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Experimental Induction of State Intolerance of Uncertainty: A Preliminary Study

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This study is aimed at pilot testing the experimental procedure for inducing state levels of intolerance of uncertainty (IU) using a sample of 62 undergraduate psychology students (M = 23.13, SD = 2.88, female 90.3%). Although similar procedures were used in other cultural contexts, this is the first time this phenomenon has been tested in Serbia. We used a two-step state IU induction procedure. The first step included describing and analysing one upcoming idiosyncratic life event with a potentially poor outcome. The second step required reading a list of irrational beliefs about uncertainty. In addition, we used an adapted Serbian IUS-11 scale, the Anxiety subscale from the DASS-21, and a single-item measure to collect information about state IU, state anxiety, and state worry, respectively. The ANCOVA results revealed that experimental and control groups did not differ in state IU after the induction. However, there seemed to be an increase in state IU in the experimental group, but not in the control group, when the pretest and posttest scores were compared in each group separately. Additionally, a significant main effect of the measurement time point on state worry and anxiety was found. In contrast, the main effects of condition and measurement time point by condition interaction were non-significant. Although the results are not straightforward (possibly due to a small sample size), the modified procedure seems to potentially serve as a tool for inducing state IU. In the concluding part, we discuss the obtained findings, the procedure's feasibility, as well as the possible modifications that could produce more precise effects.

Keywords: intolerance of uncertainty, worry, anxiety, experimental manipulation

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Intolerance of uncertainty (IU), which reflects fear of the unknown, is described as "an individual's dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty" (Carleton, 2016, p. 31). People with elevated IU cannot tolerate the lack of information about uncertain events they are experiencing daily and are frightened by uncertainty as they typically overestimate the possibility that the negative event will occur regardless of the actual probability of such an outcome (Dugas et al., 1998). Considering this, it is not surprising that IU is strongly related to worry (i.e., Buhr & Dugas, 2006; Dugas et al., 1997, 2001, 2004; Ladouceur et al., 2000) and considered to be a transdiagnostic risk factor for predicting the symptoms of emotional distress disorders (i.e., Boswell et al., 2013; Carleton, 2012, 2016; Carleton et al., 2012, 2014; Fetzner et al., 2013; Gentes & Ruscio, 2011; McEvoy & Mahoney, 2012; Mihić et al., 2014; Oglesby et al., 2016; Rosser, 2019; Saulnier et al., 2019).

Trait and State Intolerance of Uncertainty

When describing and assessing IU and other related risk factors, the focus is typically on the traits (i.e., relatively stable characteristics) in cognitive, behavioural, and emotional reactions that predispose an individual to a specific disorder. However, while the trait levels tend to be relatively stable over time, there is variability in the traits across time (i.e., state effects), which is often conflated with general tendencies (Geiser et al., 2014, 2017). For example, an individual might have low levels of the trait IU, which reduces the likelihood that this risk factor leads to the development of psychopathology. Still, individual-level or global events can alter an individual's level of IU, at least temporarily. For example, the COVID-19 pandemic has resulted in the IU levels in community samples more than one standard deviation above the typical levels for community samples before the pandemic (e.g., Allan et al., 2021). This elevated IU can increase the individual's risk for the development of psychopathology. Additionally, different stimuli can evoke IU differentially in people, depending on their perception of the situation or stimuli. Further, measuring a risk factor such as IU at a single time point conflates trait and state effects, confounding our understanding of the role of trait and state IU in the development of anxiety and other disorders (Hamaker, 2012). Therefore, it is critical that state and trait variance be disentangled when studying the role of IU in the etiology of psychopathology.

Experimental Manipulation of Intolerance of Uncertainty

There have been several attempts to manipulate the state levels of IU in an experimental setting in order to explore how IU affects worry, anxiety, negative affect, and decision-making (Grenier & Ladouceur, 2004; Ladouceur

et al., 2000; Mosca et al., 2016; Reuman et al., 2015). The first study of this kind used a gambling task where the levels of uncertainty were manipulated (increased or decreased) by varying the probability of the positive outcome of the game (i.e., high vs. low chances of winning; Ladouceur et al., 2000). These authors found that participants from the increased IU condition had higher state IU and worry compared to the group from the decreased IU condition (Ladouceur et al., 2000). However, the content of the items from state IU and worry measures in their study was specifically related to the gambling task and not IU and worry in general (i.e., "*Not being sure of winning money concerned me*"; Ladouceur et al., 2000, p.937), and the authors neither had a control group nor pretest measures. Nevertheless, this study was very important because it demonstrated that it was possible to experimentally manipulate IU levels and also triggered the development of other IU-related induction procedures.

The induction procedures that were later developed called for describing real-life situations instead of playing an artificial gambling game (i.e., Grenier & Ladouceur, 2004; Mosca et al., 2016; Reuman et al., 2015). For that reason, they were more ecologically valid. In these novel procedures, researchers used vignettes that depicted everyday experiences (Reuman et al., 2015) or instructed participants to describe uncertain idiosyncratic life events that they might encounter in the future (Grenier & Ladouceur, 2004; Mosca et al., 2016).

