# The Evolution of Risk Attitudes: A Panel Study of the University Years

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#### Abstract

We analyze a unique longitudinal dataset of university students to investigate the stability of risk preferences over a five-year period. Our findings indicate that, overall, subjects' risk tolerance, as measured by incentivized lottery choices, tends to increase over time, while it decreases when assessed through a self-reported survey question. Furthermore, we explore the influence of negative experiences and emotions on the temporal changes in subjects' risk tolerance elicited by the incentivized measure proves to be more robust, whereas the survey measure exhibits greater sensitivity to negative shocks. These results enhance our understanding of how risk preferences evolve over time and emphasize the importance of employing appropriate measurement methods when investigating risk attitudes.

Keywords: Risk Preferences, Risk-Preference Measures

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## 1 Introduction

We use a longitudinal panel study to examine changes in the risk preferences of a cohort of undergraduate students over five years, from matriculation until one year past graduation (2016-2021). Using two different measures, we elicit the students' risk preferences prior to matriculation and then multiple times as they move through their undergraduate career and into the work force. We then examine whether and how preferences change over time.

We are not the first to ask whether risk preferences are stable over time. However, our study follows a sample of individuals for five years during a particularly formative period of their lives, providing us insight into the development of long-term preferences. The study also includes information concerning our subject's life experiences throughout their college and into their post-college career.

We focus on two distinct measures of risk attitudes: an incentivized lottery-choice task by Eckel and Grossman (2008a) as adapted in Dave et al. (2010), and a validated nonincentivized survey measure of self-reported willingness to take risk based on questions in the German Socio-Economic Panel (SOEP) (Dohmen et al., 2011). Subjects in our panel repeated these measures several times over the five-year period. The aggregate results show that subjects' willingness to take risks increases over this time period under the incentivized lottery-choice measure, but decreases when using the survey measure.

This is curious and troubling if we believe that all measures of risk aversion assess the same property of an individual's preferences. While several studies have documented instability of preferences across different measures,<sup>1</sup> others have argued that this survey measure in particular has equal or superior validity as a measure of risk tolerance as compared to incentivized elicitations.<sup>2</sup> Our study shows that conclusions about the comparability of the measures should not rest on a simple cross-sectional correlation, but that the two measures

<sup>&</sup>lt;sup>1</sup>Beginning with Slovic (1962), many authors have noted the inconsistency of risk preferences across different measures. See Eckel (2019) and the references therein for a discussion.

<sup>&</sup>lt;sup>2</sup>Galizzi et al. (2016) and Falk et al. (2018) provide large-scale studies relating preferences measures across time and with respect to specific behaviors.

can exhibit important differences in trends over time.

We also ask whether negative life experiences impact risk preferences. Our panel experienced the COVID-19 pandemic during their last semester of university. Our findings indicate that higher COVID-19 threats reduced risk tolerance as assessed by the survey measure, while the lottery-choice measure remains stable during the pandemic. We also focus on the impact of negative emotions during the pandemic on subjects' risk preferences. Our results indicate that the survey measure is more responsive to negative emotions, with sadness and fear reducing risk tolerance, and anger and hostility increasing risk tolerance. Consistent with the results from COVID-19 threats, the risk preference measured by lottery choice is less responsive to subjects' experiences of negative emotions.

Finally we ask whether one measure or the other better predicts behaviors associated with the pandemic. After all, we would like to know whether risk preferences are associated with observed and self-reported behaviors. We find mixed results. Overall, the survey measure is more related to changes in pandemic precautionary behaviors. Our study captures the period of confusion about what to do at the outset of the pandemic. It then remeasures what subjects were doing as the scope of COVID-19 became much clearer. When we turn to self-reported likely behaviors. Neither the incentivized nor the survey measure do well in predicting what respondents do in response to the pandemic.

Our study underscores the importance of using appropriate measures. It also points out that external factors can impact risk attitudes over time, and should be taken into account when studying their evolution. Finally, it raises concerns about relying on a single type of measure when predicting behavior in a highly uncertain environment.

## 2 Motivation

Numerous studies explore whether risk preferences are stable over time, across contexts, and with respect to alternative measures of preferences. The instability of risk preferences can be conceptualized in at least two different ways: in the long term, risk preferences may change as individuals mature; in the short term, risk preferences can be affected by life experiences. For lifetime risk preference evolution, there is quite a bit of evidence that as individuals grow older, they become less willing to take risks (Dohmen et al., 2011, 2017; Schildberg-Hörisch, 2018). Moreover, there are also studies showing how exogenous shocks can impact risk preferences, temporarily or longer-term. For example, Meier (2022) found that losing a parent or a child significantly reduces risk taking. Bandyopadhyay et al. (2021) observe subjects weekly over a 12-week window, and provide evidence that both male and female subjects' preferences are responsive to their stress and happiness levels. Major events such as natural disasters also affect risk preferences in their wake, as shown by Eckel et al. (2009) and others.

Economists and psychologists have developed diverse experimental methods to elicit and evaluate individual risk preferences (see Charness et al. (2013) for a review). Comparisons of the various risk-preference measures have focused on their ability to predict risky behavior, such as financial portfolios, insurance purchases, or health-related choices (Dohmen et al., 2017; Charness et al., 2020). However, little attention has been paid to differences in the stability of alternative preference measures over time, or whether the measures vary in their response to life events or emotional states. Many researchers have attempted to assess the impact of the COVID-19 pandemic on preferences, and several have noted that the answer depends on how preferences are measured. For example, Zhang and Palma (2022) find that incentivized measures are more robust during the pandemic, while context-based survey measures indicate reduced risk tolerance during the pandemic. Adema et al. (2022) find that during the pandemic, the willingness to take risks increased if measured by incentivized methods, but decreased if measured by self-reported survey questions. Notice that both studies estimated the impact of COVID-19 on risk preferences at an aggregate rather than an individual level.

Our study adds to the discussion of risk preference elicitation by comparing two distinct

methods in investigating the stability of risk preferences. In particular, our investigation is divided into two strands. First, following previous studies, we assess the evolution of risk preferences over time at an aggregate level across all subjects. Second, we evaluate the impact of COVID-19 threats and negative emotions on the (in)stability of risk preferences at an individual level.

## **3** Experimental Design and Procedures

Our data come from a panel study examining the evolution of preferences from just before matriculation, through the four years that a student was enrolled in a university, and continuing for more than a year after graduation. Full details of the study are provided in the Supplemental Information, Section A. Prior to matriculation, a cohort consisting of two-thirds of the class of 2020 at a single university was recruited into this study. That panel of students was recontacted at numerous points during their college career and participated in further studies, which examined various different social and economic preferences. In this paper we focus only on subjects' risk preferences. It is important to note that by the end of the study just over 60 percent of the subjects had dropped out (see Table 1. Much of the attrition was due to difficulties in contacting subjects during the COVID-19 pandemic, which occurred just as the participants were graduating, and the fact that subjects post-graduation and did not respond to email solicitations. Not all subjects participated in every phase of the overall study - many moved in and out of studies. In the analysis reported below we focus on the 150 respondents who participated in every phase of the study.

Two types of measures are used to elicit subjects' risk preferences. The first is a lottery choice task which was originally developed by Eckel and Grossman (2002, 2008a) and further developed by Eckel et al. (2009) and Dave et al. (2010), in which subjects are presented with a menu of six lotteries, all with equal probability of a high or low outcome. The outcomes are structured so that the lotteries increase in expected return and variance for lotteries

1-5, but lottery 6 has only an increase in variance, maintaining the same expected value as lottery 5. The first lottery gives the subject a \$10 payoff for sure, while the sixth lottery is the most risky with the highest variation in payoffs, returning \$0 and \$28 with equal probability. Subjects are asked to choose their most-preferred lottery from among the six, and then actually play this lottery to determine their payoff. Their choices reveal their risk preferences. See Figure B2 in Supplemental Information B in the Supplemental Information for instructions for this task.<sup>3</sup>

The second measurement is the self-reported risk tolerance assessment as used in the German Socio-Economic Panel and described in Dohmen et al. (2011), in which subjects report their self-perception of their desired level of risk tolerance on a scale of 0 to 10, with 0 representing the most risk averse ("I avoid taking risks"), and 10 representing the most risk taking ("I enjoy taking risks") (see Figure B1 B in the Supplemental Information). These measures differ in several aspects. The first is incentivized, while the second is not. In addition the first is an actual risky choice that reveals risk preference, while the second is a self-reported subjective assessment of willingness to take risks.

We repeated these two risk measurement tasks at irregular intervals from July 2016 to June 2021. Table 1 lists the timeline of the studies and which measures were included in each study wave. Additional information was collected about subjects over time (including demographic and attitudinal information).

In order to address potential concerns that the Class of 2020 may have been unique in some unforeseen manner, or that the behavior of subjects changed due to repeated exposure to measures, we include a smaller sample of subjects from the graduating Classes of 2021, 2022, and 2023 in some of the analysis below. As with the Class of 2020, these groups each were given the same study questions one month prior to matriculation. In addition we recruited "untouched" students from the same class as the primary cohort, the Class of

<sup>&</sup>lt;sup>3</sup>This measure is widely used in laboratory experiments, online experiments, and lab-in-the-field experiments. We have chosen this task due to its simplicity and its minimal demands on participants' numerical abilities. See Dave et al. (2010) for the discussion of the simplicity and external validity of this task, in comparison to the lottery choice task developed by Holt and Laury (2002).

