Emotions and Risk Attitudes

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Abstract

Previous work has shown that preferences are not always stable across time, but surprisingly little is known about the reasons for this instability. I examine whether variation in people's emotions over time predicts changes in risk attitudes. Using a large panel data set, I identify happiness, anger, and fear as significant correlates of within-person changes in risk attitudes. Robustness checks indicate a limited role of alternative explanations. An event study around the death of a parent or child further confirms a large relationship between emotions and risk attitudes. (JEL D01, D90, D91)
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1 Introduction

Economists assume that changes in behavior result from changes in constraints individuals face, such as prices, rather than from preference changes (Stigler and Becker, 1977). Recent research, however, demonstrates that risk preferences are not always stable over time (see, e.g., Meier and Sprenger, 2015; Mata et al., 2018; Schildberg-Hörisch, 2018).[1] Changes in preferences over time could have a large and lasting impact on credit card borrowing, addictive behavior, and job search behavior. Changes could even amplify business cycles, in case higher risk aversion leads to stock market sales, reductions in entrepreneurship, and reductions in consumption. Knowing why changes in risk preferences occur is thus fundamental to understanding and predicting individual economic behavior and aggregate economic outcomes.

Why do preferences vary over time? In *The Theory of Moral Sentiments*, Adam Smith suggested emotions could be linked to preference instability (Ashraf, Camerer and Loewenstein, 2005). Yet, surprisingly little is known about the reasons for variation. Previous work documents that changes in sociodemographics fall short of consistently predicting observed variability (Meier and Sprenger, 2015; Chuang and Schechter, 2015; Guiso, Sapienza and Zingales, 2018). While emotions are a leading candidate to predict instability in preferences (Loewenstein, 2000; DellaVigna, 2009), there has been little evidence in economics that links changes in emotions to changes in preferences over time.

This paper provides direct field evidence of how changes in emotions in individuals relate to changes in risk attitudes over time. I exploit large-scale panel data from the German Socio-Economic Panel (SOEP). The data consist of 169,964 observations from a representative sample of 34,176 individuals from the German population surveyed in the years 2008 to 2016. The data provide unique information on the frequency of recently experienced happiness, anger, and fear. Importantly, the data also contain a question on risk attitudes which is an experimentally validated measure of risk preferences. The measure strongly predicts behavior

[1] For further evidence on variation in preferences over time, see, for example, Schurer (2015); Chuang and Schechter (2015); Golsteyn and Schildberg-Hörisch (2017).

in high-stakes laboratory experiments, and has been shown to correlate with a range of risky behaviors, such as smoking (Dohmen et al., 2011; Falk et al., 2016, 2018).

I find that within-individual changes in happiness, anger, and fear correlate with changes in risk attitudes. The correlations are statistically significant conditional on individual, age, year, and month fixed effects, as well as sociodemographics. I find that emotions relate to risk attitudes in different ways: Happiness and anger relate to higher willingness to take risks, and fear relates to lower willingness to take risks, conditional on the other emotions.

The estimated relationships are large when compared to the relationship of income with risk attitudes: A 1-standard deviation change in happiness relates to a 1.4 to 2.7 times larger change in risk attitudes than a 1-standard deviation change (~$2,340 per month) in household income. The relationships are also substantial when compared to the association between domain specific willingness to take risks and general willingness to take risks, and the well-documented association between a higher age and lower willingness to take risks.[2] A 1-standard deviation change in happiness can compensate for up to 5 years in age difference. And, the relationship between happiness and willingness to take risks is a third as large as the association of domain-specific willingness to take risks measures with general willingness to take risks. The comparisons indicate that emotions are a significant correlate of changes in risk attitudes.

To further assess the robustness and magnitude of the emotions–risk attitudes relationship, I exploit detailed information on the death of a parent or child in an event study. Experiencing the death of a parent or a child reduces the willingness to take risks. Scaling the reduced form effect by emotions reveals a substantial relationship between emotions and risk attitudes consistent with the fixed effects estimates: Less happiness relates to a lower willingness to take risks. I examine the robustness of the event study as follows: First, I show that risk attitudes and emotions do not change before the shock. Second, I find that other observables, such as income, employment, or proxies for beliefs, do not change in accordance with risk attitudes or emotions. Third, I highlight that since I compare the shock at death with the whole period after death, permanent income or wealth shocks, updates in beliefs,

[2]See, for instance, Dohmen et al. (2017); Mata, Josef and Hertwig (2016); Josef et al. (2016); Pachur, Mata and Hertwig (2017); Schurer (2015).

or learning are unlikely to affect the estimate. Fourth, I replicate the estimate in data with choice under risk for people deciding between investing in stocks or depositing money on a bank account. Taken together, the results suggest a substantial and robust relationship between changes in emotions and changes in risk attitudes.

Do alternative economic or psychological explanations drive the observed changes in risk attitudes? I examine an array of alternative explanations and do not find that changes in wealth, income, or macroeconomic conditions can consistently explain the emotion–preference relationships. The event study on the death of a parent or child also suggests at best a small role of economic explanations. Alternative psychological explanations also fall short of fully rationalizing the results. For instance, increases in life satisfaction relate to higher willingness to take risks, but life satisfaction only partly explains the relationship between recently experienced happiness and risk attitudes. Emotions relate to risk attitudes even conditional on life satisfaction.

I study three potential mechanisms for how emotions relate to risk attitudes: expectations (DellaVigna, 2009), impulsivity (Loewenstein, 2000), and feelings of control (Lerner et al., 2015). The results suggest that emotions may relate to risk attitudes directly, rather than through expectations about the future, and that self-control does not moderate all emotion–preference relationships. The results offer support for the prominent psychological Appraisal-Tendency Framework, which predicts that emotions affect risk attitudes through feelings of control (Lerner and Keltner, 2000; Lerner et al., 2015). In addition, I examine heterogeneities and find that individuals with lower socioeconomic status exhibit a stronger relationship between anger and willingness to take risks, consistent with predictions of limited coping resources from the literature on decision making under scarcity (Haushofer and Fehr, 2014).

Incorporating the documented relationships between emotions and risk attitudes in economic models may help understand macroeconomic and political developments. For instance, if people experience more fear in a recession and are more risk averse, they may sell risky assets such as stocks, reinforcing market developments. Such emotional reactions may partly explain key asset prizing puzzles: high volatility and large variation in risk premiums within asset classes over time (Campbell and Cochrane, 1999; Cohn et al., 2015; Guiso, Sapienza

and Zingales, 2018). Changes in emotions and risk attitudes may also affect occupational sorting in times of crisis. If people forego risky jobs when experiencing fear, such as becoming entrepreneurs, innovation and long-term growth may be hampered. Last, changes in risk attitudes may help explain political developments in times of crisis, such as higher demands for redistribution: More risk averse voters may support an expansion of social insurance during and after economic depressions.

One way to incorporate these findings in economic models could be by adding a few questions about emotions to surveys. The results indicate that measuring emotions is informative about risk attitudes. Adding emotion questions would therefore be a cheap way to extract more accurate information about risk attitudes and behavior.[3] Thereby it is not sufficient to just measure negative and positive mood. It is also important to measure specific emotions, such as anger or fear, as they have differential relationships with risk attitudes.[4]

A puzzling discrepancy between two sets of prominent findings illustrates the need for the measurement of specific emotions: One set of findings seems to suggest that negative emotions promote risk taking with respect to domestic violence, in high-stakes TV game shows, professional sports, and political unrest (Post et al., 2008; Card and Dahl, 2011; Föllmi, Legge and Schmid, 2016; Passarelli and Tabellini, 2017). Another set of findings, however, seems to suggest that negative emotions inhibit risk taking in investment, dangerous environments, and voting (Kamstra, Kramer and Levi, 2003; Guiso, Sapienza and Zingales, 2018; Callen et al., 2014; Cohn et al., 2015; Meier, Schmid and Stutzer, 2019).

How can it be that negative emotions seemingly increase risk-taking in some situations, but have opposing effects in others? The discrepancy may be because in the first set of situations, people may experience anger, while in the second set of situations, people may experience fear. For instance, while Card and Dahl (2011) argue that college football game losses cause anger, Cohn et al. (2015) argue that electroshocks cause fear. This paper provides direct evidence on the differential relationships between anger and fear with risk attitudes,

[3]Recent attempts to address measurement error in preference elicitation (Gillen, Snowberg and Yariv, 2019) and to better understand correlations across behavioral regularities (Chapman et al., 2018) may offer useful guidance.

[4]See Lerner et al. (2015) for a similar argument with respect to findings from laboratory experiments in psychology.

offering a potential resolution for the seemingly contradictory findings. Measuring emotions and considering differences across emotions may thus be crucial for understanding and predicting economic behavior in high-stakes settings.[5]

In sum, this paper shows a strong link between the concepts of emotions and risk attitudes which is helpful for predicting behavior. Prediction may be further improved by a better understanding of commonalities and differences in underlying physiological processes that shape the elicitation of emotions and risk attitudes.

This paper relates to three strands of literature. First, this paper most closely relates to the economics literature on the emotions–preferences link in the field. Field evidence on the link is limited: "it remains incompletely understood exactly which psychological aspects of stress, and which types of negative affect, influence economic behaviors. In addition, the evidence on this link is currently restricted to laboratory studies" (Haushofer and Fehr, 2014; p. 866).

Existing literature in economics focuses on how fear affects risk aversion: Cohn et al. (2015) conduct a lab-in-the-field experiment with financial professionals and show that financial investors tend to be more risk averse when primed with a crisis scenario.[6] By eliciting fear with electroshocks they test fear as a potential mechanism for countercyclical risk aversion in a student sample. Similarly, Guiso, Sapienza and Zingales (2018) show that surveyed measures of risk aversion increased during the 2008 financial crisis in a way that cannot be explained by income and wealth shocks. They propose fear as a mechanism and test it in a laboratory experiment with students where they induce fear with a horror movie. Like Cohn et al. (2015), they argue that reduced willingness to take risks because of fear may be the reason for countercyclical risk aversion. However, the data in Guiso, Sapienza and Zingales (2018) and Cohn et al. (2015) prevent the authors from directly linking changes in risk attitudes over time to changes in fear in the field. In contrast to the relationship of fear with risk attitudes, the relationships between happiness, anger, and risk attitudes have

[5]Measuring emotions may also help better understand the impact of sleep and pain on decision-making (for a review, see Kremer, Rao and Schilbach, 2019).

[6]In a similar vein, Callen et al. (2014) use a convenience sample of Afghan voters to examine the relationship between violence, fear, and risk preferences using priming of individuals with experienced past violence.

received barely any attention.[7] Yet, different relationships of emotions with risk attitudes may be crucial for predicting economic behavior. In addition, I present novel evidence of the relationship between changes in life satisfaction and changes in risk attitudes (Goudie et al., 2014).

Second, this paper relates to the literature examining the temporal stability of preferences. The literature predominantly relies on laboratory measures of risk preferences, measured over up to 2 years (Meier and Sprenger, 2015; Chuang and Schechter, 2015; Galizzi, Machado and Miniaci, 2016). While the extent of preference variation over time is still debated (Schildberg-Hörisch, 2018), the review by Chuang and Schechter (2015) suggests that laboratory measures of risk preferences show variation over time that cannot be explained by changes in sociodemographics. Using panel data covering 8 years, I find that risk attitudes show similar variation within individuals over time when compared to measures from the laboratory (see also Mata et al., 2018; Salamanca, 2018), and I examine correlates of this variation.[8]

Third, this paper complements evidence from laboratory experiments in psychology by providing novel evidence from natural emotional experiences in a large, representative sample from the field.[9] The debate about how emotions affect preferences is not settled. I discuss the corresponding evidence from the laboratory in more detail in Section 2.[10]

[7] In recent work, Kessler, McClellan and Schotter (2017) use a lab-in-the-field experiment to show that National Football League fans are more risk taking while happy about game outcomes.

[8] A growing number of papers using cross-sectional data examine the reasons for individual differences in risk aversion and highlight past experiences, age, or genes as drivers (see, e.g., Cesarini et al., 2009; Malmendier and Nagel, 2011; Bucciol and Zarri, 2015; Dohmen et al., 2017; Dohmen, Quercia and Willrodt, 2018). Using panel data, Hanaoka, Shigeoka and Watanabe (2018) document that the Great East Japan Earthquake affected men's risk aversion. Jakiela and Ozier (2018) and Brown et al. (2018) also use panel data to establish a relationship between increased violence, uncertainty, as well as economic insecurity and higher risk aversion. More recently, a few working papers examine the reduced form impact of life events such as changes in financial circumstances, child birth, family loss, or being robbed on risk attitudes (see, e.g., Kettlewell, 2018; Browne et al., 2016).

[9] Using field data may alleviate concerns about external validity (Levitt and List, 2007; Charness and Fehr, 2015). Al-Ubaydli, List and Suskind (2017) argue that findings in student samples may sometimes not generalize to representative samples and that effects from stimuli in the laboratory may not always transfer to relevant natural settings.

[10] More generally, this paper adds to the literature that explores how contextual factors shape preferences; see, e.g., Goette and Huffman (2007*b*,*a*); Andersson et al. (2014); Imas (2016); Baillon, Koellinger and Treffers (2016).

Section 2 provides a review and discussion of predicted relationships between emotions and risk attitudes. Section 3 describes the data on attitudes and emotions. It also documents the substantial variation in risk attitudes within individuals over time and correlates of those changes. Section 4 presents the main results on the relationships between emotions and risk attitudes. Section 5 examines alternative explanations and Section 6 shows results from an event study exploiting the death of a parent or child. Section 7 then discusses three psychological mechanisms that could be responsible for the relationships between emotions and preferences. In conclusion, Section 8 highlights the relevance of emotions for economic behavior and offers avenues for future research.

2 Background

Feelings and emotions color how individuals perceive their environment and evaluate their actions (Loewenstein, 2000; Lerner et al., 2015). Emotions also affect the readiness to take action to increase the probability of survival, among other reasons, and are therefore deeply biologically rooted (Keltner and Gross, 1999; Bach and Dayan, 2017).

Accordingly, emotions are closely tied to trade-offs between now and later, as well as to choice under risk (Loewenstein et al., 2001; Haushofer and Fehr, 2014; Engelmann and Hare, 2018).[11] The concepts of risk preferences and emotions may therefore capture similar underlying physiological processes and may be determined simultaneously when elicited.

In spite of the likely tight relationship between emotions and willingness to take risks, how exactly emotions relate to the willingness to take risks is still debated. There are three frameworks that aim to explain the relationships between emotions and the willingness to take risks, summarized in Table 1.

The conflicting predictions across frameworks stem from heterogeneous evidence on emotions and willingness to take risks. The mixed evidence could be a result of three challenges associated with eliciting emotions in the laboratory: First, short-term emotion elicitations used in experiments vary, from movie clips (Ifcher and Zarghamee, 2011) to autobiograph-

[11] For a recent review that focuses on how emotions triggered in the field have been used to examine behavior in the laboratory, see Bhanot et al. (2017).

ical texts (Callen et al., 2014). Second, the measures used in psychological experiments to capture willingness to take risks are very heterogeneous (Mauss and Robinson, 2009; Angie et al., 2011). Third, it is difficult to manipulate just one emotion. For instance, it is difficult to differentially elicit fear and anger with movie clips (Schaefer et al., 2010). While the debate in psychology about which of the frameworks is most useful in predicting changes in preferences and behavior is not settled, recent evidence from laboratory experiments in psychology is most consistent with the Appraisal-Tendency Framework (Lerner et al., 2015).

