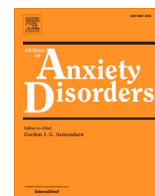




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## Intolerance of COVID-19-related uncertainty and depressive and anxiety symptoms during the pandemic: A longitudinal study in Argentina

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### ABSTRACT

The current COVID-19 pandemic is a novel, unprecedented situation that has created considerable uncertainty due in part to the unpredictability of the future situation. *Intolerance of Uncertainty* is the inability to withstand negative uncertain situations, and predisposes people to overestimate threats and to develop psychopathological symptoms. The aim of this study was to longitudinally analyze the relationship between intolerance of COVID-19-related uncertainty and anxiety and depression symptoms. A non-probabilistic online snowball sampling method was used. For the study, 1230 Argentine adults (216 men; 1005 women; 9 other genders; mean age = 41.62;  $SD = 13.81$ ) were recruited to complete three open-access surveys at three different time points: (1) between May 6 and June 1, 2020, (2) between August 8 and 13, 2020, and (3) between April 17 and 23, 2021. The results suggest that anxiety and depressive symptoms increase over time, and that intolerance of uncertainty is a predictor of this variability even up to eleven months after the initial assessment. Gender- and age- related effects were also observed (women and young people reported more psychopathological symptoms). The findings suggest the importance of intolerance of uncertainty for mental health and the importance of this type of study for understanding the psychological impact of the pandemic.

### 1. Introduction

In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic (WHO, 2020). That month, several governments, such as Argentina's, implemented different measures to prevent the spread of the virus. These measures include shuttering of businesses, ordering people to stay at home, isolation periods, working from home, social distancing, among others (Smith, Twohy, & Smith, 2020). The COVID-19 pandemic is one of the greatest challenges the world has faced in recent decades. Despite the undeniable need for measures to contain the COVID-19 disease, these measures, along with the pandemic itself, have had a number of negative consequences, including psychological ones. Initial studies of individuals' reactions to the pandemic context revealed anxiety and depressive symptoms as well as stress reactions in the general population (Canet-Juric et al., 2020; Wang et al., 2020).

According to a recent meta-analysis (Salari et al., 2020) the prevalence of anxiety and depression in the general population during the pandemic was 31.9% and 33.7%, respectively. Results of various epidemiological studies have also revealed that women are usually at higher risk of depression and anxiety than men (Lim et al., 2018). Particularly in the pandemic context, the prevalence of anxiety and depression was found to be higher in women than in men (Liu et al., 2020; Moghanibashi-Mansourieh, 2020; Wang, Di, Ye, & Wei, 2021; Zhou et al., 2020). On the other hand, although age increases the risk of COVID-19 infection and mortality, anxiety and depressive symptoms are higher in younger people, especially in the 21–40 age group (Ahmed et al., 2020; Huang & Zhao, 2020; Moghanibashi-Mansourieh, 2020; Wang et al., 2020).

Since this pandemic is a new and unprecedented situation, it means overwhelming uncertainty due to the unpredictability of the future

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situation (Zandifar & Badrfam, 2020). Uncertainty is a subjective negative state characterized by the presence of negative emotions experienced in response to unpredictable conditions (Freeston, Tiplady, Mawn, Bottesi, & Thwaites, 2020) and the feeling that there is not enough information to cope with them (Toro, Avendaño-Prieto, & Vargas, 2020). COVID-19 pandemic-related uncertainty is the feeling of not being able to control or predict pandemic-related events (del-Valle et al., 2020; Li et al., 2021). Will I be infected? Will my relatives be infected? Will my income be affected? Will the economy in my country recover? Will there be supply shortages? When will this pandemic end? The unpredictability of these and other questions is one of the greatest stressors of the pandemic (Satici, Saricali, Satici, & Griffiths, 2020).

Although uncertainty is a normal reaction to situations such as the current one, if the distress persists or becomes unbearable, it can be a serious challenge for some people (Mertens, Gerritsen, Duijndam, Salemink, & Engelhard, 2020). *Intolerance of Uncertainty* (IU) is the inability to withstand negative uncertain situations (Carleton, 2016; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994; Zvolensky, Vujanovic, Bernstein, & Leyro, 2010). IU is not limited to the appraisal of a situation as a threat, but refers to the predisposition to experience uncertainty as unpleasant and to react negatively to it (Dugas, Schwartz, & Francis, 2004; Freeston et al., 2020). People who are highly intolerant of uncertainty feel they need guarantees and predictability, and tend to excessively avoid unexpected events because they fear that a negative event might occur (Basevitz, Pushkar, Chaikelson, Conway, & Dalton, 2008). Higher IU predisposes people to overestimate threats (Pepperdine, Lomax, & Freeston, 2018; Taha, Matheson, Cronin, & Anisman, 2014) and is related to various psychopathological symptoms such as anxiety or depression (Dar, Iqbal, & Mushtaq, 2017; Norr et al., 2013; Tobar, Avendaño-Prieto, & Espinosa, 2020). Some studies suggest that women tend to report higher IU than men (e.g., Dugas et al., 2004; Parlapani et al., 2020), and that younger people tend to report higher IU than older people (e.g., Basevitz et al., 2008; Mertens et al., 2020). However, both gender- and age- related effects on IU appear to be small (e.g., González-Rodríguez, Cubas-León, Rovella, & Darias Herrera, 2006; Taha et al., 2014) and many studies even find no evidence for this (e.g., Bottesi, Marchetti, Sica, & Ghisi, 2020; Carleton, Norton, & Asmundson, 2007; Tolin, Abramowitz, Brigidi, & Foa, 2003).

Pandemic stressors are present for a large proportion of the population. However, only some people develop mental health problems, and IU could be an important concept to explain these individual differences. Few studies have been published on the role of IU on mental health in the pandemic context. Some of them found that higher levels of IU were associated with greater anxiety and depressive symptoms during the pandemic (e.g., Korkmaz & Güloğlu, 2021; Rettie & Daniels, 2020; Voitsidis et al., 2020; Zhuo et al., 2021). In addition, IU has been related to fear of COVID-19 (Deniz, 2021; Pak, Süsen, Denizci Nazhgül, & Griffiths, 2021) and Coronavirus threat perceptions (Wheaton, Messner, & Marks, 2021). In this sense, people with higher IU may have trouble coping with the great uncertainty caused by the pandemic context, leading to further mental health impairment (Blanuša, Barzut, & Knežević, 2020; pp. 20; Smith et al., 2020; pp. 20).

However, most empirical evidence on this topic has been published in developed countries. In Latin America, only two studies have been published. The first is a cross-sectional study conducted by Seco Ferreira, Lisboa Oliveira, Costa Delabrida, Faro, and Cerqueira-Santos (2020) in Brazil which found that higher IU levels predicted higher stress, anxiety and depressive symptoms. It is important to emphasize that Seco Ferreira et al. (2020), like many other studies, analyzed general IU, and not IU specifically arising from the pandemic context. Li et al. (2021) suggested that the tendency to be unable to tolerate the uncertainty of COVID-19-related events can be referred to as *intolerance of COVID-19-related uncertainty* (COVID-19 IU). COVID-19 IU includes not only the inability to tolerate uncertainty about whether or not one will be infected (or even whether one is already infected), but also all the general aspects that the pandemic has brought (e.g., whether loved ones

will become infected, whether containment measures will continue, when one will be able to see family and friends again, whether one will be affected financially). The second Latin-American study is also cross-sectional and was conducted in Argentina by del-Valle et al. (2020). They specifically examined COVID-19 IU and found that this variable predicted symptoms of anxiety and depression. This study, like those previously discussed, was a cross-sectional study. Only one study has analyzed the effect of IU on mental health longitudinally. This study was conducted by Tull et al. (2020) in the United States between March and April 2020, and they found that IU was uniquely associated with one-month later health anxiety.

