





The impact of the COVID-19 pandemic on risk perceptions: differences between ethnic groups in Germany

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ABSTRACT

Since the start of the COVID-19 pandemic, people perceive their health and finances to be at greater risk than before. Using data from CILS4COVID, an add-on study to the German long-term project CILS4EU-DE, surveying young adults aged 24–26, we show that these risk perceptions are prevalent in populations with a former Yugoslavian, Turkish, and Asian background, although we find only few differences between the German majority and the ethnic minority groups overall. Contrary to expectations, we were not able to fully explain these systematic differences with sociodemographic, experiential and sociocultural factors. Nevertheless, our analysis provides important insights into mechanisms underlying the increased perception of risk during the pandemic irrespective of respondents' ethnic origin.



ARTICLE HISTORY Received 31 July 2020; Accepted 15 September 2020


KEYWORDS Risk perception; health worries; financial worries; COVID-19 pandemic; ethnic minorities; social inequalities

Introduction

The COVID-19 pandemic has massively affected the lives of people around the world. Such major changes are inevitably accompanied by insecurities in many different areas of life (Tull *et al.* 2020), with health and financial insecurity being the most prominent ones. These insecurities reflect individuals' risk perceptions: people who perceive COVID-19 as a big risk to their health or financial situation will express greater concern about these domains during the pandemic.

Not everyone is equally affected by COVID-19-related insecurities. Research suggests that ethnic minorities are hit particularly hard by the

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 Supplemental data for this article can be accessed <https://doi.org/10.1080/14616696.2020.1825766>.

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pandemic in terms of health and financial outcomes (Pew Research Center 2020). The ethnic differences in vulnerability to the virus and its consequences can in turn lead to ethnic disparities in risk perception.

When risk perceptions accumulate into a negative psychological burden on individuals and societies, the result is stress, fear or frustration (Lima 2004; Breznau 2020). Since these are undesirable emotions, ethnic differences in risk perception during the COVID-19 pandemic could increase existing ethnic inequalities in terms of mental health in Germany.

The first aim of this paper is descriptive. We investigate whether the COVID-19 pandemic has affected health and financial risk perceptions of ethnic groups in the 24–26 age group in Germany differently. Our second aim is analytical and addresses the explanation of ethnic differences in the impact of the pandemic on risk perceptions, if present. We thereby extend previous studies on risk perception during the pandemic (e.g. Breznau 2020; Dryhurst *et al.* 2020; Duc Huynh 2020) by focusing on both ethnic disparities and their underlying mechanisms.

Theoretical background

Risk perception is a complex construct, which scholars from different disciplines and schools of thought approach very differently (e.g. Douglas and Wildavsky 1982; Slovic 1987; Loewenstein *et al.* 2001). In this paper, we investigate three explanations for the connection between ethnic groups and risk perceptions of health and financial situation: (1) sociodemographic factors, (2) direct and indirect experiences with COVID-19 that increase the cognitive availability of risks associated with the pandemic, and (3) sociocultural factors that affect risk perception by shaping how an individual perceives the world.

Sociodemographic factors

First, we examine sociodemographic factors as determinants of ethnic differences in health and financial risk perception. We assume that most of the respondents, who are around 25 years old and 40% of whom are still in education, have close contact with their parents because they are economically dependent on them. We therefore expect that respondent's risk perception of their health will increase if their parents are essential workers. At the same time, essential service workers have been less affected by job loss or salary cuts during the

pandemic, which should lower their children's financial risk perception. Since a high number of people with a migration background in Germany work in essential services (Khalil *et al.* 2020), this could account for differences in risk perception between ethnic groups.

Moreover, the disadvantages for people with migration background, e.g. precarious jobs and lower socioeconomic position (Khalil *et al.* 2020), could further increase due to the COVID-19 pandemic. This in turn could increase ethnic minorities' perception of the risk COVID-19 poses to their economic situation.

Another sociodemographic factor that could influence individuals' health risk perception is their general health status. Since previous studies have found that ethnic minorities in Germany have a lower health status (Brand *et al.* 2017), we expect higher health risk perceptions among this group, as people with pre-existing conditions are more vulnerable to COVID-19. Possible explanations for such disadvantages in subjective health status are (1) lower socioeconomic status, which is linked to poorer health, and (2) limited access to the healthcare system for ethnic minorities (Shor *et al.* 2017). In contrast, the 'healthy immigrant effect' states that newly arrived immigrants have the same or better health status than the native population, although this advantage diminishes over time (Kwak 2016). As most of the respondents in our sample belong to the second or higher generation, we still expect to find health disadvantages for ethnic minorities in our analysis.