Table 1: Predictions for the Relationship of Emotions and Risk Attitudes

Psychological Framework	Effect on Willingness to Take Risks		
	Happiness	Anger	Fear
Appraisal-Tendency Framework	Positive	Positive	Negative
Feelings-as-Information	Positive	Negative	Negative
Mood Maintenance	Negative	Positive	Positive

Note: The Appraisal-Tendency Framework was proposed by Lerner and Keltner (2000); Feelings-as-Information originates in the work of Schwarz and Clore (1983); Mood Maintenance was developed by Isen and Patrick (1983). See Lerner et al. (2015) for a review.

The Appraisal-Tendency Framework highlights how specific emotions change individuals' appraisals of a situation (Lerner and Keltner, 2000, 2001; Han, Lerner and Keltner, 2007). For instance, while happiness and anger go together with a feeling of high individual control and therefore more optimistic appraisals, fear, characterized by feelings of low individual control, leads to more cautious appraisals. Accordingly, the Appraisal-Tendency Framework predicts that happiness and anger lead to more willingness to take risks (Lerner and Keltner, 2000; Ferrer et al., 2017).

In contrast, Feelings-as-Information and Mood Maintenance only distinguish positive and negative mood. The two frameworks predict that all negative or positive emotions have the same effect on behavior. Feelings-as-Information argues that individuals overweight emotion-congruent information. Accordingly, when in a bad mood, individuals tend to overweight adverse effects of risky choices and the opposite happens when they are in a good mood (Schwarz and Clore, 1983; Schwarz, 2012). Mood Maintenance argues that individuals who feel positive emotions do not want to take any risks, in order to avoid potential negative

consequences of a risky choice, while individuals who feel negative emotions have nothing to lose (Isen and Patrick, 1983; Isen, 2001). In sum, the most prominent psychological frameworks agree that emotions affect risk preferences, but they differ in their predictions.

3 Data and Method

3.1 German Socioeconomic-Panel

I use unique large-scale data from the German Socio-Economic Panel (SOEP) that contain yearly survey responses from a representative sample of the German resident population (for details, see Goebel et al., 2018 and DIW Berlin, 2018). The data has been collected since 1984 in in-person interview of individuals over the age of 17. Currently, the SOEP collects data from roughly 30,000 individuals per year.

I restrict the sample observations with information on the following variables: risk attitudes (2008 to 2016), all emotions (available from 2008), life satisfaction, the main controls (household income, household income squared, a dummy indicating unemployment, a dummy indicating marriage, and an indicator for the presence of children in the household), and the month and year of the interview.[12] The final sample contains 169,964 observations from 34,176 individuals. I provide summary statistics for the dependent variables, emotions, and main controls in Table A.1 in the Appendix.[13] I use additional data and variables for the event study which I describe in the corresponding section.

3.2 Measurement and Validation of Risk Attitudes

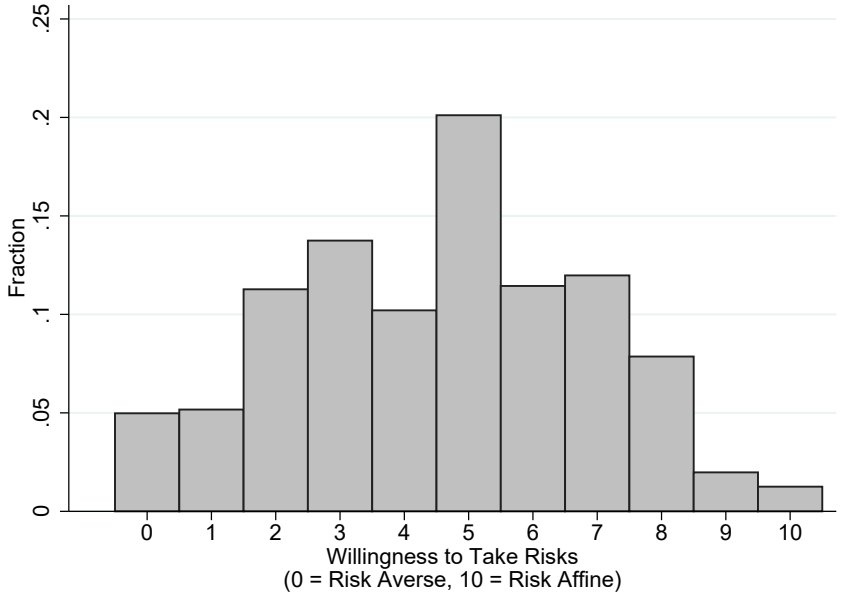
Measurement — Individuals respond to the question (emphasis in original): "How would you describe yourself: Are you generally willing to take risks, or do you try to avoid risks? *Please answer on a scale from 0 to 10, where the value 0 means* ***risk averse*** *and the value 10 means* ***fully prepared to take risks***." Figure A.1 gives the questions for risk attitudes and

[12]For analyses where additional variables are used, the sample size maybe smaller due to missing values.

[13]Tables and figures with an alphabetic prefix can be found in the Appendix. Appendix Section F refers to the data sources.

emotions in English translated from the German questionnaire.[14] The average willingness to take risks is 4.5, with 80% of the answers ranging from 1 to 7; see Figure 1 for the raw distribution of risk attitudes.[15]

Figure 1: Distribution of Risk Attitudes



Note: The figure shows the overall distribution of risk attitudes in the cross-section.

Validation of Risk Attitudes — Dohmen et al. (2011) show that the response to the survey question predicts behavior in incentivized, high-stakes choices under risk in a representative sample of the German population. Galizzi, Machado and Miniaci (2016) also validate the question in a representative panel from the United Kingdom and Vieider et al. (2015) confirm these findings in a sample of more than 2,900 subjects in 30 countries. Furthermore, Falk et al. (2016) document that while the test–retest correlation for experimentally elicited risk preferences is 0.35, the correlation of risk attitudes with experimentally elicited risk preferences is also 0.35.

How does this measure relate to risk attitudes across domains and to behavior outside of the laboratory? First, evidence from Dohmen et al. (2011) and Vieider et al. (2015)

[14]The questions were usually separated by multiple items, see Figure A.1 for more details.

[15]To make it easier to read the coefficient estimates, I use the raw measure multiplied by 10 as the dependent variable in all regression analyses and corresponding tables and figures.

suggests that the general measure of risk attitudes strongly correlates with risk attitudes and behaviors across domains ranging from health to finance (see also Huck, Schmidt and Weizsäcker, 2014). I confirm these findings in the panel dimension by regressing general willingness to take risks on domain specific willingness to take risks (available in 2009 and 2014) regarding finance, driving, leisure, job, health, and trusting other people. The estimates are statistically significantly positive at $p < 0.01$ for all domains conditional on individual, age, and year fixed effects; see Table A.3, column (5). The standardized coefficients suggest that a 1-standard deviation shift in domain specific willingness to take risks relates to a 2-point change in general willingness to take risk.

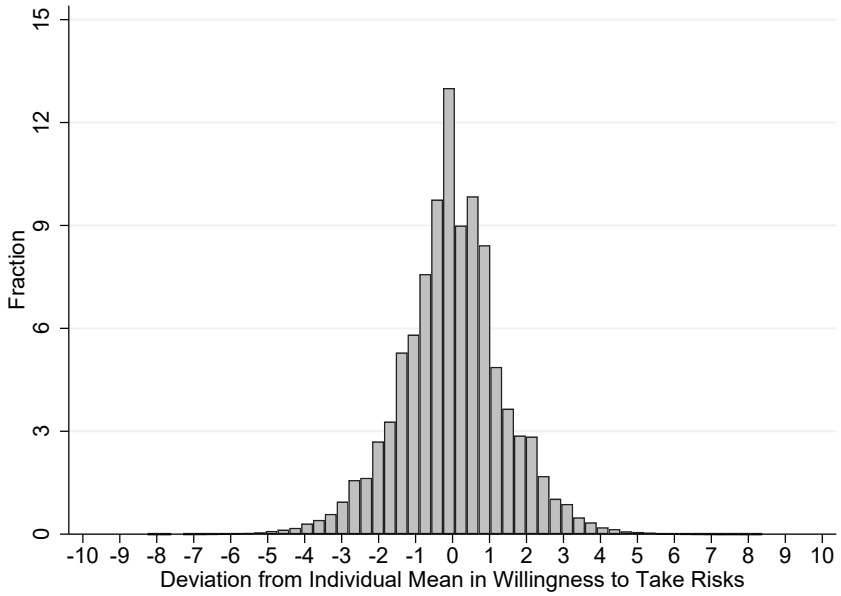
Second, the measure relates to behavior outside of the laboratory: Dohmen et al. (2011) find that a 1-point higher value of risk attitudes relates to a 4 percentage point higher likelihood of smoking, and Jaeger et al. (2010) show that the measure predicts emigration. Moreover, a composite measure for risk preferences with more than 50% weight on the survey question used here strongly correlates with business ownership, plans to start a business, and smoking intensity (Falk et al., 2018). In sum, risk attitudes seem to offer a valid approximation of incentive-compatible measures of risk preferences and predict behavior outside the laboratory.[16]

3.3 Temporal Variation in Risk Attitudes and Correlates

Variation — How strongly do risk attitudes vary within individuals over time? Figure 2 shows the within-individual deviations from the mean willingness to take risks. The standard deviations in residuals on the scale from 0 to 10 is $sd = 1.4$. This variation seems large when compared to the standard deviation in risk attitudes of 2.3 in the cross-section.

[16]Studies use this or similar measures to study how risk attitudes are transmitted across generations (Dohmen et al., 2012), evolve over the life cycle (Dohmen et al., 2017; Schurer, 2015; Mata, Josef and Hertwig, 2016), and correlate with unemployment (Hetschko and Preuss, 2015). For a review see Falk et al. (2016). For psychometric evidence on surveyed risk preferences, see Frey et al. (2017).

Figure 2: Temporal Variation in Risk Attitudes



Note: The figure shows the residuals from OLS regressions of the willingness to take risks [0,10] on dummy variables for each of the individuals (individual fixed effects). An observation is an individual–year residual. The residual is 0 if the individual did not deviate from her mean value of risk attitudes. The within-individual standard deviation of the residuals is 1.4.

More than 65% of individuals exhibit a maximum residual larger than 1 point in risk attitudes. The correlation in risk-attitude measures is 0.58 ($p < 0.01$) at 1 year apart and 0.54 ($p < 0.01$) at 3 years apart; see Table A.2. This is similar to previously reported year-to-year correlations of elicited preferences in the laboratory of 0.21 to 0.48 according to the surveys by Chuang and Schechter (2015) and Mata et al. (2018).[17]

Correlates of Changes — I assess how the documented variation in risk attitudes relates to changes in household income, employment status, marital status, presence of children in the household, changes in wealth (approximated by an interaction of real estate prices with real estate ownership), changes in health, and domain specific willingness to take risks conditional on individual and age fixed effects; see Table A.3. Unemployment or marriage do not consistently relate to risk attitudes.[18] However, I find that higher income concavely

[17] See also Harrison, Lau and Yoo (2020) for recent results showing within individual correlations of 0.36 to 0.69 with less than 12 months between sessions in Danish data.

[18] One reason for the statistically insignificant relationship with marriage could be opposing emotional changes around marriage. Anger decreases which implies a reduction in willingness to take risks. The two opposing emotional reactions could on their own result in no change in risk attitudes.

relates to higher willingness to take risks. A 1-standard deviation shift of monthly household income that is more than €2,000 (~$2,340) relates to a roughly 0.5-point higher willingness to take risks on a 0 to 100 scale. Similarly, a wealth increase for owners of real estate relates to higher willingness to take risks. A child in the household also relates to lower willingness to take risks. In addition, I document that higher subjective health goes together with a higher willingness to take risks. Finally, like in the cross-section (Dohmen et al., 2011), domain specific willingness to take risks strongly correlates with general willingness to take risks in the panel.

The findings for sociodemographics are in contrast to previous evidence summarized by Chuang and Schechter (2015), who find no stable correlates between variables such as income or health and preferences. Here, changes in income and health correlate with risk attitudes.

3.4 Measurement of Emotions

The data contain unique information on the frequency of recent emotions felt within the last 4 weeks: happiness, sadness, anger, and fear. Individuals respond to the following item: "I will now read to you a number of feelings. Please indicate for each feeling how often or rarely you experienced this feeling in the last four weeks," which they can then answer with "Very Rarely, Rarely, Sometimes (Occasionally), Often, Very Often."

Psychologists predict the same effects of higher happiness or lower sadness on risk attitudes (Lerner, Small and Loewenstein, 2004; Lerner, Li and Weber, 2013). I therefore combine the happiness and sadness responses in a happiness index for ease of exposition. The index is simply {(happiness - sadness)/2}+3 which leads to an index with the same range as the other emotions. The results are qualitatively equivalent when using the happiness and sadness items separately (see Table B.4). The relationships of the happiness index with willingness to take risks seems to be mostly driven by happiness. Most responses indicate a low frequency of fear and low happiness; see Figure A.2. The frequency of experienced anger shows a less skewed distribution, centering around "Sometimes."

Figure A.3 gives the within-individual deviations across the emotion measures. The individuals deviate up to 3 points from their mean emotional state. Importantly, while the

emotions covary, they are not linearly dependent. The highest absolute correlations are -0.46 ($p < 0.01$) between fear and happiness and -0.31 ($p < 0.01$) in changes within individuals between fear and happiness; see Tables A.4 and A.5. I provide a discussion about the reliability of the emotion measures in Appendix A.4.

3.5 Specification

I exploit within-individual variation in emotions and risk attitudes as follows:

$$\mathrm{Y}_{iym} = \eta_i + \gamma_a + \delta_y + \tau_m + \mathrm{Emotions}'_{iy}\alpha \ + X'_{iy}\beta + \varepsilon_{iym}$$

where i indexes individuals; y indexes survey years; m indexes months; Y_{iym} is risk attitudes ranging from 0 to 100, derived from the raw measures multiplied by 10; and η_i are individual fixed effects. In addition, I include age fixed effects γ_a, year fixed effects δ_y, and month fixed effects τ_m. The coefficients of interest are denoted by vector α, which gives the estimated effects of a vector $\mathrm{Emotions}'_{iy}$ containing the frequency of experienced emotions within the last 4 weeks ranging from very rarely (1) to very often (5). The vector of covariates X'_{iy} includes household income, household income squared, a dummy indicating unemployment, a dummy indicating marriage, and an indicator for the presence of children in the household. Clustered standard errors ε_{yim} allow for correlation in emotions within individuals over time.

4 Emotions and Risk Attitudes

Main Results — I show the relationships between emotions and the willingness to take risks in Figure 3. The gray dots in panels (a) through (c) show binned averages of the residuals in willingness to take risks against the residual frequency of felt emotions. The residuals stem from regression of willingness to take risks on all other emotions and individual and age fixed effects. The data reveal clear linear relationships between happiness, anger, fear, and the willingness to take risks. The slopes are statistically significantly different from 0 at $p < 0.01$.

When respondents move 2 points up on the fear scale, for instance, from sometimes felt fear to very often felt fear, this is associated with a more than 1 point decrease in willingness

to take risks on the scale from 0 to 100. Conversely, anger relates to a higher willingness to take risks of 0.5 points when an individual moves 2 points on the scale, for instance, from sometimes to often felt anger. A 2-point upwards change in happiness relates to a predicted 1.8-point higher willingness to take risks.

The relationships are large when compared to a 1-standard deviation shift of €2,000 (~$2,340) in mothly household income. Using a quadratic functional form and ignoring very high incomes, a 1-standard deviation shift in income translates to an only 0.5-point higher willingness to take risks, while a 1-standard deviation shift in happiness (0.76 points) relates to a 0.7-point higher willingness to take risks. When using a linear approximation, a 1-standard deviation shift in income only relates to a 0.25-point higher willingness to take risks – only a third of the happiness-risk attitudes relationship (for the corresponding coefficient estimates, see Table B.4, columns 8 and 9).