	Lottery Choice	SOEP Survey	N. of Subjects
Wave 1 (July 2016)	$\checkmark$	$\checkmark$	553
Wave 2 (October 2017)	$\checkmark$	$\checkmark$	488
Wave 3 (March $2020$ )	$\checkmark$	$\checkmark$	404
Wave 4 (April 2020)	$\checkmark$	$\checkmark$	402
Wave 5 (July 2020)		$\checkmark$	282
Wave 6 (October 2020)		$\checkmark$	219
Wave 7 (June 2021)	$\checkmark$	$\checkmark$	221

Table 1: Study Contents and Timeline

<sup>1</sup> In total, 150 subjects participated in all 7 waves of studies;

<sup>3</sup> This table only contains a subset of the tasks from the larger panel study. "Lottery Choice" is the lottery-choice task from Dave et al. (2010). "SOEP Survey" is the risk survey question from the German Socio-Economic Panel.

2020, who never participated in any of the previous studies. Just prior to graduating the core cohort and all of the supplementary samples completed the same set of study questions as the core cohort had faced in the initial survey prior to matriculation.<sup>4</sup>

#### 4 Results

We code the two risk measures so that a higher value indicates stronger risk tolerance. Following previous practice (Dohmen et al., 2017), we standardize the two risk measures to have a mean of zero and a standard deviation of one using the full sample, making these two variables comparable to each other and comparable across different waves and cohorts of subjects. Therefore, unless explicitly noted otherwise, all subsequent analyses pertaining to these two risk measures in this section are conducted using the standardized values. Moreover, we focus on the 150 subjects who participated in all of the seven waves of studies listed in the previous section.<sup>5</sup>

<sup>&</sup>lt;sup>4</sup>With the onset of COVID-19 additional funding was obtained allowing us to recruit more subjects. Therefore, those students (Classes of 2021, 2022, 2023, and the untouched subjects) were included in Waves 4 through 7. We use those subjects in order to demonstrate that the Class of 2020 was not unusual.

<sup>&</sup>lt;sup>5</sup>See Table C1 in the Supplemental Information Section C for the comparison between those who are in the panel vs. those who dropped out. The comparison indicates that there are no systematic differences



Figure 1: Distribution of Choices in Risk Measure Tasks

Note. Data in this table is restricted to the 150 panelists who participated in all studies. The risk attitudes in the left panel are measured by the lottery choice in Dave et al. (2010), and the risk attitudes in the right panel are measured by the SOEP survey question. Both panels report the distribution of unaltered task responses, without standardizing the value. p-values are from the Kolmogorov–Smirnov tests comparing the risk tolerance between men and women.

#### 4.1 Descriptive Statistics: Subject Characteristics

Table 2 summarizes the demographic information for subjects. 56% of the subjects are women, and the majority of subjects are Asian (38%) and Caucasian (32.7%). In Figure 1, we plot the distribution of subjects' responses to the two risk-measure tasks, divided by gender: the left panel is the distribution for the incentivized lottery choice task, and the right panel is for the SOEP risk survey question. Both panels are restricted to the 150 panelists who participated in all studies. We replicate the typical finding that women are more risk-averse than men. For both measures, the distribution of risk tolerance among men is more left-skewed than among women, indicating that women are more risk-averse. The distributions and gender differences of both panels are similar to the distributions of risk measures in previous studies(Charness and Gneezy, 2012; Dohmen et al., 2005; Dave et al., 2010).

between these two samples.

%Female	56.7
%African American	2.7
%Asian	38.0
%Caucasian	32.7
%Hispanic/LatinX	12.0
%Other	4.0
%Foreign	8.7
%Unknown	2.0

Table 2: Descriptive Statistics of the Panel of Class of 2020

Number of Subjects 150

<sup>1</sup> Data in this table is restricted to the 150 panelists from the Class of 2020 who participated in all studies.

Table 3: Spearmans' rho for Correlations between Lottery Choices and SOEP Survey Responses

	Spearman's rho	p-value
All	0.23	< 0.001
Female	0.20	< 0.001
Male	0.20	< 0.001
Wave 1	0.15	0.073
Wave 2	0.24	0.004
Wave 3	0.34	< 0.001
Wave 4	0.24	0.003
Wave 7	0.30	< 0.001

 $^{1}$  Data in this table is restricted to the 150 panelists from the Class of 2020 who participated in all studies.

In Table 3 we examine the correlations between the lottery choice measure and the survey measure using Spearman's rank correlation coefficient, examining the associations for males and females and across different study waves. The key finding from this table is that these two risk measures exhibit a moderate yet statistically significant correlation, suggesting a meaningful relationship between the incentivized lottery-choice task and the self-reported willingness to take risks as measured by the survey question.



Figure 2: Average Risk Measures Across Time

Note. Data in this table is restricted to the 150 panelists who participated in all studies. The risk attitudes in the left panel are measured by the lottery choice in Eckel and Grossman (2008a), and the risk attitudes in the right panel are measured by the SOEP survey question. Both risk measures are standardized to mean 0 and standard deviation 1 using the whole sample in all waves. Vertical bars indicate the confidence intervals of means. The vertical dash lines are the wave of study when Rice University locked down because of COVID-19 (March 2020).

#### 4.2 Aggregate-Level Stability of Risk Attitudes Over Time

To what extent are risk preferences stable for the Class of 2020 panel? Figure 2 displays the average of the standardized risk measures across all waves of studies conditional on gender. The left panel displays the average risk attitudes measured by the incentivized lottery choice task, and the right panel is based on the SOEP survey question. Notably, from month -1 to month 60, the left panel suggests an upward trend in risk tolerance, in contrast to a downward trend indicated by the right panel. This divergence in temporal changes between the two risk-elicitation methods suggests that the stability of risk preferences may depend on the methods employed for eliciting risk preferences.

To further validate the stability of risk preferences over time, Table 4 reports the panel regression of subjects' risk tolerance, from one month before matriculation (July 2016) to one year after graduation (June 2021).<sup>6</sup> Columns (1) and (2) use the lottery choice from Eckel-Grossman (1-6) as the dependent variable, while Columns (3) and (4) include the

 $<sup>^{6}</sup>$ In Table C5 in the Supplemental Information we included the entire sample for the Class of 2020 for the same regression analysis as a robustness check and we find similar results.

response to the SOEP survey on risk attitude as the dependent variable. In column (1), the coefficient associated with the variable "Months From Matriculation" is positive and significant ( $\beta = 0.004$ ). The magnitude of this coefficient is robust after controlling for race in Column (2). Therefore, using the lottery choice as a measure of risk attitude, subjects are becoming 0.004 standard deviation more risk tolerant for each additional month. Extrapolated by a year, this magnitude leads to a 0.048 standard deviation increase in risk tolerance. In addition, the coefficient for the interaction between the Female indicator and the "Months From Matriculation" is negative but not significant, implying the absence of gender differences in the increasing trend of risk tolerance.

By contrast, when we use the survey measure of risk attitudes (Column 3), the coefficient associated with the variable "Months From Matriculation" is negative and statistically significant( $\beta = -0.004$ ); extrapolated over a year, the risk tolerance measured by the survey decreases by 0.048 standard deviation for an additional year post-matriculation. Notice that this effect size is higher than the impact of aging found in Dohmen et al. (2017) using the same survey measure, where an additional year of age decreased risk attitudes by about 0.021 standard deviation. One possible explanation of this difference could be the demographic differences between the two studies: our panel consists primarily of young university students, whereas the sample in Dohmen et al. (2017) encompasses a broader age range. This result suggests that students' risk tolerance, as self-reported in the survey, decreases over time, which contrasts with the findings obtained from the lottery-choice measure.

One possible confounding effect is the "participation effect": subjects get used to these two risk-elicitation tasks through those repeated studies, and therefore we observe an increasing/decreasing trend for the lottery-choice task/SOEP survey response. In order to deal with these potential confounds, we excluded a group of students in the Class of 2020 from participating in the study until Wave 3 when they became senior undergraduates. As described in Section 3, we call this group of students "untouched seniors". Because this group of students never participated in any studies until Wave 3 in March 2020, we expect

	DV: Lotte	ery Choice	DV: SOEI	P Survey Measure	
	(1)	(2)	(3)	(4)	
Months From Matriculation	$0.004^{*}$	0.004*	-0.004**	-0.004**	
	(0.002)	(0.002)	(0.002)	(0.002)	
Female	-0.439***	-0.435***	-0.243*	-0.258*	
	(0.138)	(0.138)	(0.145)	(0.145)	
Female $\times$ Months From Matriculation	-0.004	-0.004	-0.003	-0.003	
	(0.003)	(0.003)	(0.002)	(0.002)	
Constant	0.059	-0.028	0.179	$0.685^{*}$	
	(0.105)	(0.173)	(0.116)	(0.363)	
Observations	749	749	1050	1050	
Individuals	150	150	150	150	
Characteristics Controls	No	Yes	No	Yes	

Table 4: Panel Regression: Stability of Risk Preferences

<sup>1</sup> Standard errors clustered at individual level are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

<sup>2</sup> The dependent variables of Model (1) and (2) are the risk attitude measured by the lottery choice in Eckel and Grossman (2008a), and the dependent variables of Model (3) and (4) are the risk attitude measured by the SOEP survey question. All variables are standardized to mean 0 and standard deviation 1 using the whole sample in all waves.