Thus, the current pandemic has triggered several mental health problems. The role of IU in this process requires further investigation because few studies have analyzed this phenomenon, and even fewer have specifically analyzed COVID-19 IU. Furthermore, many of the studies have been conducted in developed countries, and there is less evidence in low- and middle-income countries such as Argentina, which also has one of the highest COVID-19 death rates in the world. Finally, only one study has analyzed the association between IU and mental health longitudinally, with a follow-up period of only one month. Therefore, the aim of this study was to longitudinally analyze the relationship between COVID-19 IU and anxiety and depression symptoms in the Argentine general population, at two follow-up periods of three and eleven months.

## 2. Materials and methods

### 2.1. Participants

The total sample included 1230 adults from different cities in Argentina (see the *Procedure* section for information on the number of participants in the initial phase of the study). Age ranged from 18 to 77 years (mean = 41.62; *SD* = 13.81). Of the 1230 participants, 81.7% identified themselves as women ( $n = 1005$ ), 17.6% as men ( $n = 216$ ), and 0.7% identified with other genders ( $n = 9$ ). Educational level was distributed as follows: 0.2% ( $n = 3$ ) had completed primary education, 1.0% ( $n = 12$ ) reported incomplete secondary education, 4.6% ( $n = 56$ ) had completed secondary education, 28.5% ( $n = 350$ ) reported incomplete or ongoing university or tertiary studies, 35.4% ( $n = 435$ ) had completed university education, and 30.3% ( $n = 373$ ) reported complete or incomplete postgraduate education.

### 2.2. Measures

#### 2.2.1. Intolerance of uncertainty

A special version (del-Valle et al., 2020) of the Argentine adaptation (Rodríguez de Behrends & Brenlla, 2015) of the Intolerance of Uncertainty Scale (IUS, Freeston et al., 1994) was administered. The IUS is a self-administered 27-item scale that assesses subjects' aversion to uncertain situations. Items are rated on a 5-point Likert scale, with 1 being the lowest score (*not at all representative*) and 5 being the highest (*completely representative*). In order to adapt the scale to specifically assess uncertainty over the current pandemic (COVID-19 IU), del-Valle et al. (2020) introduced some modifications to the Argentine adaptation. They shortened the scale and kept only the items that were relevant to the current pandemic and easier to understand (considering different education levels). They also made some wording adjustments to specifically address uncertainty about the coronavirus situation. For example, the modified instructions ask participants to respond considering their feelings *during* the pandemic. Similar adaptations to assess COVID-19-related IU have already been reported (e.g., Li et al., 2021). The final scale developed by del-Valle et al. consisted of 17 items organized on a single factor solution, explaining 53.6% of the variance. The scale also showed excellent internal consistency ( $\alpha = 0.93$ ). In the present study, the scale also proved to be highly reliable ( $\alpha = 0.93$ ).

### 2.2.2. Depressive symptoms

The Argentine adaptation (Brenlla & Rodríguez, 2006) of the Beck Depression Inventory-II (BDI-II, Beck, Steer, & Brown, 1996) was administered. The BDI-II is a self-administered instrument that assesses the presence and severity of depressive symptoms. It comprises 21 items, each consisting of a group of statements that refer to symptoms such as sadness, tearfulness, loss of pleasure, guilt and pessimism. For each group of statements, participants must select the one that best describes their feelings during the past two weeks, including the current day. Both the symptoms to which the statements refer and the time frame are consistent with the DSM-IV criteria for major depression. Each item is answered on a scale graded from 0 to 3, describing the increasing severity of that symptom. The BDI-II has demonstrated adequate reliability ( $\alpha = 0.89$ , Sanz, Perdigón, & Vázquez, 2003) and validity (e.g., Beltrán, Freyre, & Hernández-Guzmán, 2012; Sanz & Vázquez, 1998). The item that referred to suicidal ideation (item 9) was removed for this study due to ethical concerns about mentioning suicide in an uncontrolled setting such as an online survey. In this study, Cronbach's showed high internal consistency (Time 1:  $\alpha = 0.92$ ; Time 2:  $\alpha = 0.92$ ; Time 3:  $\alpha = 0.93$ ).

### 2.2.3. State anxiety

The Argentine adaptation (Leibovich de Figueroa, 1991) of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) was administered to assess anxiety symptoms. The STAI is a 40-item self-report instrument designed to assess separately state anxiety (transient condition) and trait anxiety (stable condition). In the present study, only the state anxiety dimension was used. This sub-scale is composed of 20 items answered in a range from 0 to 3. Previous studies in the Spanish population show that the internal consistency of the STAI ranges between  $\alpha.84$  and  $.93$  (e.g., del-Valle, Andrés et al., 2021; Guillén-Riquelme & Buela-Casal, 2011). In the present study, the state anxiety sub-scale exhibited high reliability (Time 1:  $\alpha = 0.95$ ; Time 2:  $\alpha = 0.93$ ; Time 3:  $\alpha = 0.95$ ).

*Socio-demographic features:* Closed-ended questions on age, educational level and gender were asked.

### 2.3. Procedure and ethical considerations

This longitudinal study was carried out as part of a larger research project that aims to assess the emotional impact of the COVID-19 pandemic on the Argentine population over time. A non-probabilistic online snowball method was used to recruit participants. Three open-access surveys were launched via Google Forms and disseminated via social media (i.e., Facebook, Instagram, WhatsApp) at different time points during the pandemic. No paid advertisements were used to distribute the surveys and no compensation was paid for participation.

The first survey was conducted between May 6 and June 1, 2020 (approximately 90 days after the start of social isolation measures in Argentina) and was answered by 5666 adults. The second survey was conducted between August 8 and 13, 2020 (approximately three months after the first survey). At that time, some regions of the country (including those with the highest population density such as the Metropolitan Area of Buenos Aires) were still under isolation measures, while others were in a social distancing phase. Of the 5666 participants who responded to the first survey, 2434 (42.96%) answered the second survey. The email address provided by the participants was used to match them across the surveys. The third survey took place between April 17 and 23, 2021, more than a year after the pandemic outbreak (and approximately eight and a half months after the second survey). At that time, the country was entering the second peak of the contagion curve, and the return to strict isolation was imminent. This third survey was answered by 1230 participants (21.71% of the original participants). This was the sample analyzed in this study.