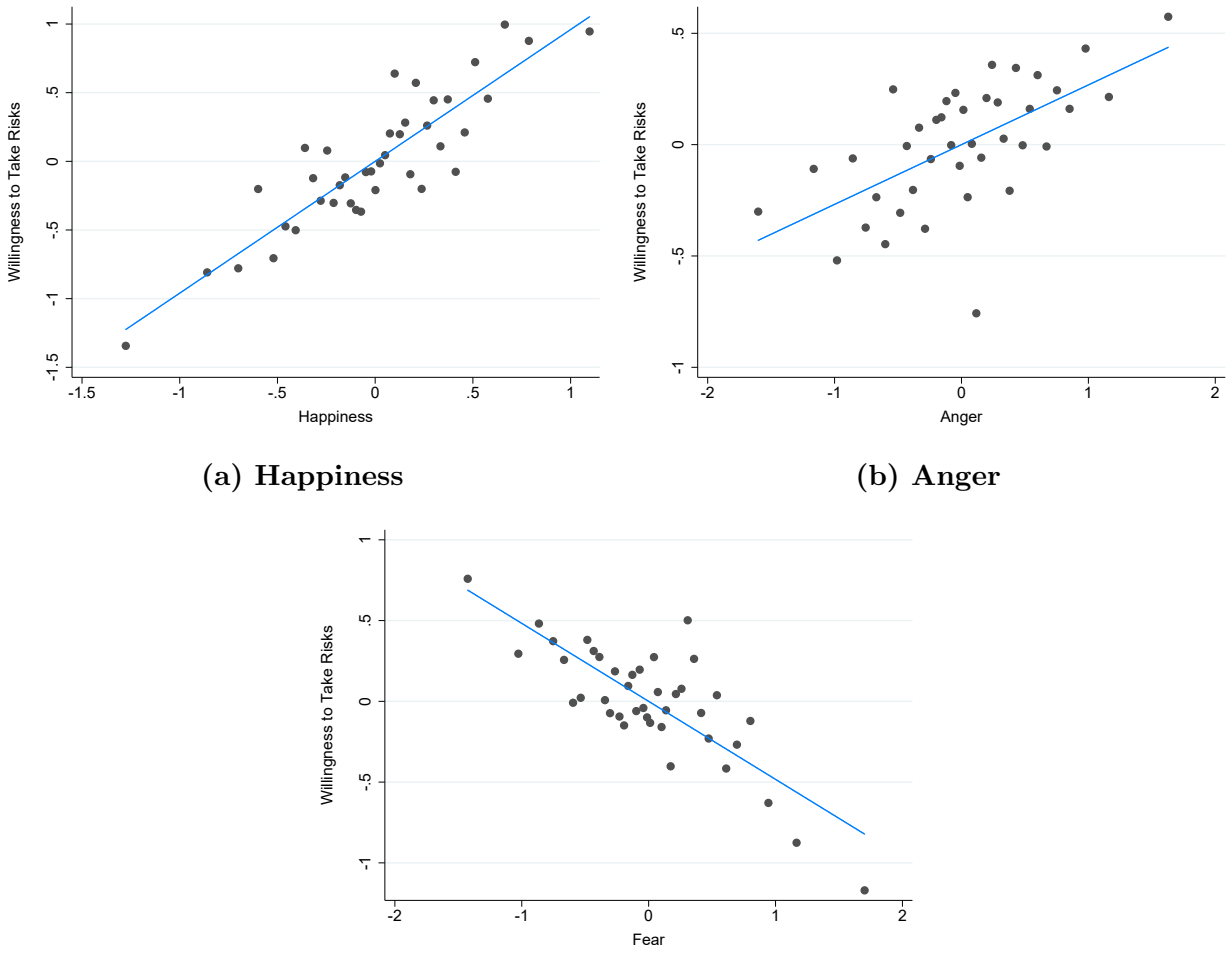
The relationships are also substantial when compared to the well-documented association between age and willingness to take risks or domain specific willingness to take risks and general willingness to take risks.[19] An additional year of age relates to a 0.18-point (se = 0.01) reduction in the willingness to take risks conditional on all emotions, controls, year fixed effects, and month fixed effects. Accordingly, a 1-point change in happiness can compensate for up to 5 years in age difference. A one standard deviation shift in one of the domain specific willingness to take risk measures relates to a 1.6 to 2.3-point change in general willingness to take risks. The relationship between happiness and willingness to take risks is a third as large. The comparisons indicate sizable emotion-risk attitudes relationships.

The relationship between fear and risk attitudes is consistent with recent findings in economics and psychology (Cohn et al., 2015; Lerner et al., 2015; Guiso, Sapienza and Zingales, 2018) and confirms the prediction from the Appraisal-Tendency Framework (see Table 1). While the Appraisal-Tendency Framework (Lerner and Keltner, 2000) predicts that the two negative emotions anger and fear may have potentially different relationships with willingness to take risks, Feelings-as-Information (Schwarz and Clore, 1983) and Mood Maintenance (Isen and Patrick, 1983) predict that negative emotions generally reduce willingness to take

[19] See, for instance, Dohmen et al. (2017); Mata, Josef and Hertwig (2016); Josef et al. (2016); Pachur, Mata and Hertwig (2017); Schurer (2015).

risks. As predicted by the Appraisal-Tendency framework, however, fear relates to lower and anger to higher willingness to take risks. The results highlight that emotions with the same negative valence can have different relationships with willingness to take risks. The results thus suggest more predictive validity of the Appraisal-Tendency framework when compared to Feelings-as-Information and Mood Maintenance.

Figure 3: Emotions and Risk Attitudes



(a) Happiness **(b) Anger**

(c) Fear

Note: The figure shows the relationships between the residual willingness to take risks and residual emotions. The residuals stem from regressions of willingness to take risks ranging from 0 to 100 on all emotions other than the one depicted, individual fixed effects, and age fixed effects. The gray dots show the binned averages across 40 quantiles of residual willingness to take risks against the residual emotion. The blue line shows the linear fit from OLS regressions using all data. The slopes for fear, anger, and happiness are statistically significant at $p < 0.01$.

Table 2 shows the corresponding regression estimates. The coefficients for happiness, anger, and fear are precisely estimated, robust to a battery of fixed effects, and do not move when adding controls. Columns (1) through (5) show the results from regressions of

willingness to take risks on whether an emotion was felt from very rarely, 1, to very often, 5. Column (1) gives the raw correlations.[20] Column (2) gives the results conditional on individual fixed effects. Individual fixed effects are the main driver of willingness to take risks and they also absorb some of the relationship between emotions and willingness to take risks. However, the relationships for fear, anger, and happiness remain precisely estimated even when I just exploit within-individual variation in columns (2) through (5). In column (3) I account for age fixed effects, which increases the coefficient estimate for anger. This is because age correlates with less anger and lower willingness to take risks. In column (4) I include year and month fixed effects, and I then add controls, such as a dummy for unemployment and income, in column (5). Column (5) serves as the main specification for the rest of the paper.

Table 2: Emotions and Risk Attitudes

Dependent Variable	Willingness to Take Risks [0,100] – Avg.: 45				
	(1)	(2)	(3)	(4)	(5)
Happiness	3.90***	0.97***	0.96***	0.90***	0.90***
	(0.13)	(0.09)	(0.09)	(0.09)	(0.09)
Anger	2.76***	0.17***	0.27***	0.25***	0.25***
	(0.09)	(0.06)	(0.06)	(0.06)	(0.06)
Fear	-2.54***	-0.40***	-0.48***	-0.51***	-0.51***
	(0.10)	(0.07)	(0.07)	(0.07)	(0.07)
Individual FE		X	X	X	X
Age FE			X	X	X
Year FE				X	X
Month FE				X	X
Controls					X
Observations	169,964	169,964	169,964	169,964	169,964
Individuals	34,176	34,176	34,176	34,176	34,176
R-squared	0.03	0.64	0.64	0.65	0.65

Note: The table shows the estimated relationships between the frequency of emotions felt on a scale from 1 to 5 and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

[20] The raw correlations are graphically depicted in Figure B.1. Table B.1 shows estimates from logit regressions.

Heterogeneities — The relationship between emotions and risk attitudes are relatively stable across socioeconomic status with the exception of anger: Table B.2 shows that individuals with lower socioeconomic status tend to have a stronger relationship between anger and the willingness to take risks than individuals with higher socioeconomic status. The data also contain information about domain-specific risk attitudes for 2009 and 2014. While power is much lower, the estimates suggest relationships between emotions and domain specific willingness to take risks (see Table B.3).[21]

Robustness Checks: Functional Form, Unconditional Relationships, and Participation — I show nonparametric estimates using dummy variables for each emotion realization in Figure B.2. In addition, I show the result for each emotion (item) separately and examine the relationships for frequent participants in Table B.4.

5 Alternative Explanations

5.1 Alternative Economic Explanations

Wealth and Income — In Tables 3 and 4, I examine whether there is evidence for wealth and income shocks as drivers of the emotion–risk attitude relationships. In a first step in Table 3, I analyze whether changes in wealth drive the results as follows: splitting the sample into individuals who held financial assets in 2012 and those who did not (columns 1 and 2), controlling for wealth shocks because of changes in real estate prices (column 3), splitting the sample into individuals who owned real estate in 2007 and those who did not (columns 4 and 5), and splitting the sample according to changes in asset income, a proxy for wealth (column 6 and 7). In Table 4 I then control for income from assets (column 1), and split the sample according to household income shocks (column 2 and 3).[22]

[21] Higher happiness goes together with a higher willingness to take risks in the domain of driving, which is in contrast to the cross-sectional evidence by Goudie et al. (2014). Goudie et al. (2014) find that happier people more often wear seat belts.

[22] I classify individuals with small wealth change as those individuals who never lost in capital investment and earned less than 500 euros of dividend income (lower than the 70th percentile) in any year.

If the emotion–risk attitude relation was driven by wealth or income shocks, individuals with no financial assets or no wealth or income changes should show no or consistently smaller relationships between emotions and risk attitudes. However, across the board, I observe strong relationships between risk attitudes, happiness, and fear. If anything, the results suggest stronger relationships between anger and risk attitudes for individuals who experience less variation in wealth or income.

Economic Uncertainty and the Business Cycle — General or local economic circumstances might drive the documented relationships. I address this concern in Table C.1. I first split the sample into data collected during the financial crisis or after. If the crisis were to drive the emotion–risk attitude relationship, I should find smaller relationships in noncrisis years. Yet, I find that, if anything, the relationships are stronger in noncrisis years. Consistent with this, the point estimates barely change when I take into account proxies for the economic environment such as economic policy uncertainty in the month of the interview (Baker, Bloom and Davis, 2016, 2018) and a sentiment index for the German economy in the month of the interview in column (3) (Leibniz-Zentrum für Europäische Wirtschaftsforschung, 2018), or trading volume and stock market returns within the last week and the last day in column (4) (Finanzen.ch, 2018).

Alternatively, the relationships may be driven by the business cycle in a way that the controls do not capture. For instance, there may be variation in the business cycle across the 16 German states. I address the two concerns with the use of month-of-survey-year fixed effects in column (5), week-of-survey-year fixed effects in column (6), or state-specific month-of-survey-year fixed effects in column (7). The coefficient estimates barely change when including the additional fixed effects. Taken together, the results so far do not suggest economic factors as a driver of the relationships.

Background Risk: Job Security and the Financial Situation — It could be that individuals face background risk not captured by the examined measures for general and personal economic circumstances. For instance, the company they work for might have lost

Table 3: Alternative Economic Explanations — Wealth

Dependent Variable	Willingness to Take Risks [0,100]						
	Financ. Assets		Real Estate	Owns Real Estate		Wealth Change	
	No	Yes	Yes	No	Yes	No	Yes
Avg.	47	44	45	46	44	46	45
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Happiness	1.03***	0.77***	0.88***	0.97***	0.77***	1.07***	0.81***
	(0.16)	(0.11)	(0.09)	(0.13)	(0.14)	(0.16)	(0.11)
Anger	0.43***	0.19**	0.29***	0.44***	0.09	0.41***	0.16**
	(0.11)	(0.08)	(0.07)	(0.09)	(0.10)	(0.11)	(0.08)
Fear	-0.55***	-0.52***	-0.53***	-0.48***	-0.59***	-0.60***	-0.46***
	(0.12)	(0.09)	(0.07)	(0.10)	(0.11)	(0.12)	(0.08)
House Owner x Real Est. Prices			0.03***				
			(0.01)				
Real Estate Prices			0.01				
			(0.03)				
Individual FE	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
Month FE	X	X	X	X	X	X	X
Controls	X	X	X	X	X	X	X
Observations	55,073	93,778	149,158	78,961	70,197	61,176	108,788
Individuals	11,281	15,145	26,512	14,835	11,677	15,132	19,044
R-squared	0.63	0.64	0.64	0.64	0.64	0.66	0.65

Note: The table shows the estimated relationships between the frequency of emotions felt on a scale from 1 to 5 and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. Financ. Assets is an indicator based on individuals stating that they held financial assets in 2012 (the only available year). Real estate ownership is based on whether individuals indicated that they owned parts of their apartments or houses in 2007 or, if the information is missing, in 2002 (even after substituting for older values, there are still some missing values). Real estate prices for apartments and houses stem from the vdp-Immobilienpreisindex (Die deutschen Pfandbriefbanken, 2018). House Owner x Real Estate Prices is an interaction of real estate prices with real estate ownership in 2007. I classify individuals with small wealth change as those individuals who never lost in capital investment and earned less than a dividend income of 500 euros in any year. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Alternative Economic Explanations — Income

Dependent Variable	Willingness to Take Risks [0,100]		
	Asset Inc.	Househ. Inc. Change	
	Yes	Small	Large
Avg.	46	44	47
	(1)	(2)	(3)
Happiness	0.89***	0.78***	0.76***
	(0.09)	(0.14)	(0.15)
Anger	0.26***	0.36***	0.15
	(0.06)	(0.10)	(0.10)
Fear	-0.51***	-0.39***	-0.52***
	(0.07)	(0.11)	(0.11)
Ln Capital Inv. Loss	-0.00		
	(0.04)		
Ln Dividend Income	0.04		
	(0.03)		
Rent Income Indicator	-0.02		
	(0.26)		
Individual FE	X	X	X
Age FE	X	X	X
Year FE	X	X	X
Month FE	X	X	X
Controls	X	X	X
Observations	169,783	79,032	77,530
Individuals	34,176	27,130	28,543
R-squared	0.65	0.72	0.73

Note: The table shows the estimated relationships between the frequency of emotions felt on a scale from 1 to 5 and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. Asset Inc. refers to the inclusion of controls for asset income. Ln Capital Inv. Loss refers to the ln of capital investment losses. The rent income indicator is 1 if the individual indicated income from renting out apartments or houses. I also include a dummy variable indicating whether rent income is missing (not shown in regression output). There are some missing values for returns from assets (Ln Capital Inv. Loss and Ln Dividend Income). I classify individuals as experiencing small income changes, Househ. Inc. Change–Small, if the income changed less than 9% (the median change in income) from the last survey wave to the current survey wave. Households with larger than 9% in income losses and more than 9% in income gains are thus classified as experiencing large income changes, whereas households with income gains or losses of less than 9% are classified as experiencing small income changes (Househ. Inc. Change–Small=yes). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

an important customer, which would lead to a higher likelihood of future income loss. To gauge the relevance of background risk, I exploit information on how worried individuals are about their financial situation and their job security; see Table C.2. Worries about the financial situation and worries about job security strongly relate to lower willingness to take risks but the inclusion does not affect the coefficient estimates for emotions much. I further split the sample into people in retirement age and younger in the spirit of Guiso, Sapienza and Zingales (2018) and again estimate similar coefficients.