Experiential factors

Second, we look at the amount of direct and indirect exposure to a risk. Tversky and Kahneman (1973) argue that people rely on the ease of retrieval of memories of an event when judging the probability that this event will occur. This means that frequent exposure to the risk will be associated with a higher risk perception (Zielinski-Gutierrez and Hayden 2006; Navarro 2017). Other research associates familiarity with a hazard with lower risk perception compared to an unknown hazard (e.g. Slovic 1987). However, these findings are based on people's assessment of different risks rather than on individual differences in exposure to one risk. In our context, the pandemic is equally (un)known to everyone.

The number of infections in a person's county of residence is one way to measure exposure to COVID-19. We assume that people believe the

disease is ‘coming closer’ and thus perceive it as a higher health risk when the case numbers in their county increase. Rising case numbers are also related to restrictions in private and public life (Bauer and Weber 2020a), which in turn have negative economic consequences (Bauer and Weber 2020b). Therefore, we further assume that rising case numbers in a county increase the perception of financial risks as well. Since ethnic minorities tend to cluster in some counties more than in others (Benassi *et al.* 2020), this could explain ethnic differences in the impact of the COVID-19 pandemic on perceived health and financial risks.

Media consumption is another factor that may influence risk perception. Negative media coverage leads to anxiety, which increases risk perception (Slovic 1987). Analyses of social and traditional media content during the pandemic reveal that both health and economic concerns are discussed on media platforms (Chipidza *et al.* 2020, Hung *et al.* 2020). Therefore, people who consume more information about the pandemic likely perceive it as a bigger threat to their health and finances. In line with this, Duc Huynh (2020) has shown that the frequent use of social media is associated with higher risk perception regarding COVID-19. As for ethnic differences, people with a migration background possibly consume less German media because they prefer media from their country of origin (Bonfadelli 2009). However, this preference should not apply to media consumption in the COVID-19-context, as developments in Germany should be relevant for people regardless of migration background. Rather, we predict that migrants have a higher media consumption due to their on average lower SES (Robert Koch-Institut 2015). Therefore, we expect them to have a higher risk perception as a consequence.

Risk perception is increased also by direct personal exposure to a risk (Chen and Kaphingst 2011). A direct personal experience with COVID-19 is, for example, when a person him- or herself or someone he or she knows has contracted the virus. Previous research has found that members of ethnic minority groups are more likely to contract COVID-19 than natives (Khunti *et al.* 2020). Together with the fact that social networks tend to be ethnically homogenous, this increases the likelihood of exposure to the virus. While direct contact with the virus increases awareness of the health threat posed by the pandemic, it is not directly associated with a financial threat.

Sociocultural factors

Alongside these culture-invariant psychological processes caused by exposure to a risk, another determinant of risk perception is people's sociocultural environment (Douglas and Wildavsky 1982; Rippl 2002; van der Linden 2015). Social and cultural values 'work like a filter in evaluating information' (Rippl 2002, p. 148) and can therefore lead to differences in risk perception.

One of the most important 'lenses' in this context is individualism. People with an individualistic worldview oppose restriction of their autonomy. Consequently, they negate environmental and technological risks: taking them seriously would mean accepting that personal freedom would be threatened by countermeasures (Xue *et al.* 2014). We hence assume that individualists play down COVID-19 and perceive the associated risk to their health as lower because measures such as contact restrictions interfere with their personal freedom. Indeed, Dryhurst *et al.* (2020) show that an individualistic worldview is linked to lower risk perception during the COVID-19 pandemic. In contrast, since individualists show less group solidarity (Rippl 2002) and more feelings of self-reliance (Xue *et al.* 2014), we assume that individualistic people are more likely to perceive a higher financial risk as a result of the pandemic. Considering that cultural differences exist between ethnic groups (Matsumoto 1993; Podsiadlowski and Fox 2011), this could be one explanation for ethnic differences in risk perception.

