.42	.377	14.21
R_c^2		27.58		15.54			20.45
Fear of Contagion	-.302	9.12	.393	15.45	24.57	-.193	3.73
Punishment	-.766	58.68	.428	18.32	77.00	-0.936	87.61
Slowing the Spread of the Virus	.557	31.03	.207	4.29	35.32	0.406	16.48
Protecting Others	.078	0.61	-.493	24.31	24.92	0.490	24.01

Structure coefficients (r_s) greater than |.45| are underlined. Communality coefficients (h^2) greater than 45% are underlined. r_s = structure coefficient; r_s^2 = squared structure coefficient; h^2 = communality coefficient; R_c^2 = Squared Canonical Correlation

In relation to the impact of the COVID-19 lockdown on mental health in accordance with gender, the results are also contradictory. Studies conducted with the adult population during the stay-at-home directive in Spain found that women displayed more symptoms of depression, anxiety and posttraumatic stress, and reported more feelings of loneliness and lower levels of spiritual well-being than men (Ausín et al., 2021). Other studies, however, found that men scored lower than women in almost all well-being scales (Fernández-Abascal & Martín-Díaz, 2021). Among children, Vallejo-Slocker et al. (2020) found poorer emotional functioning among girls than among boys, and Oosterhoff et al., (2020) also found more symptoms of depression and anxiety among female than among male adolescents. For their part, Zhou et al. (2020) found that being female was the principal risk factor for symptoms of depression and anxiety. The present study confirms the existence of gender differences. In the sample of children, no differences were observed between T1 and T2 in the scores obtained by girls in any of the variables assessed, whereas among boys, differences were found in Anxiety and Anger Control Problems. Among adolescents, the scores obtained by girls for all mental health variables remained stable during the lockdown, with the exception of Awareness of Problems. As time passed, teenage girls became more aware of the situation, the problems they were experiencing and the need to ask for help. The scores obtained by teenage boys also remained stable, with the exception of a decrease in Rebellious Behavior.

The present study makes a novel contribution to the literature in that it explores whether beliefs about the lockdown predicted mental health outcomes. The results revealed that, among both children and adolescents, viewing the lockdown as a Punishment predicted poorer mental health, specifically higher levels of Depression, Anxiety, and Emotion Regulation Problems and lower levels of Self-esteem. Somatic Complaints emerged as a predictor of poorer mental health among children, as did Awareness of Problems among adolescents. In contrast, and again among both children and adolescents, viewing the lockdown as a means of Protecting Others who may be more vulnerable to the COVID-19 virus was found to predict better mental health. However, interpreting the lockdown as a responsibility (Slowing the Spread of the Virus) only predicted better mental health outcomes among children, not among adolescents. In light of these findings, during future pandemics and lockdowns, education professionals should pay special attention to how young people interpret the need to remain confined to their homes and follow strict government rules. When children's and adolescents' needs and interests are taken into consideration, they feel valued and important, which in turn may have a positive effect on their mental health (Urbina-Garcia, 2019). Understanding the risk factors that may affect the mental health of children and adolescents during a lockdown is as important as identifying those that may protect against and foster resilience confronting that same situation (Dvorsky et al., 2021). Giving children and adolescents the opportunity to express their experiences and ideas during a lockdown would help encourage their participation in community life (Pascal &

Bertram, 2021). In this context, interventions based on art therapy can be a useful tool for the expression of such experiences, as it is widely accepted by children and adolescents, and has shown to be effective in improving mental health and psychological well-being (Le Vu et al., 2022).

During situations of imposed social isolation, such as mandatory lockdowns, prevention campaigns should place special emphasis on encouraging children and adolescents to interpret the sacrifice they are being asked to make as a means of protecting others, or as an act of responsibility that will help stop or slow the spread of the virus, rather than as a punishment or an obligation, since this seems to have a negative impact on their mental health.

Finally, the present study has certain limitations that should be taken into consideration when interpreting the results. First, the sampling procedure used was incidental rather than probability-based. The fact that, while fairly large, our sample was not representative, precludes any generalization of the results to the general population of children and adolescents. Second, due to the nature of the pandemic and subsequent lockdown, no previous mental health assessments were available for the same sample group. Consequently, we were unable to compare the results of the study with previous scores of these same participants in order to determine the effects of the lockdown more precisely. Third, data were collected at only two time points, due to the difficulty involved in gathering information from these age groups over long periods of time. However, the inclusion of data collected at two moments during the most stringent part of the lockdown period enabled us to analyze, in detail, the effect of an unexpected event that had a major impact on participants' lives, at the very time it was happening.

Conclusions

Our findings may be useful for both researchers and child and adolescent mental health services, as well as for the development of intervention programs following the end of the COVID-19 pandemic. They may also help inform the decision-making process regarding stringent lockdown orders for children and adolescents in future situations, providing insight into how authorities can provide better support both during and after a possible outbreak. It is important to understand more about how children and adolescents interpret their situation and how they use the resources at their disposal.

In sum, the results of our study indicate that, as the lockdown progressed, young people entered into a stabilization phase in which mental health indicators remained at the same level as they were 8 to 10 days into the confinement period.

Finally, we analyzed one factor that is often overlooked in studies on the pandemic and subsequent lockdown, namely the way in which participants interpreted what was happening to them. We found that participants' interpretation of the lockdown impacted their mental health outcomes. It is therefore important for both parents and authority figures to foster children's and adolescents' understanding of lockdowns as a means of protecting others, or as an act of responsibility to help stop or slow the spread of the virus, since this seems to be a protective factor for mental health. They should also strive to discourage children and adolescents from viewing it as a punishment, since this seems to lead to higher levels of psychopathology.

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Authors' contribution Ordóñez-Camblor and Pizarro-Ruiz contributed to the study conception and design. Material preparation, data collection and analysis were performed by Ordóñez-Camblor and Pizarro-Ruiz. The manuscript was written by all authors: Ordóñez-Camblor, Ubillos-Landa, González-Castro and Pizarro-Ruiz. All authors read and approved the final manuscript.

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Declarations

Ethics approval All procedures performed in this study 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 study was approved by the Bioethics Committee of the University of Burgos (IR 22/2020).

Consent Informed consent was obtained from all individual participants included in the study and their legal guardians.

Competing interests The authors have no competing interests to declare that are relevant to the content of this article.

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