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THE RETURN OF HAPPINESS – RESILIENCE IN TIMES OF PANDEMIC

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The Return of Happiness - Resilience in Times of Pandemic

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Abstract:

Many papers have been written about people's loss of life satisfaction during the first wave of the COVID-19 pandemic in 2020, but not much has been said about their resilience after the first shock had passed. Were people able to return, at least in part, to their original level of life satisfaction? This amounts to the question to which degree people had shown psychological resilience during the first wave of the COVID-19 crisis. In this context, it is also of interest which internal and external factors supported a person's tendency to prove resilient during the crisis. Based on an online survey conducted in August / September 2020 in Germany we try to answer these questions. We find that after a loss of average life satisfaction during the first three months after the outbreak of the pandemic in Germany many people's life satisfaction increased again. Roughly 60% of the respondents proved resilient in the sense that eight months after the outbreak of the pandemic they had regained the same or an even higher level of life satisfaction as compared to the situation before the COVID-19 crisis. Our results show that besides socioeconomic characteristics like age and income and certain character traits, people's personal experience during the crisis and their approval or disapproval of government policy during the crisis had an important influence on their chance to prove resilient. Therefore, a consistent and competent crisis communication building up trust in government's crisis management capacity is essential for people's resilience in a crisis.

Keywords: Resilience, resistance, COVID-19, life satisfaction

JEL-Classification: I10, I12, I18

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1. Introduction

Whenever a major calamity occurs, it turns out that some people get through the crisis better than others do. This capability is generally described by the concept of resilience. There exist many different definitions of resilience in the literature, but they all boil down to more or less the same idea, namely the ability of individuals to cope successfully with an adversity they are suddenly confronted with. Resilience helps people to survive in a crisis and "leads to greater happiness, more success and better health", as Sheryl Sandberg and Adam Grant (2017, p. 111) put it. Knowing its determinants might help to get through future crises better than through previous adversities. In the empirical study underlying this paper, we identify personal and objective factors that supported people's resilience in the COVID-19 pandemic in early 2020.

The year 2020 was the first year decisively marked by the COVID-19 crisis in most countries. In January 2020 the Coronavirus SARS-CoV-2, which causes COVID-19, arrived in Europe and quickly changed people's lives fundamentally. On March 8 the first German citizen died from COVID-19. After that, the number of Corona infections in Germany increased rapidly. As a consequence, the German central government together with the state governments declared a general lockdown, which implied restrictions of social contacts, the closure of shops, schools, kindergartens, restaurants, cultural institutions etc. People not employed in "systemically relevant" jobs had to work from home; many went into short-time work or had no work at all. Travelling abroad without special permission was firmly restricted. These constraints lead to psychological problems and many complications in people's lives. Numerous empirical studies analysed the losses in life satisfaction people experienced during the first months of the COVID-19 crisis in 2020 (cf. e.g. Bidzan-Bluma et al., 2020; Cheng et al., 2020; de Pedraza et al., 2020; Dymecka et al., 2020; Hamermesh, 2020; Huebener et al., 2021; Rogowska et al., 2020; Windsteiger et al., 2020; Zhang et al., 2020). While these studies mainly aimed at the first impact of the crisis on people's wellbeing, this paper here focusses on their resilience over a longer period in 2020.

In our study, we analyze empirically over different time spans how people in Germany were psychologically affected by the pandemic in 2020. We are especially interested in people who showed a high level of resilience in this situation and in the internal and external factors that supported this outcome. For this purpose, we conducted an online survey with a representative sample of 2,000 participants in Germany in August and September in 2020. We found that, while a majority of respondents had experienced a loss in life satisfaction during the first three months of the pandemic, roughly 60% of respondents proved resilient in the sense that their life satisfaction eight months after the outbreak of the COVID-19 pandemic was not lower than before the crisis. Using regression analysis, we identify several factors, which significantly supported people's resilience.

The paper is organized as follows: in order to provide a sound theoretical basis for our analysis we introduce resilience and related concepts in section 2. In section 3 we provide the details of our empirical study and of our survey strategy. Section 4 contains our empirical results and discusses the effects of various external and internal characteristics of individuals on their resilience shown during the first wave of the COVID-19 crisis. Section 5 contains our conclusions.

2. Conceptual background

In our study, we compare respondents' level of life satisfaction of three months after the outbreak of the COVID-19 pandemic to their life satisfaction at the time before the crisis and then to their life satisfaction of eight months after the outbreak. We want to find out if there was a tendency to return towards one's initial level of life satisfaction after some time and, if yes, what the determinants of this tendency were. Before going into the details of our survey, we discuss the basic concepts underlying our analysis.

Resilience

The general concept of resilience plays an important role in many different fields like e.g. biology, physics, economics, medicine, ecology, psychology etc. Psychological resilience focusses on individuals and their psychological reaction to adversity. Leipold and Greve (2009, p. 41) define resilience as "an individual's stability or quick recovery (or even growth) under significant adverse conditions". A number of similar definitions of psychological resilience can be found e.g. in Fletcher and Sarkar (2013, p. 13) or in Luthar et al. (2000). Resilient people might either show resistance to stressors and maintain normal psychological and physical functioning after potentially traumatic events (Antonovsky, 1979; Bonanno et al., 2002; Kobasa, 1979; Staudinger et al., 1993; Wilson, 2004) or they may experience transient disruption but return quickly to the initial level of functioning (Bonanno, 2004; Staudinger et al., 1993) or they might be even better off in or after an adversity than before.

There are two fundamentally different concepts of resilience discussed in the literature. One is the general and situation-independent ability of a person to cope with an adversity, regardless of a specific occasion. This aspect refers to a permanent character trait, therefore, we call it *trait resilience*. The other concept of resilience refers to an individual's observable performance during an actual crisis, independent of her character traits. We call this concept *process resilience*. The two concepts refer to different perspectives on resilience and are, in principle, independent of each other.

Trait resilience can be described as the general and lasting capacity of a person to cope with adversities (Block and Block, 1980 or Connor and Davidson, 2003), i.e. "the ability to bend but not break, bounce back, and perhaps even grow in the face of adverse life experiences" (Southwick et al., 2014, p. 2). It encompasses a number of stable characteristics of human adaptability such as emotional stability and competence (Block and Kremen, 1996) that help individuals to successfully cope with hardships.

Process resilience refers to a person's actual performance during a concrete crisis and involves different adaptation mechanisms (Windle, 2011). The American Psychological Association (APA) describes this concept as "the *process* and outcome of successfully adapting to difficult or challenging life experiences, especially through mental, emotional, and behavioral flexibility and adjustment to external and internal demands". Block (1993) and Cicchetti and Rogosch (1997) implicate that trait resilience functions as a protective factor in the process of resilience (Luthar et al., 2000), i.e. trait resilience can be a general predictor of process resilience in specific situations, but this is not necessarily the case. We will scrutinize this suggestion in our empirical study.

Life satisfaction as a measure of process resilience

While the degree or level of trait resilience can be measured using well-established psychometric scales (cf. e.g. Connor and Davidson, 2003), there is much debate about the

measurement of resilience as a process (Masten, 2001). *Process resilience* is not a one-dimensional item, which can be observed and assessed empirically. Considering e.g. Garmezy's (1991, p. 459) definition of resilience as "the capacity for recovery and maintained adaptive behavior that may follow initial retreat or incapacity upon initiating a stressful event"), the question arises how process resilience could be measured in a specific crisis. "Maintained adaptive behavior" might refer to various different ways of coping with an adversity such as the ability to manage one's daily routines in spite of the crisis, to preserve one's health or one's social involvement, or to keep one's financial affairs in order etc. In trying to aggregate these heterogeneous aspects of process resilience into one single measure, it is helpful to look at the definition provided by Panter-Brick et al. (2013, p. 333): "Resilience is the process of harnessing biological, psychosocial, structural, and cultural resources to sustain wellbeing". This definition establishes a direct relation between process resilience and a person's wellbeing as an aggregator of the different activities that contribute to wellbeing. This kind of aggregation is analogous to what microeconomic consumption theory does when using a person's utility function as an aggregator of her various consumption activities. A number of studies confirm that resilience is positively related to wellbeing or life satisfaction (Bonanno et al., 2002; Cohn et al., 2009; Fredrickson et al., 2003; Smith and Hollinger-Smith, 2015; Souri and Hasanirad, 2011; Wrosch and Scheier, 2003). We will use the term life satisfaction (LS) rather than wellbeing in this paper.[4]

Life satisfaction is typically assessed on the basis of self-reported levels of satisfaction indicated by respondents in the course of interviews (e.g. Diener, 2006; Diener et al., 2003; Kahneman and Krueger, 2006). As Diener (2006) suggests, it is necessary to provide respondents in a survey with proper instructions regarding the specific point in time the survey is focussing on, for instance, “How satisfied were you in [time period], all in all, with your life?”. This single-item scale has been widely used in many panel studies, such as the German Socio-Economic Panel (GSOEP) (Richter et al., 2017), the British Household Panel Survey (BHPS) (Taylor et al., 2005), and the Swiss Household Panel (SHP) (Voorpostel et al., 2015). Sandvik et al. (1993) reported this single-item measure as reasonably valid and moderately associating with other measures of wellbeing. Responses to questions regarding life satisfaction are often indicated on a numerical scale ranging e.g. from 1 to 10 (OECD, 2018; Richter et al., 2017).