Another factor that can influence risk perception is trust (Siegrist 2019). It is likely that there is a negative relationship between trust of people in the government and risk perception (Dryhurst *et al.* 2020). Accordingly, we assume that the perception of health and financial risks of people who trust more in the government and its capability to handle the COVID-19 pandemic has increased less during the pandemic. Since empirical studies have shown that ethnic minorities in European countries, including Germany, trust less in government and politics (McLaren 2017), we can assume that their risk perception is higher.

A dimension of trust specifically relevant for health risk perception is trust in the healthcare system. People who trust the German healthcare system should be less likely to perceive the COVID-19 pandemic as a threat to their health because they are confident that they will receive treatment. Prior research in the U.S. reports that ethnic minorities have higher distrust of the healthcare system (Armstrong *et al.* 2013). Therefore, we suppose that there are ethnic differences in the impact of

COVID-19 on health risk perception because some minority groups trust public bodies less than others.

Across a range of hazards, also general trust correlates negatively with risk perceptions (Siegrist 2019), and we assume that this applies especially to health risks: a person's health is at risk if others do not follow the hygiene guidelines and, e.g. do not wear masks; a person's finances, however, do not depend to the same extent on the behaviour of others. As studies have shown that ethnic minorities have a lower level of generalized trust (Hooghe *et al.* 2009), this could help explain ethnic differences in health risk perceptions.

The above-mentioned sociodemographic, experiential, and sociocultural factors thus are well suited to explain the impact of the COVID-19 pandemic on people's risk perceptions in the domains of health and finances as well as related ethnic differences.

Data and methods

Data

We use data from the CILS4COVID survey, an extension of the German part of the Children of Immigrants Longitudinal Survey in Four European Countries (CILS4EU, Kalter *et al.* 2016; 2019a, 2019b), to investigate how ethnic differences in risk perception changed due to the COVID-19 pandemic among individuals aged 24–26 (for details on the data see Appendix A1, for an analysis of non-response see Appendix A2).

Operationalization

Following Breznau (2020), we measure our dependent variable, risk perception, with two questions about whether respondents worry more or less about 'their financial situation' and 'their health' since the beginning of the pandemic.

Ethnic origin is our main independent variable. Participants are assigned to the German majority if neither they nor their parents or grandparents were born outside of Germany. Participants are assigned to the following countries/regions of origin if at least one grandparent was born there (cf. Dollmann *et al.* 2014): Turkey, the former Soviet Union (FSU), Poland, former Yugoslavia (FYR), Eastern Europe, other Europe, Americas, Asia, and Africa/Middle East (see Appendix A3 for a list of

countries included). Ideally, we would run our analyses by country instead of region of origin, but sample sizes are too small to do so.

We use the following variables to control for sociodemographic factors: whether respondents' parents are essential workers, respondents' subjective health (measured in earlier CILS4EU waves), parental socioeconomic status (highest ISEI-score of parents), respondents' labour market status, whether respondents' income changed during the COVID-19 pandemic, and respondents' education. The following variables are included as experiential factors: the trend of infection rates (decreasing, stagnating, increasing), exposure to COVID-related information in the media during the pandemic, and whether the respondent knows someone infected with COVID-19. As sociocultural factors, we include the variables individualist worldview, respondents' trust in government, satisfaction with healthcare system, and generalized trust. For a more detailed description of the operationalizations see Appendix A4.

Analytical strategy

We first estimate linear regression models with the two worry domains as dependent variables and ethnic origin as independent variable. Gender and epidemiological week are the only controls included. We then add sociodemographic factors, experiential factors, and sociocultural factors. In the last models, all three factor types are included.¹ All models are estimated using design weights.

In all but the base models we also include a measure for people's general tendency to worry before the start of the pandemic for two reasons: First, we want to adjust for ethnic group differences in the general level of worries before the pandemic. Second, previous research found a link between neuroticism and risk perception (Fyhri and Backer-Grøndahl 2012), and we want to make sure that group differences in domain-specific worries are not only due to personality differences in tendency to worry.

Results

Figure 1 shows the relationship between ethnic origin and change in the two domains of risk perception during the COVID-19 pandemic. On

¹Missing values due to item nonresponse were imputed. The results are rather robust when comparing the analyses with and without the imputed data. For more information on the handling of missing values, see Appendix A5.