There were no significant differences in Time 1 COVID-19 IU, anxiety symptoms, or depressive symptoms between participants who

completed vs. did not complete the second survey (Time 1 COVID-19 IU:  $t_{(5664)} = -1.84$ ;  $p > .05$ ; Time 1 anxiety symptoms:  $t_{(5664)} = -1.57$ ;  $p > .05$ ; Time 1 depressive symptoms:  $t_{(5664)} = -1.14$ ;  $p > .05$ ). There were also no significant differences in Time 1 COVID-19 IU, anxiety symptoms, or depressive symptoms (nor in Time 2 anxiety symptoms, or depressive symptoms) between participants who completed vs. did not complete the third survey (Time 1 COVID-19 IU:  $t_{(2432)} = -1.24$ ;  $p > .05$ ; Time 1 anxiety symptoms:  $t_{(2432)} = -1.81$ ;  $p > .05$ ; Time 1 depressive symptoms:  $t_{(2432)} = -0.68$ ;  $p > .05$ ; Time 2 anxiety symptoms:  $t_{(2432)} = 0.03$ ;  $p > .05$ ; Time 2 depressive symptoms:  $t_{(2432)} = -0.10$ ;  $p > .05$ ).

This study was approved by the Bioethics Committee of the National University of Mar del Plata. All procedures recommended by the Declaration of Helsinki and the American Psychological Association (2010) were followed in its implementation. Participation in the study was voluntary and the signing of a digital informed consent form was required. The contact information of the research team was provided to clarify any doubts concerning the protection of rights in research contexts.

### 2.4. Data analysis

Because the survey was conducted through Google Forms (which indicates to participants when they have unanswered questions), there was no missing data. Normality of depressive symptoms, anxiety symptoms, and COVID-19 IU was explored through skewness and kurtosis (values between  $\pm 2$  points are considered acceptable limits for normality; Field, 2009; George & Mallery, 2016). While COVID-19 IU ( $Sk = 0.03$ ;  $Ku = -0.42$ ) and anxiety symptoms (Time 1:  $Sk = 0.48$ ;  $Ku = -0.07$ ; Time 2:  $Sk = 0.49$ ;  $Ku = -0.16$ ; Time 3:  $Sk = 0.23$ ;  $Ku = -0.60$ ) presented acceptable values, depressive symptoms (Time 1:  $Sk = 1.33$ ;  $Ku = 1.99$ ; Time 2:  $Sk = 1.40$ ;  $Ku = 2.34$ ; Time 3:  $Sk = 1.34$ ;  $Ku = 2.56$ ) showed a leptokurtic distribution at the three time points. To normalize these distributions, the results were transformed through the natural logarithm (Sedgwick, 2012). The resulting skewness and kurtosis were adequate (Time 1:  $Sk = -0.57$ ;  $Ku = -0.03$ ; Time 2:  $Sk = -0.60$ ;  $Ku = 0.03$ ; Time 3:  $Sk = -0.78$ ;  $Ku = 0.22$ ).

Descriptive statistics were estimated. While descriptive statistics of depressive symptoms were examined with the non-normalized results, inferential analyses were conducted using the normalized data. The effect of gender was assessed using the Mann-Whitney  $U$  test (only males and females were considered as only nine individuals identified with other genders). The  $U$ -test was chosen because the group sizes of men and women were different and because Levene's test did not meet the homoscedasticity criterion for some of the variables. Cohen's  $d$  was used for effect size and  $1-\beta$  for Power. In addition, the effect of age was examined using partial correlations (controlling for gender).

To test the effect of the pandemic context on anxiety and depressive symptoms over time (intra-subject factor), repeated-measures ANOVAs were applied. Because the Mauchly sphericity test was statistically significant, the Greenhouse-Geisser correction was used. The Bonferroni statistic was used to adjust for multiple comparisons in repeated-measures ANOVAs.

Partial correlations (controlling for age and gender) between anxiety symptoms, depressive symptoms, and COVID-19 IU were calculated. To assess the association of COVID-19 IU, age, and gender with anxiety and depressive symptoms over time, six multiple linear regression models were tested (enter method). In all models, gender, age, and COVID-19 IU were considered independent variables. The first three models examined the association between COVID-19 IU and anxiety symptoms at time 1, time 2 and time 3. The fourth, fifth, and sixth models assessed the association between COVID-19 IU and depressive symptoms at time 1, time 2 and time 3. Collinearity diagnostics showed VIF values of less than 1.02. The residuals of the six models showed a normal distribution ( $Sk$  between  $-0.65$  and  $0.34$ ;  $Ku$  between  $-0.25$  and  $1.29$ ). The effect of the independent variables was estimated using standardized  $\beta$ . Effect

size and Power were estimated using  $f^2$  and  $1 - \beta$  respectively (Cárdenas Castro & Arancibia Martini, 2014; Faul, Erdfelder, Buchner, & Lang, 2009).

### 3. Results

To determine if there was an effect of gender on the emotional variables, Mann-Whitney's *U* tests were conducted for time 1, time 2 and time 3. Cohen's *d* was used to estimate the effect size. The results presented in Table 1 show a small effect of gender on the variables studied: women tended to report higher COVID-19 IU, anxiety symptoms and depressive symptoms than men.

To evaluate the effect of age, partial correlations (controlling for gender) were calculated between age and emotional variables. The results are presented in Table 2. All relationships were statistically significant, although small. The effect of age on COVID-19 IU was extremely small or even negligible. The effect of age on anxiety and depressive symptoms was small. All emotional variables showed a tendency to decrease with age. Because both gender and age showed an effect (although small) on the emotional variables, they were considered as covariates and controlled for in subsequent analyses.

To determine whether depressive symptoms and anxiety symptoms changed over time, repeated measures ANOVAs were conducted. The result indicated that anxiety symptoms increased over time with a large effect size ( $F_{(1.91, 2344)} = 34.46; p < .01; \eta p^2 = 0.027$ ). Post-hoc analyses (Bonferroni) indicated that there were differences in anxiety symptoms between time 1 and time 2 ( $p = .05$ ), between time 2 and time 3 ( $p < .01$ ) and between time 1 and time 3 ( $p < .01$ ). Regarding depressive symptoms, the result indicated that they also increased over time ( $F_{(1.91, 2355)} = 8.68; p < .01; \eta p^2 = 0.007$ ). Post-hoc analyses (Bonferroni) indicated that the data were homogeneous between time 1 and 2. At time 3 there was a significant increase compared to time 1 ( $p < .01$ ) and time 2 ( $p < .01$ ).

After these preliminary analyses, partial correlations (controlled for gender and age) were calculated between anxiety symptoms, depressive symptoms, and COVID-19 IU. The results are presented in Table 3. All emotional variables showed high correlations with each other. The correlation between COVID-19 IU (assessed at time 1) and anxiety and depressive symptoms decreases over time but remains at high values.