3. Data and method

The data of this study was collected in an internet-based survey with a random sample of participants from all over Germany. The survey was conducted between August 28 and September 4, 2020. The technical part of the online survey was designed and programmed by TGM Research[5]. A targeted sample of 2,000 respondents aged between 18 and 84 years had been interviewed by the end of the survey period, which yielded 1,887 valid questionnaires after data cleaning. As a sampling method, stratified sampling was used with the strata age, sex and educational level in order to obtain a sample that was representative of the German population with respect to these aspects. The demographic data of our sample is shown in Table 1.

[4] The terms life satisfaction, subjective wellbeing, happiness etc. are often used interchangeably in the literature (cf. e.g. Diener et al., 2003; Frey and Stutzer, 2002; Oishi et al., 2009; MacKerron, 2012; Feldman, 2008; Tatarkiewicz, 1976; Veenhoven, 1991).

[5] Company’s official website: https://tgmresearch.com/

In the first part of our questionnaire, we asked respondents their sociodemographic data, which were later used as control variables in our regression analysis. In addition to the data shown in Table 1 we asked questions regarding respondents' level of education, their disposable household income and their profession. The respective results are shown in Tables A1 to A3 in the appendix.

	Unit	Mean	Standard deviation	Median	share	Germany
Age	years	48.5	16.8	50	-	44.1[a]
Male	share (%)	-	-	-	49.7	49.4[a]
Persons in household	number	2.1	1.2	2	-	2[a]
German citizenship	yes (%)	-	-	-	90	87.8[a]
Living in own property	yes (%)	-	-	-	33	45.5[b]

Sources:
[a] *Deutschland in Zahlen, Ausgabe 2020, IW Medien*
[b] *Statistisches Jahrbuch 2019, Statistisches Bundesamt*

Table 1 Demographics

Assessing process resilience

The empirical assessment of process resilience poses two main problems: the choice of a suitable measuring unit or scale and the choice of the time span over which resilience should be measured. Following the German Socio-Economic Panel (GSOEP) we use a 10-point scale of self-declared life satisfaction ranging from 1 (= “not at all satisfied”) to 10 (= “completely satisfied”) for the assessment of respondents' process resilience (cf. Richter et al., 2017). Regarding the second problem, it must be decided at what points in time these LS questions should be asked in order to check if a person has shown process resilience or not. It is clear that the LS score before the adversity occurred should serve as a reference level. Since there is no "natural" time span after which resilience should be expected to set in, a time interval has to be specified after which the LS question should be asked again in order to decide whether a person has shown process resilience or not. This problem is not trivial. If the time interval between the first and the second assessment of life satisfaction is too short, a person showing no process resilience during this short interval might have proved resilient if the second assessment had taken place some time later. If, on the other hand, the observation interval is too long, factors like prices, incomes, the political situation etc., which have nothing to do with the crisis itself, might have changed in the meantime, so that the observed LS change cannot be attributed to a person's resilience alone.

For our survey, we decided that a time span of about eight months after the outbreak of the pandemic should be appropriate for resilient people to adapt to the pandemic without too many other factors biasing our results. Therefore, we conducted our survey in late August and early September 2020. We first asked respondents to indicate their actual level of life satisfaction on a 10-point scale: "Think about your life situation today: how satisfied are you now, all things considered, with your life?". Later in our questionnaire, we asked respondents their remembered LS from before the crisis ("Please try to remember your life situation in

January, before the COVID-19 crisis began in Germany. How satisfied were you, all in all, with your life at that time?"). Now we could compare the pre-crisis level of LS with the actual LS level eight months after the outbreak of the pandemic in order to see if respondents had shown process resilience or not. Additionally, we wanted to know how people's LS had reacted to the COVID-19 crisis during the first three months after its outbreak. Therefore, we asked them: "Do you remember how you felt during the lockdown, i.e. at the end of March and beginning of April? How satisfied were you, all in all, with your life at that time?"). We chose this point in time, because that was at the peak of the (first wave of) the pandemic in 2020, when the lockdown with its accompanying restrictions constituted such a drastic experience in people's lives that we hoped they would remember it vividly and reliably.

This survey strategy gained us three different levels of life satisfaction: the pre-crisis level LS_0, the level LS_1 from three months after the outbreak and the level LS_2 from eight months after the outbreak. The latter is the only level that represents an "experienced" level of life satisfaction, while LS_0 and LS_1 are "remembered" LS levels (see Kahneman, 2011, pp. 391). We are well aware of the problems associated with remembered life satisfaction (see e.g. Kahneman, 2011, pp. 377; Kahneman and Riis, 2005; or Mogilner and Norton, 2019). These problems are less dramatic in the context of our study, since our results and conclusions do not refer to absolute LS levels, but to differences in LS levels (in this context see also Arampatzi et al., 2020 or Windsteiger et al., 2020). We assume that the "remembering self" (Kahneman) of most respondents is subject to a similar kind of memory bias regarding previous levels of life satisfaction, so that the LS changes ΔLS_{01} (= LS_1 - LS_0), ΔLS_{12} (= LS_2 - LS_1) and ΔLS_{02} (= LS_2 - LS_0) are meaningful in our context (see Fig. 1).

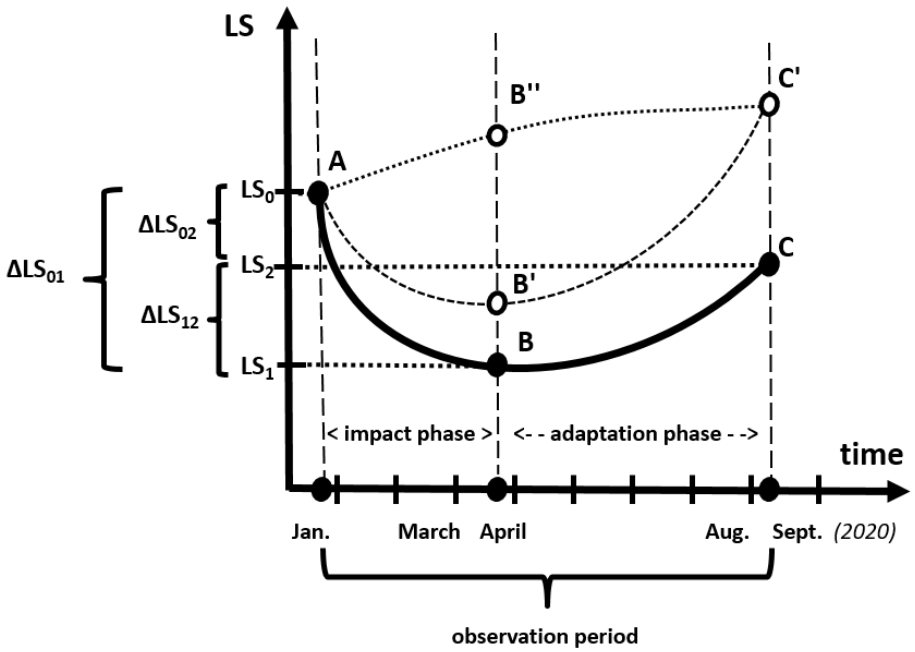

Fig. 1 Examples of LS trajectories during a crisis

We use the total change in life satisfaction ΔLS_{02} as an indicator of a person's process resilience. We define a person to be process *resilient*, if ΔLS_{02} is nonnegative in a given crisis. If ΔLS_{02} is negative, she is considered non-resilient. We disaggregate the overall resilience process into two successive phases as shown in Fig. 1. During the first phase, which we call the "*impact phase*", an external shock occurs, which puts a person out of her initial equilibrium and changes her life satisfaction from LS_0 to LS_1. We define a person to be *resistant* to the shock, if ΔLS_{01} is nonnegative. If ΔLS_{01} is negative, she is considered non-resistant. In our study, we chose the impact phase to last from January until April 2020, i.e. about three months. The ensuing "*adaptation phase*" lasts from April until September 2020, i.e. about five months. During this phase, a person's life satisfaction develops towards the new equilibrium LS_2.

The trajectory ABC in Fig. 1 shows an exemplary resilience process, where an individual's life satisfaction drops during the impact phase ($\Delta LS_{01} < 0$) and then partially recovers again ($\Delta LS_{12} > 0$) during the subsequent adaptation phase. In this example, the total effect ΔLS_{02} is negative, i.e. the respective person is non-resilient. The trajectories AB'C' and AB''C' both represent resilient individuals, where AB''C' describes the change in life satisfaction of individuals who are both, resilient and resistant.

Of course, the three observations LS_0, LS_1 and LS_2 are only snapshots taken at three different points in time, which do not allow us to characterize the development of life satisfaction during a crisis comprehensively. Nevertheless, the observation of LS_1 as a third observation in addition to LS_0 and LS_2 makes it possible to assess a person's immediate reaction to an external shock in addition to the long-term adjustment of her life satisfaction. It allows us to get a more differentiated impression of the impact a crisis has on people's life satisfaction than a simple resilience analysis comparing only LS_2 with LS_0. Otherwise two LS trajectories with the same initial and final level of life satisfaction like AB'C' and AB''C' in Fig. 1, where both are resilient, but only AB''C' shows also resistance to the shock, could not be distinguished from each other.

Based on our online survey we will answer the following two research questions:

1) What were the immediate effects of the outbreak of the COVID-19 crisis in 2020 on people's life satisfaction during the impact phase (ΔLS_{01}) and during the adaptation phase (ΔLS_{12}), and what were the total effects on their LS over the entire observation period (ΔLS_{02})?
2) What were the main internal and external characteristics supporting people's resilience?

In the next section, we will first present the LS changes reported by our respondents. Using regression analysis, we will then turn to the influence of several internal and external factors on life satisfaction during the first eight months of the COVID-19 crisis in 2020.