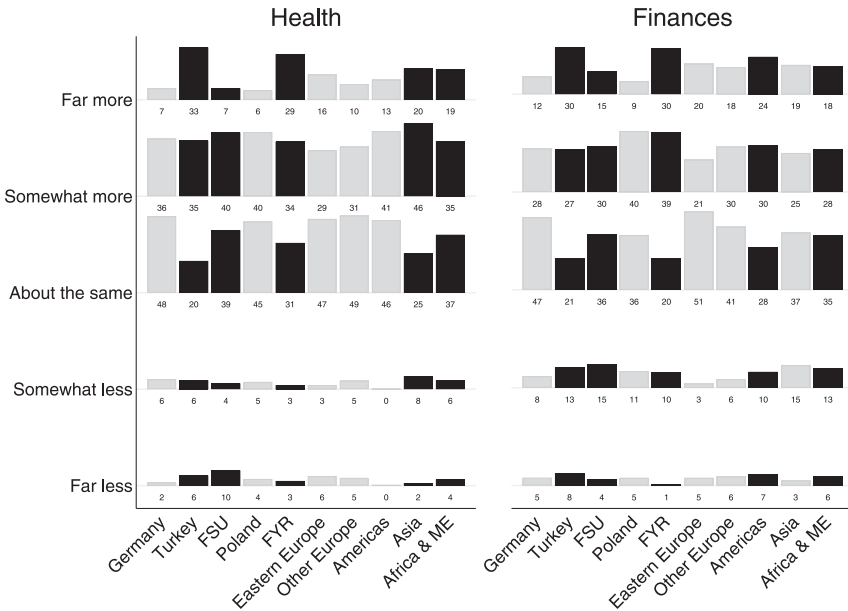


Figure 1. Distribution of health and financial risk perception for ten ethnic groups. Note: Graph based on weighted data. Chi-squared tests were performed by ethnic origin group with Germany as the reference (based on unweighted data). Darker bars indicate significant differences ($p < 0.05$) to the German majority.

average, health and financial insecurities have increased in all ethnic groups since the beginning of the pandemic. However, not all groups have been equally affected.

Looking at health risk perceptions, people with a migration background from Turkey, former Yugoslavia, Asia and Africa/Middle East are hit particularly hard. The Turkey and FYR groups experienced the biggest increase in risk perception since the beginning of the pandemic: 33% of respondents with a Turkish background and 29% of respondents with an FYR background report far higher health risk perceptions during the pandemic than the German majority (only 7% of respondents).

The same ethnic groups are disadvantaged also with regard to financial risk perception. In this domain, also respondents from the Americas and FSU report a higher increase in financial risk perception than the German majority. 30% of respondents with a migration background from Turkey and former Yugoslavia and 24% from the Americas report far higher financial risk perceptions than the German majority with only 12%. Differences between respondents with an FSU and Africa/Middle East background and the German majority are much smaller.

Results of weighted linear regressions for health risk perceptions are displayed in [Table 1](#), for financial risk perceptions in [Table 2](#).² Controlling for epidemiological week and gender in Model 1, we find significant positive effects of ethnic background on health risk perception for individuals of Turkish, Yugoslavian, and Asian background. Considering the scale has only five categories, the effects are quite strong. Individuals with a migration background from former Yugoslavia or Turkey have an approximately 0.4 higher score on the scale of worries than individuals from the German majority. Even if sociodemographic factors, experiential factors, sociocultural factors and finally all of them are included, the significant differences between ethnic minorities and the Germany majority remain, although their coefficients slightly decrease compared to the base model.

While ethnic differences remain, most effects of our control variables point in the expected direction: general tendency to worry is associated with higher health risk perception, although this effect becomes insignificant with the inclusion of all controls in Model 5. As predicted, better subjective health is associated with lower health risk perception. Increased media exposure is associated with higher levels of health risk perception, while neither the trend in case numbers nor contact with COVID-19 is significant. Generalized trust and individualistic world-views are negatively correlated with health risk perception, suggesting that individualistic people and those who generally trust in others perceive the pandemic as less of a health risk. However, the effect of generalized trust remains only marginally significant in the full model. Contrary to our predictions, people with higher trust in the government are more concerned about their health, but this effect becomes insignificant in Model 5.

