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DISCUSSION PAPER SERIES

IZA DP No. 18204

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ABSTRACT

Decline in Job Satisfaction and How It Relates to Investment Decisions of the Self-Employed

Despite substantial research on job satisfaction in self-employment, we know little about the consequences for the venture when job satisfaction declines after an external shock. Taking the pandemic as an example of an external shock and drawing on 7,000 self-employed in Germany, we investigate how declines in job satisfaction are related to their investment decisions. Having separated job satisfaction into its financial and non-financial aspects, we build in our analysis on two perspectives to predict how reductions in financial and non-financial job satisfaction relate to investments in venture development. Our results show that decreasing financial job satisfaction is positively related to time investments, providing support for the performance feedback perspective. Negative performance, in terms of reduced financial job satisfaction, induces higher search efforts to improve the business situation. Moreover, we observe that reductions in non-financial job satisfaction are negatively associated with both time and monetary investments. This supports the broadening-and-build perspective in that negative experiences narrow the thought-action repertoire, thus hindering resource deployment.

JEL Classification: L26, J28, G11

Keywords: job satisfaction, investment decisions, self-employment and entrepreneurship, performance feedback perspective, broadening-and-build perspective, behavioral economics, economic psychology, Germany

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1 Introduction

Self-employed individuals face many unexpected changes alongside substantial business risks and uncertainty in their work environment (Batjargal et al., 2023). These impairments may also affect subjective well-being, since work-related factors and private life are often closely linked in self-employment (Backman et al., 2023; Caliendo et al., 2023a). The importance of subjective well-being in self-employment, defined as how the self-employed personally evaluate their life and how they feel and think about their experiences (Stone & Mackie, 2013), is widely recognized and its antecedents are extensively studied (Stephan, 2018; Wiklund et al., 2019).[1] Moreover, so far existing literature mainly concentrates on the analysis of how specific states of high or low subjective well-being influence venture development (Stephan, 2018). In this regard, insights about the consequences of short-term changes in subjective well-being, in particular of job satisfaction as one important aspect of subjective well-being, after an external shock are lacking (Stephan et al., 2022). This aspect is gaining increasing relevance because, in an uncertain world, job satisfaction may change over time. Specifically, the affected self-employed must learn to cope with reductions in job satisfaction (White & Gupta, 2020). Thus, the impact of job satisfaction on self-employment activities can only be fully understood when recognizing the consequences of such changes for venture-related decision making. To address this gap, this study focuses on how reductions in job satisfaction after an external shock are associated with the behavior of self-employed individuals in terms of their venture investment decisions. Thus, we shed light on the second-order effects of external shocks on the performance of the self-employed. If decreases in job satisfaction lead to disinvestments, the economy will face negative economic consequences, which may increase private costs in terms of income losses for the self-employed themselves but also impose societal costs in terms of job losses and negative regional effects.

The theoretical background of our study is rooted in research that distinguishes between financial and non-financial job satisfaction (Croson & Minniti, 2012; Murnieks et al., 2020). Two established behavioral perspectives are drawn upon to derive hypotheses about the relationship between reductions in job satisfaction and the venture investments of the self-employed. These two perspectives complement each other and are well suited to capture reactions to an external shock. From a performance feedback perspective, *financial* job satisfaction decreases when individuals make subjective evaluations about their ability to

[1] In contrast, objective well-being is measured by indicators assessing quality of life (e.g., health status, personal security, environmental quality) or material living conditions such as income, wealth, or housing (OECD, 2011).

achieve their financial goals. These goals are possibly set before an external shock occurs, after which individuals then decide how to react (Alexy et al., 2016; Greve, 2003). The broadening-and-build perspective posits that reductions in *non-financial* job satisfaction are affected by experiences and emotions, which in turn may influence individual behavior and decision making (Fredrickson, 1998, 2001, 2004). In addition, we investigate a potential mechanism that may moderate the reactions of the self-employed by considering the influence of locus of control (Rotter, 1966). This personality trait is consistently regarded as central characteristic in the context of entrepreneurial decision-making (Kritikos, 2022) and may prove to be crucial when investigating moderators of reactions to external shocks.

In our empirical analysis, we use a dataset of nearly 7,000 self-employed individuals living in Germany during the pandemic. We take the economic consequences of COVID -19 as an example – it negatively affected the job satisfaction of the majority of self-employed (Caliendo et al., 2023a) – and investigate how this decline is associated with the investment decisions of the affected self-employed. We measure the extent of this shock on their job satisfaction and, subsequently, its effect on venture-related investment decisions distinguishing between time and monetary investments (Cassar & Friedman, 2009). This also aligns with discussions on mental health and the resilience of entrepreneurs in changing economic environments (Stephan et al., 2022). In line with the performance feedback perspective, we find that reductions in financial job satisfaction, representing negative performance feedback, are positively related to time investments, leading to increased search efforts and time investments in venture development (Alexy et al., 2016; Greve, 2003). This reasoning does not hold for monetary investments, which are not significantly related to reduced financial job satisfaction. We also find that reductions in non-financial job satisfaction are negatively related to time and monetary investments. From the broadening-and-build perspective, reductions in non-financial job satisfaction seem to narrow the thought-action repertoires of self-employed individuals. This, in turn, may result in reduced cognitive abilities (Fredrickson, 1998, 2001, 2004) and a reduced propensity to allocate resources to their businesses (Cohn & Fredrickson, 2006).