Health — Bad health relates to higher risk aversion (Decker and Schmitz, 2016; Böckerman, Conlin and Svento, 2019) and to a higher incidence of fear and lower incidence of happiness (regressions not shown). Accordingly, it is a candidate for driving the results. But, when I include subjective health linearly as a control, the coefficient estimates remain very similar; see column (8) in Table C.1. The results are also similar when I include dummies for each subjective health realization in column (9). These two checks suggest that while better subjective health increases the willingness to take risks, it does not capture the same variation as emotions do. Interestingly, the coefficient of happiness slightly decreases, which hints at the potential role of general well-being or life satisfaction as an alternative explanation for the happiness–risk attitude relationship.

5.2 Alternative Psychological Explanations

Life Satisfaction — It seems highly likely that not just recently experienced emotions relate to risk attitudes but also more general evaluative well-being. I consider changes in life satisfaction in Table C.3. When adding life satisfaction, the coefficients for fear and anger remain stable and the coefficient for happiness decreases but remains statistically significant. Interestingly, higher life satisfaction also relates to higher willingness to take risks. While changes in general well-being matter for risk attitudes, more short-term emotional experiences relate to risk attitudes even conditional on general evaluative well-being.

Past Emotions and Risk Attitudes — Additional results show that it is mostly concurrent emotions that drive the results as past emotions do not have consistent and large relationships with current risk attitudes (see Table C.3). Moreover, past risk attitudes do not drive the results. In conclusion, the alternative psychological explanations do not suffice to explain the relationships.

6 Event Study: Death of a Parent or Child

The link between emotions and risk attitudes withstands an array of alternative explanations and robustness checks. To further examine the robustness and magnitude of the link, I study the death of a child or parent.[23] The main goal is to get a sense of magnitude of the impact of the emotional event. To this end, I scale the reduced form effect of the death of a parent or child on risk attitudes by the variation in emotion. The goal of the following checks is thus to give the reader a sense of the robustness and magnitude of the effects of an emotional event, rather than claiming that the estimates demonstrate a causal effect of emotions on risk attitudes.

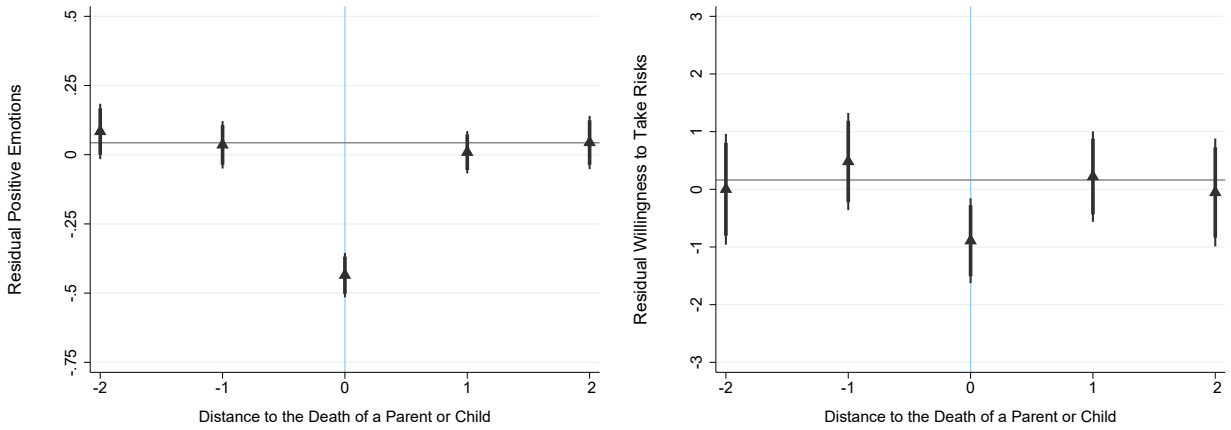
6.1 Empirical Approach

Sample and Reduced Form — I study how emotions and risk attitudes change around 1,242 deaths of a parent or child experienced by 1,118 individuals, yielding 8,250 observations.[24] All specifications consider individuals who experienced the death of a child or parent during the sample period. Moreover, I drop all individuals who inherited money at some

[23]It is known that the death of a relative reduces mental health and life satisfaction (see, e.g., Liberini, Redoano and Proto, 2017; Persson and Rossin-Slater, 2018). Liberini, Redoano and Proto (2017) use death of a partner as an instrument for life satisfaction to assess the robustness of the relationship between life satisfaction and voting behavior. In recent working papers Kettlewell (2018) and Browne et al. (2016) examine the reduced form relationship between family loss and risk attitudes. The authors mainly rely on spousal death, but Kettlewell (2018) also adds child death to the bereavement indicator and Browne et al. (2016) separately consider parental death. The authors document an imprecisely estimated reduction in willingness to take risks because of bereavement. One reason for why the estimates are less precise may be the smaller sample sizes. In my application, using the death of a parent or child exclusively seem particularly well suited because issues such as complementarities in household production are less likely to affect the coefficient estimates.

[24]Of the 1,118 individuals, 112 individuals experienced 2 deaths, and 6 individuals experienced 3 deaths. I observe 79 child deaths.

Figure 4: Death of a Parent or Child



(a) Residual Positive Emotions **(b) Residual Willingness to Take Risks**

Note: These graphs show the relationships between risk attitudes, emotions, and distance to the death of a parent or child. Each triangle shows the average residual of the dependent variable for the corresponding distance. The 95% confidence intervals for the averages are shown as thin black lines, the 90% confidence intervals as thick black lines. Distance to death means the distance in survey waves. Zero indicates the first survey wave after the death, highlighted with the light blue line. The horizontal gray line depicts the average residual for distances that are not 0, that is, not the first survey wave immediately following the death. The residuals stem from regressions of risk attitudes or positive emotions on all fixed effects for individuals who experience the death of a parent or child in the sample period, do not inherit money, and whom I observe before the death, at the time of the death, and after the death.

point during the sample period, mainly because inheritance can result in temporary wealth shocks that could affect estimation.[25] Furthermore, I examine only those individuals who I observe in the survey wave immediately before, at, and after a death. This allows me to absorb level differences between before and after a death.

I use an index for positive emotions that is: (happiness×2)–fear. The reason is that the t-values and the first stage coefficients are more than two times larger for happiness when compared to fear. Overweighting happiness thus yields more precision on the first stage. I do not include anger as the estimates show death does not affect anger in the aggregate; see Table D.1.[26] The results are robust to how the index is constructed: Using only happiness, the principal component which captures good mood based on the three emotions, using

[25]Including the individuals who inherited money in the sample does not change the main conclusion. The second-stage estimates for the full sample conditional on the difference before and after the death yields a coefficient estimate of positive emotions of 1.94 (se = 0.9).

[26]This also holds true across most groups partitioned by age and socioeconomic status; see Table D.2. Only for the unemployed I observe a reduction in experienced anger.

an alternative index including anger, or giving equal weight to happiness and fear yields qualitatively equivalent results, see Table D.4.

Figure 4 shows that the death of a parent or child leads to a pronounced drop in positive emotions in the survey wave immediately after the death, denoted as a distance of 0 to the death. Contemporaneously, I also observe lower willingness to take risks. There is no decline in willingness to take risks or a change in emotions just before the death of a parent or a child.

Specification — I exploit the strong effect of death on emotions in instrumental variable estimations of the following form:

$$\begin{aligned} \text{PosEm}_{iym} =& \eta_i + \gamma_a + \delta_y + \tau_m + \alpha \text{Bereavement}_{iy} \\ & \psi \text{AfterBer}_{iy} + X'_{iy}\beta + \varepsilon_{iym} \qquad \text{(1st stage)} \end{aligned}$$

$$\begin{aligned} \text{WTR}_{iym} =& \eta_i + \gamma_a + \delta_y + \tau_m + \lambda \widehat{\text{PosEm}}_{iy} \\ & + \psi \text{AfterBer}_{iy} + X'_{iy}\beta + \varepsilon_{iym} \qquad \text{(2nd stage)} \end{aligned}$$

where WTR_{iym} is the willingness to take risks; η_i, γ_a, and δ_y, τ_m are individual, age, year, and month fixed effects; and α indicates the effect of bereavement on the first stage. Bereavement_{iy} is 1 if it is the first survey wave after the death of a parent or child and 0 otherwise. The coefficient of positive emotions on the second stage is denoted with λ. AfterBer_{iy} is a dummy indicating after bereavement, being 1 if the distance to the death of a parent or child is $\geqslant 0$. In some specifications I account for X'_{iy}, which is a matrix of covariates including household income, household income squared, and income from assets (rent income, ln dividend income, and ln of losses at capital markets).

The estimates from the specification rely on variation in the timing of the death of a parent or child within individuals who experienced a death. Differencing out the average level of risk attitudes and emotions before and after the death isolates the immediate effect of the death from long-term effects of the death. This means that factors which change

persistently because of the death can not affect the coefficient estimates. Permanent income or wealth shocks, updates in beliefs, or learning can thus not affect the estimate. Only shocks that exclusively accrue at bereavement could affect the estimate.

Using an index of positive emotions rather than a single emotion has two advantages: First, I do not need two instruments for happiness and fear. Second, fear and happiness are both affected by the death of a parent or a child and the index captures both changes. Combining the emotions in an index thus transparently shows that multiple emotions are affected, increases power on the first stage which reduces potential size distortions, and avoids a mechanic violation of the exclusion restriction because of omitting an affected emotion from the specification.

6.2 Results

As suggested by the graphical evidence, the death of a parent or child affects positive emotions. Across all specifications, the smallest absolute t-value for the effect of a death of a parent or child is 8.61, which clearly surpasses the rule-of-thumb threshold for weak instruments of a 3.2 t-value ($F > 10$); see Table D.1. The death of a parent or child leads to a 0.52-point drop in positive emotions on the scale of -3 to 9 ($avg. = -5.25, sd = 2.2$).

Table 5 gives the main results from the event study. First, column (1) shows that positive emotions relate to higher willingness to take risks for the event study sample: A 1-point change relates to a 0.65-point higher willingness to take risks. Second, column (2) shows that the death of a parent reduces the willingness to take risks statistically significantly at the time of death when compared to the whole period after the death.

Columns (3) and (4) give the instrumental variable estimates. A 1-point change in positive emotions relates to a 2.68 ($se = 1.14$) higher willingness to take risks. The estimate is similar when conditioning on income and wealth. The estimates remain stable when conditioning on the level difference before and after the death, controlling for the level of risk attitudes around the time of death (Table D.3), or when using alternative indices (Table D.4).

The estimate is larger than the one suggested by ordinary least squares estimates. One reason may that individuals with strong emotional reactions to the death do also react

Table 5: Death of a Parent or Child

Dependent Variable	Willingness to Take Risks [0,100]			
	OLS	Red.-Form	IV	
	(1)	(2)	(3)	(4)
Positive Emotions	0.65***		2.68**	2.64**
	(0.14)		(1.14)	(1.14)
Death of a Parent or Child		-1.40**		
		(0.58)		
After Death	-0.07	0.55	0.77	0.75
	(0.59)	(0.72)	(0.79)	(0.79)
Individual FE	X	X	X	X
Age FE	X	X	X	X
Year FE	X	X	X	X
Month FE	X	X	X	X
Income & Wealth Controls				X
Observations	8,250	8,250	8,250	8,241
Individuals	1,118	1,118	1,118	1,118
R-squared	0.62	0.62	0.60	0.60

Note: The table shows the estimated relationship between the frequency of emotions felt and willingness to take risks using OLS or instrumental variable (IV) estimates as indicated. Standard errors (in parentheses) are based on clustering at the individual level. Red.-Form refers to reduced-form. After Death is an indicator variable that is 1 from the survey wave at bereavement onward. Income & Wealth Controls contain household income, household income squared, and income from assets (rent income, an indicator for missing rent income, ln dividend income, and ln of losses at capital markets). There are 9 missing values for returns from assets (Ln Capital Inv. Loss and Ln Dividend Income). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

stronger to emotions. That is, compliers may be different from the general population the OLS estimates rely on. Another reason may be that IV reduces measurement error in emotions. In any case, the instrumental variable estimates suggest a strong and robust relationship between positive emotions and risk attitudes.

6.3 Competing Explanations

Assumption for a Causal Interpretation — To interpret the estimates of the relationship between positive emotions and willingness to take risks as causal, the following key assumption would need to hold: Only the emotional shock drives the difference between an individual's risk attitudes at the death of a parent or child when compared to the risk attitudes after the death of a parent or child.[27]

I examine the extent of potential violations of the exclusion restriction below. However, it is generally difficult to assess the validity of the exclusion restriction in this context even if the data allowed perfect measurement of all variables of interest. For instance, it could be that temporary unemployment is a direct result of the death because one of the parents owned the company the individual works for. But, it could also be that the strength of the emotional shock leads to temporary unemployment. This should be kept in mind when interpreting both the results from instrumental variable estimates and the examination of competing explanations.

Changes in Income, Wealth, Unemployment, and Marital Status — It could be that other changes in the first survey wave after the death affect emotions and risk attitudes. To examine the robustness of the instrumental variable results I first control for changes in asset income and household income in column (4) of Table 5. I then examine changes at the time of death in Table D.5. Table D.5 reveals no statistically significant effects of bereavement when compared to the whole period after the death on household income, income from

[27]In addition, the monotonicity assumption would need to hold: The death of a parent or child weakly reduces the incidence of positive emotions for all individuals. I examine heterogeneities in Table D.2 and find similarly sized negative emotional impacts of the death of a parent or child across socioeconomic groups.

assets, income from rent, real estate value, unemployment, or marital status.[28] The effects are arguably small. For instance, average monthly household income is only €11 (se = 25) lower at the first survey after the death. In comparison, the standard deviation in household income across the sample here is €1,941 while the median income is €2,700.[29]

Changes in Beliefs and Background Risk — Similarly, concurrent changes in background risk or beliefs about one's financial situation could drive the relationship. But I do not find higher worries about finances or about job security at bereavement compared to after bereavement; see Table D.5. Dropping individuals from the sample who are younger than 45 years and therefore might arguably face more severe changes in background risk because of the death, if anything, leads to a higher estimate (Table D.7).

Overall Impact on the Above Observables — I do one more check to assess the impact of the death of a parent or a child on observables using all information contained in the time-variant observables. Using the variables described so far in this subsection plus life satisfaction and fixed effects I first predict variation in positive emotions. I then examine whether the timing of the survey wave immediately after the death of a parent or a child correlates with the predicted variation in positive emotions. This should not be the case if the covariates where orthogonal to the death of a parent or a child.

Table D.6 indicates that predicted positive emotions do not change at the time of the death of a parent or a child. The biggest coefficient estimate for predicted positive emotions is -0.03, se = 0.03 which is much smaller than the -0.52, se = 0.06 coefficient for the first stage estimate with actual positive emotions. The coefficient estimates for the indicator capturing the survey wave immediately after the death of a parent or a child are all small and not statistically significant across different predicted positive emotions based on an increasing number of covariates. Taken together, other observables do not change starkly immediately

[28] The signs on the dummy indicating the period after the death is consistent with van den Berg, Lundborg and Vikström (2017), who find permanent effects of the death of a child on unemployment and marital status.

[29] One further concern may be burial costs, which can exceed €1,500. Yet, a €1,000 reduction in income relates to only a 0.25-point (se = 0.43) decrease in the willingness to take risks in the subsample used here. This comparison reveals that even high burial costs are unlikely to substantially drive the estimates.

after the death of a parent or a child when compared to the whole period after the death. The results thus suggest idiosyncratic predictory power of emotions for risk attitudes.

Changes in Other Living Circumstances — In Table D.7 I provide additional checks on whether a temporary change in living circumstances drives the relationship. It could be that the relationship appears because a death forces individuals to deviate from their original plans. To test this, I drop all individuals for whom I know that they stated "I have to order my life in a new way" because of the death as opposed to "Some things will change now" or "Nothing will change because of that."[30] The resulting instrumental variable estimate is 3.48 (se = 1.28) and larger than the full-sample estimates. Similarly, dropping individuals who changed their employment status does not dampen the estimate. In conclusion, these tests suggest limited changes in other variables exactly in the survey after the death when compared to the whole period after the death.