Six multiple linear regression models were tested to assess the association of COVID-19 IU with anxiety and depressive symptoms over time. COVID-19 IU, gender, and age were considered as independent variables, and anxiety (at Time 1, 2 and 3) and depressive symptoms (at Time 1, 2 and 3) as dependent variables. The results are presented in Table 4. All models were statistically significant. COVID-19 IU was a predictor of both anxiety and depressive symptoms at all three time points, that is, up to eleven months after the COVID-19 IU assessment. The effect size of COVID-19 IU was initially larger for anxiety symptoms than for depressive symptoms (time 1), but decreased and was similar for both by time 3. The effect size was large for the models at time 1 and 2, and slightly smaller for the models at time 3. Age was also a significant predictor, and more so for depressive symptoms than for anxiety

**Table 1**

Gender effect for depressive symptoms, anxiety symptoms and intolerance of uncertainty over COVID-19 pandemic.

|                                     | Male  |       | Female |       | Z     | U           | Cohen's <i>d</i> | 1 - $\beta$ |
|-------------------------------------|-------|-------|--------|-------|-------|-------------|------------------|-------------|
|                                     | M     | SD    | M      | SD    |       |             |                  |             |
| COVID-19 IU (IUS)                   | 46.49 | 13.12 | 49.87  | 13.25 | -3.61 | 91,592.50** | 0.26             | .96         |
| Depressive symptoms Time 1 (BDI-II) | 8.27  | 7.41  | 11.51  | 9.25  | -5.08 | 84,661.50** | 0.39             | .99         |
| Depressive symptoms Time 2 (BDI-II) | 9.17  | 8.42  | 11.50  | 9.37  | -3.79 | 90,750.00** | 0.26             | .97         |
| Depressive symptoms Time 3 (BDI-II) | 9.74  | 8.22  | 12.42  | 9.72  | -3.78 | 90,775.00** | 0.30             | .99         |
| Anxiety symptoms Time 1 (STAI)      | 20.64 | 9.86  | 24.23  | 11.21 | -4.28 | 88,441.50** | 0.34             | .99         |
| Anxiety symptoms Time 2 (STAI)      | 21.79 | 10.39 | 24.69  | 11.12 | -3.43 | 92,424.50** | 0.26             | .96         |
| Anxiety symptoms Time 3 (STAI)      | 22.19 | 10.86 | 26.59  | 11.68 | -4.89 | 85,552.50** | 0.39             | .99         |

Note: \*\*  $p < .01$ ; COVID-19 IU = Intolerance of COVID-19-related uncertainty; Time 1: May, 2020; Time 2: August, 2020; Time 3: April, 2021.

**Table 2**

Relationships between age and emotional variables.

|                                     | Age    |
|-------------------------------------|--------|
| COVID-19 IU (IUS)                   | -.08** |
| Anxiety symptoms Time 1 (STAI)      | -.17** |
| Anxiety symptoms Time 2 (STAI)      | -.14** |
| Anxiety symptoms Time 3 (STAI)      | -.10** |
| Depressive symptoms Time 1 (BDI-II) | -.32** |
| Depressive symptoms Time 2 (BDI-II) | -.23** |
| Depressive symptoms Time 3 (BDI-II) | -.19** |

Note: \*\*  $p < .01$ ; COVID-19 IU = Intolerance of COVID-19-related uncertainty. Time 1: May, 2020; Time 2: August, 2020; Time 3: April, 2021.

**Table 3**

Partial correlations (controlled for gender and age) between anxiety symptoms, depressive symptoms, and IU.

|  | 1     | 2     | 3     | 4     | 5     | 6     | 7     |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1. COVID-19 IU (IUS)                   |       |       |       |       |       |       |       |
| 2. Anxiety symptoms Time 1 (STAI)      | .74** |       |       |       |       |       |       |
| 3. Anxiety symptoms Time 2 (STAI)      | .55** | .68** |       |       |       |       |       |
| 4. Anxiety symptoms Time 3 (STAI)      | .43** | .55** | .64** |       |       |       |       |
| 5. Depressive symptoms Time 1 (BDI-II) | .59** | .72** | .54** | .46** |       |       |       |
| 6. Depressive symptoms Time 2 (BDI-II) | .49** | .59** | .73** | .54** | .72** |       |       |
| 7. Depressive symptoms Time 3 (BDI-II) | .42** | .49** | .54** | .74** | .61** | .67** |       |
| <i>M</i>                               | 49.26 | 23.57 | 24.17 | 25.79 | 10.94 | 11.03 | 11.92 |
| <i>SD</i>                              | 13.33 | 11.09 | 11.07 | 11.66 | 9.03  | 9.24  | 9.51  |

Note: \*\*  $p < .01$ ; COVID-19 IU = Intolerance of COVID-19-related uncertainty. Time 1: May, 2020; Time 2: August, 2020; Time 3: April, 2021.

symptoms. The effect of gender was smaller and was non-significant at time 2.

### 4. Discussion

The current pandemic represents an unprecedented challenge that brings with it great uncertainty. This uncertainty, which is commonplace in the day-to-day life of the pandemic, entails a particular problem for people who are intolerant of uncertainty. They tend to worry and

Table 4

Linear multiple regressions to assess the effect of intolerance of uncertainty, age and gender on anxiety and depressive symptoms over time.

|                      | Anxiety symptoms<br>Time 1 (STAI) | Anxiety symptoms<br>Time 2 (STAI) | Anxiety symptoms<br>Time 3 (STAI) | Depressive symptoms<br>Time 1 (BDI-II) | Depressive symptoms<br>Time 2 (BDI-II) | Depressive symptoms<br>Time 3 (BDI-II) |
|----------------------|-----------------------------------|-----------------------------------|-----------------------------------|--|--|--|
| COVID-19 IU<br>(IUS) | $\beta$<br>.73**                  | $\beta$<br>.54**                  | $\beta$<br>.42**                  | $\beta$<br>.56**                       | $\beta$<br>.48**                       | $\beta$<br>.41**                       |
| Age                  | -.11**                            | -.09**                            | -.07*                             | -.27**                                 | -.19**                                 | -.15**                                 |
| Gender               | -.04*                             | -.04                              | -.10**                            | -.07**                                 | -.04                                   | -.07**                                 |
| $r^2$                | .56                               | .32                               | .21                               | .43                                    | .29                                    | .22                                    |
| $F(3, 1226)$         | 520.94**                          | 192.08**                          | 106.42**                          | 306.63**                               | 167.66**                               | 113.98**                               |
| 1 - $\beta$          | 1.00                              | 1.00                              | 1.00                              | 1.00                                   | 1.00                                   | 1.00                                   |
| $f^2$                | 1.27                              | 0.47                              | 0.27                              | 0.75                                   | 0.41                                   | 0.28                                   |

Note: \*  $p < .05$ ; \*\*  $p < .01$ ; COVID-19 IU = Intolerance of COVID-19 related uncertainty. Time 1: May, 2020; Time 2: August, 2020; Time 3: April, 2021.

overestimate the likelihood of negative things happening, such as contracting COVID-19 or infecting loved ones (Li et al., 2021), leading to further mental health impairment (Blanuša et al., 2020; pp. 20; Smith et al., 2020; pp. 20). Our results support the idea that higher levels of IU tend to be associated with higher levels of anxiety and depressive symptoms during the pandemic, as other studies have previously reported (Rettie & Daniels, 2020; Voitsidis et al., 2020; Zhuo et al., 2021). This is also similar to what previous (non-pandemic) research has highlighted about the importance of IU as a transdiagnostic factor (Carleton et al., 2007; Toro et al., 2020). In addition, the results tend to be consistent with those of by Li et al. (2021), who suggest that particular attention should be paid to COVID – 19 IU, that is, the (in)ability to tolerate all uncertain situations associated with the pandemic. The COVID-19 IU is not only about the uncertainty of contracting the disease but also about the whole context surrounding the current pandemic and its possible social, affective, psychological, economic, and political consequences. Moreover, COVID-19 IU explains a large proportion of variance in anxiety and depression concurrently and prospectively up to almost a year later.