<sup>3</sup> Individual characteristics controls include race dummies.

that if there exists a participation effect, their responses should be systematically different from the responses from the subjects who have participated in our studies before Wave 3. Therefore, in Table 5 we make comparisons of the risk measures between the untouched seniors with the Class of 2020. We also extract the 150 panelists from the Class of 2020 to make comparison with the untouched seniors. From this table, we do not see systematic differences in risk measures between subjects who have participation experiences and who do not. The only marginal exception emerged in the lottery choices, where the difference between the panelists and untouched seniors is marginally significant (p = 0.072). However, the average risk tolerance among the panelists is lower than that of the untouched seniors, contradicting the idea that a participation effect causes the increasing trend in risk tolerance observed in Table 4. Therefore, we do not find evidence for participation effects as a reason for the increasing/decreasing trends of the two risk measures.

We next explore the possibility that the pattern from Table 4 is a cohort-specific pattern

		Lottery Choices	SC	DEP Risk Measures
	Mean	<i>t</i> -test with Untouched 2020 Cohort	Mean	<i>t</i> -test with Untouched 2020 Cohort
2020 Panelists	-0.220	p = 0.072	0.050	p = 0.343
2020 All Respondents	-0.109	p = 0.340	0.055	p = 0.229
Untouched Seniors	-0.030	_	0.151	—

Table 5: t-test of 2020 Panel vs. Untouched 2020 Cohort in Wave 3

<sup>1</sup> "2020 Panelists" contains 150 subjects who participated in all studies; "2020 All Respondents" contains the 404 subjects from the Class of 2020 who participated in Wave 3 (the 150 panelists are included as well); "Untouched Seniors" are 257 subjects who are also students from the Class of 2020 but were firstly introduced to our study, starting from Wave 3.

 $^2$  *p*-values are from two-sample *t*-tests. For example, for the row of "2020 Panelists", the *p*-value is from the *t*-test of the risk measure between the 2020 Panelists and the Untouched Seniors.

that only happened among the Class of 2020. In the Supplemental Information C, we compare the Class of 2020 with the Class of 2021, 2022, and 2023 prior to matriculation (see Table C2 and C3), and we find that with the lottery choice measure, the Class of 2021 is significantly more risk tolerant than other entering classes, while with the SOEP survey measure, the Class of 2023 is more risk seeking than the other entering classes. However, we do not find evidence that the Class of 2020 was systematically different from all other entering classes. Moreover, we compare the Class of 2020 with the Class of 2017 when they were seniors. The results from Table C4 in the Supplemental Information show no difference between these two cohorts in their fourth year regarding their two risk attitude measures. Therefore, we argue that the increasing pattern of risk attitudes measured by lottery choice and the decreasing pattern of risk attitudes measured by SOEP survey response are less likely to be cohort-specific patterns.

**Result 1.** During the 5 years from before matriculation to after graduation, subjects' risk tolerance measured by the incentivized lottery choices was increasing over time, but the risk tolerance measured by the un-incentivized survey measure was decreasing over time.

#### 4.3 Individual Instability: The COVID-19 Pandemic Threat

In this subsection, we examine individual experiences to identify potential explanations for the contrasting risk-tolerance trends we observed between our two measures. First, we focus on the impact of the COVID-19 pandemic on subjects' risk attitudes. On March 13, 2020, the Trump Administration declared the pandemic a nationwide emergency. Rice University cancelled its classes for the week of March 9, 2020, a week prior to spring break. On March 12, 2020, Rice announced that the university would transition to remote teaching and all undergraduate students were asked to leave campus by March 25, 2020. Our wave 3 study was launched on March 17, 2020. Consequently subjects at this point were participating in a period of high uncertainty. At the time little was known about COVID-19. It is quite likely that wave 3 represents an inflection point for our participants and we might expect that risk preferences abruptly changed at this time.

For each subject, across waves 3 through 7, we measure threats from COVID-19 using the 7-day change in county-wide positivity rates given the subject's location on the day of participating in the study. Starting from Wave 4, we used each subject's IP address derived from Qualtrics and retrieved their county locations. COVID-19 positivity rates are taken from data reported by the Center for Systems Science and Engineering (CSSE) at the Johns Hopkins University (JHU) (Dong et al., 2020). The 7-day percentage point increase in positivity rate in each subject's county is used as a proxy for the threats from COVID-19.

Wave 3 did not collect subjects' IP addresses. Consequently, we adopt an alternative method to identify a subject's location. In that wave we asked subjects whether they were currently at home (75.7 percent), at the university (15.1 percent), or somewhere else (9.2 percent). For those who responded that they were at home, we used their home zip codes derived from administrative data. For those still on campus, we used the COVID-19 cases data in the Harris County in Texas. It is important to acknowledge that some zip codes may be associated with multiple county FIPS codes. For those home zip codes, we calculated the average of the 7-day percentage point increase across all associated counties, serving as the

best approximation for the pandemic threats for those specific subjects.<sup>7</sup>

Table 6 reports the panel regression examining the impact of COVID-19 shocks on each individual's risk preferences.<sup>8</sup> Columns (1) through (3) include subjects' Eckel-Grossman lottery choices as the dependent variable, while Columns (4) through (6) involve the SOEP survey measure as the dependent variable. In Column (1) and (4) we run a basic regression, only including months from matriculation, whether the subject was female, the interaction of months and gender, and the 7-day percentage point increase in positivity rate ("7-D pp INC" thereafter). In Columns (2) and (5) we further include the interaction of the female dummy variable and the 7-D pp INC. And in Columns (3) and (6) we control for subjects' race dummies.

In Columns (1) through (3), the coefficient associated with the variable "Months From Matriculation" is not statically significant, although the effect size, .003, is similar to what we find in Table 4. The coefficient associated with the "Positivity Rate" is positive, but not significant. Therefore, we do not find supporting evidence that the COVID-19 threat had an impact on subjects' risk tolerance measured by lottery choice. Conversely, when using the SOEP survey measure (Columns (4) through (6)), the "Positivity Rate" coefficient is negative and statistically significant, indicating that for every percentage point increase in the positive case in the past 7 days, subjects' risk tolerance decreases by around .4 standard deviations. The interaction between the "Positivity Rate" and being female is not statistically significant. This implies that there are no gender differences in the impact of pandemic threats on risk preferences elicited by the SOEP survey measure. To validate the robustness of the findings above, we also use the 30-day percentage-point increase of positivity rates as the measure of COVID-19 threats, which returns similar findings, as shown in Table C7 in Supplemental Information Section C.

The findings above are consistent with the findings from Zhang and Palma (2022) who

<sup>&</sup>lt;sup>7</sup>For Wave 1 and 2, the 7-day percentage point increase in positivity rate is coded as 0 for all subjects.

 $<sup>^{8}</sup>$ In Table C6 in the Supplemental Information we include the whole Class of 2020 for the same regression analysis in Table 6 as a robustness check. It yields similar results.

	DV:	Lottery Cl	noice	DV: SOH	EP Survey	Measure
	(1)	(2)	(3)	(4)	(5)	(6)
Months From Matriculation	0.003	0.003	0.003	-0.003*	-0.003	-0.003
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Female	-0.440***	-0.440***	-0.436***	-0.239*	-0.239*	-0.251*
	(0.138)	(0.138)	(0.138)	(0.145)	(0.145)	(0.145)
Female $\times$ Months From Matriculation	-0.004	-0.003	-0.004	-0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
7-D pp INC in Positivity Rate	1.116	1.290	1.261	-0.393**	-0.461**	-0.459**
	(0.797)	(0.887)	(0.901)	(0.157)	(0.219)	(0.219)
Female $\times$ 7-D pp INC in Positivity Rate		-0.410	-0.389		0.136	0.126
		(1.688)	(1.699)		(0.314)	(0.315)
Constant	0.063	0.064	-0.031	0.177	0.177	$0.682^{*}$
	(0.106)	(0.106)	(0.174)	(0.115)	(0.115)	(0.363)
Observations	738	738	738	1028	1028	1028
Individuals	150	150	150	150	150	150
Characteristics Controls	No	No	Yes	No	No	Yes

Table 6: Panel Regressions: Impact of COVID-19 Positive Cases on Risk Attitudes

<sup>1</sup> Standard errors clustered at individual level are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

 $^2$  The dependent variables of Model (1) and (2) are the risk attitude measured by the lottery choice in Eckel and Grossman (2008a), and the dependent variables of Model (3) and (4) are the risk attitude measured by the SOEP survey question. All variables are standardized to mean 0 and standard deviation 1.

<sup>3</sup> Individual characteristics controls include race dummies.

find that incentivized risk measures are stable during the pandemic. They also show that the context-based surveys (e.g., Domain Specific Risk Taking by Blais and Weber (2006) and the Sensation Seeking Scale by Zuckerman et al. (1964)) are more likely to be affected by the COVID-19. We extend their findings by including an unincentivized survey measure, i.e., the SOEP risk survey, into our study. Although the SOEP survey question does not include any concrete context, the risk attitude measured by it is still affected by the threats from the pandemic.

**Result 2.** Pandemic severity has a negative impact on the risk tolerance measured by the SOEP survey measure, but does not affect the risk preference measured by the incentivized lottery choice.