4. Results and discussion

4.1 Influence of COVID-19 on life satisfaction

To answer the first research question we calculate the average total effect of the crisis on life satisfaction $\Delta LS_{02} = LS_2 - LS_0$, as well as the average impact effect $\Delta LS_{01} = LS_1 - LS_0$ and – for completeness sake – the adaptation effect $\Delta LS_{12} = LS_2 - LS_1$ from our data. As explained above, our respondents were asked to indicate their perceived life satisfaction LS on a 10-point scale ranging from 1 to 10 for three different points in time: before the COVID-19 crisis in January

2020, at its peak in April 2020 and at the time of the survey in late August and early September 2020. The results are shown in Table 2.

	Variable	Obs.	Mean	Std. Dev.	Min	Max	Median
Impact effect	ΔLS_{01}	1,887	- 1.48	2.33	-9	8	- 1
Adaptation effect	ΔLS_{12}	1,887	.94	2.16	-9	9	1
Total effect	ΔLS_{02}	1,887	- .54	1.98	-9	9	0

Table 2 Aggregate changes of life satisfaction

These results show that aggregate life satisfaction first decreased as a consequence of the COVID-19 crisis with a mean value of -1.48 points and then recovered with a positive mean value of .94 points leaving us with a mean total effect of -.54 points, i.e. on average our respondents proved neither resistant nor resilient during the observation period. This corresponds with the bold trajectory ABC in Fig. 1. From Table 2 we also learn that the median respondent experienced a loss of life satisfaction of -1 during the impact phase, followed by an equivalent gain during the adaptation phase, so that the total median effect was zero. Looking at the frequency distribution of individual LS changes during the different phases of the crisis presented in Table 3, it turns out that a considerable number of individual respondents showed nonnegative resistance or resilience or both.

Tables 2 and 3 show that a majority of 56.76% of our respondents experienced a loss in life satisfaction ($\Delta LS_{01} < 0$) during the *impact* phase of the pandemic, while 43.24% proved resistant during this phase with $\Delta LS_{01} \geq 0$. It is also interesting to note that the mode of this distribution is $\Delta LS_{01} = 0$ with a share of 33.17%, i.e. one third of our respondents, did not experience any change of their life satisfaction at all during the first three months of the pandemic. This is surprising since also citizens who were neither infected nor professionally affected by the crisis had to endure the restrictions on their private lives that came along with the lockdown.

The frequency distribution of the *adaptation* effects ΔLS_{12} according to Table 3 has its mode also at $\Delta LS_{12} = 0$ and its median at $\Delta LS_{12} = 1$. For the vast majority of 84.74% of our respondents, life satisfaction had either increased or remained constant during the adaptation phase. The frequency distribution of the *total* effects has its mode and its median both at $\Delta LS_{02} = 0$. These results indicate a rather mild average loss of life satisfaction over the whole observation period. Table 3 shows that roughly 60% of our respondents proved resilient in the sense of $\Delta LS_{02} \geq 0$. A share of 43.24% ended up at the same level of perceived life satisfaction that they had before the crisis, while as many as 16.85% even showed an overall growth of their life satisfaction with $\Delta LS_{02} > 0$. These results show that, all in all, the loss of life satisfaction during the first wave of the Corona pandemic in Germany in 2020 was not as dramatic as one might have expected considering the public debate and the media coverage of the COVID-19 crisis.

ΔLS	Impact effect: ΔLS_{01}			Adaptation effect: ΔLS_{12}			Total effect: ΔLS_{02}		
	Freq.	Percent	Cum.	Freq.	Percent	Cum.	Freq.	Percent	Cum.
-9	20	1.06	1.06	2	0.11	0.11	8	0.42	0.42
-8	14	0.74	1.80	3	0.16	0.26	8	0.42	0.85
-7	38	2.01	3.82	5	0.26	0.53	13	0.69	1.54
-6	55	2.91	6.73	8	0.42	0.95	17	0.90	2.44
-5	84	4.45	11.18	7	0.37	1.32	28	1.48	3.92
-4	118	6.25	17.44	18	0.95	2.28	58	3.07	7.00
-3	177	9.38	26.82	31	1.64	3.92	80	4.24	11.23
-2	274	14.52	41.34	71	3.76	7.68	185	9.80	21.04
-1	291	15.42	56.76	143	7.58	15.26	356	18.87	39.90
0	626	33.17	89.93	619	32.80	48.07	816	43.24	83.15
1	101	5.35	95.28	371	19.66	67.73	165	8.74	91.89
2	47	2.49	97.77	251	13.30	81.03	77	4.08	95.97
3	16	0.85	98.62	149	7.90	88.92	30	1.59	97.56
4	18	0.95	99.58	97	5.14	94.06	20	1.06	98.62
5	1	0.05	99.63	49	2.60	96.66	7	0.37	98.99
6	5	0.26	99.89	29	1.54	98.20	10	0.53	99.52
7	1	0.05	99.95	23	1.22	99.42	7	0.37	99.89
8	1	0.05	100.00	8	0.42	99.84			
9				3	0.16	100.00	2	0.11	100.00
Total	1,887	100.00		1,887	100.00		1,887	100.00	

Table 3 Frequency distribution of LS changes during the different phases

In order to get a better understanding of people's psychological reaction to the COVID-19 crisis during its beginning in 2020, it is interesting to have a closer look at the relation between LS changes during the impact phase on the one hand and the adaptation phase on the other. From Table 4 it can be seen that a majority of 77.31% of respondents who had experienced a loss in life satisfaction during the impact phase ($\Delta LS_{01} < 0$) recovered during the adaptation phase ($\Delta LS_{12} > 0$). Only 15.03% of these respondents stayed at the lower LS level, while the life satisfaction of 7.66% deteriorated even further. Analogously, more than one half (53.70%) of those respondents who had benefitted from the crisis during the impact phase ($\Delta LS_{01} > 0$) experienced a compensating loss of life satisfaction ($\Delta LS_{12} < 0$) afterwards, while 21.58% stayed at the higher LS level and 24.74% thrived even more ($\Delta LS_{12} > 0$). Table 4 shows also that 66.61% of those respondents whose life satisfaction had not changed during the impact phase ($\Delta LS_{01} = 0$) maintained their initial LS level also during the adaptation phase ($\Delta LS_{12} = 0$).

These results suggest that there is a certain degree of path-dependence between the LS changes during the two phases. A majority of those who suffered during the impact phase of the crisis were compensated later by an increase in their life satisfaction, while many of those who had thrived initially suffered a loss of life satisfaction during the adaptation phase. Interestingly, nearly one quarter (22.10%) of our respondents (417 out of a total of 1,887 respondents) were completely unimpressed by the crisis with $\Delta LS_{01} = 0$ and $\Delta LS_{12} = 0$.

ΔLS_{01}	→ ΔLS_{12}	Freq.	Percent
Δ LS$_{01}$ < 0	**$\Delta LS_{12} < 0$**	82	7.66
	$\Delta LS_{12} = 0$	161	15.03
	$\Delta LS_{12} > 0$	**828**	**77.31**
Δ LS$_{01}$ = 0	**$\Delta LS_{12} < 0$**	104	16.62
	$\Delta LS_{12} = 0$	**417**	**66.61**
	Δ LS$_{12}$ > 0	105	16.78
Δ LS$_{01}$ > 0	**$\Delta LS_{12} < 0$**	**102**	**53.7**
	$\Delta LS_{12} = 0$	41	21.58
	$\Delta LS_{12} > 0$	47	24.74

Table 4 Relation between ΔLS in impact and adaptation phase

In the following section, we identify subjective and objective factors that help people to get through a crisis like the COVID-19 pandemic better than others do. We are interested in the factors, which had a positive effect on life satisfaction during the impact phase of the crisis (ΔLS_{01}) as well as over the whole observation period (ΔLS_{02}).

4.2 Marginal effects

In this section, we analyse the marginal effects of various internal and external factors on a person's life satisfaction during the COVID-19 crisis in 2020. We want to find out if and how these factors support a person's resilience. Most definitions of resilience refer explicitly to two effects: the immediate response of life satisfaction to an adversity and the convergence to the new equilibrium.

In order to identify the marginal impact of potential determinants on people's life satisfaction, we run regressions with ΔLS_{02} and ΔLS_{01} as dependent variables. For each of these two variables we estimate ordinary least square (OLS) regression models of the general form:

$$(\Delta LS_t)_i = \alpha_i + \beta_i \cdot S_i + \gamma_i^{ex} \cdot X_i^{ex} + \gamma_i^{att} \cdot X_i^{att} + \gamma_i^{trait} \cdot X_i^{trait} + \varepsilon_i \quad (t = 01, 02)$$

The dependent variable $(\Delta LS_t)_i$ describes the change in life satisfaction shown by an individual *i* during the impact phase for *t* = 01 or over the entire observation period for *t* = 02. The scalar α_i is the constant of the regression equation. We distinguish four different categories of control variables, which we consider potential determinants of LS changes: the vector of sociodemographic characteristics S_i of individual *i* with the corresponding vector of

coefficients β_I, experience-based determinants X_i^{ex} with coefficients γ_i^{ex}, believes and attitudes X_i^{att} with coefficients γ_i^{att} and character traits X_i^{trait} with coefficients γ_i^{trait}. The scalar ε_i is an error term. Our hierarchical regression analysis explained below is based on these four categories of control variables. For technical reasons we include the base level of life satisfaction LS_0 as a control variable in our analysis, where we expect that LS_0 has a negative effect on ΔLS_{01} and ΔLS_{02}. If a respondent's initial LS level is 8 or 9 there is less room for further improvements than for an initial LS level of 2 or 3. Therefore, we need to control for LS_0 as a kind of normalization. Table 5 shows a list of the control variables we use in our regression analysis in detail.