Even though uncertainty distress is an evident and understandable reaction in this context and should not be pathologized (Freeston et al., 2020), early interventions may assist people to cope with their distress and prevent more serious problems. As Brooks et al. (2020) suggested, information is a key aspect of this pandemic. So, to prevent over-engagement behaviors (e.g., breaking quarantine to try to regain control over the situation and alleviate the distress; Freeston et al., 2020) and mental health problems, it is necessary to avoid biased information and ensure that people understand what is happening and what they can and cannot do. To our knowledge, this is the first longitudinal study of COVID-19 IU. In addition, most IU studies were conducted in high-income countries, with only a few studies published in low- and middle-income countries (i.e., del-Valle et al., 2020; Seco Ferreira et al., 2020).

The results also indicated a general increase in symptoms of anxiety and depression as the pandemic continues. This is consistent with previous longitudinal studies in the general population that have also found a progressive increase in the symptoms of anxiety and depression during the COVID-19 pandemic (González-Sanguino et al., 2020; Ozamiz-Etxebarria, Dosil-Santamaria, Picaza-Gorrochategui, & Idoiaga-Mondragon, 2020; Pierce et al., 2020; Planchuelo-Gómez, Odrizola-González, Irurtia, & de Luis-García, 2020). Although some studies (e.g., Bendau et al., 2021; Fancourt, Steptoe, & Bu, 2021) suggest that symptoms of anxiety and depression increased at the beginning of the pandemic and then tended to decrease, this does not appear to be the case in Argentina. As noted above, the pandemic affects people not only in terms of the disease itself, but also in terms of a whole range of social, political and economic factors. It is therefore to be expected that mental health trends over the course of the pandemic will vary across high-, middle- and low-income countries. The number of infections and the progress of the pandemic should also be mentioned as possible differences between countries. For example, while in May (time 3) some

developed countries had a large proportion of their population vaccinated or were experiencing a reduction in infections, in Argentina vaccination was progressing slowly and the country was entering its second peak of infections (so a return to strict isolation was imminent).

Furthermore, the anxiety and depressive symptoms reported in this study tended to be higher (with a small effect at time 1 and a moderate effect at time 3) than those observed in pre-pandemic studies (e.g., Acuña, 2010; Brenlla & Rodríguez, 2006; Mustaca, Kamenetzky, & Vera Villarroel, 2010; Posada & Castaneiras, 2005) that examined samples of the general Argentine population using the same instruments (i.e., BDI-II, STAI). However, since the participants in this study were not examined before the pandemic, it is not possible to draw direct conclusions about whether anxiety and depressive symptoms differ from prior times. In this sense, the lack of a pre-pandemic assessment is a limitation of the study.

The results showed that women tend to report higher COVID-19 IU, anxiety symptoms, and depressive symptoms than men, and that young people tend to report higher levels of distress as well. These results are consistent with those reported by previous studies (e.g., Ahmed et al., 2020; Basevitz et al., 2008; Canet-Juric et al., 2020; Dugas et al., 2004; Huang & Zhao, 2020; Mertens et al., 2020; Parlapani et al., 2020; Wang et al., 2020; Zhou et al., 2020) and suggest that particular attention should be paid to the risk that may be encountered in these groups. Although women, and especially young women, are typically at higher risk of depression and anxiety than men (Leach, Christensen, Mackinnon, Windsor, & Butterworth, 2008; Lim et al., 2018), this becomes even more important in a context of vulnerability such as the current one. However, the gender imbalance in the present sample should be mentioned as a limitation, as 81.7% of participants identified as female. Studies with similar procedural characteristics to the present one (i.e., unpaid participation, dissemination of the study via the Internet) have reported a similar proportion of women (e.g., 76% Alomo et al., 2020; 83% Torrente et al., 2021), suggesting that women tend to be more participatory and cooperative in studies of this type.

Some other limitations should be considered in the present study. First, although the sample was large, it was not probabilistic, limiting the generalizability of the results. Second, it should be noted that a large proportion of the study participants reported having completed university studies, which is not representative of the proportion of university graduates in the general Argentine population. Future studies should attempt to reach more vulnerable populations to better examine the emotional impact of the pandemic. Third, COVID-19 IU was only evaluated at time 1. However, exploring possible changes in IU over the course of the pandemic would have been interesting. In addition, data collection was exclusively based on self-report measures, which have various disadvantages as several authors have previously pointed out (e.g., del-Valle & Zamora, 2021; Paulhus & Vazire, 2007). Fourth, the study had a correlational observational design, so it is not possible to draw clear causal conclusions. Finally, the surveys were completed remotely, which may bias participants' responses compared to studies conducted face-to-face.

Despite these limitations, the present study is an important contribution to our understanding of the long-term emotional effect of IU (and particularly COVID-19 IU) during the pandemic. Although uncertainty is a normal reaction under current conditions, greater IU seems to be associated with higher levels of distress and symptomatology and may lead to long-term problems or challenges (e.g., post-traumatic stress, Brooks et al., 2020). Findings highlight IU as a potential target for preventing the development of psychopathological symptoms that could lead to maladaptive behaviors during the current pandemic. Future studies could investigate the effectiveness and usefulness of interventions aimed at reducing IU in contexts similar to the present one (Schmidt, Crepaldi, Bolze, Neiva-Silva, & Demenech, 2020). For example, cognitive-behavioral interventions that specifically target IU (Hebert & Dugas, 2019) may also be helpful in reducing distress and symptomatology (Tull et al., 2020). In the face of situations such as the current pandemic, interventions should not only be aimed at preventing the contraction of the disease but also at educating the population to manage the emotions that may arise (Leppin & Aro, 2009; Taha et al., 2014).