With our study, we contribute to research about subjective well-being in self-employment. So far, existing research mainly focuses on the *antecedents* of subjective well-being (Stephan, 2018). Our study follows calls in the literature to also investigate the *consequences* of a change in subjective well-being that may have lasting effects on further venture development (e.g., Shepherd et al., 2019; Stephan, 2018; Wiklund et al., 2019). By analyzing job satisfaction from two complementary behavioral perspectives, we enhance our understanding of how financial and non-financial reductions in job satisfaction, as two

important aspects of subjective well-being, are related to time and monetary investments into venture development. We identify opposing relationships of how reductions in financial and non-financial job satisfaction influence investments in venture development. Moreover, this relationship differs between time and monetary investments. Our study underlines that job satisfaction comprises both financial and non-financial aspects with unique and qualitatively different implications for the self-employed and their ventures. By using the COVID-19 pandemic as an unexpected external shock, we further contribute to research about job satisfaction during crisis situations (e.g., Batjargal et al., 2023). Finally, our study yields practical insights for the self-employed and policymakers, as reductions in job satisfaction may not only have consequences for the self-employed individuals but also for the development of their ventures, with implications for the regional ecosystems in which they are embedded.

2 Theoretical background and hypotheses

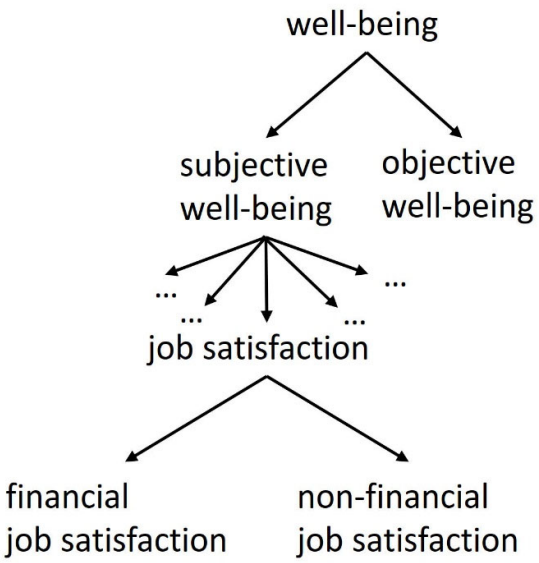
2.1 Consequences of declines in job satisfaction of self-employed

Our study focuses on the consequences of declines in job satisfaction. The concept of job satisfaction comprises the feelings and beliefs of individuals about their current job, which means how well that job provides for things that are considered important for the individual (Akehurst et al., 2009, p. 5). Studying the consequences of reductions in job satisfaction is particularly relevant in the context of self-employment. This is due to the close and direct link that the self-employed have between their work effort and their income (Backman et al., 2023; Caliendo et al., 2023a; Torrès et al., 2022). Low levels of job satisfaction may negatively affect venture performance (Hobfoll, 2001; Gorgievski et al., 2010; Johnson et al., 2015). In particular, low job satisfaction may result in diminished cognitive capabilities and resources (Fredrickson, 2004; Fredrickson & Joiner, 2002), thereby prompting a short-term orientation toward immediate tasks and the disregard of long-term considerations (Cohn & Fredrickson, 2006; Foo et al., 2009; Fredrickson, 2004). It may further hinder goal achievement (Laguna et al., 2016) and impair opportunity recognition (Huppert, 2009). Frustration with the job may increase the perceived stress level at work (Örtqvist & Wincent, 2010), supporting the idea that low job satisfaction has a resource-depleting effect (Stephan, 2018). Yet, the insights from existing literature focus on the *state* of job satisfaction. We know surprisingly little about the consequences of *changes* in job satisfaction on self-employment (see also Stephan, 2018). With

this study, we aim to increase our understanding of the venture-related consequences of reductions in job satisfaction of self-employed individuals.

To enhance our understanding, we decompose the concept of job satisfaction into two components: satisfaction with the income from self-employment activities (in the following: financial job satisfaction) and non-pecuniary aspects of job satisfaction (in the following: non-financial job satisfaction). Job satisfaction – especially financial job satisfaction – is embedded in the larger concept of well-being. There is an ongoing discussion on how to properly measure occupational and financial well-being (see, inter alia, Su et al., 2014; Brzozowski et al., 2020; de Olivieira et al., 2023; Brüggen et al., 2017; Bashir & Qureshi, 2023) with most authors agreeing that financial and occupational well-being have a strong subjective component (e.g., satisfaction, peer comparison, temporal perspective).[2] Thus, by examining the implications of reductions in financial and non-financial job satisfaction, we focus on one important dimension of the broader concept of subjective well-being (Figure 1).

Figure 1: Job satisfaction in the concept of well-being



Source: The authors.

[2] Financial well-being also includes objective components (e.g., income, debt, assets), which are not examined in this article.

Concerning the distinction between financial and non-financial job satisfaction, Chakraborty et al., (2019), among others, show that financial job satisfaction is one central component of job satisfaction, especially in the context of entrepreneurship. Among the self-employed, financial motivations play an important role in the decision to start and to run a venture (e.g., Dawson, 2017; Murnieks et al., 2020). For instance, substantial revenues and earnings (above expectations) can be seen as an appreciation of their work, which contributes to overall job satisfaction (Chakraborty et al., 2019). Despite all of this, non-financial aspects are shown to be of similar importance for self-employment, particularly for intrinsically motivated individuals (Caliendo et al., 2023b), sometimes even outweighing financial aspects (e.g., Croson & Minniti, 2012; Murnieks et al., 2020).