Variable	Description	Mean *(std. dev.)*
CONS.	Constant	-
MALE	Whether the respondent is male. 1 = Male, 0 = Female	0.49 *(0.50)*
AGEGROUP	Categorized into 6 age groups from 1 (= "18 – 29") to 6 (= "Above 70")	3.42 *(1.63)*
INCOME	Average monthly disposable income of household, categorized into 7 groups from 1 (= "less than 2,000 €") to 7 (= "7,000 € or more")	2.35 *(1.52)*
CHILDREN	The number of children living in the household	0.36 *(0.78)*
RESILIENCE	"Trait resilience" score (Connor / Davidson 2003) ranging from 0 to 40	26.72 *(6.64)*
SOC_NET	"Social network" = the number of persons the respondent is in close contact with, ranging from 0 to 30 ("Lubben Social Network Scale")	12.46 *(5.81)*
RISK	"Risk aversion" score according to Meertens and Lion (2008, p. 1520), ranging from 5 to 25 (higher score indicating higher risk-aversion)	18.89 *(3.31)*
LOC	"Locus of Control" score. Aggregate of 6 items from the SOEP scale (cf. Richter et al. 2017, p. 35). Range from 6 to 30 (high score = internal LoC)	19.26 *(3.99)*
SOCIAL_SIT	"How has your social situation changed after the COVID-19 lockdown compared to before the lockdown?", from 1 (= "Greatly deteriorated") to 5 (= "Greatly improved")	2.62 *(0.78)*
JOB_SIT	"How has your job situation changed after the COVID-19 lockdown compared to before the lockdown?", from 1 (= "Greatly deteriorated") to 5 (= "Greatly improved")	2.88 *(0.65)*
HEALTH_SIT	"How has your health situation changed after the COVID-19 lockdown compared to before the lockdown?" from 1 (= "Greatly deteriorated") to 5 (= "Greatly improved")	2.99 *(0.57)*
FAMILY_SIT	"How has your family situation changed after the COVID-19 lockdown compared to before the lockdown?", from 1 (= "Greatly deteriorated") to 5 (= "Greatly improved")	3.05 *(0.65)*
HOUSING_SIT	"How has your housing situation changed after the COVID-19 lockdown compared to before the lockdown?", from 1 (= "Greatly deteriorated") to 5 (= "Greatly improved")	3.05 *(0.46)*
AGREE_MEASURE	Categorical variable on the agreement with government measures to combat the COVID-19 pandemic. Answering options are "Too hesitant", "Exactly right", and "Too radical" with "Exactly right" being the baseline option.	
PER_THREAT	Dummy variable regarding perceived threat posed by the Corona virus, 1 (= "Threatening") and 0 (= "Not threatening")	0.51 (0.50)
SELF_INF	Response to question "Are you or have you been infected with the Coronavirus yourself?". 1 = "Yes", 0 = "No"	0.02 *(0.14)*
UNCONCERN	The degree to which respondents were "unconcerned" about the COVID-19 pandemic. Agreeing or disagreeing with statements "I am not worried that I personally will get COVID-19 now or in the future", "For me it's important to have fun, I don't care about Corona" and "I don't think there is any danger at all from COVID-19" on a 5-point Likert scale. Range from 3 to 15.	6.81 *(2.88)*

FUT_EXP	Expected quality of life two years from now as compared to today, ranging from 1 (= “much worse”) to 5 (= “much better”)	3.32 *(0.83)*
LS0	LS_0 from 1 (= "Not at all satisfied") to 10 (= "Totally satisfied")	7.08 *(2.26)*

Table 5 Description of variables used in regression models

Table 6 summarizes our hypotheses regarding the effects of the potential determinants on life satisfaction during the impact phase (ΔLS_{01}) and the adaptation phase (ΔLS_{02}). The determinants in Table 6 are ordered according to their affiliation to the four categories explained above. We will test these hypotheses in our regression analysis. Our hypothesis regarding LS_0 is that its effect on ΔLS_{01} and ΔLS_{02} is negative, as explained above.

Hypotheses (expected impact of potential determinants)	**ΔLS_{01}**	**ΔLS_{02}**
Sociodemographic characteristics		
Sex male	⇧	⇧
Age group	⇧	⇧
Income	⇧	⇧
Children	**?**	**?**
Social network	⇧	⇧
Experience during the pandemic		
Improvement of various aspects of life during the lockdown	⇧	⇧
Perceived threat during the lockdown	⇩	⇩
Having been infected with the virus	**X**	⇩
Attitudes and believes regarding the pandemic		
Lockdown measures too radical	⇩	⇩
Lockdown measures too hesitant	⇩	⇩
Being unconcerned about Corona in August / September 2020	**X**	⇧
Expectation of a better life in the future in August / September 2020	**X**	⇧
Character traits		
Trait resilience	⇧	⇧
Locus of control (internal LoC)	⇧	⇧
Risk aversion	⇩	⇩

(⇧ = positive impact; ⇩ = negative impact; **?** = impact unclear; X = does not apply)

Table 6 Hypotheses regarding the marginal effects of potential determinants

The results of our regression analysis with ΔLS_{01} and ΔLS_{02} as dependent variables are shown in Tables 7 and 8, respectively. Each table contains three hierarchical regression models, where Model 1 is our base model with respondents' sociodemographic characteristics S_i. These variables are based on objective facts, which cannot be influenced by a respondent, and are independent of her preferences or convictions and attitudes. They are also independent of the specific adversity under consideration, i.e. the COVID-19 pandemic. The second model contains all control variables of the base model plus independent variables of the categories

"Experience during the pandemic" (X_i^{ex}) and "Attitudes and believes regarding the pandemic" (X_i^{att}). These variables are directly related to the COVID-19. Their values depend on respondents' preferences and their subjective assessment of their situation during the observation period. With our regression analysis, we want to analyse the impact of these pandemic-related variables on respondents' resistance and resilience. We also want to check if the explanatory power of our model, as measured in terms of adjusted R^2 and AIC, increases if we include these variables into our regression analysis. Our third model in this hierarchy contains all control variables of Model 2 plus additional psychological variables describing a respondent's permanent "Character traits" (X_i^{trait}). These traits are stable over time and independent of the COVID-19 pandemic. They cannot be influenced by respondents, at least not in the short run. The assessment of the character traits "Trait resilience", "Locus of control" and "Risk aversion" is based on the score respondents achieve on already existing and validated scales with various questions each. This assessment method differs fundamentally from the assessment of the other categories of variables. Here we are interested in the effects of the permanent character traits on resistance and resilience and in the question if their consideration will improve the explanatory power of our regression model. Based on the four categories of potential determinants we will now discuss their influence on life satisfaction changes during the first eight months of the COVID-19 crisis in 2020.

Sociodemographic characteristics

From Table 7 we see that *being male* (MALE) has a significant positive effect on ΔLS_{01}, which means that men proved more resistant to the COVID-19 crisis than women in the short run, i.e. between January and April 2020. This result is in accordance with other studies on the loss of perceived life satisfaction during the COVID-19 crisis (cf. e.g. Entringer et al., 2020; Gonzalez-Bernal, 2021; Hertwig et al., 2020; Windsteiger et al., 2020). Reasons for this result might be that women suffered more from loneliness than men during the crisis (Entringer et al., 2020) and were more worried about their health than men (Hertwig et al., 2020). Another plausible reason why women might have suffered more than men is the double burden they have to bear in the form of job responsibilities on the one hand and household duties, especially childcare (cf. e.g. Chauhan, 2020), on the other. This effect seems to be partially reversed during the adaptation phase since being male has no significant effect on life satisfaction in the long run, i.e. between January and September 2020 (see Table 8). These results fulfil our expectations regarding the impact phase but not the whole observation period, where we also expected a positive effect according to Table 6.

Ex ante, when we set up our hypotheses, the effect of having *children* (CHILDREN) on life satisfaction appeared unclear. Of course, children are a source of constant joy for their parents and keep them company during a lockdown in a pandemic. However, considering the stress of having to work from home while having to entertain the children, to help them with home schooling etc., it seems plausible that having children caused a loss of LS during the impact phase of the pandemic according to Table 7. This result is also in accordance with the findings of other studies (see e.g. Dawes et al., 2021; Huebener et al., 2021; Windsteiger et al., 2020). The effect of children on overall LS change ΔLS_{02} is not significant according to our results, which means that during the adaptation phase the positive effects of having children seem to have outweighed the negative effects of the impact phase.