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## References

- Acuña, D. F. (2010). "Evaluación de Ansiedad". Datos normativos del Inventario de Ansiedad Estado-Rasgo en Buenos Aires ["Anxiety Assessment". Normative data of the State-Trait Anxiety Inventory in Buenos Aires]. (<http://repositorio.ub.edu.ar/handle/123456789/544>).
- Ahmed, M. Z., Ahmed, O., Aibao, Z., Hanbin, S., Siyu, L., & Ahmad, A. (2020). Epidemic of COVID-19 in China and associated psychological problems. *Asian Journal of Psychiatry*, 51(June), Article 102092. <https://doi.org/10.1016/j.ajp.2020.102092>
- Alomo, M., Gagliardi, G., Pelocche, S., Somers, E., Alzina, P., & Prokopez, C. R. (2020). Efectos psicológicos de la pandemia COVID-19 en la población general de Argentina [Psychological effects of the COVID-19 pandemic in the general population of Argentina]. *Revista Délelött Louisiana Facultad Délelött Ciencias Médicas Délelött Córdoba*, 77(3), 176–181. <https://doi.org/10.31053/1853.0605.v77.n3.28561>
- American Psychological Association. (2010). *Ethical principles of psychologists and Code of Conduct*. ([www.apa.org/ethics/code/principles.pdf](http://www.apa.org/ethics/code/principles.pdf)).
- Basevitz, P., Pushkar, D., Chaikelson, J., Conway, M., & Dalton, C. (2008). Age-related differences in worry and related processes. *The International Journal of Aging and Human Development*, 66(4), 283–305. <https://doi.org/10.2190/AG.66.4.B>
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory-II*. The Psychological Corporation.
- Beltrán, M. C., Freyre, M.Á., & Hernández-Guzmán, L. (2012). El Inventario de Depresión de Beck: Su validez en población adolescente [The Beck Depression Inventory: Its validity in an adolescent population]. *Terapia Psicológica*, 30(1), 5–13. <https://doi.org/10.4067/S0718-48082012000100001>
- Bendau, A., Kunas, S. L., Wyka, S., Petzold, M. B., Plag, J., Asselmann, E., & Ströhle, A. (2021). Longitudinal changes of anxiety and depressive symptoms during the COVID-19 pandemic in Germany: The role of pre-existing anxiety, depressive, and other mental disorders. *Journal of Anxiety Disorders*, 79(April), Article 102377. <https://doi.org/10.1016/j.janxdis.2021.102377>
- Blanusa, J., Barzut, V., & Knežević, J. (2020). Direct and indirect effect of intolerance of uncertainty on distress during the COVID-19. *Primenjena Psihologija*, 13(4), 473–487.
- Bottesi, G., Marchetti, I., Sica, C., & Ghisi, M. (2020). What is the internal structure of intolerance of uncertainty? A network analysis approach. *Journal of Anxiety Disorders*, 75(October), Article 102293. <https://doi.org/10.1016/j.janxdis.2020.102293>
- Brenlla, M. E., & Rodríguez, C. M. (2006). Adaptación argentina del Inventario de Depresión de Beck (BDI-II) [Argentine adaptation of the Beck Depression Inventory (BDI-II)]. In A. T. Beck, R. A. Steer & G. K. Brown (Eds.), *BDI-II. Inventario de Depresión de Beck. Segunda Edición. Manual [BDI-II. Beck Depression Inventory. Second Edition. Manual]*. Paidós.
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*, 395, 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Canet-Juric, L., Andrés, M. L., del-Valle, M., López-Morales, H., Poo, F., Galli, J., ... Urquijo, S. (2020). A longitudinal study on the emotional impact caused by the covid-19 pandemic quarantine on general population. *Frontiers in Psychology*, 11, Article 565688. <https://doi.org/10.3389/fpsyg.2020.565688>
- Cárdenas Castro, M., & Arancibia Martini, H. (2014). Potencia estadística y cálculo del tamaño del efecto en G\*Power: Complementos a las pruebas de significación estadística y su aplicación en Psicología [Statistical power and effect size calculation in G\*Power: complements to statistical significance tests and their application in psychology]. *Salud & Sociedad*, 5(2), 210–244. <https://doi.org/10.22199/s07187475.2014.0002.00006>
- Carleton, R. N. (2016). Into the unknown: A review and synthesis of contemporary models involving uncertainty. *Journal of Anxiety Disorders*, 39(April), 30–43. <https://doi.org/10.1016/j.janxdis.2016.02.007>
- Carleton, R. N., Norton, M. P. J., & Asmundson, G. J. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders*, 21(1), 105–117. <https://doi.org/10.1016/j.janxdis.2006.03.014>
- Dar, K. A., Iqbal, N., & Mushtaq, A. (2017). Intolerance of uncertainty, depression, and anxiety: Examining the indirect and moderating effects of worry. *Asian Journal of Psychiatry*, 29(October), 129–133. <https://doi.org/10.1016/j.ajp.2017.04.017>
- del-Valle, M. V., Andrés, M. L., Urquijo, S., Yerro Avincetto, M., López Morales, H., & Canet Juric, L. (2020). Intolerance of uncertainty over COVID-19 pandemic and its effect on anxiety and depressive symptoms. *Revista Interamericana Délelött Psicología/ Interamerican Journal of Psychology*, 54(2), Article e1335. <https://doi.org/10.30849/ripij.v54i2.1335>
- del-Valle, M. V., Andrés, M. L., Urquijo, S., Zamora, E., Mehta, A., & Gross, J. J. (2021). Argentinean adaptation and psychometric properties of the Emotion Regulation Questionnaire –ERQ–. *Psychological Reports*. <https://doi.org/10.1177/00332941211021343>
- del-Valle, M. V., & Zamora, E. V. (2021). El uso de las medidas de auto-informe: Ventajas y limitaciones en la investigación en Psicología [The use of self-report measures: Advantages and limitations in psychology research.]. *Alternativas Ensis Psicología*, 47, 22–35. (<https://www.alternativas.me/attachments/article/264/El%20uso%20de%20las%20medidas%20de%20auto-informe.pdf>).
- Deniz, M. E. (2021). Self-compassion, intolerance of uncertainty, fear of COVID-19, and well-being: A serial mediation investigation. *Personality and Individual Differences*, 177(December 2020), Article 110824. <https://doi.org/10.1016/j.paid.2021.110824>
- Dugas, M. J., Schwartz, A., & Francis, K. (2004). Intolerance of uncertainty, worry, and depression. *Cognitive Therapy and Research*, 28(December), 835–842. <https://doi.org/10.1007/s10608-004-0669-0>
- Fancourt, D., Steptoe, A., & Bu, F. (2021). Trajectories of anxiety and depressive symptoms during enforced isolation due to COVID-19 in England: A longitudinal observational study. *The Lancet Psychiatry*, 8(2), 141–149. [https://doi.org/10.1016/S2215-0366\(20\)30482-X](https://doi.org/10.1016/S2215-0366(20)30482-X)
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(November), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Field, A. (2009). *Discovering statistics using SPSS*. SAGE.
- Freeston, M., Tiplady, A., Mawn, L., Bottesi, G., & Thwaites, S. (2020). Towards a model of uncertainty distress in the context of Coronavirus (COVID-19). *Cognitive Behaviour Therapist*. , Article e31. <https://doi.org/10.1017/S1754470x2000029X>
- Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences*, 17(6), 791–802. [https://doi.org/10.1016/0191-8869\(94\)90048-5](https://doi.org/10.1016/0191-8869(94)90048-5)
- George, D., & Mallery, P. (2016). *IBM SPSS statistics 23 step by step: A simple guide and reference* (14th ed.). Routledge.
- González-Rodríguez, M., Cubas-León, R., Rovella, A. T., & Darias Herrera, M. (2006). Adaptación española de la Escala de Intolerancia hacia la Incertidumbre: Procesos cognitivos, ansiedad y depresión [Spanish adaptation of the Intolerance of Uncertainty Scale: cognitive processes, anxiety and depression]. *Psicología York Salud*, 16(2), 219–233. (<https://psicologiaysalud.uv.mx/index.php/psycysalud/articula/view/775>).
- González-Sanguino, C., Ausín, B., Castellanos, M.Á., Saiz, J., López-Gómez, A., Ugidos, C., & Muñoz, M. (2020). Mental health consequences of the coronavirus 2020 pandemic (COVID-19) in Spain: A longitudinal study. *Frontiers in Psychiatry*, 11, 1256. <https://doi.org/10.3389/fpsyg.2020.565474>
- Guillén-Riquelme, A., & Buela-Casal, G. (2011). Actualización psicométrica y funcionamiento diferencial de los ítems en el State Trait Anxiety Inventory (STAI) [Psychometric update and differential item functioning in the State Trait Anxiety Inventory (STAI)]. *Psicothema*, 23(3), 510–515. (<http://www.psicothema.com/pdf/3916.pdf>).
- Hebert, E. A., & Dugas, M. J. (2019). Behavioral experiments for intolerance of uncertainty: Challenging the unknown in the treatment of generalized anxiety disorder. *Cognitive and Behavioral Practice*, 26(2), 421–436. <https://doi.org/10.1016/j.cbpra.2018.07.007>
- Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: A web-based cross-sectional survey. *Psychiatry Research*, 288(June), Article 112954. <https://doi.org/10.1016/j.psychres.2020.112954>
- Korkmaz, H., & Güllü, B. (2021). The role of uncertainty tolerance and meaning in life on depression and anxiety throughout Covid-19 pandemic. *Personality and Individual Differences*, 179(April), Article 110952. <https://doi.org/10.1016/j.paid.2021.110952>