2.2 Performance feedback perspective

Drawing on the performance feedback perspective, which is rooted in the behavioral theory of the firm, we posit that negative performance feedback has implications for individuals' business decisions and behaviors (Argote & Greve, 2007; Cyert & March, 1963; Greve, 2003). Decision makers in (established) firms set aspiration levels that determine their desired or expected returns (Argote & Greve, 2007; Cyert & March, 1963; Greve, 2003). When these aspirations are not met, the negative performance feedback signals that changes are necessary, with the decision makers subsequently initiating additional search efforts and investments to remedy the business situation (Alexy et al., 2016; Argote & Greve, 2007; Greve, 2003). Like decision makers in large and established firms, the self-employed also set aspiration levels and rely on performance feedback for their decisions (Ucbasaran et al., 2010). They specifically set expectations about their financial returns because their living expenses often crucially depend on their income from self-employment (Gimeno et al., 1997).

Reductions in financial job satisfaction mean that the returns from self-employment are lower than what the self-employed was aiming for. Thus, as the financial performance of the venture is below expectations, negative feedback for the individual is created (Argote & Greve, 2007; Greve, 2003). In such a case of financial underperformance, self-employed individuals assess their situation by determining whether expectations can be met again in the future (Hyytinen et al., 2014). This assessment influences their efforts and resource expenditures in terms of investments (Hyytinen et al., 2014; Ucbasaran et al., 2010). Ultimately, this influences whether the venture survives or not (Hyytinen et al., 2014; Ucbasaran et al., 2010). If the self-employed individuals expect to be able to realize their aspiration levels following additional

investments, they will eventually be motivated to make these investments to save or further develop their ventures (Ayala & Manzano, 2014; Koellinger et al., 2007; Li et al., 2021).

In case of an exogenous shock, the negative performance feedback is caused by external conditions. Even if self-employed individuals are neither responsible for, nor in control of, such negative external shocks, they must become active if they do not expect that the pre-crisis conditions will be externally restored (Ayala & Manzano, 2014; Koellinger et al., 2007; Li et al., 2021). In this regard, affected self-employed are likely to react to a crisis by adapting their venture and by pivoting their business model (Nguyen et al., 2024). Hence, we expect the affected self-employed to react to underperformance and negative performance feedback by initiating higher efforts (i.e., time investment) and higher monetary investments to make the necessary adaptations to the venture (Greve, 2003). This leads to the following hypothesis:

Hypothesis 1a: *Reductions in financial job satisfaction increase the likelihood that self-employed invest time and money into further venture development.*

Regarding the distinction between time and monetary investments, literature suggests that individuals do not treat them equally (Aeon & Aguinis, 2017; Soman, 2001; Thaler, 1999). Individuals are often more willing to invest time and other non-financial resources to save money, even if the theoretical value of the time and non-financial resource investment exceeds the amount of monetary savings (Thaler, 1999). This can lead to an escalation of time commitment (Aeon & Aguinis, 2017). Therefore, we expect that the self-employed will invest higher amounts of time into their venture development when their financial job satisfaction suffers due to an exogenous shock. This tendency is reinforced given that money is a particularly scarce resource in a situation of financial dissatisfaction. We hypothesize:

Hypothesis 1b: *The increased likelihood of making investments due to reductions in financial job satisfaction is higher for time investments than for monetary investments.*

2.3 Broadening-and-build perspective

For our second set of hypotheses, we draw on the broadening-and-build perspective. While positivity broadens an individual's thought-action repertoire, leading to long-term benefits such as intellectual, social, and psychological resources, negativity narrows an individual's perspective and diminishes cognitive resources (Fredrickson, 1998, 2001, 2004). Negativity increases an individual's focus on the short-term perspective (Cohn & Fredrickson, 2006).

Reductions in non-financial job satisfaction may make it difficult for individuals to draw on their cognitive resources and make targeted, long-term decisions (Cohn & Fredrickson, 2006). Specifically, in case of a negative exogenous shock, a narrow cognitive perspective due to reduced non-financial job satisfaction may prevent self-employed individuals from addressing and improving their respective situation. For instance, they may have lower coping abilities and a lower likelihood to engage in creative innovation (Cohn & Fredrickson, 2006; Grözinger et al., 2022). Moreover, the perception of options for action can suffer and the self-employed may risk overlooking important business opportunities (Fredrickson, 2004). In combination with the increasing short-term focus, it becomes less likely that the self-employed take action by committing time and financial resources to their venture when their non-financial job satisfaction suffers (Cohn & Fredrickson, 2006). This leads to the following hypothesis:

Hypothesis 2a: *Reductions in non-financial job satisfaction decrease the likelihood that the self-employed invest time and money into further venture development.*

Distinguishing between time and monetary investments, prior studies suggest that individuals often tend to commit time instead of money (Aeon & Aguinis, 2017; Soman, 2001; Thaler, 1999). In particular, during a crisis, when the outcome of an investment is uncertain, individuals will be even more inclined to primarily commit non-financial resources. Thus, when expecting a negative relationship between reductions in non-financial job satisfaction and venture investments, the self-employed will primarily reduce their monetary commitments. Hence, the negative relationship should be weaker for time than for monetary investments, summarized in the following hypothesis:

Hypothesis 2b: *The reduced likelihood to make investments due to reductions in non-financial job satisfaction is lower for time than for monetary investments.*

2.4 The moderating role of locus of control on the effects of job satisfaction

Internal locus of control is shown to exert a consistent influence on the decision-making processes of self-employed individuals across various stages of their entrepreneurial activities (Hansemark, 2003; Rauch and Frese, 2007; Caliendo et al., 2014, 2022; Kerr et al., 2019). This personality characteristic is also a central contextual factor of self-employment during crises (Kesavayuth et al., 2022). Therefore, we specifically consider internal locus of control as a moderator in our analysis. High scores in this trait reflect self-employed individuals and their

belief that they can determine the future development of their own firms through their own performance and efforts (Rotter, 1966). In the context of a negative external shock that may reduce job satisfaction, individuals with a high internal locus of control tend to be more resilient (Kesavayuth et al., 2022). They are, thus, more likely to take action, trying to improve their situation when faced with such a setback by investing time and money (Skinner, 1996). Conversely, individuals with relatively high external locus of control are more inclined to attribute the outcomes of their firms to external factors, such as uncontrollable shocks – like the COVID-19 pandemic – that they must accept. Therefore, they may have reservations about their abilities and whether they can recover from setbacks through their own efforts. Consequently, individuals who possess a high internal locus of control tend to demonstrate greater adaptability, mobilizing resources and adjusting their goals to mitigate the adverse impact of external shocks on their job satisfaction (Cobb-Clark, 2015). Accordingly, in the context of our analysis, self-employed individuals with a high locus of control may be more convinced that their actions can enhance their situation, even if job satisfaction is found to be reduced. This suggests the possibility of moderation effects. In line with our prior hypotheses, we argue that financial and non-financial job aspects are two distinct aspects of job satisfaction. We suggest that high internal locus of control buffers the negative effect of reductions in non-financial job satisfaction. We also suggest that a high internal locus of control strengthens the positive effect of reductions in financial job satisfaction. This leads us to four moderation hypotheses:

Hypothesis 3a: *The positive relationship between reductions of financial job satisfaction and monetary investment is higher for individuals with high internal locus of control than for those with low internal locus of control.*

Hypothesis 3b: *The positive relationship between reductions of financial job satisfaction and time investment is higher for individuals with high internal locus of control than for those with low internal locus of control.*

Hypothesis 3c: *The negative relationship between reductions of non-financial job satisfaction and monetary investment is less negative for individuals with high internal locus of control than for those with low internal locus of control.*

Hypothesis 3d: *The negative relationship between reductions of non-financial job satisfaction and time investment is less negative for individuals with high internal locus of control than for those with low internal locus of control.*

3 Data

3.1 Data set

We collected data from 11,937 self-employed individuals in Germany via an online survey in May and June 2021, the second year of the COVID-19 pandemic. Our survey gathered information about the ventures of the respondents and about their situation during the pandemic (Stiel et al., 2025).[3] We obtained data from self-employed individuals with various backgrounds, comprising the self-employed with employees alongside full- and part-time solo self-employed individuals. However, the data does not include so-called gig workers and we focus only on the full-time self-employed in our analysis. Part-time self-employed individuals are excluded (N=2,039), since their level of job satisfaction might also depend on their other job(s). We further exclude respondents with missing information on relevant variables (N=2,943), resulting in a final sample of 6,955 full-time self-employed.

3.2 Variable description

3.2.1 Dependent variables

The dependent variables for our hypotheses are investments into venture development, differentiated into time investments and monetary investments. To collect this information, the respondents were asked about their agreement with the following two statements:

a) "During the pandemic I have *invested* a significant amount of *time* in the *further development* of my venture."
b) "During the pandemic I have *invested* a significant amount of *money* in the *further development* of my venture."

Possible answers to the respective statements range from 1 (does not apply at all) to 7 (fully applies) on a 7-Point Likert scale.

[3] The Association of Founders and Self-employed in Germany ("Verband der Gründer und Selbstständigen Deutschland", VDSG) distributed the survey among the self-employed population. The VGSD approached its members with personalized e-mails, included information about the survey in their newsletters, and contacted other professional associations for the self-employed in Germany. For this reason, people who gave up their self-employment during the pandemic were generally not part of the survey. However, as our focus is on explaining investments in venture development, this group of people is less relevant for our study. Rather, the behavior of this group can be interpreted as an extreme case where dissatisfaction with self-employment led them to stop investing completely and give it up.

3.2.2 Independent variables

We measured job satisfaction by asking the self-employed how satisfied they are overall with their job. On an 11-Point Likert scale, answers range from 0 (very dissatisfied) to 10 (very satisfied). The question is asked twice with different time horizons. Thus, first, the respondents are asked to rate their current job satisfaction during the COVID-19 pandemic and, second, to rate their job satisfaction level before the pandemic:[4]

a) All in all, how satisfied are you currently with your job?
b) Please think about the time before the COVID-19 crisis: All in all, how satisfied were you with your job back then?

Similarly, satisfaction with the income from self-employment activities is measured by two questions enquiring about their income satisfaction:

a) "All in all, how satisfied are you currently with your income?"
b) "Please think about the time before the COVID-19 crisis: All in all, how satisfied were you with your income back then?"