Dependent Var.:	Model 1		Model 2		Model 3	
ΔLS_{01}	Coefficient	Std. Err.	Coefficient	Std. Err.	Coefficient	Std. Err.
MALE	0.387***	0.098	0.266***	0.098	0.236**	0.098
AGEGROUP						
18 – 29	-0.035	0.167	-0.148	0.172	-0.180	0.173
30 – 39	0.124	0.176	-0.041	0.178	-0.008	0.178
40 – 49	- base -		- base -		- base -	
50 – 59	0.361**	0.164	0.325**	0.162	0.312*	0.161
60 – 69	0.457***	0.163	0.372**	0.161	0.317**	0.161
Above 69	0.675***	0.195	0.534***	0.192	0.456**	0.192
INCOME	0.040	0.034	0.003	0.034	-0.005	0.034
CHILDREN	-0.120*	0.066	-0.153**	0.069	-0.147**	0.068
SOC_NET	0.002	0.009	-0.001	0.009	-0.007	0.009
SOCIAL_SIT			0.401***	0.072	0.402***	0.071
JOB_SIT			0.238***	0.087	0.219**	0.087
HEALTH_SIT			0.322***	0.099	0.312***	0.100
FAMILY_SIT			0.053	0.086	0.036	0.086
HOUSING_SIT			0.164	0.123	0.166	0.123
PER_THREAT			-0.550***	0.100	-0.493***	0.101
AGREE_MEASURE						
Too radical			-1.254***	0.149	-1.229***	0.150
Exactly right			- base -		- base -	
Too hesitant			-0.061	0.124	-0.012	0.125
RESILIENCE					0.017**	0.008
RISK					-0.024	0.016
LOC					0.044***	0.014
LS_0	-0.474***	0.023	-0.500***	0.023	-0.534***	0.025
CONS.	1.371***	0.209	-1.018**	0.442	-1.399**	0.587
Observations	1,752		1,528		1,528	
Adjusted R^2	0.218		0.320		0.328	
AIC	7461.724		6288.965		6273.742	

***p<0.01, **p<0.05, *p<0.1

Table 7 Hierarchical regression analysis for the change in life satisfaction during the impact phase (resistance)

It is not surprising that household *income* (INCOME) has a significant positive effect on life satisfaction over the whole observation period, i.e. higher incomes support resilience. Higher incomes typically help to make everyday life easier in many respects. For this reason, we originally expected income to have a positive effect also during the impact phase, but this hypothesis is not supported by our regression analysis.

Our results regarding the effect of *age* (AGEGROUP) on life satisfaction reflects rather nicely the U-shaped relation between (the absolute level of) happiness and age, which is well known from many studies on happiness or life satisfaction (e.g. Bell and Blanchflower, 2007; Blanchflower and Oswald, 2004, 2008; Ferrer-i-Carbonell, 2005; Hayo and Seifert, 2003; Powdthavee, 2005). These studies, which formed also the basis for our respective hypotheses, typically show that people's self-reported happiness decreases until the age of 50 and increases afterwards (see e.g. Blanchflower, 2021; Dear et al., 2002; Ferrer-i-Carbonell, 2005; Gerdtham and Johannesson, 2001). For our regression analysis, we defined dummy variables for six age groups (18-29, 30-39, 40-49, 50-59, 60-69, 70 and above) using the interval between 40 and 49 years as our base interval. Here we find that belonging to the age group of 18 to 29 years instead of belonging to the base group of 40 to 49 years has a significant negative effect

on resilience, while belonging to age groups above 60 years has a significant positive effect. Being 50 years or older supports life satisfaction also during the impact phase. These results are in accordance with other studies showing that younger people suffered more from loneliness than older people during the crisis (see e.g. Achdut and Refaeli, 2020; Entringer et al., 2020; Luchetti et al., 2020).

Dependent Var.:	**Model 1**		**Model 2**		**Model 3**	
ΔLS_{02}	**Coefficient**	**Std. Err.**	**Coefficient**	**Std. Err.**	**Coefficient**	**Std. Err.**
MALE	0.030	0.081	-0.053	0.083	-0.080	0.082
AGEGROUP						
18 – 29	-0.146	0.139	-0.446***	0.149	-0.407***	0.146
30 – 39	-0.059	0.147	-0.304**	0.153	-0.190	0.149
40 – 49	- base -		- base -		- base -	
50 – 59	0.260*	0.136	0.212	0.139	0.160	0.134
60 – 69	0.516***	0.136	0.483***	0.138	0.352***	0.134
Above 69	0.617***	0.162	0.606***	0.164	0.415**	0.161
INCOME	0.094	0.028	0.067**	0.029	0.054*	0.028
CHILDREN	0.008	0.055	0.022	0.058	0.036	0.056
SOC_NET	0.046	0.007	0.040***	0.007	0.027***	0.007
SOCIAL_SIT			0.248***	0.061	0.230***	0.060
JOB_SIT			0.364***	0.074	0.314***	0.073
HEALTH_SIT			0.443***	0.086	0.437***	0.084
FAMILY_SIT			0.239***	0.074	0.192***	0.072
HOUSING_SIT			-0.010	0.107	0.013	0.104
PER_THREAT			-0.233***	0.088	-0.150*	0.087
SELF_INF			-0.955***	0.341	-0.845**	0.331
UNCONCERN			-0.003	0.018	0.021	0.018
FUT_EXP			0.237***	0.057	0.138**	0.057
AGREE_MEASURE						
Too radical			-0.438***	0.143	-0.439***	0.139
Exactly right			- base -		- base -	
Too hesitant			-0.239**	0.106	-0.180*	0.103
RESILIENCE					0.041***	0.007
RISK					0.002	0.013
LOC					0.079***	0.012
LS_0	-0.401***	0.019	-0.442***	0.019	-0.510***	0.020
CONS.	1.311***	0.174	-2.330***	0.411	-3.898***	0.530
Observations	1,752		1,486		1,486	
Adjusted R^2	0.202		0.317		0.359	
AIC	6830.328		5606.290		5513.711	

***p<0.01, **p<0.05, *p<0.1

Table 8 Hierarchical regression analysis for the change in life satisfaction over the whole observation period (resilience)

There seems to be a common believe that people who are part of a close *social network* (SOC_NET) of friends and family get more smoothly through a crisis than others. In order to assess our respondents' social network, we used the 6-item version of the Lubben Social Network Scale (Lubben et al., 2006, p. 513) asking questions like "How many relatives (friends) do you talk to or meet with at least once a month?", "How many relatives (friends) do you feel close enough to ask for help?" and "With how many relatives (friends) do you feel comfortable enough to talk to them about private matters?". As expected, we found that the size of the

social network in which respondents were involved had a significant positive effect on their life satisfaction in the long run, i.e. it supported their resilience. Surprisingly, we could not detect an analogous effect for the impact phase alone.

Experience during the pandemic

The items included in this category of potential determinants of resilience and resistance refer to respondents' personal assessment of how they experienced the pandemic. Only the question "Are you or have you been infected with the Corona virus yourself?" refers to an objective fact. It seems reasonable to expect that the experience people made in their personal lives during the observation period of the COVID-19 crisis should influence their life satisfaction in the short as well as in the long run. Therefore, we asked respondents: "How has your life changed after the COVID-19 lockdown compared to before the lockdown in the following ways?". Then they had to mark this change on a 5-point Likert scale ranging from "(5) greatly deteriorated" to "(1) greatly improved". The different aspects of their lives they had to assess were "*social situation*" (SOCIAL_SIT), "*job situation*" (JOB_SIT), "*health situation*" (HEALTH_SIT), "*family situation*" (FAMILY_SIT) and "*housing situation*" (HOUSING_SIT). Our hypothesis was that positive experience in these fields would have a positive influence on people's life satisfaction. These expectations were fully met by the effects of improvements of their social, job and health situation, for which all OLS models show significant positive effects. Improvements of the housing situation had no significant effect on life satisfaction, while the family situation had a significant positive total effect on resilience, but not on resistance.

People who had *felt threatened* (PER_THREAT) by the Corona virus during the crisis in 2020 experienced a higher loss or lower gain of life satisfaction during the impact phase (ΔLS_{01}) as well as over the whole observation period (ΔLS_{02}) than people who had not felt threatened. These results are perfectly plausible and in accordance with our hypotheses. Analogously, respondents who themselves had been *infected* with the Corona virus (SELF_INF) showed a lower level of resilience (ΔLS_{02}) than people who had not been infected.

Attitudes and believes

While the variables contained in the previous category mainly referred to people's assessment of what had happened to them personally during the crisis, the items considered in the present category aim at their general assessment of government policy during the crisis and their believes regarding their future lives including their concerns about the risk of getting infected in the future. Regarding people's attitudes towards the restrictions imposed on their lives during the lockdown, we asked respondents to mark on a 4-point scale how much they agreed with the measures taken by government: "Do you think that, all things considered, these measures were adequate to combat the COVID-19 pandemic?". Answering options were "These measures were (1) too hesitant, (2) exactly right, (3) too radical, (4) partly, partly". The first three answering options were treated as categorical variables with "exactly right" as base option, while "partly, partly" was treated as an "opt out" answering option for respondents who could not make up their mind. Our hypotheses as shown in Table 4 were that *agreeing with the lockdown measures* (AGREE_MEASURE) by answering "exactly right" would have a positive effect on their resistance and their resilience. Disagreeing by finding these measures either too radical or too hesitant was supposed to have a negative effect. Our results show that finding the lockdown measures *too hesitant* (instead of "exactly right") had no significant effect on ΔLS_{01}, while finding them *too radical* had the expected negative effect. That means

that people who found the lockdown measures excessive, suffered more during the impact phase of the pandemic than people who fully agreed with them. This is plausible since they had to endure a double burden: the threat to their health caused by the Corona virus plus the seemingly too radical curtailment of their civil rights during the lockdown. Both, the total effects of finding the lockdown measures too hesitant or too radical instead of "exactly right" have a significant negative effect on resilience. The negative effect of finding the government measures "too hesitant" on resilience but not on resistance, can be explained by the fact that after the relief of these measures during the adaptation phase, things became even worse for people who found these measures to lax anyway. The positive effect of agreeing with government measures during the lockdown shows that in order to support people's resilience it is extremely important for government to explain its policy in a crisis comprehensively and consistently to the public in order to build up trust into their problem-solving competency.