Anticipation — The main specification used here exploits the variation in the timing of the death among the bereaved. It could be that this timing is not exogenous to the living circumstances of the bereaved person or the dead person. There is no decline in willingness to take risks just before the death of a parent or a child, which suggests that the timing does not coincide with general changes in willingness to take risks. To further assess whether potential endogeneity of the timing of death affects the estimates, I drop all individuals for whom I know that their deceased relative was in need of care or was less than "satisfactorily healthy" 3 months before death. This does not alter the instrumental variable estimates substantially; see Table D.7, column (4).[31]

[30]The survey responses to this question, as well as to the questions about the deceased person's health and whether the person was receiving medical care before death, are available only for 2009 onward. I keep all observations with nonresponses (including all observations in 2008) or responses that are different from the ones excluded in the estimation sample.

[31]As an alternative instrument one might want to use the more surprising occurrence of terrorist attacks or school shootings (Meier, 2021) which I used to validate the emotion measures in (Meier, 2019). A drawback is that this is a relatively weaker instrument for positive emotions with a first stage estimate of -0.12 (t = −3.17), which is substantially smaller than bereavement and considerably less precise. The second-stage estimate is 3.35 (se = 3.5), which points in the same direction as the estimates from the death of a parent or child.

Life Satisfaction — General well-being and positive emotions closely relate, but not perfectly so (Luhmann et al., 2012). Clearly, a negative impact on life satisfaction in the survey wave immediately after bereavement versus the whole period after bereavement would not necessarily indicate a violation of the exclusion restriction. It would just mean that life satisfaction and negative emotions are not easily separable outcomes after the death of a parent or child.

Table D.5, column (10) shows coefficient estimates of the effect of the death of a parent or child on life satisfaction. In the whole period after death, life satisfaction is substantially lower with a coefficient estimate of -0.12 (se = 0.06). Importantly, however, when compared to the whole period after the death, life satisfaction is not statistically significantly lower in the survey immediately after the death (-0.07, se = 0.05).[32] That is, there is a level shift in life satisfaction from before to after the death of a parent or child, but not a particularly large shock at the time of death when compared to the whole period after death.[33] Therefore, the trajectory of life satisfaction does not match the trajectory of emotions and risk attitudes which are lower immediately after the death when compared to the whole period after death.

Since the change in life satisfaction around the death of a parent or child does not match the trajectory observed for risk attitudes, but the change in emotions does, the results imply that emotions are more closely tied to the change in risk attitudes than overall life satisfaction. The result is consistent with predicted positive emotions based on covariates and life satisfaction not changing around the death of a parent or child. The result is also consistent with the results from the fixed effects estimations showing emotional experiences relate to risk attitudes even conditional on life satisfaction.

[32]One reason for this finding may be the relatively short panel, which prevents full adaptation that, presumably, would raise the average life satisfaction after the death; see, e.g., Odermatt and Stutzer (2019).

[33]Previous literature has focused on examining the impact of the death of the spouse (Luhmann et al., 2012; Liberini, Redoano and Proto, 2017; Odermatt and Stutzer, 2019). The evidence points to a lasting reduction in life satisfaction for up to 3 years after the event. However, there is much less evidence concerning the effect of the death of a parent or a child on life satisfaction. Moor and De Graaf (2016) examine the impacts of the death of a parent or a child in the cross-section on life satisfaction and find lasting effects: The death of a parent or a child is associated with a marked reduction life satisfaction for more than 10 years after the event and the reduction in life satisfaction has a similar magnitude throughout this time-span. This finding is consistent with the results presented here which suggest a lasting reduction in life satisfaction.

6.4 Replication with Incentivized Choice

I replicate the main instrumental variable estimate combining two cross-sectional surveys embedded in the representative Dutch LISS data set (Centerdata, 2019). The surveys were conducted by other researchers for a different purpose (see Drerup, Enke and von Gaudecker, 2017; Bosmans et al., 2017).[34] The dependent variable risktaking is the share which individuals invested in an index fund or a specific stock rather than a bank account. Researchers who conducted the survey later on invested 100 Euros divided according to subjects' allocation for 1 out of 10 subjects (Drerup, Enke and von Gaudecker, 2017).

Table D.8 shows the relationship between the death of a loved one or a colleague and choice under risk based on a sample of 2,000 individuals. I find that individuals who have recently experienced the death of a colleague or a loved one are less likely to choose an index fund or stock relative to a bank account. The shock goes together with a reduction of positive mood on a scale from 1 to 7 by -0.28 (se = 0.12) and the share of money invested in the risky option by 10 percentage points (se = 0.03). The instrumental variable estimate suggests that a 0.3 point better mood leads to a 10 percentage points higher allocation to the risky option. The evidence has to be interpreted cautiously given the cross-sectional data, but it is reassuring to see a broadly similar pattern.

7 Mechanisms

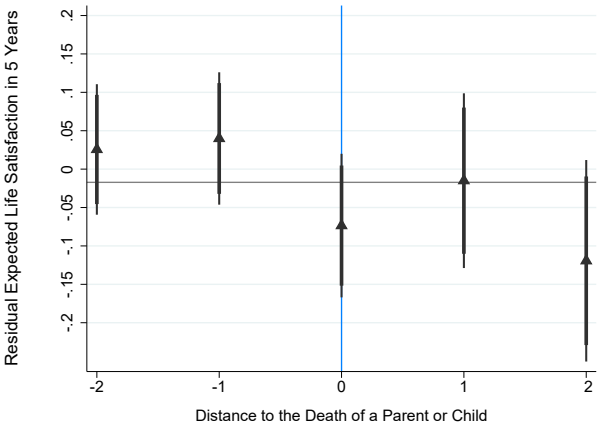
7.1 Expectations

Economists agree on at least two potential channels for how emotions could affect behavior: Emotions could affect individuals' expectations about the future and/or individuals' preferences directly (Elster, 1998; Loewenstein et al., 2001; DellaVigna, 2009). To address

[34]The LISS (Longitudinal Internet Studies for the Social sciences) data are from a representative panel of the Dutch population which are contacted for surveys regularly (the panel is administered by CentERdata). Researchers can add their own surveys. I combine existing data from a survey on life shocks in April 2012 (Bosmans et al., 2017) with data from a survey on investment behavior in September 2013 which had an incentivized investment choice (Drerup, Enke and von Gaudecker, 2017). The median distance between experiencing the death of a loved one or a colleague and the risky choice is less than 2 years. I add information from survey wave on personality containing information on mood which was conducted in May–July 2012 as well as sociodemographic information collected in May 2012.

whether emotions affect behavior through a change in expectations or by directly affecting preferences I exploit a unique question about expected life satisfaction in 5 years, answered on a scale ranging from 0=completely not satisfied to 10=completely satisfied.[35] Expected life satisfaction is particularly appealing because it provides a general summary measure of expectations (Odermatt and Stutzer, 2019). This information therefore allows a direct test of whether emotions relate to preferences because of expectations.

Figure 5: Death of a Parent or Child and Expected Life Satisfaction



Note: The figure shows the relationship between residual expected life satisfaction in 5 years (on a scale from 0, completely not satisfied, to 10, completely satisfied) and distance to the death of a parent or child. Each triangle shows the average residual for the corresponding distance. The 95% confidence intervals for the averages are given with thin black lines, the 90% confidence intervals with thick black lines. Distance to death means the distance in survey waves. Zero indicates the first survey wave after the death, highlighted with the light blue line. The horizontal gray line depicts the average residual for distances that are not 0, that is, not the first survey wave immediately following death. The residuals stem from regressions of risk attitudes or positive emotions on all fixed effects for individuals who experience the death of a parent or child in the sample period, do not inherit money, and whom I observe before the death, at the time of the death, and after the death. The reduced-form coefficient of an indicator variable indicating the first survey after the death on expected life satisfaction is -0.08 (se = 0.09) conditional on an indicator for the whole period after death and all fixed effects. The instrumental variable estimate for positive emotions in the sample where expected life satisfaction is available is 3.3 (se = 1.6).

In the survey wave immediately after the death of a parent or child, when compared to the whole period after the death, the expected life satisfaction is not statistically significantly lower; see Figure 5. In contrast, willingness to take risks and positive emotions are substantially lower immediately after the death of a parent or child when compared to the period after the death.

[35]This information is available for 2008, 2009, 2011, and 2013.

Consistent with this, Table E.1 shows that the coefficient estimates for anger and happiness prevail when taking into account expected life satisfaction. Interestingly, expected higher life satisfaction goes together with a higher propensity to be willing to take risks. If the relations between emotions and preferences were driven exclusively by expectations about future well-being, the emotion–preference relationships should be close to 0 when taking into account these expectations. But, the results suggest that emotions, at least in the case of anger and happiness, directly drive preferences rather than operating through expectations.

7.2 Impulsivity

It could be that impulse control can mitigate the role of emotions (Loewenstein, 2000). If that is the case, a reasonable prior would be close to zero emotion relationships with preferences for nonimpulsive individuals and large emotion relations with preferences for impulsive individuals with low emotion regulation. I examine this prediction using a proxy for emotion regulation stemming from a question about self-reported general impulsiveness in 2008.[36] I then split the sample into impulsive individuals (at or above median impulsiveness) and nonimpulsive individuals.

Table E.1 shows sample splits for the relationships of emotions with willingness to take risks, depending on individuals' impulsiveness. Impulsive individuals have a stronger relationship of anger with preferences. The difference is particularly strong for risk attitudes, where impulsive individuals completely drive the main relationship. However, for the other emotion–preference relationships, being a less impulsive individual does not completely mitigate the relationships. Accordingly, even individuals with high emotion regulation may be affected by emotions in their decisions. This implies that emotions play a distinct role beyond self-control.

[36]The question was also asked in 2013, but I use only the year 2008 for the categorization to avoid changing categorization over time due to a change in impulsiveness.

7.3 Feelings of Control

Rather than through expectations or impulsivity, emotions may change risk attitudes through perceived control over the situation (Lerner et al., 2015). According to the Appraisal-Tendency Framework, emotions with high perceived control increase risk taking because they lead to an overestimation of individual control over getting a good outcome. The prediction from the Appraisal-Tendency Framework is as follows: Fear goes together with lower perceived control; anger and happiness go together with higher perceived control (Lerner and Keltner, 2000; Lerner et al., 2015). This leads to the prediction that fear relates to lower willingness to take risks while anger and happiness relate to higher willingness to take risks, see also Table 1.

I exploit a question about perceived control over one's life, answered on a scale from 1 to 7, to look at within-individual variation in feelings of control and emotions. The results are largely consistent with the Appraisal-Tendency Framework (see Table E.1). Fear relates to lower feelings of control than both anger and happiness.[37] The Appraisal-Tendency Framework thus yields the correct predictions on the relationship between anger and risk attitudes and is broadly consistent with the observed pattern for perceived control. In conclusion, the relationship between emotions and risk attitudes seems not easily explained by expectations, but could be partly driven by impulsiveness and perceived control.

8 Conclusion

This paper shows direct field evidence of the link between emotions and risk attitudes. The results indicate that preferences, at least partly, change with a person's emotional state. The results may be helpful for a better understanding of business cycle dynamics due to the likely role of emotions and risk attitudes in shaping investment behavior and consumption.

Why should economists invoke emotions to explain and predict macroeconomic developments and indvidual behavior? Previous research and this paper highlight five properties of

[37] Depending on the interpretation of the Appraisal-Tendency Framework, one discrepancy is that anger is related to lower feelings of control in an absolute sense. However, the coefficient on anger is much smaller than the coefficient for fear. So relatively speaking, more angry individuals have higher feelings of control than more fearful individuals.

emotions that underscore the relevance of emotions for economics: First, individuals have difficulties anticipating the influence of emotions on their decisions (Loewenstein, 2000). Second, individuals usually underestimate the influence of emotions on their behavior conditional on the occurrence of an emotion (Loewenstein, 2000). Third, emotions create an urge to act (Elster, 1998). For example, emotions triggered by cues may have long-lasting effects by fostering addiction (Bernheim and Rangel, 2004). Fourth, emotions might affect economic expectations and preferences such as risk or time preferences (DellaVigna, 2009). Fifth, taking nuanced emotional states into account can improve predictions of risk attitudes and behaviors. Taken together, the five factors provide strong arguments for considering emotions when analyzing economic decision making. One way to incorporate emotions is to measure emotions as a means to improve the accuracy of predictions of risk attitudes and behavior.

Given the pervasiveness of emotions and the fundamental role that risk attitudes play in most economic decisions, these results could bear relevance for diverse fields such as labor economics, health economics, and public economics. For instance, emotions could affect patients' treatment choices (Kőszegi, 2003), job search behavior and unemployment duration, or tax compliance (Cullen, Turner and Washington, 2020). Future research could examine when emotions play a particularly influential role, assess the relative influence of cognitive factors such as attention versus emotional influences, and investigate in more detail how individuals shield themselves from emotional decisions.

> "Hence, in order to have anything like a complete theory of human rationality, we have to understand what role emotion plays in it." Herbert A. Simon (1983, p. 29)

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Online Appendix

Emotions and Risk Attitudes

Armando N. Meier*

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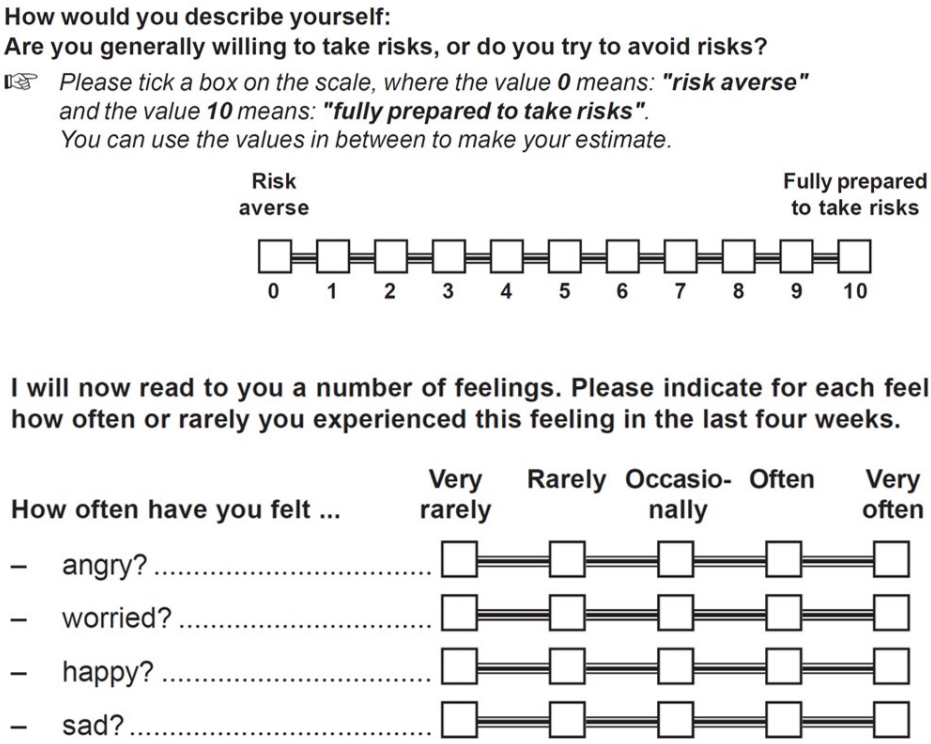
A Data

A.1 Questions from the German Socio-Economic Panel

Figure A.1: Translated Questions from the German Socio-Economic Panel



Note: The figure gives the original questions translated to English asked every year from 2008 through 2015. Note that worried is not an appropriate translation for what was asked in German. The question was about how often a person felt "Angst", for which the usual translation is fear. The questions about emotions and attitudes were normally separated by several items. The question order and the distance between questions changed over time as follows: 2008, emotions question number (qn) 2, risk attitudes qn 10; 2009, emotions qn 117, risk attitudes qn 121; 2010, emotions qn 125, risk attitudes qn 123; 2011, emotions qn 150, risk attitudes qn 121; 2012, emotions qn 2, risk attitudes qn 148; 2013, emotions qn 2, risk attitudes qn 154; 2014, emotions qn 3, risk attitudes qn 4; 2015, emotions qn 2, risk attitudes qn 4; 2016, emotions qn 2, risk attitudes qn 5.