Acknowledging the trade-off in large-scale studies between efficiency and measurement accuracy (Brzozowski et al., 2020; Nagy, 2002), this study follows Alessandri et al., (2017) and employs two single-item measures to assess job and financial satisfaction. Several studies demonstrate the validity of single-item measures for domain-specific satisfaction, establishing it as an accepted methodology (Wanous et al., 1997; Nagy, 2002; Cheung & Lucas, 2014; Brown et al., 2014; Alessandri et al., 2017; Van der Zwan et al., 2018; Brzozowski et al., 2020).

Moreover, single-item measures do not entail the risk of missing facets that are salient to the respondent while they also do not pose the challenge of aggregating the facets in a way that reflects the respondents' internal weighting scheme (Scarpello & Campbell, 1983; Nagy, 2002). This is particularly important when assessing the individuals' satisfaction levels during an unprecedented situation as in the COVID-19 crisis. The relevance and the weighting of the facets for the respondent may vary from those in non-crisis times. Furthermore, the primary objective of the survey was to obtain a comprehensive overview of the general conditions experienced by self-employed individuals during the period of the pandemic. Therefore, the survey comprised 58 questions addressing a wide variety of topics. The goal was to gather information from a large sample of self-employed individuals to obtain a comprehensive and,

[4] In the descriptives section of the paper, we verify how well the retrospectively reported levels align with actual pre-crisis survey data, using the 2019 wave of the Socio-Economic Panel (SOEP). The results confirm that the retrospective measure is very close to the values reported by the self-employed in the SOEP 2019. See Section 3.3 for details.

if possible, representative overview of the influence of the pandemic. As no incentives were given for completing the questionnaire, we had to rely on the respondents' intrinsic motivation to complete the questionnaire. Thus, the questionnaire length was restricted. For these reasons, we used single-item measures, which are a prevalent tool in the study of the antecedents and consequences of (job) satisfaction (Brzozowski et al., 2020; Van der Zwan et al., 2018; Alessandri et al., 2016; Brown et al., 2014; Plagnol, 2011; Joo and Grable, 2004).

We computed changes in job satisfaction and financial satisfaction by taking the difference between the satisfaction levels before and during COVID-19. The data shows that a substantial share of the self-employed experienced reductions in job and financial satisfaction following the outbreak of the pandemic (see Section 3.3). Therefore, we focus on reductions in satisfaction and construct a binary variable indicating reductions in job satisfaction (yes/no) and a binary variable for reductions in financial satisfaction (yes/no). The measure for non-financial satisfaction is obtained by residualizing job satisfaction from financial satisfaction. We explain the decomposition approach and how we define non-financial satisfaction in Section 4.1.

3.2.3 Control variables

We control for several characteristics that are relevant for decision making in self-employment. First, we account for personal factors, including *business experience, age, gender*, and *education*. Existing studies suggest that the time allocated to work can decrease with age (Levesque & Minniti, 2006; Juster & Stafford, 1991; Blinder & Weiss, 1976) and that women were disproportionally more affected and constrained by the COVID-19 crisis (Backman et al., 2023; Caliendo et al., 2023a; Graeber et al., 2021; Yue & Cowling, 2021). Regarding education and business experience, prior research shows that cognitive abilities matter for adapting to new circumstances in times of crises (Berry et al., 2006; Stasielowicz, 2020). Thus, more educated and experienced self-employed individuals with higher cognitive abilities should find it easier to adjust their business strategies after the outbreak of a crisis, which might also be reflected in their venture investment behavior.

We further include business characteristics shown to be relevant for decision making in self-employment, such as the *size of the venture, the existence of employees, liquidity, industry, exports,* and *the venture's digitalization level before the crisis*. Highly digitalized ventures (Bertschek et al., 2024, Audretsch et al., 2025) and ventures that export to foreign markets (Eppinger et al., 2018) prove to be more resilient in times of crisis and, therefore, may have less need to invest in venture development. Furthermore, investment opportunities may vary

between industries because adjustments of the business according to the COVID-19 restrictions were easier in some industries (e.g., retail, consulting, coaching and training) than in other industries (e.g., personal service activities, accommodation). We consider 15 different *industries*, taking the cultural and arts industry as the reference group.[5] *Employees* are measured as a dummy variable set to one if the self-employed has employees, the *size of the venture* is measured by operational expenses, and *liquidity* denotes the estimated time until insolvency. Our measure for *digitalization* averages over the self-reported digitalization levels in the fields "products and services," "internal processes," and "customer relations and distribution," ranging from 1 (very low) to 7 (very high). *Exporting* is a binary variable (yes/no).

Finally, we include *financial* and *non-financial job satisfaction before COVID* as control variables since variations in job satisfaction might depend on their initial states. We expect that self-employed, who were more satisfied before the pandemic (Nikolova, 2019), are more likely to experience stronger reductions in job satisfaction during the pandemic (Caliendo et al., 2023a). In addition, we control not only for the *internal locus of control before the crisis,* but also for the *level of optimism before the crisis* and the *level of occupational risk tolerance before the crisis*.[6] We incorporate these psychological aspects into our model since prior research highlights their relevance for decision making in self-employment, including investment decisions (Caliendo et al., 2010, 2022; Kihlstrom & Laffont, 1979; Schwenk, 1988; Verheul et al., 2009). A full description of all variables and measurements used in the empirical analysis is provided in Table A1 in the Appendix; Table A2 lists the correlations.