#### 4.4 Individual Instability: Experience of Negative Emotions

We also ask whether negative emotions affect risk preferences. The sudden onset of the pandemic and changes associated with the pandemic may have triggered emotional responses by subjects. Previous studies have shown that negative emotions can change people's risk preference (Kamstra et al., 2003; Eckel et al., 2009; Meier, 2022). In Waves 4 through 7, we collected subjects' frequency of experiencing 11 negative emotion items (see Figure B3 in the Supplemental Information for the screenshot of questions), such as feelings of loneliness, anger, and more. For each survey wave, we used confirmatory factor analysis with a varimax rotation for the 11 emotion items. We expected two things. First, we are sensitive to the possibility that emotions shifted over time with the severity of COVID-19 and other life experiences. Second, we anticipated two distinct factors pertaining to valence and arousal. Indeed, across these four waves, two factors consistently emerge. The first factor, henceforth referred to as "Sadness and Fear", is loaded on items capturing feelings related to sadness and fear. The second factor, designated as "Anger and Hostility", demonstrated strong loadings for items associated with anger and hostility. We then calculate factor scores for each dimension and use these in our analysis.

Table 7 presents the panel regression results, with the lottery choice as the dependent variable in Columns (1) and (2), and the SOEP survey measure as the dependent variable in Columns (3) and (4). We include the two factor scores, "Sadness and Fear" and "Anger and Hostility" from the factor analysis of the negative emotion items. Additionally, we introduce interactions between each factor score and the female indicator to assess gender differences in the impact of negative emotions on risk attitudes. In Columns (1) and (2), the coefficients associated with "Sadness and Fear" and "Anger and Hostility" are not statistically significantly affect subjects' risk attitudes as measured by lottery choices.

Conversely, in Column (3), we observe a statistically significant negative association between the "Sadness and Fear" score and risk tolerance measured by the SOEP survey  $(\beta = -0.223)$ . And this estimate is robust after controlling for for subjects' race and ethnicity in Column (4). Meanwhile, the "Anger and Hostility" score exhibits a statistically significant positive relationship with risk tolerance ( $\beta = 0.107$ ), although remains only marginally significant after adding individual controls in Column (4). These findings indicate that a higher frequency of experiencing sad and fearful feelings makes subjects less risk tolerant, while frequent experiences with anger and hostile feelings lead to some increase in subjects' risk tolerance. These findings align with Meier (2022), indicating that sadness leads to reduced risk tolerance, while anger leads to increased risk tolerance, with risk tolerance measured by the SOEP survey question. Furthermore, in Table C8 in the Supplemental Information we conduct a robustness check by including the whole Class of 2020 in the same regression analysis as in Table 7. We still find a statistically significant negative effect of "Sadness and Fear" on risk tolerance, while the positive effect of "Anger and Hostility" on risk tolerance loses statistical significance. Therefore, the negative impact of Sadness and Fear on the risk attitude measured by survey questions is more robust in our sample.

Therefore, we find a contrasting effect of negative emotions on the risk attitudes measured by incentivized lottery choice tasks and by survey questions: while the incentivized lottery choices appear robust in the face of negative emotional shocks, the responses in risk survey questions are more sensitive to such influences. This finding emphasizes the importance of utilizing different measurements of risk attitudes when exploring the impact of negative emotions on risk preferences.

We find only limited evidence for gender differences and negative emotions on risk attitudes. The interaction between "Sadness and Fear" and the female indicator is positive but not statistically significant ( $\beta = 0.142$  in Column (4)). Furthermore, the interaction between "Anger and Hostility" and the female dummy variable is marginally significant and negative ( $\beta = -0.117$  in Column 4), which reduces the positive effect of anger and hostility on risk tolerance. This finding provides some evidence that female subjects' risk attitudes seem to be less affected by anger and hostile feelings.<sup>9</sup>

	DV: Lotte	ery Choice	DV: SOEP	Survey Measure
	(1)	(2)	(3)	(4)
Female	-0.539***	-0.517***	-0.277**	-0.297**
	(0.132)	(0.132)	(0.136)	(0.135)
Sadness and Fear	-0.093	-0.124	-0.223***	-0.216***
	(0.087)	(0.085)	(0.071)	(0.073)
Female $\times$ Sadness and Fear	0.068	0.100	$0.151^{*}$	0.142
	(0.108)	(0.106)	(0.086)	(0.087)
Anger and Hostility	-0.003	-0.015	$0.107^{**}$	$0.107^{*}$
	(0.115)	(0.127)	(0.054)	(0.055)
Female $\times$ Anger and Hostility	-0.063	-0.029	-0.113	-0.117*
	(0.152)	(0.160)	(0.070)	(0.070)
Constant	$0.222^{*}$	0.154	-0.133	0.351
	(0.115)	(0.204)	(0.113)	(0.365)
Observations	300	300	600	600
Individuals	150	150	150	150
Characteristics Controls	No	Yes	No	Yes

Table 7: Panel Regressions: Impact of Negative Emotion on Risk Tolerance

<sup>1</sup> Standard errors clustered at individual level are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

 $^2$  The dependent variables of Model (1) and (2) are the risk attitude measured by the lottery choice in Eckel and Grossman (2008a), and the dependent variables of Model (3) and (4) are the risk attitude measured by the SOEP survey question. All variables are standardized to mean 0 and standard deviation 1.

<sup>3</sup> The variables "Sadness and Fear" and "Anger and Hostility" are the two factor scores from the factor analysis over subjects' responses to the questions on frequencies of 10 different negative emotions.

<sup>4</sup> Model (1) and (2) includes data from Waves 4 and 7, because we did not include the lottery choice task in Waves 5 or 6. Model (3) and (4) includes data from Waves 4, 5, 6, and 7, as we collected the SOEP survey risk measure for all these waves.

 $^5$  Individual characteristics controls include race dummies.

**Result 3.** Risk attitudes measured by incentivized lottery choices are stable in face of negative emotions, while risk attitudes measured by the un-incentivized SOEP survey measure are responsive to negative emotions: with sadness and fear significantly lowering risk toler-ance and anger and hostility leading to an increase in risk tolerance. Moreover, we observe

 $<sup>^{9}</sup>$ In Table C8 in the Supplemental Information, we do not find robust results supporting the gender differences in the impact of negative emotions on risk attitudes.

#### 4.5 Predictive Power of Risk Measures

To this point we find that the incentivized lottery choice measure of risk tolerance increases over time and is relatively stable given exogenous shocks. On the other hand, the widely used SOEP unincentivized measure of risk tolerance decreases over time, but is susceptible to exogenous shocks. The question remains which item should be used to predict behavior and willingness to engage in risky behavior?

Table 8: Descriptive Statistics of Ris	ky-Behavior In	ndices (2020 $Pa$	anelists)
	Wave 4	Wave 7	p-values
	(April 2020)	(June 2021)	from $t$ -tests
Precautionary Behavior Index	$0.713 \\ (0.174)$	$0.387 \\ (0.244)$	< 0.001
Regular Hazardous Behavior Index	2.064 (0.712)	1.902 (0.583)	< 0.001
Pandemic-Related Hazardous Behavior Index	$1.547 \\ (0.547)$	3.276 (0.809)	< 0.001
Individuals	150	150	

<sup>1</sup> This table contains the descriptive statistics of three risky-behavior indices for the 2020 Panelists who participated in all 7 studies (n=150);

 $^{2}$  Within each cell with two values, the top value is the mean, and the bottom value in the parenthesis is the standard deviation;

 $^3$  The last column presents the  $p\mbox{-values}$  from paired  $t\mbox{-tests}$  that compare Wave 4 and Wave 7 for each index.

We rely on two outcome measures that were salient during the last portion of our study. The first involves precautionary behaviors taken by individuals during the COVID-19 pandemic. Respondents were provided a list of 12 items (e.g. wearing a face mask) and asked whether they had engaged in the behavior in the prior two weeks. Figure B4 in the Supplemental Information lists those behaviors. We then calculate the proportion of behaviors engaged in by each individual. The same list of items was used in April 2020 (at the outset of the pandemic) and in June 2021. One should notice that the mean of this index is higher in June 2021 than in April 2020, indicating that respondents engaged in many more precautionary activities at the outset of the pandemic. One explanation is that at the outset of the pandemic, there was little clear guidance about appropriate behaviors; by June 2021 it was clearer as to which behaviors were most effective. This is borne out by the differences in means between the two periods (see row 1 of Table 8). Respondents engaged in many more precautionary activities at the outset of the pandemic. Furthermore, as highlighted by Smart and Polachek (2024), widespread distribution of the COVID-19 vaccine in 2021 led to vaccinated individuals engaging in more COVID-19-related risky behaviors.

The second outcome measure asks respondents about the likelihood they might engage in specific behaviors. Six items are taken from Blais and Weber (2006) which lists behaviors associated with different risk domains, including drinking heavily; having unprotected sex; driving without seat belt; driving motorcycle without helmet; sunbathing without sunscreen; going home alone at late night. A second set of three items were more closely related to behaviors surrounding the pandemic. These included: hanging out with friends; using public transportation; and attending services. All items were scored on a 5-point Likert scale, ranging from Very Unlikely to Very Likely. See Figures B5 and B6 in the Supplemental Information for the screenshots of full lists of questions.<sup>10</sup> Two separate indices were constructed by taking the average score. The first index is the "Regular Hazardous Behavior Index" and the second is the "Pandemic-Related Hazardous Behavior Index."