Looking at [Table 2](#), we can generally say that financial risk perceptions of ethnic minority groups have increased more than those of the German majority since the beginning of the pandemic, all coefficients being positive. However, this difference is only significant for FYR and marginally significant for Turkey. The pandemic apparently reinforces ethnic differences in risk perceptions more in the health than in the financial domain.

Neither experiential factors (Model 8) nor sociocultural factors (Model 9) contribute to the explanation of ethnic differences. However, Model 7

²We report OLS results for ease of interpretation. However, since the scale of the dependent variables is ordinal, we repeat our estimations using ordered probit models with the answer categories 'far less' and 'somewhat less' combined due to restrictions in the sample size. These models yield similar substantial results (see Appendix A6).

Table 1. Linear regression models explaining health risk perception.

	(1)	(2)	(3)	(4)	(5)
Ethnic origin (ref.: Germany)					
Turkey	0.410*** (0.108)	0.407*** (0.108)	0.352** (0.107)	0.388*** (0.111)	0.337** (0.109)
FSU	-0.089 (0.103)	-0.092 (0.103)	-0.065 (0.108)	-0.094 (0.107)	-0.048 (0.112)
Poland	-0.018 (0.086)	-0.013 (0.088)	-0.007 (0.086)	-0.022 (0.085)	-0.021 (0.086)
FYR	0.421** (0.152)	0.405** (0.157)	0.394* (0.174)	0.398* (0.159)	0.379* (0.173)
Eastern Europe	0.064 (0.189)	0.033 (0.187)	0.091 (0.182)	0.069 (0.190)	0.081 (0.185)
Other Europe	-0.049 (0.092)	-0.045 (0.092)	-0.040 (0.089)	-0.058 (0.087)	-0.030 (0.086)
Americas	0.241 (0.154)	0.229 (0.159)	0.270 ⁺ (0.143)	0.318* (0.150)	0.324* (0.141)
Asia	0.345* (0.148)	0.331* (0.149)	0.314* (0.139)	0.338* (0.142)	0.284* (0.135)
Africa & ME	0.169 (0.128)	0.173 (0.130)	0.155 (0.132)	0.156 (0.129)	0.182 (0.136)
Gender (ref.: female)	-0.099* (0.045)	-0.069 (0.047)	-0.058 (0.046)	-0.047 (0.047)	-0.035 (0.046)
General worries		0.059* (0.029)	0.060* (0.028)	0.062* (0.028)	0.040 (0.028)
Essential worker (parents) (ref.: no parent)					
one parent		-0.055 (0.059)			-0.056 (0.057)
both parents		-0.014 (0.108)			-0.018 (0.110)
Subjective health		-0.063* (0.029)			-0.067* (0.029)
Trend (ref.: decreasing)					
stagnating			0.041 (0.093)		0.035 (0.095)
increasing			0.083 (0.053)		0.083 (0.052)
Media exposure			0.023*** (0.004)		0.021*** (0.004)
Contact with COVID-19			0.007 (0.053)		-0.006 (0.053)
Individualist worldview				-0.124*** (0.027)	-0.116*** (0.026)
Trust in government (ref.: low trust both)					
low and high trust				0.161 ⁺ (0.083)	0.114 (0.081)
high trust both				0.134* (0.060)	0.079 (0.059)

(Continued)

Table 1. Continued.

	(1)	(2)	(3)	(4)	(5)
no answer				0.065 (0.082)	0.056 (0.080)
Satisfaction with healthcare system				-0.018 (0.011)	-0.017 (0.011)
Generalized trust (ref.: can't be too careful)				-0.094* (0.046)	-0.082 ⁺ (0.044)
Constant	3.531*** (0.040)	3.581*** (0.155)	2.978*** (0.109)	3.680*** (0.170)	3.694*** (0.195)
Observations	3420	3420	3420	3420	3420
R^2	0.038	0.048	0.071	0.069	0.098
Adjusted R^2	0.034	0.042	0.065	0.062	0.090

Source: CILS4EU waves 1–3, CILS4EU-DE waves 4–8, CILS4COVID.