Grenier and Ladouceur (2004) conducted a study with a two-wave crossover design to test the effectiveness of their manipulation procedure. It included decreased IU and increased IU conditions, and all study participants went through both conditions, just at different time points. The procedure was led by a trained psychologist and required imagining a potential negative life event that the participants may experience and thinking of the consequences of such an event that were uncertain and worrying, using the vertical arrows technique ([VAT]; see the Method section of this manuscript for a detailed description; Grenier & Ladouceur, 2004). While thinking about those consequences, participants were instructed to generate *What if...?* types of thoughts/sentences. This type of thinking is a cognitive worry process, associated with trying to predict the outcome of some future, uncertain event (Borkovec, 1984). It is assumed that, by imagining a potential negative life event and thinking in *what-if* terms about the potential outcomes of that event the participants would bring their awareness to a specific uncertain situation. This imagined uncertain situation creates a context for inducing state IU. After VAT, the psychologist/investigator instructed the participants to imagine that they took a medicine that triggered some unforeseen effects, and then they had to read out loud the statements that were supposed to increase (i.e., *Not knowing what will happen in the future is frustrating*) or decrease (i.e., *I have to live with different possibilities, it is a part of life*) intolerance of uncertainty.

Researchers reported that the procedure was effective for inducing IU and worry only for the people who had lower pretest state anxiety, while the decreasing condition was effective for all participants (Grenier & Ladouceur, 2004). They also showed that individuals from the increased IU condition had increased scores on the worry scale, while those from the decreased IU condition tended to worry less (Grenier & Ladouceur, 2004).

Mosca and colleagues (2016) tested a Modified version of Grenier and Ladoucer's (2004) paradigm. The authors developed standardized self-administered procedures for conducting the VAT that eliminated the need for a researcher to deliver the exercise. In addition, instead of asking the participants to imagine that they took medication, they were instructed to focus on the idiosyncratic event they described using the VAT instead while reading the same statements that Grenier and Ladoucer utilized. The results reported by Mosca and colleagues (Mosca et al., 2016) revealed that the induction (increased IU) condition had an indirect effect – via state IU – on worry and negative affect. They also found that the participants from the induction condition had higher state IU, worry, and negative affect compared with the participants from the decreasing condition after the procedure. However, there was not a significant difference between the decreasing and control groups (Mosca et al., 2016).

The Current Study

In the current study, we aim to test whether an abbreviated state IU induction procedure described by Mosca and colleagues (2016) can be used virtually to induce state IU in a sample of undergraduate students in Serbia. The COVID-19 pandemic and the required social distancing forced all of us to adjust and transfer most of our activities online. This also applied to researchers, who needed to modify and adjust their research procedures (e.g., Moises, 2020). Our study goes in line with this situation, trying to demonstrate that even some procedures within the field of experimental psychopathology can be conducted virtually.

Given that the current study is a pilot study, we are interested in the feasibility of the procedure. The state IU induction procedure that we used had one major change compared to the Mosca et al.'s version. Namely, Mosca and colleagues (2016) conducted a two-session study with a 1-to-2 week period between the sessions. In their study, during the first session, participants completed the VAT and pretest surveys. During the second session, the participants first reviewed the content of the VAT that they had written down during the first session, then read the induction (the increased/decreased condition) or neutral sentences, and finally filled out the posttest surveys (Mosca et al., 2016).

There are several reasons why we think that abbreviating this procedure to a single session is beneficial. First of all, we think that the time interval between the sessions was not necessary because it is debatable whether the carryover effects are controlled for if VAT content is reviewed all over again in session 2, right before reading the induction/neutral sentences. Next, ethical problems can be raised if the participants are not debriefed between the sessions, while debriefing after the VAT can have an impact on the second part of the procedure. Also, researchers have no control over the possibility that the uncertain situation described during the first session is going to resolve in the meantime, before the second session, which would make the VAT content irrelevant. In addition, if the aim is to capture the state-level changes in IU, having the study with two time points may unnecessarily complicate it. Finally, it is more likely that the task would be used by researchers if reduced to one session, especially because it would be easier to conduct it virtually. For all the reasons mentioned above, our study was reduced to a single session and done virtually. We did not include the decreasing condition in the study as we were only interested in inducing IU and not whether an individual can artificially reduce IU. We hypothesize that the participants assigned to the induction condition would report elevated IU compared to the participants assigned to the control condition. We conducted exploratory analyses to determine if this same pattern of results was found for state anxiety and state worry as outcomes.

Method

Sample and procedure

We collected data on a convenience sample of 62 undergraduate psychology students from the University of Novi Sad, Serbia. The age range of the participants in the sample was 21 to 38 (M = 23.13, SD = 2.88). Most of the sample was comprised of female participants (90.3%). The entire study was conducted online in April 2021. Once the participants had signed up for the study, they received the link to the survey via e-mail and were asked to complete a trait measure of IU at baseline. E-mail correspondence was also used for scheduling appointments for the experiment. The sign-up list was used to randomly assign the participants to an experimental or control group. Numbers from 1 to 62 were given to each participant and two sets of numbers were generated using a research randomizer application. Experimental and control groups were equal in size (n = 31).

The experimental part of the study was conducted between the researcher and the participant using the Zoom platform. After joining a Zoom meeting, each study participant received a link to the survey where they were asked to report state IU, worry, and anxiety. After completing the survey, participants

were administered the experimental procedures. The experimental and control group each completed two tasks, with the first task being identical across conditions.

The first part of the procedure in the experimental group included using a standardized, three-level VAT schema with the following instructions: *Imagine ONE unfavourable (negative) life event that could happen in your future, and which would make you anxious (tense, worried). Try to imagine the situation as vividly as possible. Imagine the situation in as much detail as possible. On the lines, write down in detail the event you envisioned.* After describing the potential negative life event (the first level), participants were further instructed to imagine and describe three consequences of such an event (the second level). After describing the consequences, downward arrows pointed to the third level of the VAT schema, instructing the participant to write down the consequences that might follow if the consequences from the second level occurred. Participants were encouraged to think in *What if...?* terms when thinking about the potential outcomes of the described events. The VAT schema was shared on the screen and the participants wrote down their responses on a piece of paper. The writing time was limited to 10 minutes. The Serbian translation of the VAT schema is provided in Appendix 1, while the original, English version can be found in Mosca et al.'s paper (2016).