Our strategy at this point is to test whether the incentivized lottery choice measure or the SOEP survey measure best predicts actions to reduce exposure to COVID-19. We expect that those who are most risk-averse are also most likely to engage in precautionary actions.

Table 9 estimates the proportion of precautionary behaviors a respondent engaged in using our two measures of risk and a handful of control variables. A simple linear model is used. We separate each time period because respondents adopted different strategies to cope with the pandemic at different points in time. Columns (1) and (2) include the SOEP

<sup>&</sup>lt;sup>10</sup>One may notice that the lists of engagement items in Wave 4 (April 2020) and Wave 7 (June 2021) are not entirely consistent. These items were designed at different stages of the pandemic for various research purposes, not limited to the research questions addressed in this paper. For the sake of comparability, we have included only those items that are present in both Wave 4 and Wave 7.

risk measure and columns 3 and 4 include the lottery choice risk measure. Table C9 in the Supplemental Information is a robustness check using the unbalanced Class of 2020 as the sample.

Neither the SOEP survey measure nor the incentivized lottery choice measure predicts precautionary behaviors in April 2020 (columns (1) and (3) respectively). In June 2021 (Columns (2) and (4)), both measures are associated with a negative coefficient, both statistically significant, indicating that higher risk tolerance predicts fewer precautions. The independent effect of the SOEP is stronger than the incentivized lottery choice measure: the former decreases precautionary behaviors by more than 6 percent for those who exhibit the most risk, while the estimated coefficient for lottery choice is 4.4 percent. The stronger predictive power of risk measures on precautionary behaviors in June 2021 compared to April 2020 is consistent with the uncertainty around what was appropriate precautionary behavior in the early days of the pandemic. Respondents did not have clear directives about the most appropriate actions. In contrast, by June 2021, far more was known about appropriate actions. Furthermore, as highlighted by Smart and Polachek (2024), vaccinated people were more likely to engage in pandemic-related risky behaviors. The continued practice of such precautions in June 2021 could be interpreted as indicative of individuals' risk aversion, contrasting with the widespread precautionary measures driven by the overwhelming threat of COVID-19 in April 2020.

The pattern is less clear when we turn to estimating likely behaviors. We have two indices - one representing regular risky activities and the other pandemic-specific. In both instances, respondents were prompted to report their likelihood of engaging in the activities. Table 10 first estimates regular activities looking separately at distinct time periods and risk measures. Comparing columns (1) and (2) with columns (3) and (4), we find that the SOEP item predicts an increased likelihood of engaging in regular hazardous activities. However, the effect size is small, with a fully risk-seeking individual in either April 2020 or June 2021 leading to less than a 0.3-point increase in regular hazardous behaviors on the 5-point Likert

	DV	: Precautionar	y Behavior Inc	lex
	(1)	(2)	(3)	(4)
	Wave 4	Wave 7	Wave 4	Wave 7
	(April 2020)	(June 2021)	(April 2020)	(June 2021)
SOEP Survey Measure	0.012	-0.062***		
	(0.017)	(0.019)		
_				
Lottery Choice			0.003	-0.044**
			(0.017)	(0.021)
Female	-0.018	0.111***	-0.021	0.104***
	(0.030)	(0.039)	(0.029)	(0.040)
Constant	0.803***	0.518***	0.809***	0.535***
	(0.057)	(0.044)	(0.054)	(0.037)
Individuals	150	150	150	150
Characteristics Controls	Yes	Yes	Yes	Yes

Table 9: Linear Regression: Predictive Power of Risk Measures on Precautionary Behaviors

<sup>1</sup> Robust standard errors clustered are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

<sup>2</sup> The variable SOEP Survey Measure is the risk tolerance measured by the SOEP survey question; the variable Lottery Choice is the risk tolerance measured by the lottery choice in Eckel and Grossman (2008a). Both measures are standardized to mean 0 and standard deviation 1.
<sup>3</sup> Individual characteristics controls include race dummies.

scale.

The lottery choice measure shows the same sign across time, but is not statistically significant. Table C10 in the Supplemental Information provides a robustness check using the unbalanced Class of 2020 as the sample.

When we turn to the pandemic-related index, we find that neither SOEP nor lottery choice is predictive. Table 11 indicates that neither measure has a coefficient that is different from zero. It is also worth noting that unlike Table 9, being female has no effect on predicting the likelihood of engaging in either type of behavior. It may be the case that the measures we have of pandemic-related hazards are flawed. We do not find that either of our risk measures predict the way in which respondents answered the items. Table C11 is a robustness check using the unbalanced Class of 2020 as the sample.

**Result 4.** The risk tolerance measured by both the SOEP survey question and the incentivized lottery choice predicts precautionary behaviors during the pandemic, and the SOEP

	DV: I	DV: Regular Hazardous Behavior Index		
	(1)	(2)	(3)	(4)
	Wave 4	Wave 7	Wave 4	Wave 7
	(April 2020)	(June 2021)	(April 2020)	(June 2021)
SOEP Survey Measure	$0.261^{***}$	$0.163^{***}$		
	(0.063)	(0.059)		
Lottery Choice			$0.159^{*}$	0.071
Female	-0.046	-0.040	-0.057	-0.048
	(0.119)	(0.105)	(0.117)	(0.109)
Constant	1.903***	2.079***	2.054***	2.064***
	(0.159)	(0.108)	(0.191)	(0.099)
Individuals	150	150	150	150
Characteristics Controls	Yes	Yes	Yes	Yes

Table 10: Linear Regression: Predictive Power of Risk Measures on Engagement in Hazardous Behaviors

 $^1$  Robust standard errors clustered are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

<sup>2</sup> The variable SOEP Survey Measure is the risk tolerance measured by the SOEP survey question; the variable Lottery Choice is the risk tolerance measured by the lottery choice in Eckel and Grossman (2008a). Both measures are standardized to mean 0 and standard deviation 1.

 $^{3}$  Individual characteristics controls include race dummies.

survey measure is stronger in such prediction. Regarding the hypothetical engagement in risky behaviors, higher risk tolerance measured by the SOEP survey question is associated with increased engagement in regular hazardous activities. In contrast, the incentivized lottery choice does not show a predictive relationship with such behaviors. Moreover, neither of these risk measures predicts the hypothetical engagement in pandemic-related hazardous behaviors.

## 5 Conclusion

We investigate the risk preferences of undergraduate students over a five-year period, from immediately prior to matriculation to one year after graduation. We utilize two distinct methods, the Eckel-Grossman lottery task and the German Socio-Economic Panel (SOEP)

	DV: Pandemic-Related Hazardous Behavior Index			wior Index
	(1)	(2)	(3)	(4)
	Wave 4	Wave 7	Wave 4	Wave 7
	(April 2020)	(June 2021)	(April 2020)	(June 2021)
SOEP Survey Measure	0.054	-0.010		
	(0.047)	(0.070)		
Lottery Choice			-0.025	-0.011
			(0.053)	(0.077)
Female	-0.100	-0.128	-0.132	-0.131
	(0.086)	(0.141)	(0.087)	(0.146)
Constant	1.899***	2.679***	1.917***	2.684***
	(0.389)	(0.311)	(0.392)	(0.315)
Individuals	150	150	150	150
Characteristics Controls	Yes	Yes	Yes	Yes

Table 11: Linear Regression: Predictive Power of Risk Measures on Engagement in Pandemic-Related Hazardous Behaviors

 $^1$  Robust standard errors clustered are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

<sup>2</sup> The variable SOEP Survey Measure is the risk tolerance measured by the SOEP survey question; the variable Lottery Choice is the risk tolerance measured by the lottery choice in Eckel and Grossman (2008a). Both measures are standardized to mean 0 and standard deviation 1.

 $^{3}$  Individual characteristics controls include race dummies.

survey question, to measure subjects' risk attitudes. Our research aims to compare the stability of risk preferences based on these measures at the aggregate level and to explore the impact of negative experiences on individual risk attitudes.

Our findings show that subjects' risk tolerance is increasing over time if measured by the incentivized lottery choice task, and is decreasing over time if measured by the SOEP survey measure. The effect sizes of time indicate that for an additional post-matriculation year, the risk tolerance increases by 0.048 standard deviation if measured by the lottery choice, and decreases by 0.048 if measured by SOEP.

We explore and rule out two alternative explanations, the participation effect and cohortspecific effect, in shaping these two distinct patterns. Furthermore, we highlight the impact of an important exogenous shock, the COVID-19 pandemic, on risk preferences, demonstrating that negative life experiences or sentiments can lead to shifts in risk tolerance at the individual level.

When we ask whether one measure or the other better predicts behaviors associated with the pandemic we find mixed results. Overall, the survey measure is more closely related to changes in pandemic precautionary behaviors. When we turn to self-reported likely behaviors, neither the incentivized nor the survey measure do well in predicting what respondents report with respect to the pandemic.

A significant contribution of this paper lies in the comparison of different risk elicitation methods in studying changes in risk preferences over time. The SOEP measure has been touted as a reasonable substitute for incentivized measures of risk aversion. Indeed, survey measures like this one are said to have been "validated" because they are correlated with incentized measures (Falk et al., 2023). Our work suggests this may not be enough to ensure their equivalence in measuring risk preferences. The survey measure is different from the incentivized task we use. It does not ask subjects to make choices, even hypothetically, but instead asks subjects to reflect on their own character and tell the researcher their level of risk tolerance. The two measures seem quite different tasks.