A.2 Summary Statistics

Table A.1: Summary Statistics

Variable	Mean	SD	Min.	Max.	N
Dependent Variables					
Willingness to Take Risks	45.61	23.40	0	100	169,964
Main Independent Variables					
Happiness	3.59	0.76	1	5	169,964
Anger	2.77	1.00	1	5	169,964
Fear	1.93	0.97	1	5	169,964
Positive Emotions	5.25	2.16	-3	9	169,964
Main Controls					
Househ. Net Inc. in 1,000	3.03	2.12	0	200	169,964
Unemployed	0.41	0.49	0	1	169,964
Married	0.61	0.49	0	1	169,964
Child in Househ.	0.31	0.46	0	1	169,964
Life Satisfaction	7.15	1.73	0	10	169,964

Note: Househ. Net Inc. in 1,000 denotes household income in 1,000 euros. Child. in Househ. refers to an indicator variable that is 1 if there are children living in the household from 2008 through 2015 or 1 if the household received "Kindergeld" in 2016 where the indicator for children living in the household is not available.

Table A.2: Time Series Correlations Willingness to Take Risks (WTR)

	Willingness to Take Risks	Lag 1 WTR	Lag 2 WTR	Lag 3 WTR
Willingness to Take Risks	1.00			
Lag 1 WTR	0.58	1.00		
Lag 2 WTR	0.56	0.57	1.00	
Lag 3 WTR	0.54	0.55	0.55	1.00

Note: All correlations are stat. sign. at $p < 0.01$.

A.3 Correlates of Changes in Risk Attitudes

Table A.3: Correlates of Changes in Risk Attitudes

Dependent Variable	Will. to Take Risks [0,100] Avg.: 45				
	(1)	(2)	(3)	(4)	(5)
Househ. Net Inc. in 1,000	0.51***	0.26***	0.20***	0.26***	
	(0.05)	(0.05)	(0.06)	(0.05)	
Househ. Net Inc. Sq./10	-0.02***	-0.01***	-0.01***	-0.01***	
	(0.00)	(0.00)	(0.00)	(0.00)	
Unemployed	0.20	-0.40**	-0.48**	-0.36*	
	(0.18)	(0.19)	(0.20)	(0.19)	
Married	-0.00	0.03	0.08	0.05	
	(0.29)	(0.30)	(0.31)	(0.30)	
Child in Househ.	-1.43***	-1.22***	-1.15***	-1.23***	
	(0.22)	(0.23)	(0.24)	(0.23)	
House Owner x Real Est. Prices			0.03***		
			(0.01)		
Real Estate Prices			0.01		
			(0.03)		
Subjective Health				0.95***	
				(0.08)	
Financial Domain					1.92***
					(0.29)
Driving Domain					2.33***
					(0.33)
Leisure Domain					2.25***
					(0.34)
Job Domain					2.06***
					(0.31)
Health Domain					1.54***
					(0.28)
Trust Domain					1.61***
					(0.27)
Individual FE	X	X	X	X	X
Age FE		X	X	X	X
Year FE		X	X	X	X
Observations	169,964	169,964	149,158	169,818	15,134
Individuals	34,176	34,176	26,512	34,176	7,567
R-squared	0.64	0.65	0.64	0.65	0.80

Note: The table shows the correlates of risk attitudes. Standard errors (in parentheses) are based on clustering at the individual level. Househ. Net Inc. Sq. refers to squared household income (Househ. Net Inc. in 1,000). House Owner is one if individuals owned parts of their apartment or house in 2007 or, if missing, in 2002. This still leaves some missing values, which leads to fewer observations in columns (3) and (5). Real estate prices (Real Est. Prices) for apartments and houses are taken from the vdp-Immobilienpreisindex. Domain specific measures of willingness to take risks are only available for 2009 and 2014. Values for the domain specific willingness to take risks are standardized. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A.4 Validity of Emotion Measurement

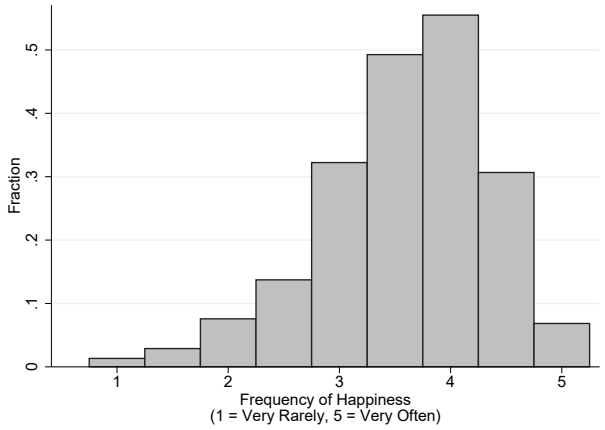
Evidence from psychology also suggests that the use of retrospective judgments of emotions is sensible in the context of this study. For instance, Barrett (1997) reports that individuals accurately recall emotions experienced within the last 90 days. A cursory look at correlations suggest the variation in emotions seems reasonable, as the correlations with life satisfaction have the expected signs confirming previous evidence on the validity of more short-term affe5ctive measures (Table A.4, Krueger and Schkade, 2008). In a previous version of the paper, I examine how emotions change around life events to understand what variation emotions capture (Meier, 2019). It seems that emotions move reasonably around life events consistent with previous evidence (Luhmann et al., 2012).

Robinson and Clore (2002) and others (for a review, see Ciuk, Troy and Jones, 2015) argue that a self-reported, retrospective assessment of emotions following an emotional event reflects the felt emotions if the retrospective assessment does not go beyond "a few weeks." However, there is a trade-off between present anchoring and personality anchoring in retrospective emotion assessments.

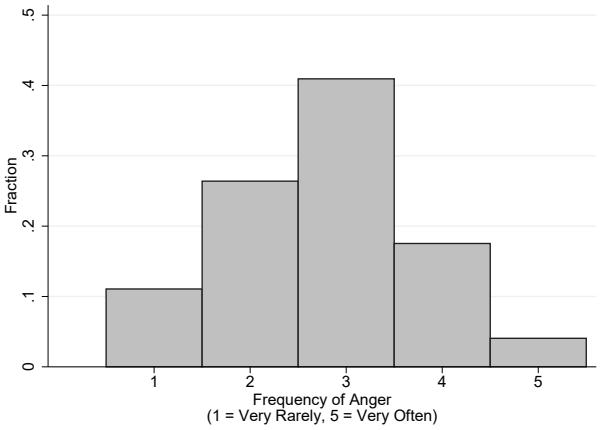
The trade-off depends on the time horizon of the retrospective assessment, whereby a longer time horizon leads to a recall of emotional experiences that is more consistent with one's personal emotional disposition (Parkinson et al., 1995; Mill, Realo and Allik, 2015). But, even these long-term assessments can be affected by recent events. Individuals being present-biased is potentially helpful here since I am interested in emotional shocks. In contrast, a bias toward emotional dispositions would reduce the variance I can exploit and bias my estimates toward 0 due to the within-individual comparisons over time. A similar effect can be expected by noisy measurement (Krueger and Schkade, 2008). If measurement error is large, my estimates are biased toward 0 and less precise (Krueger and Schkade, 2008). In sum, while imperfect, the emotion measures in the data seem a reasonable approximation of individuals' recent feelings and, if anything, work against finding a relationship.

A.5 Descriptive Statistics for the Emotion Variables

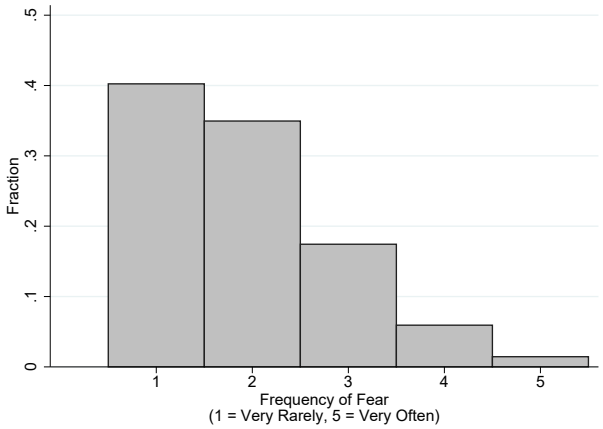
Figure A.2: Distribution of the Emotions



(a) Happiness

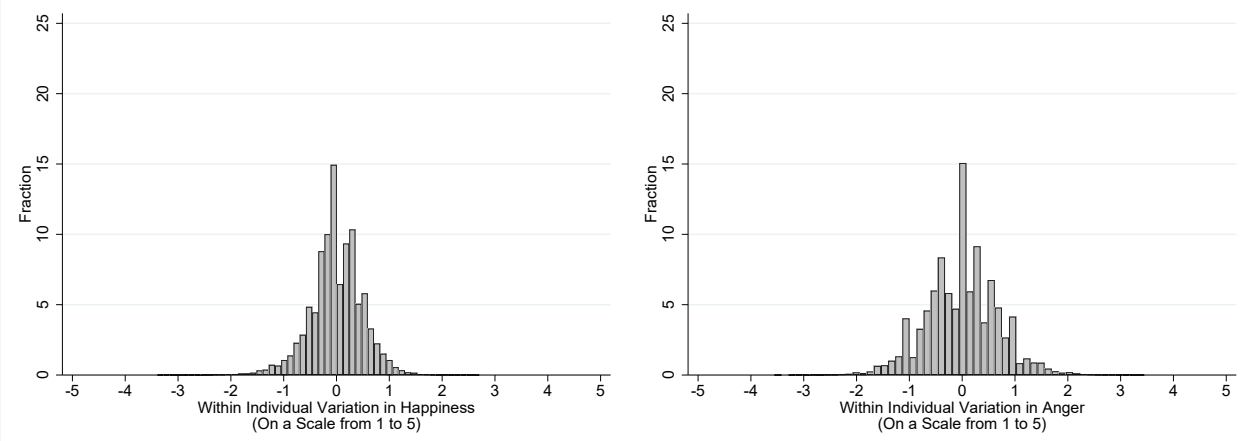


(b) Anger



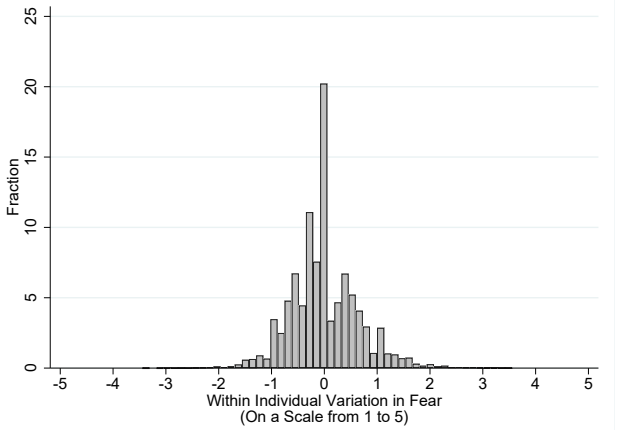
(c) Fear

Figure A.3: Within Individual Variation in Emotions



(a) Happiness

(b) Anger



(c) Fear

Note: The figure shows the residuals from OLS regressions of each emotion on dummy variables for each of the individuals (individual fixed effects). An observation is an individual–year residual. The residual is 0 if the individual did not deviate from her mean value of the corresponding emotion.

Table A.4: Raw Correlations Between Emotions and Life Satisfaction

	Happiness	Anger	Fear	Life Satisfaction
Happiness	1.00			
Anger	-0.36	1.00		
Fear	-0.46	0.34	1.00	
Life Satisfaction	0.53	-0.30	-0.33	1.00

Note: All correlations are stat. sign. at $p < 0.01$.

Table A.5: Correlations of Changes in Emotions

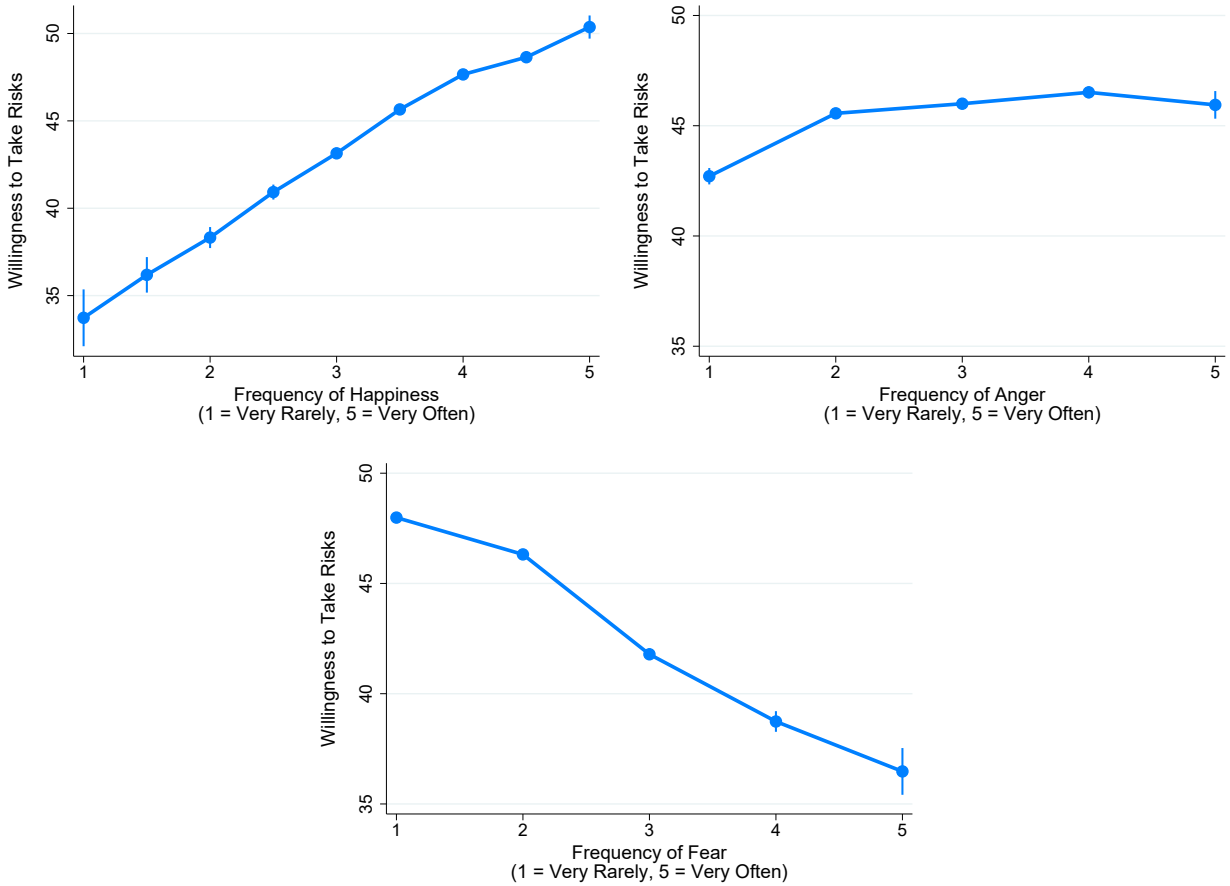
	Happiness Res.	Anger Res.	Fear Res.	Life Satisfaction Res.
Happiness Res.	1.00			
Anger Res.	-0.25	1.00		
Fear Res.	-0.31	0.23	1.00	
Life Satisfaction Res.	0.32	-0.16	-0.19	1.00

Note: All correlations are stat. sign. at $p < 0.01$. The above correlations give the correlations between residuals (Res.) from regressions of each emotion on individual fixed effects.