The second part of the procedure was the actual experimental manipulation. Participants from the experimental group were presented with a list of statements and beliefs about uncertainty (e.g., *I have no idea what will happen. It upsets me that I don't know what will happen. It is difficult for me to live with so many possible outcomes*; Appendix 2). The sentences were formulated in such a way as to reflect typical thoughts that could trigger uncertainty-related distress. Participants were instructed to read the content that they had written using the VAT one more time, and then to read the (negative) statements presented on the computer screen. It was emphasized that they should keep in mind the negative life event that they had described, and think about the sentences that they were reading as if they referred to the described event.

As mentioned, the first part of the control condition also included a standardized, three-level VAT schema that was administered in the same way as it was described for the experimental condition. After completing the VAT schema, participants from the control group read a list containing some pieces of general information (i.e., *Tokyo is the most populous city in the world*; Appendix 3) instead of the list of negative thoughts presented to those in the experimental condition.

In both groups, participants were told to read the list (described above) once. After reading the sentences from the list (which were either negative

thoughts about uncertainty or general information), both groups reported the posttest state IU, worry, and anxiety. All surveys were administered using the Google Forms platform. The ethical committee of the Faculty of Philosophy (University of Novi Sad) approved the study, and the study followed The Declaration of Helsinki.

Instruments

The Intolerance of Uncertainty Scale-11 (IUS-11; Mihić et al., 2014). For this study, the short Serbian IU scale (a short version of the IUS-27) was used to measure trait IU at the baseline (α = .92, *n* = 11). Aside from having one item less, the IUS-11 differs from the well-known IUS-12 (Carleton et al., 2007) in three other items. Despite the difference between IUS-11 and IUS-12, the Serbian version of the scale provides comparable results to the results of the studies where IUS-12 was used (e.g., Blanuša et al., 2020, 2021; Mihić et al., 2014; Volarov et al., 2021; Vukosavljević-Gvozden et al., 2021).

The scale was also adapted to measure state IU (Appendix 4); it was administered during the pretest (before the induction procedure) and posttest (after the induction procedure). The scale consists of 11 items, using a 5-point Likert scale (1 – "does not apply to me at all"; 5 – "applies to me completely"). Cronbach's Alpha calculated on the pretest and posttest data was excellent (α = .91 and .95, respectively).

The Depression, Anxiety, and Stress Scale-21 – the Anxiety subscale (DASS-21; Jovanović et al., 2014). As a measure of state (somatic) symptoms of anxiety, a subscale from the DASS-21 was used. The Anxiety subscale is comprised of 7 items, using a 4-point Likert scale (0 = "does not apply to me at all"; 3 – "applies to me very much or most of the time"). Cronbach's Alpha calculated on the pretest and posttest data was α = .83, and α = .82, respectively.

State worry. State worry was measured using a single item "*How much do you worry right now?*", which asked the participants to rate their worry on a 7-point scale (1 – "not at all"; 7 – "extremely").

Results

The means and standard deviations calculated for the variables in the study, separately for the experimental and control groups, are shown in Table 1. When it comes to skewness and kurtosis, the data did not substantially deviate from normality (i.e., skew values lower than ±2 [Hair et al., 2010] and kurtosis values lower than ±7 [Byrne, 2016]).

Table 1

Descriptive statistics for the baseline, pretest, and posttest measures in both experimental (n=31) and control (n=31) groups

		M	SD	*Skew*	*Kurtosis*
Experimental group					
trait IU	baseline	32.32	9.36	0.31	-1.02
state IU	pretest	27.90	9.63	0.25	-0.44
	posttest	31.74	11.91	0.16	-0.79
state anxiety	pretest	4.90	4.05	1.20	1.45
	posttest	6.58	4.26	0.49	-0.63
state worry	pretest	3.94	1.34	0.13	-1.11
	posttest	4.58	1.43	-0.06	-0.85
Control group					
trait IU	baseline	27.87	8.85	0.79	-0.21
state IU	pretest	22.71	7.01	0.41	-0.66
	posttest	24.87	8.06	0.44	-0.82
state anxiety	pretest	3.71	3.49	1.69	3.94
	posttest	4.26	3.52	0.91	0.20
state worry	pretest	3.90	1.22	0.08	-0.98
	posttest	3.97	1.42	-0.01	-0.95

Note: Trait measure was collected as a baseline, but at a different time point than the pretest measures.

To check whether randomization was successful, the groups were compared on the pretest scores. The groups did not differ significantly in the trait IU, $t(60) = 1.93$, $p = .059$, state worry $t(60) = 0.99$, $p = .921$, and state anxiety, $t(60) = 1.24$, $p = .219$, but the effect sizes were medium in trait IU ($d = -0.49$) and small in state anxiety ($d = -0.32$).

However, the groups did significantly differ in the pretest state IU, with the experimental group reporting higher state IU scores compared to the control group, $t(60) = 2.43$, $p = .018$, $d = -.62$. Group nonequivalence, regardless of a randomized assignment, is nevertheless not surprising in small samples (i.e., Strube, 1991).