We ask whether they behave the same way over time, and in response to major life events. We first show that the two measures exhibit differentiated trends over time. Perhaps more importantly, we also show that the two measures respond differently to important risk-related events. The incentivized measure, the lottery-choice task, is more stable during the pandemic period, which may indicate that incentivized measures in general are more reflective of general preferences and less vulnerable to manipulation. The SOEP survey measure is more sensitive to changes in context in which the measure is reported. This may indicate that survey measures such as this one are more suitable for capturing the impact of negative life experiences or emotions on subjects' temporal change in risk preferences. This highlights the importance of the selection of measurement methods is important when studying the evolution of risk attitudes, and should be selected with care.

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#### **Electronic Supplementary Material of**

## The Evolution of Risk Attitudes: A Panel Study of the University Years

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## A Research Design

The overall project is a multi-wave panel of a sample of university students and graduates. Across the seven waves reported here we have multiple measures of risk. The studies were funded by the National Science Foundation (SES-1534403; SES2027548 for Rice and SES-1534411; SES2027513 for TAMU). The Rice Preferences Study began with a sample of 661 entering undergraduates matriculating in August of 2016. This was 66.7% of the entering class. Of that sample, 553 completed the study with an 83.7% response rate. Prior to coming to campus in fall 2016 Rice students were given a battery of incentivized preference measures. Over the subsequent four years these subjects were involved in 2 to 4 tests per year. To provide a basis for comparison, each year a smaller sample (between 112 And 148) was drawn from incoming classes and tested with the same instruments. The remaining students from the Class of 2020, who had never been tested, were invited in March 2020 to participate in the initial study (259 of 376 completed the study). A total of 670 subjects participated in this study (67.1% of the graduating class). Following the onset of Covid-19 the study was expanded to cover post-graduation of the panel. Below we detail information for each of the waves included in this paper.

Wave 1 of the study (July 2016) constituted the initial sample which was drawn from a random sample of two-thirds of Rice University's entering freshman class (992 students). These subjects were contacted prior to arriving on campus in the late summer of 2016 (from July 14 – August 12, 2016). A total of 553 of the 661 students who were contacted completed this portion of the study. The study was carried out online. Subjects were told that the study would take about 25 minutes and that they will be compensated USD \$5 for completing a short survey and compensated for two out of six, randomly chosen, incentivized decision tasks. On average subjects earned \$26.79 for their participation. Excluding extreme outliers, it took subjects an average of 20 minutes to complete the study. Subjects participated in seven modules: the first module was a survey of basic preferences (including the SOEP item used in this study) and a personality inventory; a second module was a standard dictator game; the third module was a third-party dictator game in which the third party made

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allocations between a member of their own residential college and someone from a different residential college (for a discussion of these dictator games see Eckel et al. (2022)); the fourth module was the lottery choice mechanism used in this study Eckel and Grossman (2008b); the fifth module was a loss aversion task; the sixth module involved a time discounting task; and the seventh module involved a competition task similar to that reported by (Niederle and Vesterlund, 2007). Modules two through seven were presented in fixed order and were incentivized.

Wave 2 of the study (October 2017) involved 488 respondents who participated in Wave 1. It took respondents an average of 32.9 minutes to complete the study and they earned an average of \$18.55. Subjects participated on-line and the study was open from October 27, 2017 through March 19, 2018. This study was focused on different risk measures across eight modules. The first module involved a survey of risky behaviors on the Rice campus. The eighth module was a survey that used a version of the Blais et. al Blais and Weber (2006) instrument and included the SOEP risk measure used in the study. These two modules were in fixed order. The remaining modules included the lottery choice task used in this study Eckel and Grossman (2008b); the Holt-Laury risk task Holt and Laury (2002); the Gneezy/Potters risk task Gneezy and Potters (1997); a loss-aversion task; a version of the balloon task Lejuez et al. (2002); and a hypothetical pairwise risk task Falk et al. (2023). These modules were randomized for each subject. Two of the incentivized modules were randomly chosen and subjects were paid for those tasks.

Wave 3 of the study (March 2020) replicated Wave 1. The aim was to re-test subjects to observe whether preferences were consistent over time. An eighth module was added that measured the trust game. Otherwise the procedures were identical to what subjects did prior to matriculating. A total of 406 panelists participated in this study. Study subjects were told that the study would take approximately 25 minutes. Excluding outliers, subjects spent an average of 23 minutes with this on-line study. Subjects earned an average of \$32.65. The study took place between March 17 and April 11, 2020. Unfortunately when the study was launched subjects were barred from campus due to COVID-19. This was a major interruption for the seniors looking forward to graduating.

Wave 4 of the study (April-May 2020) took respondents an average of 22 minutes to complete. A total of 402 respondents from the original panel completed this study. For their participation, respondents earned an average of \$20.30. The study included 7 modules. In module one, respondents were asked a set of questions about behaviors they had engaged in to avoid contracting or spreading COVID-19. The second module focused on respondent's knowledge of COVID-19 and beliefs about the pandemic. The third module contained survey measures of risk aversion, trust and trustworthiness, including the SOEP risk item used in this study. The fourth module turned to targets of trust, ranging from the US President to friends and family. The fifth module was incentivized and asked respondents to guess the injunctive norms held by other students from their university concerning COVID-19. The sixth module was also incentivized and asked respondents to guess the descriptive norms of other students concerning COVID-19. The seventh module contained a battery of demographic items and an opportunity to donate their earnings to a charitable organization.

In wave 5 of the study (July-August 2020) a total of 295 panelists participated and took an average of 27 minutes to complete it. In this study not everyone was paid. A sample of respondents were randomly selected and paid \$50 for completing the study. Another sample were randomly chosen and paid for an incentivized norms task. The study covered six modules. The first module repeated the same set of questions about precautionary behaviors as in wave 4. The second module focused on the respondents' knowledge of COVID, beliefs about the pandemic and attitudes toward vaccines. The third module turned to targets of trust, ranging from the US President to friends and family. This module also included the SOEP risk item used in this study. The fourth module was incentivized and asked respondents to guess the injunctive norms held by other students concerning COVID-19. The fifth module was also incentivized and asked respondents to guess the descriptive norms of other students concerning COVID-19. The sixth module contained a battery of demographic items.

Wave 6 of the study (October-November 2020) took respondents an average of just under 20 minutes. A total of 226 of the original panelists participated. As with wave 5, not all subjects were paid. A sample were paid a \$50 bonus for completing the study and another group were randomly chosen to be paid for the incentivized norms task. The study covered seven modules: preventative behaviors; beliefs and attitudes about coronavirus and vaccines; incentivized injunctive norms; incentivized descriptive norms; and demographic items. The sixth module was focused on the 2020 US Presidential election and trust and included the SOEP risk item used in this study. There was considerable overlap in items from both Wave 4 and Wave 5.

Wave 7 of the study (July-August 2021) included 221 of the original panelists who spent just over 27 minutes in the study. Respondents were paid a fixed fee of \$10 for answering survey questions and were paid for one of the incentivized modules. That module was randomly chosen for each respondent at the conclusion of the study. On average respondents earned \$23.16 for participation. The study covered thirteen modules: preventative behaviors; beliefs and attitudes about coronavirus and vaccines; trust in various institutions; survey based risk items (including the SOEP risk item used in this study); incentivized injunctive and descriptive norms relating to COVID; an incentivized task measuring confidence; a dictator game played with an entering Freshman at Rice; an incentivized investment taskGneezy and Potters (1997); the lottery choice task used in this study Eckel and Grossman (2008b); an incentivized dictator game with a member of their entering class (this task and the one with a Freshman were presented in random order to the respondent); an incentivized trust game in which the respondent played both roles; a charitable giving game for Covid relief in India; and survey items dealing with resilience, effects of Covid on friends and family and demographic items.

## **B** Task Descriptions

This study focuses on two different measures of risk preferences. The first item is a survey measure that asks respondents to indicate their risk orientation, as shown by the task screenshot in Figure B1. The second item is an incentivized lottery derived from Eckel and Grossman (2008b). Figure B2 is a screenshot of the task.

During the COVID-19 pandemic (Wave 4 through 7), we collected subjects' frequency of experiencing 11 negative emotion items. Figure B3 is a screenshot of the 11 items of negative emotions. We also surveyed subjects on whether they did any of the 12 precautionary behaviors, with a screenshot in Figure B4. In addition, we surveyed subjects on their propensity to engage in some risky behaviors, including some regular risky behaviors and some pandemic-related behaviors. Figure B5 is the screenshot of the survey items in Wave 4 (April 2020). Figure B6 is the screenshot in Wave 7 (June 2021). It's important to note that certain items in these two waves of studies are not congruent. In our manuscript, we solely incorporated items that were present in both studies for analysis purposes.