- Leach, L. S., Christensen, H., Mackinnon, A. J., Windsor, T. D., & Butterworth, P. (2008). Gender differences in depression and anxiety across the adult lifespan: The role of psychosocial mediators. *Social Psychiatry and Psychiatric Epidemiology*, 43(12), 983–998. <https://doi.org/10.1007/s00127-008-0388-z>
- Leibovich de Figueroa, N. B. (1991). Ansiedad: Algunas concepciones teóricas y su evaluación [Anxiety: Some theoretical conceptions and its evaluation.]. In M. M. Casullo, N. B. Leibovich de Figueroa, & M. Aszkenazi (Eds.), *Teoría y técnicas de evaluación psicológica [Theory and techniques of psychological assessment]* (pp. 123–155). Psicoteca.
- Leppin, A., & Aro, A. R. (2009). Risk perceptions related to SARS and Avian influenza: Theoretical foundations of current empirical research. *International Journal of Behavioral Medicine*, 16(March), 7–29. <https://doi.org/10.1007/s12529-008-9002-8>
- Li, Q., Luo, R., Zhang, X., Meng, G., Dai, B., & Liu, X. (2021). Intolerance of COVID-19-related uncertainty and negative emotions among Chinese adolescents: A moderated mediation model of risk perception, social exclusion and perceived efficacy. *International Journal of Environmental Research and Public Health*, 18(6), 2864. <https://doi.org/10.3390/ijerph18062864>
- Lim, G. Y., Tam, W. W., Lu, Y., Ho, C. S., Zhang, M. W., & Ho, R. C. (2018). Prevalence of depression in the community from 30 countries between 1994 and 2014. *Scientific Reports*, 8(1), 2861. <https://doi.org/10.1038/s41598-018-21243-x>
- Liu, D., Ren, Y., Yan, F., Li, Y., Xu, X., Yu, X., Qu, W., Wang, Z., Tian, B., Yang, F., Yao, Y., Tan, Y., Jiang, R., & Tan, S. (2020). Psychological impact and predisposing factors of the coronavirus disease 2019 (COVID-19) pandemic on general public in China. <http://doi.org/10.2139/ssrn.3551415>.
- Mertens, G., Gerritsen, L., Duijndam, S., Salemkim, E., & Engelhard, I. M. (2020). Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020. *Journal of Anxiety Disorders*, 74(August), Article 102258. <https://doi.org/10.1016/j.janxdis.2020.102258>
- Moghanibashi-Mansourieh, A. (2020). Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian Journal of Psychiatry*, 51(June), Article 102076. <https://doi.org/10.1016/j.ajp.2020.102076>
- Mustaca, A. E., Kamenetzky, G. V., & Vera Villaruel, P. (2010). Relaciones entre variables positivas y negativas en una muestra de estudiantes argentinos [Relationships between positive and negative variables in a sample of Argentine students]. *Revista Argentina de Clínica Psicológica*, XIX(3), 227–235. <https://www.redalyc.org/pdf/2819/281921798004.pdf>.
- Norr, A. M., Oglesby, M. E., Capron, D. W., Raines, A. M., Korte, K. J., & Schmidt, N. B. (2013). Evaluating the unique contribution of intolerance relative to other cognitive vulnerability factors in of uncertainty anxiety psychopathology. *Journal of Affective Disorders*, 151(1), 136–142. <https://doi.org/10.1016/j.jad.2013.05.063>
- Ozamiz-Etxebarria, N., Dosil-Santamaria, M., Picaza-Gorrochategui, M., & Idoiaga-Mondragon, N. (2020). Niveles de estrés, ansiedad y depresión en la primera fase del brote del COVID-19 en una muestra recogida en el norte de España [Levels of stress, anxiety and depression in the first phase of the COVID-19 outbreak in a sample collected in northern Spain]. *Cadernos Délelött Saúde Pública*, 36(4). <https://doi.org/10.1590/0102-311x00054020>
- Pak, H., Süsen, Y., Denizci Nazlıgöl, M., & Griffiths, M. (2021). The mediating effects of fear of COVID-19 and depression on the association between intolerance of uncertainty and emotional eating during the COVID-19 pandemic in Turkey. *International Journal of Mental Health and Addiction*. <https://doi.org/10.1007/s11469-021-00489-z>
- Parlapani, E., Holvea, V., Nikopoulou, V. A., Sereslis, K., Athanasiadou, M., Godosidis, A., ... Diakogiannis, I. (2020). Intolerance of uncertainty and loneliness in older adults during the COVID-19 pandemic. *Frontiers in Psychiatry*, 11, 842. <https://doi.org/10.3389/fpsy.2020.00842>
- Paulhus, L., & Vazire, S. (2007). The self-report method. In En R. Robins, C. Fraley, & R. Krueger (Eds.), *Handbook of research methods in Personality Psychology* (pp. 224–239). The Guilford Press.
- Pepperdine, E., Lomax, C., & Freeston, M. H. (2018). Disentangling intolerance of uncertainty and threat appraisal in everyday situations. *Journal of Anxiety Disorders*, 57(June), 31–38. <https://doi.org/10.1016/j.janxdis.2018.04.002>
- Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., ... Abel, K. M. (2020). Mental health before and during the COVID-19 pandemic: A longitudinal probability sample survey of the UK population. *The Lancet Psychiatry*, 7(10), 883–892. [https://doi.org/10.1016/S2215-0366\(20\)30308-4](https://doi.org/10.1016/S2215-0366(20)30308-4)
- Planchuelo-Gómez, Á., Odriozola-González, P., Iruarta, M. J., & de Luis-García, R. (2020). Longitudinal evaluation of the psychological impact of the COVID-19 crisis in Spain. *Journal of Affective Disorders*, 277(December), 842–849. <https://doi.org/10.1016/j.jad.2020.09.018>
- Posada, M. C., & Castañeiras, C. (2005). Investigación psicométrica del Inventario de Depresión de Beck. Datos normativos en la ciudad de Mar del Plata [Psychometric investigation of the Beck Depression Inventory. Normative data in the City of Mar del Plata]. *Perspectivas Ensis Psicología*, 2(1), 1–19. <http://rpsico.mdp.edu.ar/handle/123456789/1016>.
- Rettie, H., & Daniels, J. (2020). Coping and tolerance of uncertainty: Predictors and mediators of mental health during the COVID-19 pandemic. *American Psychologist*. <https://doi.org/10.1037/amp0000710>
- Rodríguez de Behrends, M., & Brenlla, M. E. (2015). Adaptación para Buenos Aires de la Escala de Intolerancia a la Incertidumbre [Adaptation of the Intolerance of Uncertainty Scale for Buenos Aires]. *Interdisciplinaria*, 32(2), 261–274. <https://www.redalyc.org/pdf/180/18043528004.pdf>.
- Salari, N., Hosseini-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., ... Khaledi-Paveh, B. (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Globalization and Health*, 16(1), 1–11. <https://doi.org/10.1186/s12992-020-00589-w>