B Results: Emotions and Risk Attitudes

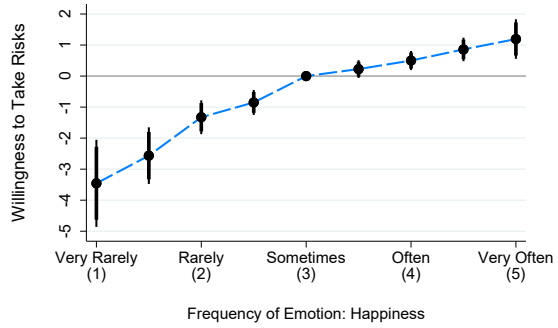
B.1 Raw Relationships and Functional Form

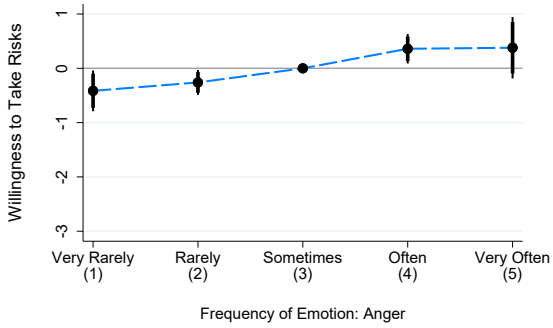
Figure B.1: Raw Relationship Between Willingness to Take Risks and Emotions

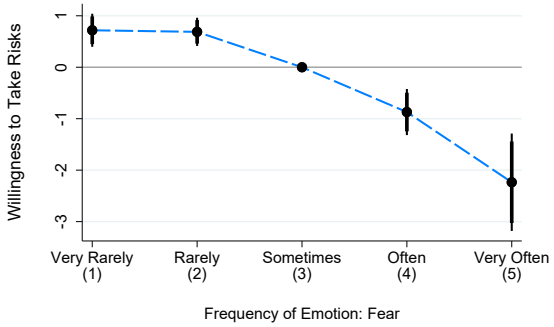


Note: The blue line in all graphs shows the relationships between average willingness to take risks by the frequency of recently experienced emotions. 95% confidence intervals are given by the vertical blue lines.

Figure B.2: Nonparametric Relationships Between Risk Attitudes and Emotions







Note: The black dots are coefficient estimates, depicted with their 90% (thick line) and 95% (thin line) confidence intervals. The coefficient estimates result from regression of the willingness to take risks on all emotion realization dummies, all fixed effects, and controls. The reference category for each emotion is "Sometimes".

Table B.1: Ordered Logit: Emotions and Risk Attitudes

Dependent Variable	Willingness to Take Risks [0,100]				
	(1)	(2)	(3)	(4)	(5)
Happiness	0.49***	0.11***	0.11***	0.11***	0.11***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Anger	0.36***	0.02***	0.03***	0.03***	0.03***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Fear	-0.14***	-0.05***	-0.06***	-0.06***	-0.06***
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Individual FE		X	X	X	X
Age FE			X	X	X
Year FE				X	X
Month FE				X	X
Controls					X
Observations	169,964	169,964	169,964	169,964	169,964
Individuals	34,176	31,504	31,504	31,504	31,504

Note: The table shows the estimated relationships between the frequency of emotions felt on a scale from 1 to 5 and willingness to take risks using the ordered logit fixed effects estimator developed by Baetschmann et al. (2020). Standard errors (in parentheses) are based on clustering at the individual level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B.2 Heterogeneities

Table B.2: Heterogeneity in the Population

Dependent Variable	Willingness to Take Risks [0,100]							
Avg.	High Inc. 47	Low Inc. 43	Uni. 47	Nonuni. 45	Employed 48	Unempl. 42	Male 50	Female 42
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Happiness	0.74***	1.22***	0.65***	0.97***	0.76***	1.03***	0.94***	0.87***
	(0.11)	(0.16)	(0.14)	(0.12)	(0.12)	(0.15)	(0.14)	(0.12)
Anger	0.24***	0.23**	0.16	0.30***	0.17**	0.37***	0.18*	0.33***
	(0.08)	(0.12)	(0.10)	(0.08)	(0.08)	(0.11)	(0.09)	(0.09)
Fear	-0.50***	-0.51***	-0.52***	-0.52***	-0.44***	-0.59***	-0.52***	-0.51***
	(0.09)	(0.12)	(0.11)	(0.09)	(0.09)	(0.11)	(0.11)	(0.09)
Individual FE	X	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Month FE	X	X	X	X	X	X	X	X
Controls	X	X	X	X	X	X	X	X
Observations	110,309	59,655	61,577	104,679	100,728	69,236	79,349	90,615
Individuals	25,928	16,586	12,294	22,298	24,192	18,002	15,876	18,302
R-squared	0.68	0.66	0.67	0.64	0.68	0.66	0.64	0.64

Note: The table shows the estimated relationships between the frequency of emotions felt and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. High Inc. refers to above median income of €2,100 of the full SOEP sample. Uni. refers to more than vocational education. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.3: Emotions and Risk Attitudes Across Domains

Dependent Variable	Willingness to Take Risks [0,100]						
Avg.	General 42	Finance 21	Driving 32	Leisure 34	Job 34	Health 29	Trust 34
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Happiness	1.14***	0.32	0.44	0.23	-0.18	-0.29	0.77**
	(0.31)	(0.30)	(0.34)	(0.34)	(0.41)	(0.35)	(0.34)
Anger	0.51**	0.64***	0.53**	0.43*	0.60**	0.97***	0.21
	(0.23)	(0.23)	(0.25)	(0.25)	(0.30)	(0.26)	(0.25)
Fear	-0.37	0.38	0.15	-0.18	-0.40	0.03	0.38
	(0.24)	(0.24)	(0.28)	(0.26)	(0.32)	(0.27)	(0.27)
Individual FE	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
Month FE	X	X	X	X	X	X	X
Controls	X	X	X	X	X	X	X
Observations	20,658	20,266	18,916	19,988	15,924	20,550	20,588
Individuals	10,329	10,133	9,458	9,994	7,962	10,275	10,294
R-squared	0.76	0.74	0.79	0.77	0.75	0.72	0.73

Note: The table shows the estimated relationships between the frequency of emotions felt and domain-specific willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. This data is only available for 2009 and 2014. Note that there are some missing values for the domain-specific questions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B.3 Robustness Checks

Table B.4: Unconditional Relationships, Participation, and Magnitude

Dependent Variable	Willingness to Take Risks [0,100]								
	(1)	(2)	(3)	(4)	(5)	(6)	Freq. Part. (7)	Standardization (8)	(9)
Happiness	1.02***						0.88***		
	(0.08)						(0.09)		
Anger		-0.02				0.23***	0.25***		
		(0.06)				(0.06)	(0.07)		
Fear			-0.66***			-0.56***	-0.53***		
			(0.07)			(0.07)	(0.07)		
Happiness Item				1.05***		0.97***			
				(0.08)		(0.08)			
Sadness Item					-0.35***	-0.07			
					(0.06)	(0.06)			
Std. Happiness								0.69***	0.69***
								(0.07)	(0.07)
Std. Anger								0.25***	0.25***
								(0.06)	(0.06)
Std. Fear								-0.49***	-0.49***
								(0.07)	(0.07)
Std. Household Inc.								0.25**	0.48***
								(0.11)	(0.11)
Std. Household Inc. Sq.									-0.01***
									(0.00)
Individual FE	X	X	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X
Month FE	X	X	X	X	X	X	X	X	X
Controls	X	X	X	X	X	X	X	X	X
Observations	169,964	169,964	169,964	169,964	169,964	169,964	153,672	169,964	169,964
Individuals	34,176	34,176	34,176	34,176	34,176	34,176	26,030	34,176	34,176
R-squared	0.65	0.65	0.65	0.65	0.65	0.65	0.64	0.65	0.65

Note: The table shows the estimated relationships between the frequency of emotions felt and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. Happiness is an index of (happiness - sadness)/2+3. Happiness Item or Sadness Item refers to the use of just the happiness question or just the sadness question, respectively. Freq. Part. indicates individuals that participated 3 times or more often. Household Inc. refers to household income. Std. refers to each of the corresponding variables being standardized. Std. Household Inc. Sq. is the quadratic function of Std. Household Inc. Standardization refers to the standardization of the emotions and household income. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C Alternative Explanations

Table C.1: Alternative Economic Explanations — General Economic Environment, the Business Cycle, and Health

Dependent Variable	Willingness to Take Risks [0,100]								
	Crisis Years		Econ. Env.		Business Cycle			Health	
	No	Yes						Linear	Dummies
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Happiness	0.84***	0.84***	0.90***	0.96***	0.90***	0.89***	0.91***	0.78***	0.76***
	(0.11)	(0.19)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Anger	0.27***	0.13	0.25***	0.27***	0.26***	0.25***	0.25***	0.29***	0.28***
	(0.08)	(0.14)	(0.06)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Fear	-0.67***	-0.27*	-0.51***	-0.52***	-0.51***	-0.50***	-0.50***	-0.45***	-0.43***
	(0.08)	(0.14)	(0.07)	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Econ. Policy Uncertainty			0.04						
			(0.14)						
ZEW Sentiment			-0.04						
			(0.04)						
Prev. Week Avg. Trading Volume in 1,000,000				0.03					
				(0.27)					
Prev. Day Trading Volume in 1,000,000				0.31*					
				(0.16)					
Prev. Week Avg. Stock Market Return				0.12					
				(0.12)					
Prev. Day Stock Market Return				0.03					
				(0.05)					
Subjective Health								0.78***	
								(0.08)	
Individual FE	X	X	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X				X	X
Month FE	X	X	X	X				X	X
Year × Month FE					X				
Year × Week FE						X			
Year × Month × State FE							X		
Health Dummies									X
Controls	X	X	X	X	X	X	X	X	X
Observations	117,849	52,115	169,964	138,859	169,964	169,960	169,964	169,818	169,818
Individual Clusters	30,072	19,411	34,176	33,414	34,176	34,176	34,176	34,176	34,176
R-squared	0.70	0.69	0.65	0.67	0.65	0.65	0.66	0.65	0.65

Note: The table shows the estimated relationships between the frequency of emotions felt and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. Crisis years are defined as the years from 2008–2010, referring to the financial crisis. Econ. Env. denotes the columns where I take into account variables capturing the economic environment, such as economic policy uncertainty. The monthly Economic Policy Uncertainty Index (Econ. Policy Uncertainty) for Germany is from Baker, Bloom and Davis (2016, 2018) and based on the frequency of mentions of economic policy uncertainty in newspaper articles. The ZEW Index for Economic Sentiment (ZEW Sentiment) is based on interviews about the situation of the German economy with economists and analysts. Stock market return and trade volume (in 1 mio.) stem from the DAX, the main German stock market index. Prev. is shorthand for previous. Subjective Health ranges from 1 ("Very Bad") to 5 ("Very Good"). It is included linearly in column (8) and each realization as a dummy in column (9). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.2: Alternative Economic Explanations — Background Risk

Dependent Variable	Willingness to Take Risks [0,100]			
	Financ. Worries		Retirement Age	
	Yes	Yes	Yes	No
Avg.	46	48	40	47
	(1)	(2)	(3)	(4)
Happiness	0.89***	0.78***	0.90***	0.89***
	(0.09)	(0.12)	(0.19)	(0.10)
Anger	0.26***	0.16**	0.29**	0.23***
	(0.06)	(0.08)	(0.14)	(0.07)
Fear	-0.49***	-0.41***	-0.52***	-0.51***
	(0.07)	(0.09)	(0.14)	(0.08)
Worried About Personal Financ. Sit.	-0.37***			
	(0.10)			
Worried About Job Security		-0.25**		
		(0.13)		
Individual FE	X	X	X	X
Age FE	X	X	X	X
Year FE	X	X	X	X
Month FE	X	X	X	X
Controls	X	X	X	X
Observations	169,358	96,654	41,128	127,973
Individuals	34,100	21,692	7,867	27,590
R-squared	0.65	0.67	0.63	0.66

Note: The table shows the estimated relationships between the frequency of emotions felt and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. Financ. Worries refers to either including worries about the personal financial situation (Worried About Personal Financ. Sit.) or worries about job security (Worried About Job Security). Only a subset of individuals was asked about whether they worry about their job security. Worries about the financial situation or job security range from "Not Concerned at All" to "Very Concerned" on a scale from 1 to 3. Retirement Age Yes indicates individuals older than 64, No indicates individuals younger than 64. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table C.3: Alternative Psychological Explanations

Dependent Variable	Willingness to Take Risks [0,100]				
	(1)	(2)	(3)	(4)	(5)
Happiness	0.51***	0.50***	0.86***	0.84***	0.44***
	(0.09)	(0.09)	(0.10)	(0.10)	(0.11)
Anger	0.33***	0.33***	0.24***	0.24***	0.32***
	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)
Fear	-0.41***	-0.40***	-0.61***	-0.61***	-0.50***
	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)
Life Satisfaction	0.69***				0.70***
	(0.04)				(0.05)
Risktaking Lag			-0.10***		
			(0.00)		
Lagged Happiness				0.15	0.09
				(0.10)	(0.10)
Lagged Anger				0.03	0.04
				(0.07)	(0.07)
Lagged Fear				-0.13*	-0.12
				(0.08)	(0.08)
Individual FE	X	X	X	X	X
Age FE	X	X	X	X	X
Year FE	X	X	X	X	X
Month FE	X	X	X	X	X
L.-Sat. D.		X			
Controls	X	X	X	X	X
Observations	169,964	169,964	135,788	135,788	135,788
Individual Clusters	34,176	34,176	34,176	34,176	34,176
R-squared	0.65	0.65	0.69	0.69	0.69

Note: The table shows the estimated relationships between the frequency of emotions felt and willingness to take risks using OLS. Standard errors (in parentheses) are based on clustering at the individual level. Lagged refers to the observation of an individual in the last survey wave he or she answered before the current survey. L.-Sat. D. indicate that I account for dummies of all realizations of life satisfaction. Date FE are fixed effects for each date a survey was taken. There are some missing values for the day of the interview. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

D Event Study: Death of a Parent or Child

Table D.1: Death of a Parent or Child — First Stage

Dependent Variable	Positive Emotions		Happiness	Anger	Fear
	(1)	(2)	(3)	(4)	(5)
Death of a Parent or Child	-0.52***	-0.52***	-0.22***	-0.05	0.08***
	(-8.61)	(-8.63)	(-9.58)	(-1.56)	(2.92)
After Death	-0.08	-0.08	-0.05	0.05	-0.01
	(-1.06)	(-1.04)	(-1.56)	(1.35)	(-0.22)
Individual FE	X	X	X	X	X
Age FE	X	X	X	X	X
Year FE	X	X	X	X	X
Month FE	X	X	X	X	X
Income & Wealth Controls		X			
Observations	8,250	8,241	8,250	8,250	8,250
Individuals	1,118	1,118	1,118	1,118	1,118
R-squared	0.61	0.61	0.57	0.49	0.55