Notes: All models include epidemiological week, but coefficients are not shown. Robust standard errors in parentheses. R^2 and adjusted R^2 are means over 20 imputations based on Fisher's z transformation. ⁺ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

suggests that sociodemographic factors explain the higher increase in risk perception of respondents with a Turkish background compared to the German majority since the begin of the pandemic.³ In the full model, the coefficients for the Turkish and FYR groups decline and the former is no longer marginally significant.

Again, most effects of the control variables point in the expected direction. General tendency to worry has a positive effect on financial risk perception. Being unemployed is associated with an increase in financial worries, while unchanged or increased income as a result of the pandemic is associated with a decrease in financial worries. Furthermore, if COVID-19 cases stagnate rather than increase, the pandemic is perceived as more of a financial risk, although this is only marginally significant in the full model. An increase in cases does not alter financial risk perception. At the same time, higher media exposure is associated with significantly higher financial risk perceptions. As expected and contrary to its effect on health risk perception, a more individualistic worldview increases financial risk perception.

Discussion

The aim of this paper was to provide descriptive insights into ethnic group differences regarding insecurities during the COVID-19 pandemic and to shed light on the underlying mechanisms.

³The general tendency to worry alone does not explain these differences (see Appendix A7).

Table 2. Linear regression models explaining financial risk perception.

	(6)	(7)	(8)	(9)	(10)
Ethnic origin (ref.: Germany)					
Turkey	0.245 ⁺ (0.129)	0.154 (0.127)	0.217 ⁺ (0.128)	0.221 ⁺ (0.129)	0.127 (0.128)
FSU	0.022 (0.126)	0.013 (0.117)	0.009 (0.127)	-0.030 (0.131)	0.017 (0.118)
Poland	0.008 (0.107)	0.016 (0.105)	0.020 (0.109)	0.018 (0.108)	0.011 (0.106)
FYR	0.527** (0.166)	0.432** (0.164)	0.479** (0.161)	0.479** (0.169)	0.384* (0.153)
Eastern Europe	0.160 (0.163)	0.138 (0.173)	0.151 (0.162)	0.127 (0.161)	0.162 (0.163)
Other Europe	0.134 (0.106)	0.091 (0.096)	0.128 (0.106)	0.108 (0.105)	0.096 (0.099)
Americas	0.197 (0.251)	0.140 (0.254)	0.191 (0.248)	0.145 (0.249)	0.101 (0.251)
Asia	0.109 (0.197)	-0.018 (0.212)	0.119 (0.177)	0.126 (0.178)	-0.025 (0.192)
Africa & ME	0.047 (0.143)	-0.054 (0.142)	0.018 (0.145)	-0.017 (0.150)	-0.074 (0.149)
Gender (ref.: female)	-0.126* (0.053)	-0.074 (0.054)	-0.066 (0.055)	-0.080 (0.055)	-0.078 (0.054)
General worries		0.127*** (0.031)	0.136*** (0.032)	0.141*** (0.032)	0.119*** (0.031)
Essential worker (parents) (ref.: no parent)					
one parent		0.103 (0.065)			0.109 ⁺ (0.064)
both parents		-0.144 (0.145)			-0.127 (0.146)
Parental HISEI		-0.002 (0.001)			-0.002 (0.001)
Labour market status (ref.: full-/part-time job)					
school or studying		0.110 ⁺ (0.066)			0.117 ⁺ (0.065)
apprenticeship		-0.177 ⁺ (0.104)			-0.168 (0.103)
unemployed		0.482*** (0.145)			0.493*** (0.139)
something else		0.078 (0.168)			0.076 (0.171)
Income change (ref.: less money)					
no change		-0.660*** (0.090)			-0.675*** (0.090)
more money		-0.929*** (0.214)			-0.927*** (0.207)
not applicable		-0.404*** (0.098)			-0.412*** (0.099)
Education (ref.: lower secondary)					
intermediate secondary		-0.122			-0.096

(Continued)

Table 2. Continued.