3.3 Institutional context and descriptive statistics

In the years 2020 and 2021 during the COVID-19 pandemic, the German government imposed several measures to stop the spreading of the virus; these measures severely impacted the economy. During that time, around 3.6 million individuals were self-employed (IfM Bonn, 2025), about 8 percent of the working population. Half of them were solo-self-employed, i.e., there were no further employees in their businesses, and half of them had employees, often up

[5] Cultural and arts professionals were strongly hit by the COVID-19 crisis (see Block et al., 2022). For these reasons, we consider them a suitable reference group to study the link between reductions in well-being and investments during an economic crisis.

[6] As for the variables for internal locus of control and occupational risk tolerance, we follow Dohmen et al., (2011) and Nieß and Biemann (2014), who find support for the behavioral relevance of single measures of personality traits. See also Goebel et al., (2019), who validated and included further single items to capture behavioral variables in the questionnaire of the German Socio-Economic Panel (SOEP).

to ten employees (IfM Bonn, 2025).[7] The self-employed were among the most affected occupational groups, especially those working in the hotel and restaurant business, the tourism industry, the retail sector, the cultural sector, the events sector, and other service industries that require personal contact. For these individuals, the policy measures meant a temporary inability to work, where they could not generate revenues to cover their operating expenses and living costs (Kritikos et al., 2021).

This is also reflected in the descriptive statistics summarized in Table 1. With respect to the impact of the crisis on the revenues of the self-employed, more than 70 percent of the self-employed in our sample faced revenue declines of more than 25 percent due to COVID-19 in 2020 or expect a revenue decline of similar magnitude in 2021.[8] Further analyses show that 45 percent of the self-employed in our sample lost more than half of their revenue by the end of 2020, as compared to the pre-crisis year 2019 (not displayed).[9] After the outbreak of the crisis, the self-employed made some investments into the development of their venture. The mean of time investments is higher (4.8 on a Likert scale from 1 to 7) than for monetary investments (3.7 on the same Likert scale), illustrating that on average individuals invested more time in their venture than money. Table A3 in the Appendix shows how time and monetary investments interact. Notably, 20 percent of the individuals reported having invested neither time nor money whereas 36 percent invested both a lot of time and money into their venture development

Comparing job satisfaction of self-employed individuals before and during the crisis, we find greater job satisfaction before the crisis with average scores in the upper third of the Likert scale. This is consistent with the findings from prior studies (Lange, 2012; Koudstaal et al., 2015). In particular, the pre-crisis mean matches the 2019 level of job satisfaction reported in the SOEP survey for self-employed persons in Germany (Caliendo et al., 2023a), confirming that our retrospective measure is not biased. During the crisis, around 79 percent faced reductions in at least one component of job satisfaction, with an average reduction of 3.2 points

[7] In terms of industries, about half of all self-employed work in the business services and private services sector including IT, the consulting industry, and the cultural and arts sector, around 20 percent in construction sector, and about 11 percent in the manufacturing and energy sectors.

[8] Representative studies for Germany based on SOEP-CoV data show that about 60 percent of the self-employed suffered from income losses during the first wave of the pandemic between April and July 2020 (Graeber et al., 2021). We obtain slightly higher numbers in the present investigation, which could be due to the fact that our survey oversamples self-employed from cultural activities and took place in summer 2021, when the pandemic was more advanced and containment measures had become more diverse. Similar numbers are reported for other countries as well, for instance, in the UK: Blundell and Machin (2020) show that three out of four self-employed individuals report a reduced workload.

[9] This clarifies that not all self-employed individuals were negatively affected by the pandemic and faced decreases in their job satisfaction. For instance, there were self-employed individuals who benefited from the pandemic or whose job satisfaction might have remained stable or had been improving. However, in this study, we focus only on those who faced decreasing job satisfaction due to this external shock.

Table 1: Descriptive statistics

Sample	Full-time self-employed respondents (N=6,955)				
Variable	**mean**	**median**	**SD**	**min**	**max**
Dependent variable					
Time investments	*4.8*	5	.022	1	7
Monetary investments	*3.7*	4	.023	1	7
Independent variables					
Reduction in job satisfaction (yes/no)	.708	1	.005	0	1
Reduction in financial job satisfaction (yes/no)	.727	1	.005	0	1
Control variables					
Job satisfaction before COVID	7.82	8	.021	0	10
Financial job satisfaction before COVID	7.11	7	.026	0	10
Ordinal and binary control variables					
Optimism before COVID	6.083	6	.013	1	7
Risk tolerance before COVID	4.993	5	.018	1	7
Internal locus of control before COVID	6.233	7	.013	1	7
Degree of digitalization before COVID	4.804	5	.021	1	7
Export sales (yes/no)	.452	0	.006	0	1
Female gender	.470	0	.006	0	1
Employees (yes/no)	.170	0	.005	0	1
More than 25 percent revenue decline	.703	1	.005	0	1