A one-way ANCOVA was conducted to compare the experimental and control groups on the posttest state IU, controlling for the pretest state IU scores. The analysis yielded non-significant differences between the experimental and control groups on the posttest state IU scores, $F(1, 59) = 1.46$, $p = .231$, $\eta_p^2 = .024$. Following a recommendation that covariates should not be chosen based on baseline differences (i.e., de Boer et al., 2015), a one-way ANCOVA was repeated including all baseline (pretest) measures as covariates (trait IU, pretest state IU, anxiety, and worry). Such a model, again, did not reveal significant group differences, $F(1, 56) = 1.45$, $p = .233$, $\eta_p^2 = .025$. However, our study was underpowered to detect potential group differences ($1-\beta = .52$ and

.53, respectively; G*Power 3 [Faul et al., 2007]). In addition, two paired sample *t*-tests were conducted to compare the pretest and posttest scores on state IU in experimental and control groups independently. The obtained results revealed that there was a significant increase in state IU in the experimental group, $t(30) = -2.83$, $p = .008$, $r_{t1t2} = .78$, with a medium-sized effect, $d = -0.34$, but a non-significant increase in state IU in the control group, $t(30) = -1.97$, $p = .058$, $r_{t1t2} = .68$, and the effect size was small, $d = -0.28$.

Two mixed ANOVAs were also conducted to test the within– and between-subjects effects using state anxiety and state worry scores as dependent variables, respectively. The first mixed ANOVA revealed a significant main effect of the measurement time point (pretest and posttest) on state anxiety, $F(1,60) = 7.94$, $p = .007$, $\eta_p^2 = .117$, with the participants showing greater average state anxiety on the posttest ($M = 5.42$, $SE = 4.97$) than on the pretest ($M = 4.31$, $SE = 4.81$). The main effect of the condition was not statistically significant, $F(1,60) = 3.87$, $p = .054$, $\eta_p^2 = .061$; experimental group, $M = 5.74$, $SE = .63$, control group, $M = 3.98$, $SE = .63$. There was no statistically significant measurement time point by condition interaction, $F(1,60) = 2.04$, $p = .158$, $\eta_p^2 = .033$.

Finally, the results of the mixed ANOVA suggested that there was a significant main effect of the measurement time point on state worry, $F(1,60) = 5.27$, $p = .025$, $\eta_p^2 = .081$, with the participants showing greater average state worry on the posttest ($M = 4.27$, $SE = .18$) compared to the pretest ($M = 3.92$, $SE = .16$). There was no significant main effect of condition on state worry, $F(1,60) = 1.09$, $p = .299$, $\eta_p^2 = .018$, and no significant measurement time point by condition interaction, $F(1,60) = 3.52$, $p = .065$, $\eta_p^2 = .055$.

Discussion

In this study, we aimed at testing whether an abbreviated state IU induction procedure proposed by Mosca et al. (2016) could be used to induce state IU among study participants in Serbia. In addition, we tested whether this procedure could also affect state anxiety (anxious arousal, somatic anxiety) and state worry (anxious apprehension). After controlling for the pretest state IU scores, due to unsuccessful randomization, the study results revealed non-significant differences between the experimental and control groups on the posttest state IU scores. Thus, the obtained results are not in line with the results obtained by Mosca and colleagues (2016), while, at the same time, they cannot be entirely compared with the results provided by Granier and Ladouceur (2004) because those authors did not include a control group in their study. Yet, it must be noted that our study was underpowered. Furthermore, although randomization was not successful and there were group differences in the initial levels of state IU, the task did elicit at least some degree of IU if

we take into account the pretest-posttest scores changes in each group separately. This increase in state IU was also captured when the pretest and posttest state IU scores were compared in Granier and Ladouceur's study (2004). It is left to be further explored whether the induction procedure effects would be captured better with a larger sample size and/or with equal pretest scores between the groups.

Although it was conducted virtually, the induction procedure seems feasible. After the study session had been completed, the investigator discussed the procedure with the participants. Most of the participants reported that the study design was interesting, that the instructions were easy to follow, and that the overall procedure was not time-consuming. They did not report having trouble understanding and using the VAT by themselves (which is very important, considering that Mosca and colleagues [2016] aimed to develop this part of the procedure in a way that participants could complete it by themselves without the guidance of the researcher). Thus, the participants were capable of completing the protocol in an online setting.

The study has potential disadvantages. Although participants received an email prior to the study session explaining that it was very important that they were alone in the room during the session and without distractions, the experimental context was not controlled by the investigator and was not kept constant among the participants. On the other hand, the fact that this was the same for both the experimental and control groups lowers the possibility that it could have had some detrimental effects on the procedure. However, a suggestion for future studies is to add a control variable, serving for the participants to report on a scale how successful they were in imagining the future life event and its potential consequences. This way, researchers could be able to identify those participants who may have been distracted during the experiment.

Another interesting finding was the significant main effect of the measurement time point on state anxiety and state worry, where both state anxiety and state worry increased from the pretest to posttest. The finding that shows an increase in state worry among those from the induced state IU condition is in line with the results reported by Granier and Ladouceur (2004) and by Mosca and colleagues (2016). These results are likely associated with the fact that both the experimental and control conditions included the VAT procedure. During the VAT, all participants were instructed to generate "*What if...*" sentences that are known as typical verbal representations of worry (Borkovec, 1984). Thus, it is plausible that this exercise may have elicited worry and accompanying somatic anxiety symptoms. This assumption is in accordance with anecdotal reports from some participants about how they had already started to feel anxious during and after the VAT. Two potentially valuable implications emerge from this finding. First, it seems that the VAT alone may be used to induce state worry in studies. Second, considering

the theoretical assumptions that IU underpins worry (i.e., Buhr & Dugas, 2006), future studies that would use this induction procedure should aim at addressing the question of whether this change in state worry is related to the VAT procedure or it is a consequence of raising state IU in the first place by using the entire procedure (the VAT + reading sentences).