When setting up our survey we had hypothesized that people who were *not worried about COVID-19* (UNCONCERN) in August / September 2020 would experience a higher total effect on their life satisfaction ΔLS_{02} than others. Our independent variable "UNCONCERN" aggregates the answers to the three respective questions stated in Table 5. Surprisingly, this variable had no significant effect on resilience. We had also hypothesized that people who in August 2020 expected that their lives would improve in the future would experience a higher level of resilience in terms of ΔLS_{02} than others. Therefore, we asked them: "What are your expectations for your life in two years?" They could choose on a 5-point Likert scale ranging from "(1) much worse" to "(5) much better". It showed that, indeed, the *expectation of a better life in the future* (FUT_EXP) had a significant positive effect on resilience.

Character traits

Permanent character traits like trait resilience, locus of control and risk aversion are independent of a specific crisis like the COVID-19 pandemic. Nevertheless, we expected these traits to have an influence on life satisfaction and, therefore, on process resilience and resistance during this concrete adversity. Therefore, we added the respective variables to our model at the third stage of our hierarchic regression analysis. Our respective hypotheses are shown in Table 6.

Trait resilience (RESILIENCE) "embodies the personal qualities that enable one to thrive in the face of adversity" (Connors and Davidson, 2003, p. 76) and "may thus also be viewed as measure of successful stress-coping ability" (Connors and Davidson, 2003, p. 77). In contrast to process resilience, trait resilience is the general and lasting ability of an individual to deal with stressful situations. The natural hypothesis regarding the impact of trait resilience in a specific adversity is that a high score on trait resilience will have a positive effect on process resilience and on resistance. For the assessment of trait resilience, we used (with their permission) the official German translation of the 10-question version of the resilience scale by Kathryn M. Connor and Jonathan R.T. Davidson (2003), the so-called CD-RISC-10. Our regression results based on model 3 meet our expectations. A high score on trait resilience is, indeed, a good predictor that a person will get better through a concrete adversity than others. This is in accordance with the results of various other studies (cf. e.g. Gundogan, 2021; Li et al., 2021; Mei et al., 2021).

In our questionnaire, we also asked questions aiming at the so-called *Locus of Control* (LoC) of respondents (see e.g. Halpert and Hill, 2011; Levenson, 1973; Piatek and Pinger, 2010). The concept of LoC refers to the question, if a person believes that she can control the course of

her life (Internal LoC) or that her life is controlled by others (External LoC). "Others" could mean other persons, but also more abstract powers like luck, fate or destiny. In order to assess a person's conviction that she can determine the course of her own life, the German Socio-Economic Panel suggests 10 statements to which respondents can agree or disagree (SOEP, cf. Richter et al. 2017, p. 35). Referring to Specht et al. (2012), Richter at al. (2017, p. 34 and 36) hold that only seven of the 10 SOEP statements can be aggregated into a scale of acceptable internal consistency. We chose six of the seven items suggested by Richter et al. (2012, p. 12) for our regression analysis since the seventh statement ("If I run up against difficulties in life, I often doubt my own abilities") did not really fit into our context. We offered the statements "How my life turns out depends on myself", "Compared to others, I haven't achieved what I deserved", "What you achieve in life is primarily a matter of fate or luck", "I often have the experience that others determine my life", "The opportunities I have in life are determined by social conditions" and "I have little control over the things that happen in my life." Respondents could agree or disagree with these statements on a 5-point Likert scale ranging from to (1) "Does not apply at all" to (5) "Fully applies". After appropriate coding and reverse-coding, a higher score indicates a higher internal LoC, while a low score indicates an external LoC of the respective respondents. Our hypothesis was that high scorers on the LoC scale would find it easier to navigate through a crisis like the COVID-19 pandemic than others, i.e. that an internal LoC would have a positive effect on resistance and process resilience. Our regression analysis confirms this hypothesis, as Tables 7 and 8 show.

Our questionnaire contained also questions aiming at the general *risk aversion* (RISK) of respondents. We adapted five of the altogether seven items suggested by (Meertens and Lion, 2008) with the following statements: "My motto is 'Safety first!'", "I do not take risks with my health", "I really dislike not knowing what is going to happen", "I prefer to avoid risk in general", "I usually view risks as a challenge". Respondents had to state their agreement or disagreement to these statements on a 5-point Likert scale. We hypothesized that risk averse persons would prove less resistant to the crisis than other people and also less resilient. Our expectations are not met by our data, as Tables 7 and 8 show. Surprisingly, there are no significant effects of risk aversion on ΔLS_{01} and ΔLS_{02}.

Significance of marginal effects	ΔLS_{01}	ΔLS_{02}
Sociodemographic characteristics		
Sex male	⇧	▪
Age group	⇧	⇧
Income	▪	⇧
Children	⇩	▪
Social network	▪	⇧
Experience during the pandemic		
Improvement of various aspects of living conditions during the lockdown	⇧	⇧
Perceived threat during the lockdown	⇩	⇩
Having been infected with the virus	X	⇩

Attitudes and Believes regarding the pandemic		
Lockdown measures too radical	⇩	⇩
Lockdown measures too hesitant	▪	⇩
Being unconcerned about Corona in August / September 2020	**X**	▪
Expectation of a better life in the future in August / September 2020	**X**	⇧
Character traits		
Trait resilience	⇧	⇧
Locus of control (internal LoC)	⇧	⇧
Risk aversion	▪	▪

(⇧ = significant positive impact; ⇩ = significant negative impact; ▪ = no significant impact; X = does not apply)

Table 9 Marginal effects of determinants on resistance and resilience

The results of our hierarchic regression analysis are summarized in Table 9. A comparison of Table 9 with Table 6 shows that most of our hypotheses have been confirmed by our regression analysis.

5. Concluding remarks

Our empirical study had two major goals, which are expressed by our two research questions. In the context of the first question, we wanted to analyse the change in people's life satisfaction during the impact phase of the COVID-19 crisis from January until April 2020 and over the whole observation period from January until September 2020. LS changes during the impact phase aim at people's resistance to the COVID-19 shock, while LS changes over the whole observation period aim at their process resilience. Regarding our second research question, we wanted to identify internal and external factors supporting resistance and process resilience of people in the face of an adversity like the COVID-19 crisis.

Addressing our first research question, we were able to identify a pattern of the average change in life satisfaction typically associated with resilience, i.e. first a decline in average life satisfaction immediately after the occurrence of the adversity during the impact phase and then a slow increase afterwards during the adaptation phase. An interesting result of our analysis is that in spite of these changes in average life satisfaction roughly 60% of our respondents had proved resilient over the observation period in the sense that the level of their life satisfaction eight months after the outbreak of the COVID-19 pandemic in Germany was not lower than before the outbreak. This is most remarkable given the severity of the COVID-19 pandemic and its consequences for people's lives.

Another interesting finding is that there seems to be a certain path-dependence of the LS changes during the first three months of the pandemic, i.e. the impact phase, on the one hand and the following five months, i.e. the adaptation phase, on the other with a "tendency towards the middle". More than three quarters of those respondents who had suffered a LS loss during the impact phase experienced a gain in life satisfaction during the adaptation phase, while more than one half of respondents who had gained LS during the impact phase suffered a loss in life satisfaction during the adaptation phase. Fittingly, 66% of those respondents who saw no change in their life satisfaction during the impact phase did not experience any LS change during the adaptation phase. The share of these respondents, who

were completely unimpressed by the COVID-19 crisis in the sense that their life satisfaction changed neither during the impact phase immediately after the outbreak of the pandemic nor afterwards, is nearly one quarter of all respondents. This is another remarkable result of our analysis.

In order to answer our second research question we formed four groups of internal and external factors potentially influencing people's life satisfaction, which were used for our hierarchical regression analysis with three regression models, where each model was an enhanced version of the previous one. Our basic model contained only the sociodemographic characteristics of respondents as control variables. For the second model, we added crisis-specific variables referring to the experience respondents had during the crisis and their attitudes and believes regarding the crisis and the time after. For the third model, we added respondents' character traits, which are considered permanent and therefore independent of the specific crisis under consideration. It turned out that the model fit, as measured in terms of adjusted R^2 or AIC, and, therefore, the explanatory power of our regression models improved with each step and that the significance of most variables was sustained over the different models. This confirms the robustness of our results.

We found that the socioeconomic characteristics income and age had a significant positive effect on proving resilient in the COVID-19 pandemic. Younger people suffered more than older people and higher incomes as well as the membership in large social networks helped people to get better through the crisis than others. Opening up our model for the COVID-19-specific control variables in Model 2 improved the model fit and provided additional significant predictors for resilience. We found that improvements of several aspects of people's lives during the pandemic and positive expectations regarding one's life in the future as well as being unconcerned about possible future infections trigger resilience, while having felt threatened by the virus or having been infected have a dampening effect. Considering character traits in our Model 3 in addition to the socio-demographic and crisis-specific control variables, suggested that trait resilience is a significant predictor of proving process resilient in a concrete crisis. The effect of our variable "Locus of Control" on resilience is also significant positive. This means that people who feel that they have their lives under control stand a better chance than others to prove resilient in a concrete crisis.

Another interesting result is that agreeing with government policy during the crisis has a significant positive effect on resilience. Unlike most of the other factors supporting resilience, the consent of people to its crisis management can be influenced by government. Here opens up an opportunity for government to actively support people's resilience in an adversity like a pandemic. Government can increase people's approval of its policy by explaining it to the population more comprehensively and convincingly than it was the case during the COVID-19 pandemic in 2020 in Germany. The obvious deficiencies in German government's communication during the COVID-19 pandemic in 2020 was one of the most important causes of people's doubts about government's competence to fight the pandemic effectively. This lack of trust in government's crisis management capacity triggered also the strong opposition in parts of the German population against government's recommendation to be vaccinated.