- Sanz, J., Perdígón, A. L., & Vázquez, C. (2003). Adaptación española del Inventario para la Depresión de Beck-II (BDI-II): 2. Propiedades psicométricas en población general [Spanish adaptation of the Beck Depression Inventory-II (BDI-II): 2. Psychometric properties in general population]. *Clínica y Salud*, 14(3), 249–280. <https://www.redalyc.org/pdf/1806/180617972001.pdf>.
- Sanz, J., & Vázquez, C. (1998). Fiabilidad, validez y datos normativos del Inventario para la Depresión de Beck [Reliability, validity and normative data of the Beck Depression Inventory]. *Psicothema*, 10(2), 303–318. <https://www.redalyc.org/pdf/727/72710207.pdf>.
- Satici, B., Saricali, M., Satici, A. S., & Griffiths, M. D. (2020). Intolerance of uncertainty and mental wellbeing: Serial mediation by rumination and fear of COVID-19. *International Journal of Mental Health and Addiction*. <https://doi.org/10.1007/s11469-020-00305-0>
- Schmidt, B., Crepaldi, M. A., Bolze, S. D. A., Neiva-Silva, L., & Demenech, L. M. (2020). Saúde mental e intervenções psicológicas diante da pandemia do novo coronavírus (COVID-19) [Mental health and psychological interventions facing the pandemic of the new coronavirus]. *Estudos de Psicologia (Campinas)*. , Article e200063. <https://doi.org/10.1590/1982-0275202037e200063>
- Seco Ferreira, D. C., Lisboa Oliveira, W., Costa Delabrada, Z. N., Faro, A., & Cerqueira-Santos, E. (2020). Intolerance of uncertainty and mental health in Brazil during the COVID-19 pandemic. *Suma Psicológica*, 27(1), 62–69. <https://doi.org/10.14349/sumapsi.2020.v27.n1.8>
- Sedgwick, P. (2012). Log transformation of data. *British Medical Journal*, 345, Article e6727. <https://doi.org/10.1136/bmj.e6727>
- Smith, B. M., Twohy, A. J., & Smith, G. S. (2020). Psychological inflexibility and intolerance of uncertainty moderate the relationship between social isolation and mental health outcomes during COVID-19. *Journal of Contextual Behavioral Science*, 18(October), 162–174. <https://doi.org/10.1016/j.jcbs.2020.09.005>
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the state-trait anxiety inventory*. Consulting Psychologists Press.
- Taha, S., Matheson, K., Cronin, T., & Anisman, H. (2014). Intolerance of uncertainty, appraisals, coping, and anxiety: The case of the 2009 H1N1 pandemic. *British Journal of Health Psychology*, 19(3), 592–605. <https://doi.org/10.1111/bjhp.12058>
- Tobar, R. A. T., Avendaño-Prieto, B. L., & Espinosa, N. M. V. (2020). Transdiagnostic model of anxiety and depression according to the relationship with affect, intolerance of uncertainty, and anxiety sensitivity. *Revista CES Psicología*, 13(1), 140–152. <https://doi.org/10.21615/CESP.13.1.9>
- Tolin, D. F., Abramowitz, J. S., Brigidi, B. D., & Foa, E. B. (2003). Intolerance of uncertainty in obsessive-compulsive disorder. *Journal of Anxiety Disorders*, 17(2), 233–242. [https://doi.org/10.1016/S0887-6185\(02\)00182-2](https://doi.org/10.1016/S0887-6185(02)00182-2)
- Toro, R. A., Avendaño-Prieto, B. L., & Vargas, N. (2020). Transdiagnostic model of anxiety and depression according to the relationship with affect, intolerance of uncertainty, and anxiety sensitivity. *Revista CES Psicología*, 13(1), 140–152. <https://doi.org/10.21615/cesp.13.1.9>
- Torrente, F., Yoris, A., Low, D. M., Lopez, P., Bekinschtein, P., Manes, F., & Cetskovich, M. (2021). Sooner than you think: A very early affective reaction to the COVID-19 pandemic and quarantine in Argentina. *Journal of Affective Disorders*, 282(March), 495–503. <https://doi.org/10.1016/j.jad.2020.12.124>
- Tull, M. T., Barbano, A. C., Scamaldo, K. M., Richmond, J. R., Edmonds, K. A., Rose, J. P., & Gratz, K. L. (2020). The prospective influence of COVID-19 affective risk assessments and intolerance of uncertainty on later dimensions of health anxiety. *Journal of Anxiety Disorders*, 75(August), Article 102290. <https://doi.org/10.1016/j.janxdis.2020.102290>
- Voitsidis, P., Nikopoulou, V. A., Holvea, V., Parlapani, E., Sereslis, K., Tsipropoulou, V., ... Diakogiannis, I. (2020). The mediating role of fear of COVID-19 in the relationship between intolerance of uncertainty and depression. *Psychology and Psychotherapy: Theory, Research and Practice*. <https://doi.org/10.1111/papt.12315>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), 1729. <https://doi.org/10.3390/ijerph17051729>
- Wang, Y., Di, Y., Ye, J., & Wei, W. (2021). Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychology, Health & Medicine*, 26(1), 13–22. <https://doi.org/10.1080/13548506.2020.1746817>
- Wheaton, M. G., Messner, G. R., & Marks, J. B. (2021). Intolerance of uncertainty as a factor linking obsessive-compulsive symptoms, health anxiety and concerns about the spread of the novel coronavirus (COVID-19) in the United States. *Journal of Obsessive-Compulsive and Related Disorders*, 28(January), Article 100605. <https://doi.org/10.1016/j.jocrd.2020.100605>
- Zandifar, A., & Badrfam, R. (2020). Iranian mental health during the COVID-19 epidemic. *Asian Journal of Psychiatry*, 51(June), Article 101990. <https://doi.org/10.1016/j.ajp.2020.101990>
- Zhou, S. J., Zhang, L. G., Wang, L. L., Guo, Z. C., Wang, J. Q., Chen, J. C., ... Chen, J. X. (2020). Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19. *European Child & Adolescent Psychiatry*, 29(6), 749–758. <https://doi.org/10.1007/s00787-020-01541-4>
- Zhuo, L., Wu, Q., Le, H., Li, H., Zheng, L., Ma, G., & Tao, H. (2021). COVID-19-related intolerance of uncertainty and mental health among back-to-school students in Wuhan: The moderation effect of social support. *International Journal of*



*Environmental Research and Public Health*, 18(3), 981. <https://doi.org/10.3390/ijerph18030981>

Zvolensky, M. J., Vujanovic, A. A., Bernstein, A., & Leyro, T. M. (2010). Distress tolerance: Theory, measurement, and relations to psychopathology. *Current*

*Directions in Psychological Science*, 19(6), 406–410. <https://doi.org/10.1177/0963721410388642>

World Health Organization (2020). WHO announces COVID-19 outbreak a pandemic. (<https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic>).