Further control variables	**% of sample**	**N**		**% of sample**	**N**
Venture size			Business experience		
0 to 500 Euros	34.1	2,373	*2 years or less*	4.0	277
501 to 1,000 Euros	24.3	1,689	*3 years*	3.3	229
1,001 to 1,500 Euros	12.7	885	*4 years*	3.6	250
1,501 to 2,000 Euros	7.6	527	*5 years*	3.8	262
2,001 to 2,500 Euros	4.0	276	*6 to 11 years*	21.8	1,519
2,501 to 3,000 Euros	2.9	202	*12 to 21 years*	35.2	2,451
3,001 to 4,000 Euros	3.1	218	*22 to 31 years*	21.1	1,469
4,001 to 5,000 Euros	2.1	147	*32 years and more*	7.2	498
5,001 to 10,000 Euros	4.2	293	Age		
10,001 to 15,000 Euros	1.9	129	*29 years or less*	1.4	100
more than 15,000 Euros	3.1	216	*30 to 44 years*	23.9	1,662
Liquidity of venture			*45 to 59 years*	56.6	3,933
already insolvent	9.2	637	*60 years and older*	18.1	1,260
using retirement provisions	8.1	560	Education		
1 month	6.6	457	*high school*	19.9	1,387
2 months	8.3	579	*Apprenticeship*	19.1	1,324
3 months	11.3	788	*university degree*	61.0	4,244
4 months	4.3	299			
5 months	2.8	195			
6 months	12.6	878			
7 to 12 months	13.0	906			
more than 12 months	23.8	1,656			

Source: "The situation of the self-employed during the COVID-19 pandemic in Germany 2021". Survey by DIW Berlin, Trier University and ZEW Mannheim (https://doi.org/10.25652/diw_data_S0033.1). Own calculations.

in job satisfaction and 3.5 points in financial satisfaction on a 11-point Likert scale. More specifically, 71 percent of the surveyed self-employed report lower job satisfaction and 73

percent report lower financial satisfaction than before the crisis. Regarding further characteristics, the majority of self-employed had been running their business for more than six years, were older than 45, completed a university degree, had a relatively high-risk tolerance, and a high internal locus of control before the crisis. About 47 percent of the respondents were female. The industry distribution is quite diverse, with most of the self-employed coming from the cultural and arts sector (16 percent), the IT sector (11 percent), and consulting (10 percent). About 41 percent of the self-employed were from industries strongly hit by the crisis, such as events, restaurants, traveling, cultural activities, hotels, and point-of-sale retail.

4 Method and results

4.1 Method

To analyze the relationship between job satisfaction and venture investments, we proceed in two steps. First, we decompose reductions in job satisfaction into *reductions in financial job satisfaction* and *reductions in non-financial job satisfaction* applying the method of residualization (Bönte et al., 2017; García et al., 2020). Following Bönte et al., (2017), we regress (reductions in) job satisfaction on (reductions in) financial satisfaction as

$$jobSF_i = \alpha + \beta\, \widetilde{financialSF}_i + \epsilon_i, \qquad (1)$$

where both $jobSF_i$ and $\widetilde{financialSF}_i$ are dummy variables equal to 1 if the individual reports a reduction and 0 otherwise. By construction, $\widetilde{financialSF}_i$ and the error term ϵ_i are orthogonal to each other. Exploiting this relationship, we define $nonfinancialSF_i = \hat{\alpha} + \hat{\epsilon_i}$ and rescale $\widetilde{financialSF}_i$ by $\hat{\beta}$ to obtain the decomposition

$$jobSF_i = financialSF_i + nonfinancialSF_i. \qquad (2)$$

In a second step, we regress investments into the venture on reductions in job satisfaction using ordered logistic regression analysis (Equations (3) and (4)).

$$Time\ investments_i = \delta_1 + \gamma_1\, financialJSF_i + \varphi_1\, nonfinancialJSF_i + \theta_1 controls_i + u_{1i} \qquad (3)$$

$$Monetary\ investments_i = \delta_2 + \gamma_2\, financialJSF_i + \varphi_2\, nonfinancialJSF_i + \theta_2 controls_i + u_{2i} \qquad (4)$$

The term $controls_i$ refers to the set of control variables described in Section 3.2.3, while θ_1 and θ_2 denote the corresponding vectors of coefficients. As the decision to invest time and money into the ventures might be correlated, we estimate both equations simultaneously in

a seemingly unrelated regression (SUR) framework. Furthermore, the SUR framework allows us to explicitly test H1b and H2b regarding the differences between time and monetary investments.

4.2 Results

Table 2 displays the results of the stepwise ordered logistic regression analyses for time and monetary investments, respectively. The first and the third column provide the results from estimating a baseline model that only includes the controls. The second and the fourth column add financial and non-financial job satisfaction as independent variables (full model). Our interpretations always refer to the full model.

Table 2: Reductions in job satisfaction and relationships with time and monetary investments

Column	**(1)**	**(2)**	**(3)**	**(4)**
Statistic	**Coeff. (SE)**	**Coeff. (SE)**	**Coeff. (SE)**	**Coeff. (SE)**
Dependent variable	**Time investments**		**Monetary investments**	
Independent variables				
Reductions in financial job satisfaction		.236(.093)**		.085(.092)
Reductions in non-financial job satisfaction		-.334(.066)***		-.191(.064)**
Control variables				
Optimism before COVID	.155(.024)***	.153(.026)***	.115(.024)***	.115(.024)***
Risk tolerance before COVID	.161(.016)***	.162(.017)***	.173(.016)***	.173(.016)***
Internal Locus of control before COVID	.028(.023)	.028(.025)	.020(.023)	.019(.023)
Digitalization before COVID	.025(.015)	.025(.016)	-.011(.014)	-.012(.015)
Export sales (yes/no)	.231(.047)***	.232(.047)***	.171(.047)***	.171(.047)***
Female gender	.255(.048)***	.257(.049)***	.164(.048)**	.165(.048)**
Employees (yes/no)	.090(.076)	.090(.076)	.206(.076)**	.205(.076)**
More than 25 percent revenue decline	.326(.053)***	.273(.061)***	-.027(.053)	-.041(.062)
Venture size	.079(.011)***	.081(.011)***	.128(.011)***	.129(.011)***
Liquidity of venture	-.014(.008)	-.013(.008)	-.004(.008)	-.004(.008)
Business experience	-.062(.016)***	-.062(.016)***	-.019(.016)	-.019(.016)
Age of self-employed	-.117(.036)**	-.119(.038)**	-.185(.036)***	-.187(.036)***
Education	.066(.029)*	.067(.029)*	.031(.029)	.032(.029)
Financial job satisfaction before COVID	-.136(.021)***	-.145(.023)***	-.045(.021)	-.049(.021)*
Non-financial job satisfaction before COVID	.083(.017)***	.094(.019)***	(.017) .002	(.017) .009
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	6,955	6,955	6,955	6,955
Chi^2	901.89	938.65	796.12	806.68
Pseudo-R^2	.04	0.04	.03	0.03