6. References

Achdut, N., & Refaeli, T. (2020). Unemployment and Psychological Distress among Young People during the COVID-19 Pandemic: Psychological Resources and Risk Factors. *International Journal of Environmental Research and Public Health*, *17*(19), 7163. https://doi.org/10.3390/ijerph17197163

American Psychological Association. (n.d.). Resilience. In *APA Dictionary of Psychology*. Retrieved October 24, 2020, from https://dictionary.apa.org/resilience

Antonovsky, A. (1979). *Health, stress, and coping* (1st ed). Jossey-Bass Publishers.

Arampatzi, E., Burger, M., Stavropoulos, S., & Tay, L. (2020). The Role of Positive Expectations for Resilience to Adverse Events: Subjective Well-Being Before, During and After the Greek Bailout Referendum. *Journal of Happiness Studies*, *21*(3), 965–995. https://doi.org/10.1007/s10902-019-00115-9

Bell, D., & Blanchflower, D. G. (2007). THE SCOTS MAY BE BRAVE BUT THEY ARE NEITHER HEALTHY NOR HAPPY. *Scottish Journal of Political Economy*, *54*(2), 166–194. https://doi.org/10.1111/j.1467-9485.2007.00410.x

Bidzan-Bluma, I., Bidzan, M., Jurek, P., Bidzan, L., Knietzsch, J., Stueck, M., & Bidzan, M. (2020). A Polish and German Population Study of Quality of Life, Well-Being, and Life Satisfaction in Older Adults During the COVID-19 Pandemic. *Frontiers in Psychiatry*, *11*. https://doi.org/10.3389/fpsyt.2020.585813

Blanchflower, D. G. (2021). Is happiness U-shaped everywhere? Age and subjective well-being in 145 countries. *Journal of Population Economics*, *34*(2), 575–624. https://doi.org/10.1007/s00148-020-00797-z

Blanchflower, D. G., & Oswald, A. J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics*, *88*(7–8), 1359–1386. https://doi.org/10.1016/S0047-2727(02)00168-8

Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle? *Social Science & Medicine*, *66*(8), 1733–1749. https://doi.org/10.1016/j.socscimed.2008.01.030

Block, J. (1993). Studying Personality the Long Way. In D. C. Funder, R. D. Parker, A. T.-K. Carol, & W. Keith (Eds.), *Studying lives through time: Personality and Development* (pp. 3–41). American Psychological Association.

Block, J., & Kremen, A. M. (1996). IQ and ego-resiliency: Conceptual and empirical connections and separateness. *Journal of Personality and Social Psychology*, *70*(2), 349–361. https://doi.org/10.1037/0022-3514.70.2.349

Block, Jeanne. H., & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behavior. In W. A. Collins (Ed.), *Development of Cognition, Affect, and Social Relations* (Vol. 13, pp. 39–101). Taylor and Francis.

Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, *59*(1), 20–28. https://doi.org/10.1037/0003-066X.59.1.20

Bonanno, G. A., Wortman, C. B., Lehman, D. R., Tweed, R. G., Haring, M., Sonnega, J., Carr, D., & Nesse, R. M. (2002). Resilience to loss and chronic grief: A prospective study from preloss to 18-months postloss. *Journal of Personality and Social Psychology*, *83*(5), 1150–1164. https://doi.org/10.1037//0022-3514.83.5.1150

Chauhan, P. (2021). Gendering COVID-19: Impact of the Pandemic on Women's Burden of Unpaid Work in India. *Gender Issues*, *38*(4), 395–419. https://doi.org/10.1007/s12147-020-09269-w

Cheng, T. C., Kim, S., & Koh, K. (2020). The Impact of COVID-19 on Subjective Well-Being: Evidence from Singapore. *Institute of Labor Economics (IZA)*, *13702*.

Cicchetti, D., & Rogosch, F. (1997). The role of self-organization in the promotion of resilience in maltreated children. *Development and Psychopathology*, *9*, 797–815. https://doi.org/10.1017/S0954579497001442

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion*, *9*(3), 361–368. https://doi.org/10.1037/a0015952

Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, *18*(2), 76–82. https://doi.org/10.1002/da.10113

Dawes, J., May, T., McKinlay, A., Fancourt, D., & Burton, A. (2021). Impact of the COVID-19 pandemic on the mental health and wellbeing of parents with young children: A qualitative interview study. *BMC Psychology*, *9*(1), 194. https://doi.org/10.1186/s40359-021-00701-8

de Pedraza, P., Guzi, M., & Tijdens, K. (2020). Life Dissatisfaction and Anxiety in COVID-19 pandemic *GLO Discussion Paper*, 544. Global Labor Organization (GLO).

Dear, K., Henderson, S., & Korten, A. (2002). Well-being in Australia. *Social Psychiatry and Psychiatric Epidemiology*, *37*(11), 503–509. https://doi.org/10.1007/s00127-002-0590-3

Diener, E. (2006). Guidelines for National Indicators of Subjective Well-Being and Ill-Being. *Journal of Happiness Studies*, *7*(4), 397–404. https://doi.org/10.1007/s10902-006-9000-y

Diener, E., Napa Scollon, C., & Lucas, R. E. (2003). The evolving concept of subjective well-being: The multifaceted nature of happiness. In *Advances in Cell Aging and Gerontology*, 15, 187–219. Elsevier. https://doi.org/10.1016/S1566-3124(03)15007-9

Dymecka, J., Gerymski, R., & Machnik-Czerwik, A. (2020). How does stress affect our life satisfaction during COVID-19 pandemic? Moderated mediation analysis of sense of coherence and fear of coronavirus [Preprint]. *PsyArXiv*. https://doi.org/10.31234/osf.io/3zjrx

Entringer, T., & Kröger, H. (2020). Einsam, aber resilient—Die Menschen haben den Lockdown besser verkraftet als vermutet. *DIW Aktuell*, *46*. Available (in German) at: https://www.econstor.eu/handle/10419/222876

Feldman, F. (2008). Whole Life Satisfaction Concepts of Happiness. *Theoria*, *74*(3), 219–238. https://doi.org/10.1111/j.1755-2567.2008.00019.x

Ferrer-i-Carbonell, A. (2005). Income and well-being: An empirical analysis of the comparison income effect. *Journal of Public Economics*, *89*(5–6), 997–1019. https://doi.org/10.1016/j.jpubeco.2004.06.003

Fletcher, D., & Sarkar, M. (2013). Psychological Resilience. *European Psychologist*, *18*(1), 12–23. https://doi.org/10.1027/1016-9040/a000124

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, *84*(2), 365–376. https://doi.org/10.1037//0022-3514.84.2.365

Frey, B. S., & Stutzer, A. (2002). What Can Economists Learn from Happiness Research? *Journal of Economic Literature*, 86.

Garmezy, N. (1991). Resilience in children's adaptation to negative life events and stressed environments. *Pediatric Annals*, *20*(9), 459–466. https://doi.org/10.3928/0090-4481-19910901-05

Gerdtham, U.-G., & Johannesson, M. (2001). The relationship between happiness, health, and socio-economic factors: Results based on Swedish microdata. *The Journal of Socio-Economics*, *30*(6), 553–557. https://doi.org/10.1016/S1053-5357(01)00118-4

Gonzalez-Bernal, J. J., Rodríguez-Fernández, P., Santamaría-Peláez, M., González-Santos, J., León-del-Barco, B., Minguez, L. A., & Soto-Cámara, R. (2021). Life Satisfaction during Forced Social Distancing and Home Confinement Derived from the COVID-19 Pandemic in Spain. *International Journal of Environmental Research and Public Health*, *18*(4), 1474. https://doi.org/10.3390/ijerph18041474

Gundogan, S. (2021). The mediator role of the fear of COVID-19 in the relationship between psychological resilience and life satisfaction. *Current Psychology*, *40*(12), 6291–6299. https://doi.org/10.1007/s12144-021-01525-w

Halpert, R., & Hill, R. (2011). *28 Measures of Locus of Control*. Beach Haven, New Jersey.

Hamermesh, D. S. (2020). Life satisfaction, loneliness and togetherness, with an application to Covid-19 lock-downs. *Review of Economics of the Household*. https://doi.org/10.1007/s11150-020-09495-x

Hayo, B., & Seifert, W. (2003). Subjective economic well-being in Eastern Europe. *Journal of Economic Psychology*, *24*(3), 329–348. https://doi.org/10.1016/S0167-4870(02)00173-3

Hertwig, R., Liebig, S., Lindenberger, U., & G. Wagner, G. (2020). Wie gefährlich ist COVID-19? Die subjektive Risikoeinschätzung einer lebensbedrohlichen COVID-19-Erkrankung im Frühjahr und Frühsommer 2020 in Deutschland. *SOEP papers on Multidisciplinary Panel Data Research*, 1095. Available (in German) at: https://www.econstor.eu/handle/10419/224086

Huebener, M., Waights, S., Spiess, C. K., Siegel, N. A., & Wagner, G. G. (2021). Parental well-being in times of Covid-19 in Germany. *Review of Economics of the Household*, *19*(1), 91–122. https://doi.org/10.1007/s11150-020-09529-4

Kahneman, D. (2011). *Thinking, fast and slow* (1st ed.). Farrar, Straus and Giroux.