Note: The table shows the estimated relationships between the death of a parent or child and the frequency of emotions felt. Standard errors (in parentheses) are based on clustering at the individual level. After Death is an indicator variable that is 1 from the survey wave at bereavement onward. Income & Wealth Controls contain household income, household income squared, and income from assets (rent income, an indicator for missing rent income, ln dividend income, and ln of losses at capital markets). There are 9 missing values for returns from assets (Ln Capital Inv. Loss and Ln Dividend Income). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.2: Death of a Parent or Child — Monotonicity

Dependent Variable	Positive Emotions						Anger					
	Older	Younger	High Inc.	Low Inc.	Employed	Unempl.	Older	Younger	High Inc.	Low Inc.	Employed	Unempl.
Avg.	-1.2	-.9	-.8	-1.7	-.9	-1.5	2.8	3.1	2.8	2.9	2.9	2.8
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Death of a Parent or Child	-0.45***	-0.65***	-0.51***	-0.44***	-0.51***	-0.43***	-0.03	-0.09	-0.04	-0.07	-0.02	-0.12**
	(-6.71)	(-4.80)	(-7.24)	(-3.55)	(-7.26)	(-3.51)	(-1.03)	(-1.38)	(-1.09)	(-1.32)	(-0.61)	(-2.10)
After Death	-0.06	-0.25	-0.10	-0.12	-0.03	-0.33**	0.03	0.11	0.05	-0.01	0.04	0.07
	(-0.70)	(-1.48)	(-1.11)	(-0.68)	(-0.36)	(-2.01)	(0.70)	(1.53)	(1.22)	(-0.09)	(1.00)	(0.92)
Individual FE	X	X	X	X	X	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
Month FE	X	X	X	X	X	X	X	X	X	X	X	X
Observations	6,195	2,055	5,535	2,715	5,712	2,538	6,195	2,055	5,535	2,715	5,712	2,538
Individuals	919	414	916	576	904	504	919	414	916	576	904	504
R-squared	0.63	0.58	0.62	0.64	0.62	0.65	0.50	0.49	0.52	0.52	0.49	0.57

Note: The table shows the estimated relationships between the death of a parent or child and the frequency of emotions felt. Standard errors (in parentheses) are based on clustering at the individual level. After Death is an indicator variable that is 1 from the survey wave at bereavement onward. High Inc. refers to above median income of €2,100 of the full SOEP sample. Uni. refers to more than vocational education. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.3: Death of a Parent or Child — Event Study Specifications

Dependent Variable	Willingness to Take Risks [0,100]			
	Reduced Form		IV	
	(1)	(2)	(3)	(4)
Death of a Parent or Child	-1.16**	-1.15**		
	(0.49)	(0.48)		
Positive Emotions			2.26**	2.05**
			(0.98)	(0.86)
Ind. 2 Waves Before – 2 W. After	0.02		0.31	
	(0.44)		(0.49)	
Individual FE	X	X	X	X
Age FE	X	X	X	X
Year FE	X	X	X	X
Month FE	X	X	X	X
Observations	8,250	8,250	8,250	8,250
Individuals	1,118	1,118	1,118	1,118
R-squared	0.62	0.62	–	–

Note: The table shows the estimated relationship between the frequency of emotions felt and willingness to take risks using OLS or IV as indicated. Standard errors (in parentheses) are based on clustering at the individual level. Ind. 2 Waves Before to – 2 W. After is an indicator variable that is one for all surveys ranging from 2 survey waves before death up to and including the third survey wave after death (that is, it is one for distance –2 to +2 in survey waves). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.4: Death of a Parent or Child — Index Specifications

Dependent Variable	Willingness to Take Risks [0,100]										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Happiness	6.34** (2.70)										
Happiness Standardized		3.12** (1.33)									
Positive Emotions Z-Value Weights			7.44** (3.16)								
Good Mood Principal Component				5.27** (2.30)							
Risky Emotions					2.46** (1.04)						
Risky Emotions Without Fear						2.87** (1.21)					
Risky Emotions, Equal Weights							4.03** (1.70)				
Risk Emotions, Equal Weights Std.								3.99** (1.69)			
Risky Emotions Z-Value Weights									8.12** (3.43)		
Happiness Item										19.02* (10.25)	
Sadness Item											-3.81** (1.60)
After Death	0.84 (0.80)	0.85 (0.81)	0.79 (0.79)	0.90 (0.85)	0.63 (0.74)	0.67 (0.75)	0.51 (0.72)	0.50 (0.72)	0.74 (0.77)	1.28 (1.16)	0.75 (0.78)
Individual FE	X	X	X	X	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X
Month FE	X	X	X	X	X	X	X	X	X	X	X
Observations	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250	8,250
Individuals	1,118	1,118	1,118	1,118	1,118	1,118	1,118	1,118	1,118	1,118	1,118

Note: The table shows the estimated relationship between the frequency of emotions felt and willingness to take risks using IV. Standard errors (in parentheses) are based on clustering at the individual level. The differences in coefficient sizes come from differences in scaling and variation in the first stage strength.

Happiness is an index of (happiness - sadness)/2+3. Happiness Item or Sadness Item refers to the use of just the happiness question or just the sadness question, respectively. Happiness Standardized refers to the sum of Happiness Item standardized and Sadness Item standardized. Positive Emotions Z-Value Weights are a combination of happiness and fear weighted by their first stage z-values. Good Mood Principal Component is the first principal component of happiness, sadness, anger, and fear. It captures 50% of the variation in emotion and based on the factor loadings captures the positive/negative mood dimension to emotions (factor loadings: happiness item 0.41, sadness item -0.57, anger -0.47, fear -0.53). Risky Emotions refers to an index of happiness×2–fear+anger. Risky Emotions Without Fear refer to the same index, but excluding Fear. Risky Emotions, Equal Weights is an index that gives all emotions equal weight in the following form: happiness–fear+anger. Risky Emotions Equal Weights Std. is an index that gives all emotions equal weight but each emotion item is standardized before aggregation. Risky Emotions Z-Value Weights is an index that weights each emotion according to their first stage z-value. Note that the first stage for happiness item is weaker than for the sadness item which inflates the corresponding coefficient value for the happiness item on the second stage in column 10 (the first stage for only the happiness item is -0.07, se=0.02, and 0.37, se=0.03, for only the sadness item). After Death is an indicator variable that is 1 from the survey wave at bereavement onward.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.5: Death of a Parent or Child — Exclusion Restriction I

Dependent Variable	Net. Househ. Income	Ln Dividend Income	Ln Loss Capital Inv.	Married	Unemployed	Income from Rent	Real Estate Value	Worried Financial Sit.	Job Security	Life Satisfaction
Avg.	3.03	4.5	.14	.61	.41	.13	53.97	.84	.54	7.15
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Death of Parent or Child	-0.011	0.013	0.041	0.007	-0.002	-0.004	0.047	0.026	0.008	-0.068
	(0.025)	(0.059)	(0.027)	(0.006)	(0.010)	(0.006)	(0.189)	(0.017)	(0.022)	(0.046)
After Death	-0.012	-0.002	-0.080**	-0.016	0.016	-0.003	-0.481	-0.002	-0.002	-0.120**
	(0.038)	(0.073)	(0.039)	(0.010)	(0.013)	(0.009)	(0.329)	(0.021)	(0.028)	(0.057)
Individual FE	X	X	X	X	X	X	X	X	X	X
Age FE	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X
Month FE	X	X	X	X	X	X	X	X	X	X
Observations	8,250	8,250	8,250	8,250	8,250	8,241	8,020	8,228	5,598	8,250
Individuals	1,118	1,118	1,118	1,118	1,118	1,118	1,064	1,118	917	1,118
R-squared	0.88	0.70	0.29	0.90	0.79	0.81	0.99	0.63	0.60	0.61

Note: The table shows the relation between the death of a parent or child and an array of outcome variables. Standard errors (in parentheses) are based on clustering at the individual level. After Death is an indicator variable that is 1 from the survey wave at bereavement onward. Household income (Net. Househ. Income) is denoted in €1,000. The rent income indicator is 1 if the individual indicated income from renting out apartments or houses (this information is not available for all individuals). Real estate value denotes the interaction between real estate prices and home ownership in 2007 or 2002 if missing in 2007. Only a subset of individuals was asked about whether they worry about their job security. Worries about the financial situation (Worried Financial Sit.) or job security (Job Security) range from "not concerned at all" to "very concerned" on a scale from 1 to 3.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.6: Death of a Parent or Child — Exclusion Restriction II

Dependent Variable	Positive Emotions Predicted Based On FE and: Income Employed Married	+ Assets	+ Financial Worries	+ Life Sat.
	(1)	(2)	(3)	(4)
Death of a Parent or Child	0.00	0.00	-0.01	-0.02
	(0.00)	(0.00)	(0.01)	(0.03)
After Death	-0.00*	-0.01*	-0.00	-0.04
	(0.00)	(0.00)	(0.01)	(0.03)
Individual FE	X	X	X	X
Age FE	X	X	X	X
Year FE	X	X	X	X
Month FE	X	X	X	X
Observations	8,250	8,012	5,413	5,413
Individuals	1,118	1,064	872	872
R-squared	0.87	0.96	0.74	0.71

Note: The table shows the estimated relationship between the frequency of positive emotions felt as predicted based on the covariates indicated in the column headings and the death of a parent or a child. After Death is an indicator variable that is 1 from the survey wave at bereavement onward. Standard errors (in parentheses) are based on clustering at the individual level. The predicted positive emotions which are the dependent variables are predicted bases on the following covariates: Column (1) uses predicted positive emotions based on household income (linear and squared), an unemployment dummy, and a dummy including marriage which are the standard controls I use. Column (2) additionally includes ln dividend income, ln of losses at capital markets, rent income, and real estate value in the prediction of positive emotions. Column (3) additionally includes worries about the personal financial situation and about job security. Column (4) additionally includes life satisfaction. All columns use individual, age, year, and month fixed effects for prediction.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.7: Death of a Parent or Child — Exclusion Restriction III

Dependent Variable	Willingness to Take Risks [0,100]			
	Young Dropped	Life Changing Dropped	Employm. Change Dropped	Unhealthy Dropped
Avg.	44	45	45	45
	(1)	(2)	(3)	(4)
Positive Emotions	3.27**	3.48***	3.76*	3.10**
	(1.47)	(1.28)	(2.13)	(1.43)
After Death	1.30	1.24	0.49	1.14
	(0.91)	(0.85)	(1.17)	(1.20)
Individual FE	X	X	X	X
Age FE	X	X	X	X
Year FE	X	X	X	X
Month FE	X	X	X	X
Observations	6,195	7,798	3,783	4,573
Individuals	919	1,057	546	620

Note: The table shows the estimated relationship between the frequency of positive emotions felt and willingness to take risks using IV. Standard errors (in parentheses) are based on clustering at the individual level. I drop individuals younger than 45 (1), who stated their life changed completely because of death (2), individuals that switched the employment status any time during the sample period (3), and all individuals which experience at least one death where I know that the dead were either "less than satisfactorily" healthy 3 months before they died or in need of care (according to the interviewed relative) in column (4). Information on (2) and (4) are only available from 2009 onward and contain a lot of missing values. I only drop the individuals where I know that life changed or which indicated that the person who died was unhealth. Therefore, I leave all individuals from 2008 in the sample. After Death is an indicator variable that is 1 from the survey wave at bereavement onward. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.8: Death of a Loved One or a Colleague and Choice Under Risk

Dependent Variable	Reduced Form		First Stage		IV	
	Risktaking [0,1], Avg. 0.67		Mood [1–7], Avg. 5.7		Risktaking	
	(1)	(2)	(3)	(4)	(5)	(6)
Death of a Close Person	-0.10***	-0.09***	-0.29**	-0.28**		
	(0.03)	(0.03)	(0.12)	(0.12)		
Good Mood					0.31*	0.32*
					(0.18)	(0.18)
Age FE	X	X	X	X	X	X
Controls		X		X		X
Observations	1,951	1,951	1,951	1,951	1,951	1,951
R-squared	0.05	0.11	0.04	0.08	–	–

Note: The table shows the estimated relationship between mood and risky choice using IV. Standard errors (in parentheses) are robust to heteroscedasticity. The data stem from the Dutch LISS panel and corresponding surveys documented in (Drerup, Enke and von Gaudecker, 2017; Bosmans et al., 2017) and on the LISS website. Individuals had the choice to divide Euro 100 between three options: index fund, specific stock, or savings account. I use the share invested in the first two as the dependent variable. Researchers who conducted the experiment later on invested 100 Euros in the way subjects allocated the funds for 1 of 10 subjects. Death refers to a variable which is 1 if the individual had experienced the death of a loved one or a colleague within at most the last 12 months and stated that the event affected them "A Lot" or "Extremely Much" as opposed to "A Fair Amount", "A Lot" or "Not at All". Otherwise it takes value 0, as long as the individual gave a response to the question. Out of the 1,951 individuals for which I have data on mood, risktaking, and the shock, 111 individuals experienced a severe shock. Good Mood refers to a question about how an individual feels at the moment where they can answer from 1, "Very Bad" to 7, "Very Good". I include age fixed effects, as well as controls for gender, net household income, net household income squared, an indicator for whether the individual is married, and dummies indicating employment status as indicated. The OLS estimates show positive, but imprecisely estimated relationships between mood and choosing the risky option (β = 0.005, se = 0.007). One reason for the imprecision could be that mood and choice were measured relatively far apart temporally. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

E Mechanisms

Table E.1: Expectations, Impulsiveness, and Perceived Control

Dependent Variable	Riskt.			High Control	
		Impulsive			
		No	Yes		
Avg.	43	37	47	4.3	
	(1)	(2)	(3)	(4)	(5)
Happiness	0.53***	1.05***	0.77***	0.22***	0.22***
	(0.16)	(0.18)	(0.13)	(0.02)	(0.02)
Anger	0.35***	0.03	0.30***	-0.03**	-0.03**
	(0.11)	(0.13)	(0.09)	(0.02)	(0.02)
Fear	-0.20	-0.51***	-0.45***	-0.14***	-0.14***
	(0.12)	(0.14)	(0.10)	(0.02)	(0.02)
Expected Life Satisfaction in 5 Years	0.57***				
	(0.07)				
Individual FE	X	X	X	X	X
Age FE	X	X	X	X	X
Year FE	X	X	X	X	X
Month FE	X	X	X	X	X
Controls	X	X	X		X
Observations	68,033	40,194	71,045	18,994	18,994
Individuals	25,513	6,010	10,686	9,497	9,497
R-squared	0.70	0.59	0.60	0.70	0.70

Note: All specifications shown use OLS. Standard errors (in parentheses) are based on clustering at the individual level. Riskt. denotes risk attitudes / willingness to take risks. Impulsive–No refers to below median self-assessed general impulsiveness (scale from 0, "Not at All Impulsive" to 10 "Very Impulsive" – the median is 5). The data on impulsiveness is available for 2008 and 2013, the sample split is done based on answers to the 2008 question. High control refers to the individuals feeling in control over their lives. The corresponding question on whether individuals feel in control of their lives was asked in 2010 and 2015. The responses were recorded on a scale from 1 "Does Not Apply" to 7 "Fully Applies". I inverted the scale, meaning that 7 is highest perceived control and 1 lowest perceived control. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

F Data Sources

- German Socio-Economic Panel:
  https://www.diw.de/de/soep
- vdp-Immobilienpreisindex:
  https://www.pfandbrief.de/site/de/vdp/statistik/statistik/statistik_uebersicht.html
- Economic Policy Uncertainty:
  http://www.policyuncertainty.com/europe_monthly.html
- ZEW Sentiment:
  https://www.zew.de/en/publikationen/zew-gutachten-und-forschungsberichte/forschungsberichte/konjunktur/zew-finanzmarktreport/
- Dax Trading Volume and Returns:
  https://finance.yahoo.com/quote/%5EGDAXI/history/?guccounter=1
- LISS Panel (Longitudinal Internet Studies for the Social sciences):
  https://www.lissdata.nl/about-panel