				Quest	tion 28	of 28.				
				How	do you see you	rself?				
Please use the :	scale from 0 t	Are you ge to 10 where 0	nerally a per means "I avoi	ton who enjo d taking risks'	ys taking risk ' and 10 mean	s or do you tr s "I enjoy takis	y to avoid tal ng risks". You	king risks? may eliek any	number betv	veen 0 and 10
I avoid taking risks 0 0	1	2 0	3 0	4 0	5 0	6	7 0	8	9	I enjoy taking riski 10 ©
				3	Submit Respons	e				

Figure B1: Screenshot: Survey Measure from Germany Socio-Economic Panel

		Rice Study		
		Task 7		
In this task you will select, The six diffe Each option has two possible o the study, the computer will ra For example, if you choose opt	, from six different options, the one t erent options are illustrated below. (1 putcomes, Low or High. For every op andomly choose a number between 1 e tion 1, you will receive \$10.00 for so 1 and 5 and \$22.00 if the	hat you most pre his is just an illu ttion, each outcor and 10. If the nu im the High pay- re; if you select a computer draws	er. The one you cho stration, you will ma ne is equally likely, mber is 1-5, then yo ff. option 4 you will ear u number between 6	ose will determine your payoffs for this task ke your actual decision later.) or has a 50% chance of happening. At the e u will eam the Low payoff; if it is 6-10 you m \$4.00 if the computer draws a number bet and 10.
	Option	Low	High	
	1	\$10.00	\$10.00	
	2	\$8.00	\$14.00	
	3	\$6.00	\$18.00	
	4	\$4.00	\$22.00	
	5	\$2.00	\$26.00	
	6	\$0.00	\$28.00	
		Continue		

Figure B2: Instructions for Eckel-Grossman risk instrument

The following questions of Please think back to Marc university.	leal with feelings h 1st before the	and emotions that pandemic was a pro	you might have. blem for your
From March 1st until now, how of	<b>ten have you experier</b> Frequently	aced the following: Sometimes	Never
Feeling overwhelmed		0	
Feeling lonely			
Had difficulty making decisions		0	
Feeling hopeless about the future			
Feeling angry		0	
Feeling nervous			
Feeling like shouting at people			
Feeling fearful			
Feeling annoyed by others			
Feeling panicked			
Feeling sad			





## Please check all of the actions that you are currently doing to try to avoid getting COVID-19 or to avoid giving it to others that you don't normally do:

- Stockpiling supplies
- Reducing in person contact with friends
- Bringing hand sanitizer when I leave my home
- Staying quarantined in my house and leaving only when necessary
- Trying to keep a distance of six (6) feet or more from strangers
- Washing my hands more frequently or thoroughly than normal
- Wearing a face mask in public
- Ordering items to my home instead of going out to get them
- Encouraging others to avoid crowded places or to engage in social distancing
- Reducing how much I touch my face
- Avoiding crowded places
- Covering my mouth whenever I cough using a tissue or my elbow instead of my hand

← →

#### Figure B4: Screenshot: Precautionary Behaviors



# For each of the following statements, please indicate the likelihood that you would engage in the described activity or behavior if you were to find yourself in that situation.

	Very unlikely	Unlikely	Not Sure	Likely	Very likely	No Answer
Drinking heavily at a social function						
Engaging in unprotected sex						
Driving a car without wearing a seat belt	0	0	0	0	0	0
Riding a motorcycle without a helmet						
Sunbathing without sunscreen						
Walking home late at night in an unsafe area of town						
Hanging out with friends during the next few weeks	0	0	0		0	0
Taking public transportation during the next few weeks						
Attending a service (such as a church, wedding, or funeral) during the next few weeks						
Volunteering at a food bank during the next few weeks						
Going to the convenience store to buy something to drink during the next few weeks						
						€ →

Figure B5: Screenshot: Engagement in Risky Behaviors (Wave 4)

For each of the following statements, **please indicate the likelihood** that you would engage in the described activity or behavior if you were to find yourself in that situation. For each of the following statements, **please indicate the likelihood** that you would engage in the described activity or behavior if you were to find yourself in that situation.

Very unlikely	Unlikely	Not Sure	Likely	Very likely
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
	Very unlikely O O O O O O O	Very unlikely         Unlikely           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O	Very unlikely         Not Sure           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O           O         O	Very unlikely         Not Sure         Likely           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O           O         O         O

(a) First Half of Survey Items

	Very unlikely	Unlikely	Not Sure	Likely	Very likely
Drinking heavily at a social function	0	0	0	0	0
Engaging in unprotected sex	0	0	0	0	0
Driving a car without wearing a seat belt	0	0	0	0	0
Riding a motorcycle without a helmet	0	0	0	0	0
Sunbathing without sunscreen	0	0	0	0	0
Walking home late at night in an unsafe area of town	0	0	0	0	0
Hanging out with friends during the next few weeks	0	0	0	0	0

(b) Second Half of Survey Items

Figure B6: Screenshot: Engagement in Risky Behaviors (Wave 7)

## C Additional Analysis

	0		11 0
	Panel Mean (SD)	Attrition Mean (SD)	<i>p</i> -value
Class of 2020			
Lottery Choice	-0.234(0.080)	-0.125(0.051)	0.265
SOEP Survey	$0.137\ (0.076)$	$0.218\ (0.045)$	0.357
Ν	150	403	
Class of 2021			
Lottery Choice	-0.067 (.172)	$0.212\ (0.101)$	0.172
SOEP Survey	-0.201(0.161)	$0.407\ (0.102)$	0.003
Ν	29	90	
Class of 2022			
Lottery Choice	-0.069(0.167)	-0.137(0.088)	0.704
SOEP Survey	$0.260 \ (0.165)$	$0.136\ (0.083)$	0.462
Ν	41	111	
Class of 2023			
Lottery Choice	$0.087 \ (0.145)$	-0.066(0.097)	0.401
SOEP Survey	0.329(156)	$0.446\ (0.095)$	0.524
Ν	39	104	
Untouched Seniors			
Lottery Choice	0.098(0.132)	-0.063(0.077)	0.307
SOEP Survey	$0.250\ (0.135)$	$0.121 \ (0.076)$	0.408
Ν	61	196	

Table C1: Balance Tests of Incoming Freshmen: Those in Panel vs. Those Dropping Out

<sup>1</sup> "Panel" indicates those subjects who participated in all waves of studies, i.e., those that are in the balanced panel; "Attrition" indicates those subjects who dropped out at some point among those studies;

<sup>2</sup> "Untouched Seniors" are a group of students from the Class of 2020 who were excluded from the studies until Wave 3 when they already became senior graduates;

<sup>3</sup> Both the lottery-choice measures and SOEP survey measures are standardized into mean 0 and standard deviation 1 using the data from the whole sample;

 $^{4}$  *p*-values are from two-tailed *t*-tests between the "Panel" group and the "Attrition" group.

Table C2: t-scores from t-tests of Eckel-Grossman Lottery Choices Before Matriculation

	Class of 2020	Class of 2021	Class of 2022
Class of 2021	$2.906^{***}$		
Class of 2022	367	2.237**	
Class of $2023$	-1.371	1.388	857

<sup>1</sup> This table reports t-statistics from t-tests between different classes of students when they were one month before matriculation;

<sup>2</sup> \* p < .1, \*\* p < .05, \*\*\* p < .01.

Table C3: t-test of SOEP risk before matriculation: t-score

	Class of 2020	Class of $2021$	Class of 2022
Class of 2021	-0.671		
Class of 2022	0.316	0.775	
Class of 2023	-2.499**	1.285	-2.219**

 $^1$  This table reports t-statistics from t-tests between different classes of students when they were one month before matriculation;  $^2$  \* p<.1, \*\* p<.05, \*\*\* p<.01.

	Eckel-Grossman		SOEP Risk Measure		
	Mean	<i>p</i> -value	Mean	<i>p</i> -value	
2020 Panel	-0.221	069	0.051	0.484	
Class of $2017$	0.005	.008	0.138	0.464	

Table C4: t-test of 2020 Panel in 2020 Spring vs. Class of 2017 in 2016 Fall

<sup>1</sup> "2020 Panel" indicates those subjects from the Class of 2020 who participated in all waves of studies, i.e., those that are in the balanced panel.

	DV: Lotte	ery Choice	DV: SOEP Survey Measur		
	(1)	(2)	(3)	(4)	
Months From Matriculation	0.005***	0.005***	-0.004***	-0.004***	
	(0.001)	(0.001)	(0.001)	(0.001)	
Female	-0.345***	-0.350***	-0.193**	-0.184**	
	(0.076)	(0.076)	(0.075)	(0.075)	
Female $\times$ Months From Matriculation	-0.005***	-0.005***	-0.002	-0.002	
	(0.002)	(0.002)	(0.002)	(0.002)	
Constant	0.094*	0.032	0.220***	0.182	
	(0.056)	(0.117)	(0.055)	(0.145)	
Observations	2067	2067	2573	2573	
Individuals	553	553	553	553	
Characteristics Controls	No	Yes	No	Yes	

#### Table C5: Panel Regression: Stability of Risk Preferences (Unbalanced Class of 2020)

<sup>1</sup> This table includes all participants from the Class of 2020, which is an unbalanced panel;

<sup>2</sup> Standard errors clustered at individual level are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01. <sup>3</sup> The dependent variables of Model (1) and (2) are the risk attitude measured by the lottery choice in Eckel and Grossman (2008a), and the dependent variables of Model (3) and (4) are the risk attitude measured by the SOEP survey question. All variables are standardized to mean 0 and standard deviation 1 using the whole sample in all waves.

<sup>4</sup> Individual characteristics controls include race dummies.