Kahneman, D., & Krueger, A. B. (2006). Developments in the Measurement of Subjective Well-Being. *Journal of Economic Perspectives*, *20*(1), 3–24. https://doi.org/10.1257/089533006776526030

Kahneman, D., & Riis, J. (2005). Living, and Thinking about It: Two Perspectives on Life. In F. A. Huppert, N. Baylis, & B. Keverne (Eds.), *The Science of Well-Being* (pp. 285–304). Oxford University Press.

Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology*, *37*(1), 1–11. https://doi.org/10.1037/0022-3514.37.1.1

Leipold, B., & Greve, W. (2009). Resilience. *European Psychologist*, *14*(1), 40–50. https://doi.org/10.1027/1016-9040.14.1.40

Levenson, H. (1973). Multidimensional locus of control in psychiatric patients. *Journal of Consulting and Clinical Psychology*, *41*(3), 397–404. https://doi.org/10.1037/h0035357

Li, F., Luo, S., Mu, W., Li, Y., Ye, L., Zheng, X., Xu, B., Ding, Y., Ling, P., Zhou, M., & Chen, X. (2021). Effects of sources of social support and resilience on the mental health of different age groups during the COVID-19 pandemic. *BMC Psychiatry*, *21*(1), 16. https://doi.org/10.1186/s12888-020-03012-1

Lubben, J., Blozik, E., Gillmann, G., Iliffe, S., von Renteln Kruse, W., Beck, J. C., & Stuck, A. E. (2006). Performance of an Abbreviated Version of the Lubben Social Network Scale Among Three European Community-Dwelling Older Adult Populations. *The Gerontologist*, *46*(4), 503–513. https://doi.org/10.1093/geront/46.4.503

Luchetti, M., Lee, J. H., Aschwanden, D., Sesker, A., Strickhouser, J. E., Terracciano, A., & Sutin, A. R. (2020). The trajectory of loneliness in response to COVID-19. *American Psychologist*, *75*(7), 897–908. https://doi.org/10.1037/amp0000690

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, *71*(3), 543–562. https://doi.org/10.1111/1467-8624.00164

MacKerron, G. (2012). Happiness economics from 35 000 feet. *Journal of Economic Surveys*, *26*(4), 705–735. https://doi.org/10.1111/j.1467-6419.2010.00672.x

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist*, *56*(3), 227–238. https://doi.org/10.1037/0003-066X.56.3.227

Meertens, R. M., & Lion, R. (2008). Measuring an Individual's Tendency to Take Risks: The Risk Propensity Scale. *Journal of Applied Social Psychology*, *38*(6), 1506–1520. https://doi.org/10.1111/j.1559-1816.2008.00357.x

Mei, S. T. L., Arianna Oh Zhing Ni, Sharren A/L Sivaguru, & Chin Wen Cong. (2021). Social Support, Resilience, and Happiness in Response To COVID-19. *Journal of Cognitive Sciences and Human Development*, *7*(1), 134–144. https://doi.org/10.33736/jcshd.2882.2021

Mogilner, C., & Norton, M. I. (2019). Preferences for experienced versus remembered happiness. *The Journal of Positive Psychology*, *14*(2), 244–251. https://doi.org/10.1080/17439760.2018.1460688

OECD (2018). *Cost-benefit analysis and the environment: Further developments and policy use*. OECD. Available at: https://www.oecd.org/governance/cost-benefit-analysis-and-the-environment-9789264085169-en.htm

Oishi, S., Diener, E., & Lucas, R. E. (2009). The Optimum Level of Well-Being: Can People Be Too Happy? In E. Diener (Ed.), *The Science of Well-Being*, 37, 175–200). Springer Netherlands. https://doi.org/10.1007/978-90-481-2350-6_8

Panter-Brick, C., & Leckman, J. F. (2013). Editorial Commentary: Resilience in child development - interconnected pathways to wellbeing. *Journal of Child Psychology and Psychiatry*, *54*(4), 333–336. https://doi.org/10.1111/jcpp.12057

Piatek, R., & Pinger, P. (2010). Maintaining (Locus of) Control? Assessing the impact of locus of control on education decisions and wages. *SOEP Papers on Multidisciplinary Panel Data Research*, 338.

Powdthavee, N. (2005). Unhappiness and Crime: Evidence from South Africa. *Economica*, *72*(287), 531–547. https://doi.org/10.1111/j.0013-0427.2005.00429.x

Richter, D., Roher, J., Metzing, M., Nestler, W., Weinhardt, M., & Schupp, J. (2017). SOEP Scales Manual (updated for SOEP-Core v32.1). *SOEP Survey Papers*, 423, 83 [Series C]. German Socio-Economic Panel Study (SOEP).

Rogowska, A. M., Kuśnierz, C., & Bokszczanin, A. (2020). Examining anxiety, life satisfaction, general health, stress and coping styles during COVID-19 pandemic in Polish sample of university students. *Psychology Research and Behavior Management*, *13*, 797–811. https://doi.org/10.2147/PRBM.S266511

Sandberg, S., & Grant, A. (2017). *Option B: Facing adversity, building resilience, and finding joy* (First edition). Alfred A. Knopf.

Sandvik, E., Diener, E., & Seidlitz, L. (1993). Subjective Well-Being: The Convergence and Stability of Self-Report and Non-Self-Report Measures. *Journal of Personality*, *61*(3), 317–342. https://doi.org/10.1111/j.1467-6494.1993.tb00283.x

Smith, J. L., & Hollinger-Smith, L. (2015). Savoring, resilience, and psychological well-being in older adults. *Aging & Mental Health*, *19*(3), 192–200. https://doi.org/10.1080/13607863.2014.986647

Souri, H., & Hasanirad, T. (2011). Relationship between Resilience, Optimism and Psychological Well-Being in Students of Medicine. *Procedia - Social and Behavioral Sciences*, *30*, 1541–1544. https://doi.org/10.1016/j.sbspro.2011.10.299

Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., & Yehuda, R. (2014). Resilience definitions, theory, and challenges: Interdisciplinary perspectives. *European Journal of Psychotraumatology*, *5*(1), 25338. https://doi.org/10.3402/ejpt.v5.25338

Specht, J., Egloff, B., & Schmukle, S. C. (2013). Everything under control? The effects of age, gender, and education on trajectories of perceived control in a nationally representative German sample. *Developmental Psychology*, *49*(2), 353–364. https://doi.org/10.1037/a0028243

Staudinger, U. M., Marsiske, M., & Baltes, P. B. (1993). Resilience and levels of reserve capacity in later adulthood: Perspectives from life-span theory. *Development and Psychopathology*, *5*(4), 541–566. https://doi.org/10.1017/s0954579400006155

Tatarkiewicz, Wł. (1976). *Analysis of Happiness*. Springer Netherlands. http://link.springer.com/10.1007/978-94-010-1380-2

Taylor, M. F., Brice, J., Buck, N., & Prentice, E. (2005). *British Household Panel Survey user manual volume A: introduction, technical report and appendices*. Colchester: University of Essex.

Veenhoven, R. (1991). Questions on happiness: Classical topics, modern answers, blind spots. In *Subjective wellbeing, an interdisciplinary perspective*, 7–26. Pergamon Press.

Voorpostel, M., Tillmann, R., Lebert, F., Kuhn, U., Lipps, O., Ryser, V.-A., Schmid, F., Antal, E., Monsch, G.-A., & Wernli, B. (2015). *Swiss Household Panel Userguide (1999-2014), Wave 16, December 2015*. Lausanne: FORS.

Wilson, J. P. (2004). The Broken Spirit: Posttraumatic Damage to the Self. In J. P. Wilson & B. Drožđek (Eds.), *Broken spirits: The treatment of traumatized asylum seekers, refugees, war and torture victims*, 109–157. Brunner-Routledge.

Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*, *21*(2), 152–169. https://doi.org/10.1017/S0959259810000420

Windsteiger, L., Ahlheim, M., & Konrad, K. A. (2020). Curtailment of Civil Liberties and Subjective Life Satisfaction. *Working Paper of the Max Panck Institute for Tax Law and Public Finance*, *2020-05*. http://ssrn.com/abstract=3606563

Wrosch, C., & Scheier, M. F. (2003). Personality and quality of life: The importance of optimism and goal adjustment. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, *12 Suppl 1*, 59–72. https://doi.org/10.1023/a:1023529606137

Zhang, S. X., Wang, Y., Rauch, A., & Wei, F. (2020). Unprecedented disruption of lives and work: Health, distress and life satisfaction of working adults in China one month into the COVID-19 outbreak. *Psychiatry Research*, *288*. https://doi.org/10.1016/j.psychres.2020.112958

Appendix

Educational level	Share of respondents
Left school without graduation	1%
Secondary school diploma *("Hauptschulabschluss")*	18%
Secondary school leaving certificate *("Realschulabschluss")*	36%
High school degree *("Abitur")*	17%
University degree	19%
Others / no answer	9%

Table 10 Education

Disposable monthly household income	Share of respondents
Less than 2,000 €	37%
2,000 to below 3,000 €	28%
3,000 to below 4,000 €	17%
4,000 to below 5,000 €	9%
5,000 to below 6,000 €	4%
6,000 to below 7,000 €	2%
7,000 € and more	3%

Table 11 Disposable monthly household incomes

Kind of profession	Share of respondents
unemployed	6%
retired	29%
trainee, pupil, student	7%
housewife / househusband	5%
civil and public servants	4%
employee / worker in private sector	42%
self-employed	6%
others	1%

Table 12 Job situation

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