	(6)	(7)	(8)	(9)	(10)
		(0.136)			(0.137)
upper secondary		-0.121			-0.078
		(0.132)			(0.134)
Trend (ref.: decreasing)					
stagnating			0.221*		0.205 ⁺
			(0.110)		(0.108)
increasing			-0.060		-0.074
			(0.070)		(0.066)
Media exposure			0.010*		0.014**
			(0.005)		(0.005)
Individualist worldview				0.083*	0.089**
				(0.034)	(0.032)
Trust in government (ref.: low trust both)					
low and high trust				0.105	0.084
				(0.095)	(0.092)
high trust both				-0.046	-0.055
				(0.069)	(0.068)
no answer				-0.001	0.031
				(0.096)	(0.087)
Constant	3.427***	3.682***	2.846***	2.795***	3.290***
	(0.049)	(0.185)	(0.130)	(0.158)	(0.231)
Observations	3392	3392	3392	3392	3392
R^2	0.020	0.104	0.038	0.041	0.121
Adjusted R^2	0.015	0.096	0.032	0.035	0.111

Source: CILS4EU waves 1–3, CILS4EU-DE waves 4–8, CILS4COVID.

Notes: All models include epidemiological week, but coefficients are not shown. Robust standard errors in parentheses. R^2 and adjusted R^2 are means over 20 imputations based on Fisher's z transformation. ⁺ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Of the ethnic groups investigated, particularly respondents with Turkish or former Yugoslavian backgrounds show a higher increase in health and financial risk perceptions than Germans. This is not surprising, at least with respect to financial risk perceptions: these minorities are particularly disadvantaged in Germany in terms of educational attainment and occupational status. Although the second generation of those two groups has caught up in the labour market, their occupational status is still lower than that of natives (OECD 2018).

For the Asian group, we obtained diverging results depending on the risk domain. They were more affected by the pandemic than German respondents with regard to health, but not regarding financial risk perception. This may be due to the concentration of the crisis on the Asian continent – especially in the early stage of the pandemic – which might have made Asian immigrants more sensitive to the consequences of COVID-19 on their health. In contrast, Asian immigrants are rather

well integrated in terms of socioeconomic status, which may explain the minor increase in financial worries among this group during the pandemic.

Overall, just four of nine ethnic minorities report a higher increase in their COVID-19-related health risk perceptions than the German majority. Even less – just the FYR and Turkish groups, and the latter just marginally – perceive the pandemic as a bigger financial risk than Germans. This suggests that the pandemic did not reinforce ethnic inequalities in risk perception to the extent we might have expected them to, which is a positive take-away from this analysis.

Although most effects of the sociodemographic, experiential, and sociocultural factors we include in our models point in the expected direction, we were not able to explain many of the few significant ethnic differences in risk perception we found. Only the marginally significant differences in financial risk perception between the Turkish and German groups are explained by sociodemographic factors.

Turning towards limitations of our study, we need to remember that our sample only includes 24- to 26-year-olds. It is possible that factors other than the ones we use in our analysis play a role in this young age group. Generally, young people are less vulnerable to the health risk posed by the pandemic than the elderly (Hooper *et al.* 2020), but more vulnerable to financial risks (Béland *et al.* 2020). In addition, the small age range of our sample makes it difficult to generalize our results to the entire migrant population in Germany. Further research should focus on mechanisms driving ethnic differences in health and financial risk perception among younger individuals and whether these also apply to other age groups.

A second limitation of our study is the sample size of some ethnic minority groups. We have less than 100 observations with an ethnic background from FYR, the Americas, and Asia. Our analyses therefore should be repeated using data sets with bigger (migrant) samples.

Furthermore, we use a very indirect measure (trend in case numbers) to capture the impact of restrictions on financial risk perception, since this was not the focus of this paper. Future research should consider using more direct measures (e.g. Bauer and Weber 2020a) to explore this relationship in more detail.

Another avenue of future research concerns the role of perceived discrimination: in an American study, Blacks and Asians show an increase in perceived discrimination during the pandemic, which was associated with higher mental distress (Liu *et al.* 2020). Since we operationalize

risk perception as domain-specific worries, a more unstable mental state may be reflected in changed risk perceptions.

To conclude, although we could not explain most of the few existing ethnic differences we find in our sample, this study is a first step towards shedding light on the mechanisms behind change in risk perception during the pandemic. It should serve as a starting point for researchers to explore alternative explanations for ethnic group differences in COVID-19-related risk perceptions.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the German Research Foundation (DFG): [grant numbers KA 1602/8-1, KA 1602/8-2, KO 3601/8-1, KO 3601/8-2]; NORFACE ERA NET Plus Migration in Europe-programme; Mannheim Centre for European Social Research (MZES).

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