Future studies should assess state IU, state worry, and state anxiety before the VAT, after the VAT, and after reading the sentences that are supposed to induce state IU to check whether some changes in state scores are already visible after the VAT. A condition that includes only reading the sentences (negative beliefs about the intolerance of uncertainty), but not the VAT, should also be considered. It is possible that reading general information unrelated to the event described using the VAT is not enough to distract some individuals (i.e., those with high trait IU) from thinking about that event. If this is the case, we could expect an increase in state IU, worry, and anxiety among vulnerable individuals even in the control group. Thus, it would be valuable to investigate whether the non-vulnerable and the vulnerable (based on trait IU levels) react differently to this procedure. Additionally, considering that in the previous studies (Granier & Ladouceur, 2004; Mosca et al., 2016) there was a "decreasing condition" after the VAT, we could assume that these researchers also speculated that the VAT alone could produce some effects (although they did not test this), and additional reading of sentences could increase state IU even more, or even decrease it (depending on the content of sentences).

In summary, although we cannot make any definite conclusions based on our results given all the mentioned limitations of the study, it is worth noting that all significant results are in line with theoretical expectations, suggesting that the used procedure could potentially do what it has been created for. In addition, we are aware that a direct comparison of our results with the results from previous studies is limited due to modifications that we applied to the procedure, as well as because our study was underpowered. Thus, ideally, a replication of the modified procedure in a large-scale study is needed before making definite conclusions about the procedure. However, if we bear in mind that pilot studies should not focus on hypothesis-testing, but rather consist of the pieces of information about the process of running the study, whether different elements of the procedure could work together, how participants perceive the study, etc. (e.g., Arain et al., 2010; Whitehead et al., 2014), we believe that our study provides valuable contribution to the body of knowledge obtained so far on the possibilities to experimentally manipulate state IU. The induction procedure designed for this study seems easy to administer, both virtually and in person. It is a promising tool that researchers could use to induce state IU (or even state worry), which is very important because investigating both state and trait IU can significantly enhance our understanding of emotional distress disorders.

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Declarations

Compliance with Ethical Standards. This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of the Faculty of Philosophy, University of Novi Sad (04/02/2021/ No.202103171552_tyos).

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

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

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References

Allan, N. P., Volarov, M., Koscinski, B., Pizzonia, K. L., Potter, K., Accorso, C., Saulnier, K. G., Ashrafioun, L., Stecker, T., Suhr, J., & Allan, D. M. (2021). Lonely, anxious, and uncertain: Critical risk factors for suicidal desire during the COVID-19 pandemic. *Psychiatry Research, 304*, 114144. https://doi.org/10.1016/j.psychres.2021.114144

Arain, M., Campbell, M. J., Cooper, C. L., & Lancaster, G. A. (2010). What is a pilot or feasibility study? A review of current practice and editorial policy. *BMC Medical Research Methodology, 10,* 67. https://doi.org/10.1186/1471-2288-10-67

Blanuša, J., Barzut, V., & Knežević, J. (2021). Intolerance of Uncertainty and Fear of COVID-19 Moderating Role in Relationship Between Job Insecurity and Work-Related Distress in the Republic of Serbia. *Frontiers in Psychology, 12,* 647972. https://doi.org/10.3389/fpsyg.2021.647972

Blanuša, J., Barzut, V., & Knežević, J. (2020). Direct and indirect effect of intolerance of uncertainty on distress during the COVID-19 pandemic. *Primenjena Psihologija, 13*(4), 473–487. https://doi.org/10.19090/pp.20.4.473-487

Borkovec T. D. (1985). Worry: a potentially valuable concept. *Behaviour Research and Therapy, 23*(4), 481–483. https://doi.org/10.1016/0005-7967(85)90178-0

Boswell, J. F., Thompson-Hollands, J., Farchione, T. J., & Barlow, D. H. (2013). Intolerance of Uncertainty: A Common Factor in the Treatment of Emotional Dis-

orders. *Journal of Clinical Psychology, 69*(6), 630–645. https://doi.org/10.1002/jclp.21965

Buhr, K., & Dugas, M. J. (2006). Investigating the construct validity of intolerance of uncertainty and its unique relationship with worry. *Journal of Anxiety Disorders, 20*(2), 222–236. https://doi.org/10.1016/j.janxdis.2004.12.004

Byrne, B. M. (2016). *Structural Equation Modelling with AMOS: Basic Concepts, Applications, and Programming* (3rd ed.). Routledge.

Carleton, R. N. (2016). Into the unknown: A review and synthesis of contemporary models involving uncertainty. *Journal of Anxiety Disorders, 39,* 30-43. https://doi.org/10.1016/j.janxdis.2016.02.007

Carleton, R. N. (2012). The intolerance of uncertainty construct in the context of anxiety disorders: theoretical and practical perspectives. *Expert Review of Neurotherapeutics, 12*(8), 937–947. https://doi.org/10.1586/ern.12.82

Carleton, R. N., Norton, M. A., & 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

Carleton, R. N., Thibodeau, M. A., Osborne, J. W., Taylor, S., & Asmundson, G. J. G. (2014). Revisiting the fundamental fears: Towards establishing construct independence. *Personality and Individual Differences, 63*, 94–99. https://doi.org/10.1016/j.paid.2014.01.040

de Boer, M. R., Waterlander, W. E., Kuijper, L. D., Steenhuis, I. H., & Twisk, J. W. (2015). Testing for baseline differences in randomized controlled trials: an unhealthy research behavior that is hard to eradicate. *The international journal of behavioral nutrition and physical activity, 12*(4). https://doi.org/10.1186/s12966-015-0162-z

Dugas, M. J., Freeston, M. H., & Ladouceur, R. (1997). Intolerance of uncertainty and problem orientation in worry. *Cognitive Therapy and Research, 21*(6), 593-606. https://doi.org/10.1023/A:1021890322153