	DV:	Lottery Cl	noice	DV: SOEP Survey Measure			
	(1)	(2)	(3)	(4)	(5)	(6)	
Months From Matriculation	$0.005^{***}$	$0.005^{***}$	$0.005^{***}$	-0.003***	-0.003***	-0.003***	
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	
Female	-0.346***	-0.345***	-0.349***	-0.191**	-0.192**	-0.181**	
	(0.076)	(0.076)	(0.076)	(0.075)	(0.075)	(0.075)	
Female $\times$ Months From Matriculation	-0.005***	-0.006***	-0.006***	-0.002	-0.002	-0.002	
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	
7-D pp INC in Positivity Rate	0.109	-0.069	-0.109	-0.449***	-0.435**	-0.438**	
TT	(0.648)	(0.738)	(0.718)	(0.141)	(0.191)	(0.190)	
Female $\times$ 7-D pp INC in Positivity Rate		0.743	0.739		-0.029	-0.023	
		(1.337)	(1.321)		(0.282)	(0.281)	
Constant	0.095*	0.095*	0.030	0 917***	0 917***	0 183	
Constant	(0.055)	(0.056)	(0.117)	(0.055)	(0.055)	(0.143)	
Observations	2044	2044	2044	2526	2526	2526	
Individuals	553	553	553	553	553	553	
Characteristics Controls	No	No	Yes	No	No	Yes	

Table C6: Panel Regressions: Impact of COVID-19 Positive Cases on Risk Attitudes (Unbalanced Class of 2020)

 $^{1}$  This table includes all participants from the Class of 2020, which is an unbalanced panel;

<sup>2</sup> Standard errors clustered at individual level are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01; <sup>3</sup> The dependent variables of Model (1) and (2) are the risk attitude measured by the lottery choice in Eckel and Grossman (2008a), and the dependent variables of Model (3) and (4) are the risk attitude measured by the SOEP survey question. All variables are standardized to mean 0 and standard deviation 1;

<sup>4</sup> Individual characteristics controls include race dummies.

	DV:	Lottery Cl	hoice	DV: SOEP Survey Measure		
	(1)	(2)	(3)	(4)	(5)	(6)
Months From Matriculation	0.004	0.004	0.004	-0.003	-0.003	-0.003
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Female	-0.441***	-0.437***	-0.436***	-0.237	-0.236	-0.249*
	(0.139)	(0.139)	(0.138)	(0.145)	(0.145)	(0.145)
Female $\times$ Months From Matriculation	-0.004	-0.004	-0.004	-0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
30-D pp INC in Positivity Rate	0.112	0.035	0.025	-0.154***	-0.177**	-0.177**
	(0.302)	(0.348)	(0.350)	(0.050)	(0.076)	(0.076)
Female $\times$ 30-D pp INC in Positivity Rate		0.294	0.293		0.044	0.043
		(0.564)	(0.570)		(0.101)	(0.101)
Constant	0.063	0.062	0.020	0.175	0.174	$0.677^{*}$
	(0.107)	(0.107)	(0.182)	(0.115)	(0.116)	(0.370)
Observations	719	719	719	1009	1009	1009
Individuals	150	150	150	150	150	150
Characteristics Controls	No	No	Yes	No	No	Yes

#### Table C7: Panel Regressions: Impact of COVID-19 Positive Cases on Risk Attitudes

<sup>1</sup> Standard errors clustered at individual level are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.</li>
<sup>2</sup> The dependent variables of Model (1) and (2) are the risk attitude measured by the lottery choice in Eckel and Grossman (2008a), and the dependent variables of Model (3) and (4) are the risk attitude measured by the SOEP survey question. All variables are standardized to mean 0 and standard deviation 1.

<sup>3</sup> Individual characteristics controls include race dummies.

	DV: Lottery Choice		DV: SOEP Survey Measure	
	(1)	(2)	(3)	(4)
Female	-0.549***	-0.556***	-0.242***	-0.241***
	(0.087)	(0.086)	(0.086)	(0.087)
Sadness and Fear	-0.052	-0.063	-0.129**	-0.128**
	(0.062)	(0.061)	(0.058)	(0.058)
Female $\times$ Sadness and Fear	0.033	0.044	0.100	0.097
	(0.080)	(0.079)	(0.070)	(0.071)
Anger and Hostility	-0.052	-0.056	0.071	0.072
0	(0.075)	(0.074)	(0.061)	(0.061)
Female $\times$ Anger and Hostility	0.095	0.095	-0.079	-0.082
	(0.104)	(0.103)	(0.071)	(0.071)
Constant	0 330***	0 458***	-0.055	0 133
	(0.070)	(0.154)	(0.066)	(0.203)
Observations	621	621	1124	1124
Individuals	410	410	427	427
Characteristics Controls	No	Yes	No	Yes

Table C8: Panel Regressions: Impact of Negative Emotion on Risk Tolerance (Unbalanced Class of 2020)

<sup>1</sup> This table includes all participants from the Class of 2020, which is an unbalanced panel;

<sup>2</sup> Standard errors clustered at individual level are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01;

<sup>3</sup> The dependent variables of Model (1) and (2) are the risk attitude measured by the lottery choice in Eckel and Grossman (2008a), and the dependent variables of Model (3) and (4) are the risk attitude measured by the SOEP survey question. All variables are standardized to mean 0 and standard deviation 1;

<sup>4</sup> The variables "Sadness and Fear" and "Anger and Hostility" are the two factor scores from the factor analysis over subjects' responses to the questions on frequencies of 10 different negative emotions;

<sup>5</sup> Model (1) and (2) includes data from Waves 4 and 7, because we did not include the lottery choice task in Waves 5 or 6. Model (3) and (4) includes data from Waves 4, 5, 6, and 7, as we collected the SOEP survey risk measure for all these waves;

<sup>5</sup> Individual characteristics controls include race dummies.

	DV: Precautionary Behavior Index			
	(1)	(2)	(3)	(4)
	Wave 4	Wave 7	Wave 4	Wave 7
	(April 2020)	(June 2021)	(April 2020)	(June 2021)
SOEP Survey Measure	0.003	-0.046***		
	(0.009)	(0.015)		
Lottery Choice			0.001	-0.044**
			(0.009)	(0.018)
Female	0.044**	0.082**	0.043**	$0.067^{*}$
	(0.017)	(0.033)	(0.018)	(0.034)
Constant	0.653***	0.491***	$0.654^{***}$	0.503***
	(0.054)	(0.103)	(0.054)	(0.099)
Individuals	402	221	400	221
Characteristics Controls	Yes	Yes	Yes	Yes

Table C9: Linear Regression: Predictive Power of Risk Measures on Precautionary Behaviors (Unbalanced Class of 2020)

<sup>1</sup> Robust standard errors clustered are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

<sup>2</sup> The variable SOEP Survey Measure is the risk tolerance measured by the SOEP survey question; the variable Lottery Choice is the risk tolerance measured by the lottery choice in Eckel and Grossman (2008a). Both measures are standardized to mean 0 and standard deviation 1.

<sup>3</sup> Individual characteristics controls include race dummies.

Table C10: Linear Regression: Predictive Power of Risk Measures on Engagement in Hazardous Behaviors

	DV: Regular Hazardous Behavior Index			
	(1)	(2)	(3)	(4)
	Wave 4	Wave 7	Wave 4	Wave 7
	(April 2020)	(June 2021)	(April 2020)	(June 2021)
SOEP Survey Measure	$0.267^{***}$	$0.138^{***}$		
	(0.034)	(0.049)		
Lottery Choice			0.090**	0.064
			(0.039)	(0.051)
Female	-0.066	-0.002	-0.078	0.001
	(0.069)	(0.084)	(0.071)	(0.092)
Constant	2.170***	1.917***	2.164***	1.914***
	(0.161)	(0.137)	(0.169)	(0.115)
Individuals	402	221	400	221
Characteristics Controls	Yes	Yes	Yes	Yes

<sup>1</sup> Robust standard errors clustered are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01.

<sup>2</sup> The variable SOEP Survey Measure is the risk tolerance measured by the SOEP survey question; the variable Lottery Choice is the risk tolerance measured by the lottery choice in Eckel and Grossman (2008a). Both measures are standardized to mean 0 and standard deviation 1.

<sup>3</sup> Individual characteristics controls include race dummies.

	DV: Pandemic-Related Hazardous Behavior Index			
	(1)	(2)	(3)	(4)
	Wave 4	Wave 7	Wave 4	Wave 7
	(April 2020)	(June 2021)	(April 2020)	(June 2021)
SOEP Survey Measure	0.132***	-0.022		
	(0.034)	(0.062)		
Lottery Choice			$0.034 \\ (0.038)$	-0.031 (0.067)
Female	-0.153**	0.045	-0.164***	0.032
	(0.064)	(0.120)	(0.062)	(0.121)
Constant	2.028***	3.008***	2.028***	3.019***
	(0.207)	(0.356)	(0.219)	(0.355)
Individuals	402	221	400	221
Characteristics Controls	Yes	Yes	Yes	Yes

Table C11: Linear Regression: Predictive Power of Risk Measures on Engagement in Pandemic-Related Hazardous Behaviors

<sup>1</sup> Robust standard errors clustered are in parenthesis. \* p < .1, \*\* p < .05, \*\*\* p < .01. <sup>2</sup> The variable SOEP Survey Measure is the risk tolerance measured by the SOEP survey question; the variable Lottery Choice is the risk tolerance measured by the lottery choice in Eckel and Grossman (2008a). Both measures are standardized to mean 0 and standard deviation 1.

<sup>3</sup> Individual characteristics controls include race dummies.