Dugas, M. J., Gagnon, F., Ladouceur, R., & Freeston, M. H. (1998). Generalized anxiety disorder: A preliminary test of a conceptual model. *Behaviour Research and Therapy, 36*(2), 215–226. https://doi.org/10.1016/s0005-7967(97)00070-3

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research, 25*(5), 551–558. https://doi.org/10.1023/A:1005553414688

Dugas, M. J., Schwartz, A., & Francis, K. (2004). Intolerance of uncertainty, worry, and depression. *Cognitive Therapy and Research, 28*(6), 835-842. https://doi.org/10.1007/s10608-004-0669-0

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods, 39(2), 175–191. https://doi.org/10.3758/BF03193146

Fetzner, M. G., Horswill, S. C., Boelen, P. A., & Carleton, R. N. (2013). Intolerance of Uncertainty and PTSD Symptoms: Exploring the Construct Relationship in a Community Sample with a Heterogeneous Trauma History. *Cognitive Therapy and Research, 37*(4), 725–734. https://doi.org/10.1007/s10608-013-9531-6

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

Geiser, C., Götz, T., Preckel, F., & Freund, P. A. (2017). States and traits: theories, models, and assessment. *European Journal of Psychological Assessment, 33*(4), 219–223. https://doi.org/10.1027/1015-5759/a000413

Geiser, C., Keller, B. T., Lockhart, G., Eid, M., Cole, D. A., & Koch, T. (2014). Distinguishing state variability from trait change in longitudinal data: The role of measurement (non)invariance in latent state-trait analyses. *Behavior Research Methods, 47*(1), 172–203. https://doi.org/10.3758/s13428-014-0457-z

Grenier, S., & Ladouceur, R. (2004). Manipulation de l'Intole´rance a` l'Incertitude et Inquie´tudes. *Revue canadienne des sciences du comportement, 36*(1), 56–65.

Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2010). *Multivariate Data Analysis* (7th ed.). Pearson.

Hamaker, E. L. (2012). Why researchers should think "within-person": A paradigmatic rationale. In M. R. Mehl & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 43–61). The Guilford Press.

Jovanović, V., Gavrilov-Jerković, V., Žuljević, D., & Brdarić, D. (2014). Psychometric evaluation of the depression anxiety stress scales-21 (DASS-21) in a Serbian student sample. *Psihologija, 47*(1), 93-112. https://doi.org/10.2298/PSI1401093J

Ladouceur, R., Gosselin, P., & Dugas, M. J. (2000). Experimental manipulation of intolerance of uncertainty: a study of a theoretical model of worry. *Behaviour Research and Therapy, 38*(9), 933–941. https://doi.org/10.1016/s0005-7967(99)00133-3

McEvoy, P. M., & Erceg-Hurn, D. M. (2016). The search for universal transdiagnostic and trans-therapy change processes: Evidence for intolerance of uncertainty. *Journal of Anxiety Disorders, 41*, 96–107. https://doi.org/10.1016/j.janxdis.2016.02.002

Mahoney, A. E., & McEvoy, P. M. (2012). A transdiagnostic examination of intolerance of uncertainty across anxiety and depressive disorders. *Cognitive Behaviour Therapy, 41*(3), 212–222. https://doi.org/10.1080/16506073.2011.622130

Moises Jr, C. (2020). Online data collection as adaptation in conducting quantitative and qualitative research during the COVID-19 pandemic. *European Journal of Education Studies, 7*(11). http://dx.doi.org/10.46827/ejes.v7i11.3336

Mosca, O., Lauriola, M., & Carleton, R. N. (2016). Intolerance of Uncertainty: A Temporary Experimental Induction Procedure. *PLOS ONE, 11*(6), e0155130. https://doi.org/10.1371/journal.pone.0155130

Mihić, L., Sokić, J., Samac, N., & Ignjatović, I. (2014). Srpska adaptacija i validacija upitnika netolerancije na neizvesnost. [Serbian adaptation and validation of the intolerance of uncertainty scale]. *Primenjena Psihologija*, *7*, 347-370. https://doi.org/10.19090/pp.2014.3-1.347-370

Oglesby, M. E., Boffa, J. W., Short, N. A., Raines, A. M., & Schmidt, N. B. (2016). Intolerance of uncertainty as a predictor of post-traumatic stress symptoms following a traumatic event. *Journal of Anxiety Disorders, 41*, 82–87. https://doi.org/10.1016/j.janxdis.2016.01.005

Reuman, L., Jacoby, R. J., Fabricant, L. E., Herring, B., & Abramowitz, J. S. (2015). Uncertainty as an anxiety cue at high and low levels of threat. *Journal of Behavior Therapy and Experimental Psychiatry, 47*, 111–119. https://doi.org/10.1016/j.jbtep.2014.12.002

Rosser, B. A. (2019). Intolerance of uncertainty as a transdiagnostic mechanism of psychological difficulties: A systematic review of evidence pertaining to causality and temporal precedence. *Cognitive Therapy and Research, 43*(2), 438–463. https://doi.org/10.1007/s10608-018-9964-z

Saulnier, K. G., Allan, N. P., Raines, A. M., & Schmidt, N. B. (2019). Depression and intolerance of uncertainty: Relations between uncertainty subfactors and depression dimensions. *Psychiatry*, *82*(1),72-79. https://doi.org/10.1080/00332747.2018.1560583

Strube, M. J. (1991). Small sample failure of random assignment: A further examination. *Journal of Consulting and Clinical Psychology, 59*(2), 346–350. https://doi.org/10.1037/0022-006X.59.2.346

Volarov, M., Saulnier, K. G., Allan, N. P., Shapiro, M. O., & Mihić, L. (2021). Are we still uncertain about the latent structure of intolerance of uncertainty: Results from factor mixture modeling in a Serbian sample. *Journal of Affective Disorders, 294*, 505–512. https://doi.org/10.1016/j.jad.2021.07.081

Vukosavljević Gvozden, T., Baucal, A., Krstic, K., & Filipović, S. (2021). Intolerance of Uncertainty and Tendency to Worry as Mediators Between Trust in Institutions and Social Support and Fear of Coronavirus and Consequences of the Pandemic. *Frontiers in Psychology, 12,* 737188. https://doi.org/10.3389/fpsyg.2021.737188

Whitehead, A. L., Sully, B. G., & Campbell, M. J. (2014). Pilot and feasibility studies: is there a difference from each other and from a randomised controlled trial?. *Contemporary Clinical Trials, 38*(1), 130–133. https://doi.org/10.1016/j.cct.2014.04.001

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Eksperimentalna indukcija stanja netolerancije na neizvesnost – preliminarni rezultati

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Ovo pilot istraživanje je imalo za cilj proveru eksperimentalne procedure za indukovanje stanja netolerancije na neizvesnost (NN) na uzorku od 62 studenta osnovnih studija psihologije (M = 23.13, SD = 2.88, ženski pol 90.3%). Iako su slične procedure ranije upotrebljavane u drugim kulturološkim kontekstima, ovo je prvi put da se ovakvo istraživanje sprovodi u Srbiji. Koristili smo proceduru za indukciju koja se sastoji iz dva koraka. Prvi korak je podrazumevao opisivanje i analizu jednog predstojećeg idiosinkratičnog životnog događaja sa potencijalno lošim ishodom. U drugom koraku se od ispitanika zahtevalo da čitaju listu iracionalnih uverenja o neizvesnosti. Dodatno, ispitanicima smo zadali srpsku adaptaciju IUS-11 skale, supskalu anksioznost iz DASS-21 i jednoajtemsku meru kako bismo prikupili informacije o stanju NN, stanju anksioznosti i zabrinutosti. Rezultati ANCOVA-e ukazuju na to da se eksperimentalna i kontrolna grupa nisu značajno razlikovale u stanju NN nakon indukcije. Međutim, kada se skorovi sa pretesta i posttesta uporede u svakoj grupi posebno, čini se da je do značajnog porasta stanja NN došlo u eksperimentalnoj grupi, ali ne i u kontrolnoj. Dodatno, u istraživanju je dobijen značajan glavni efekat merenja na stanje anksioznosti i stanje brige. Nasuprot tome, nije pronađen značajan glavni efekat grupe, kao ni značajan efekat interakcije grupe i merenja. Iako rezultati nisu jednoznačni (potencijalno usled malog uzorka ispitanika), čini se da primenjena modifikovana procedura ima potencijal da indukuje stanje NN. U zaključnom delu rada razmatramo dobijene nalaze, izvodljivost procedure, kao i moguće modifikacije koje bi mogle da proizvedu jasnije efekte.

Ključne reči: netolerancija na neizvesnost, briga, anksioznost, eksperimentalna manipulacija

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Appendix 1
Standardized Sheet for the Vertical Arrows Technique

Zamislite JEDAN nepovoljan (negativan) životni događaj koji bi mogao da se desi u Vašoj budućnosti, a koji bi Vas učinio anksioznim (napetim, zabrinutim). Pokušajte da se što više uživite u sliku koju zamišljate. Zamislite tu sliku sa što je moguće više detalja. Zapišite detaljno na linijama događaj koji ste zamislili.
Šta ako bi se negativan događaj koji ste zamislili zaista dogodio? *(zapišite ispod 3 potencijalne posledice ovakvog ishoda)*

Posledica 1:	**Posledica 2:**	**Posledica 3:**
Šta ako bi se Posledica 1 zaista dogodila? **Zapišite posledice takvog ishoda.**	Šta ako bi se Posledica 2 zaista dogodila? **Zapišite posledice takvog ishoda.**	Šta ako bi se Posledica 3 zaista dogodila? **Zapišite posledice takvog ishoda.**

Posledica 1a	Posledica 1b	Posledica 1c	Posledica 2a	Posledica 2b	Posledica 2c	Posledica 3a	Posledica 3b	Posledica 3c

Appendix 2
Experimental Condition: Induction Sentences in the Serbian Language

Imajući u vidu negativni događaj koji Vam se može dogoditi u budućnosti, a čiji ste opis upravo pročitali, tokom naredna 2 minuta pažljivo pročitajte u sebi i sledeće rečenice trudeći se da se uživite u sadržaj. Dovoljno je da rečenice pročitate samo jednom.

Kad pomislim na taj MOGUĆI negativni događaj, teško mi je da živim u neznanju šta će se desiti. Frustrira me to što ne znam šta će mi se dogoditi; Ne znam šta me može snaći u budućnosti. To je van moje kontrole. I to je upravo ono što me muči, volim kada držim stvari pod kontrolom. Nemam predstavu šta će se dogoditi. Uznemirava me što ne znam šta će biti. Teško mi je da živim sa toliko mogućih ishoda. Zapravo, kad imam na umu negativni događaj koji sam opisao/la, postoji više od jednog mogućeg ishoda. Ne znam šta će biti sa mnom. Teško je živeti u neizvesnim okolnostima. Ne osećam se dobro kada je reč o bilo čemu što je neizvesno. Neprihvatljivo je živeti tako. Ne znam šta će se dogoditi. Trebalo bi da sam u mogućnosti da organizujem i planiram sve unapred, ali ne znam šta će mi budućnost doneti. Teško mi je živeti u neznanju. Neočekivani događaji me ekstremno uznemiravaju. Nije pošteno što ne postoje nikakve garancije u životu. Ne znam šta će mi se dogoditi. Ne mogu da živim u neizvesnim okolnostima. Teško mi je jer ne znam šta će mi se dogoditi. Teško mi je da živim sa tako puno mogućih ishoda. Ma šta ja radi/la, budućnost je i dalje puna neizvesnosti nad kojima nemam kontrolu. Kad imam na umu događaj koji sam opisao/la, ne znam šta će me snaći u budućnosti. Frustrira me što to ne znam, užasno je ne znati. Ne znam šta će mi se dogoditi. Teško je živeti u neizvesnosti. Ne osećam se lagodno u stvarima koje su neizvesne. Težak mi je život koji sa sobom nosi toliko različitih mogućih ishoda. Zaista, kada uzmem u obzir opisani događaj, moguće je više ishoda i na žalost, ne znam koji od njih će me zadesiti. Nije uopšte lako živeti u takvim okolnostima. Ne osećam se lagodno kada su stvari neizvesne. Neprihvatljivo mi je da živim tako!

Appendix 3
Control Condition: The List of General Pieces of Information

U naredna 2 minuta pročitajte pažljivo (u sebi) sledeće rečenice:

Tokio predstavlja najnaseljeniju metropolu na svetu. Broj stanovnika iznosi 34.900.000. Druga po redu najnaseljenija metropola na svetu je Njujork. Broj stanovnika iznosi 21.600.000. Treća po redu najnaseljenija metropola je Seul sa 21.150.000 stanovnika. Država koja broji najmanje stanovnika na svetu je grad-država Vatikan sa svojih 541 stanovnikom. Druga po redu država po maloj naseljenosti je Tuvalu sa 9981 stanovnikom. Svega 5% porođaja se dogodi u predviđenom terminu. Svaki čovek, pored otisaka prstiju, ima jedinstven otisak površine jezika koji može da služi u svrhe identifikacije. Skorašnja istraživanja su pokazala da je za adekvatno pranje ruku potrebno minimum 20 sekundi. Svaka pojedinačna kap krvi pređe svoj put kroz ljudski organizam približno za 20 s, u proseku. Nos i uši su delovi ljudskog tela koji nastavljaju da rastu tokom čitavog života. Najduža reka na svetu je reka Amazon i dugačka je 6.937km. Druga reka po dužini je reka Nil čija je dužina 6.695km. Najhladnija temperatura zabeležena je satelitskim merenjem na istočno-antarktičkoj visoravni 10. avgusta 2010. godine (-93,2°C). Najtoplije mesto na svetu je tzv. Dolina smrti u Kaliforniji (56,7 ° C). Najviša zgrada na svetu je Burž Kalifa u Dubajiu (838 metara). Najstariji muzej na svetu je Kraljevski artiljerijski muzej u Londonu koji je otvoren za javnost 1660. godine. Mesto sa najviše padavina na svetu je Mavsinrama, u Megalaji, Indija. Tamo svake godine padne oo 11.873mm padavina. Najskuplje putovanje na svetu bila je poseta Internacionalnoj svemirskoj stanici i koštalo je 26 miliona evra. Najbrži čovek na svetu u trci na duge staze je ujedno i čovek koji drži svetski record u maratonu (42km i 195m). Trenutni nosilac ove titule je Dennis Kipruto Kimetto iz Kenije. Najveća brzina dostignuta skokom u atmosferu sa visine od 38 969m je 1.137 km/h. Najveća brzina zvanično registrovana u trkama na kratke staze zabeležena je u trkama na 100 i 200 metara sprintom. Rekord trenutno drži Jamajčanin Jusein Bolt. Najstarija žena na svetu živela je 122 godine i 164 dana. Najstariji muškarac na svetu živeo je 116 godina i 54 dana. Najviši čovek na svetu bio je visok 2,72m i bio je težak 220kg.

Appendix 4
The Serbian Intolerance of Uncertainty Scale – 11 (state version)

Imajući u vidu događaj (aktivnost) koji Vam predstoji, odgovorite u kojoj meri se slažete sa sledećim trvdnjama. Brojevi znače sledeće:

1 – uopšte se ne odnosi na mene
2 – pomalo se odnosi na mene
3 – umereno se odnosi na mene
4 – veoma se odnosi na mene
5 – u potpunosti se odnosi na mene

1	Neizvesnost mi trenutno život čini nepodnošljivim.	1	2	3	4	5
2	Neizvesnost me trenutno sprečava da živim život punim plućima.	1	2	3	4	5
3	Sada kada treba da delujem, neizvesnost predstojećeg događaja (aktivnosti) me paralište.	1	2	3	4	5
4	Sada dok sam u neizvesnosti, ne mogu dobro da funkcionišem.	1	2	3	4	5
5	Sada bi me i najmanja sumnja mogla sprečiti da delujem.	1	2	3	4	5
6	Trenutno ne mogu da se opustim ako ne znam šta mi donosi sutra.	1	2	3	4	5
7	Ovog momenta sam veoma uznemiren/a zbog mogućih nepredvidivih događaja.	1	2	3	4	5
8	Nervira me što nemam sve informacije koje su mi potrebne u vezi sa događajem (aktivnosti) koji mi predstoji.	1	2	3	4	5
9	Razmišljam kako da po svaku cenu izbegnem neizvesnost.	1	2	3	4	5
10	Trenutno ne mogu da podnesem nenadane situacije.	1	2	3	4	5
11	U ovom trenutku bih najradije izbegao/la sve neizvesne situacije.	1	2	3	4	5