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Reference industry: artists and cultural professionals.

Reductions in *financial* job satisfaction are significantly positively associated with time investments into venture development. The regression coefficient is positive for monetary investments as well, albeit lower and not significantly different from zero. Hence, we derive support for H1a with respect to time investments, but not with respect to monetary investments. These findings highlight the importance of distinguishing between time and monetary investments when analyzing investment decisions of self-employed in times of crisis. Since the logistic regression is non-linear and investment behavior was measured on a 7-point-Likert scale, we cannot interpret the coefficients' magnitude as changes in probabilities.

To facilitate the understanding of the results, we additionally estimate a model where we collapse the dependent variable into three categories. The first category subsumes Likert scale values from 5 to 7 expressing agreement with the statement "I invested more time (money) into the further development of my venture." Likert scale values between 1 and 3 build the second category expressing disagreement and 4 denotes neutrality. Table A4 in the Appendix lists the results. The regression results are similar to the full model in terms of sign and magnitude, confirming that little information is lost when collapsing the 7-point-Likert scale into three categories. However, the coefficients of some control variables are less efficiently estimated. The advantage of the collapsed model is that the marginal effects can be directly interpreted as probabilities. These are listed in Appendix Table A5. Reductions in financial job satisfaction are linked to a 6.5 percentage points higher likelihood that the self-employed invest time into their venture. The comparison of the effects for time and monetary investments shows significant differences (Table A5, last column) between the two forms of investment. The effect of reductions in financial job satisfaction is stronger for time than for monetary investments (which is effectively zero), supporting our reasoning from H1b. To sum up, we find partial support for H1a and full support for H1b.

Regarding reductions in *non-financial* job satisfaction, Tables 2 and A4 show a significantly negative association with time as well as monetary investments, providing support for H2a. However, the effect does not significantly differ between time and monetary investments (Appendix Table A5, last column). Thus, H2b is not supported.

Examining the results for the control variables provides further insights (Tables 2 and A6). First, risk tolerance positively correlates with both types of investments. Individuals who were more risk-tolerant prior to the crisis invested both more time and more money into their ventures during the crisis. So did female and younger self-employed. We further find that the highly educated self-employed invested more time, but not more money, when faced with strong revenue declines. Venture size also played a substantial role: Larger firms and firms that

export were more likely to invest both time and money. Comparing the effect sizes of the controls with our variables of interest, i.e., reductions in job satisfaction, we find that, next to business size (measured by business expenses and having employees) and gender, reductions in financial and non-financial job satisfaction show the strongest marginal effect on venture investments (Table A6 in the Appendix).

4.3 Internal locus of control as a moderator variable

To test our hypotheses regarding the moderating effect of internal locus of control, we construct a dummy variable and perform an interaction analysis. The dummy variable is set to 1 for individuals reporting high internal locus of control over their business before the crisis (i.e., a value above 5 on a scale running from 1 to 7) and zero otherwise. Table 3 displays the results for the interaction analysis between this dummy variable and reductions in financial and non-financial job satisfaction. To assess the role of internal locus of control, we compare the coefficient for the interaction effect (outcome among individuals with high internal locus of control) with the baseline coefficient of reductions in (non-) financial job satisfaction (outcome among individuals with low internal locus of control).

For both time and monetary investments, interaction effects with reductions in *financial job satisfaction* are positive. In the case of monetary investments, the coefficient significantly differs from the baseline coefficient (Table 3, Wald test, first row), indicating that individuals with higher levels of internal locus of control invest more financial resources into venture development than those with lower levels. This finding supports Hypothesis 3a. Table 3 further highlights potential reasons why no effects were observed for monetary investments and reductions in financial job satisfaction in the main analysis. Specifically, the baseline coefficient for individuals with lower internal locus of control is negative (though not significantly different from zero), suggesting that the effects for individuals with low versus high internal levels of locus of control might cancel each other out when analyzed jointly. In contrast, no significant differences emerge for time investments and reductions in financial job satisfaction between individuals with low and high internal locus of control, not supporting Hypothesis 3b.

Looking at reductions in *non-financial job satisfaction*, we again find positive interaction effects for both time and monetary investments. In both cases, the coefficients significantly differ from the (negative) baseline coefficient of reductions in non-financial job satisfaction (Table 3, Wald test, second row). Thus, a higher internal locus of control weakens

the negative relationship between reductions in non-financial job satisfaction and venture investments, confirming hypotheses H3c and H3d.

Table 3: Reductions in job satisfaction and investments by locus of control

Statistic	**Coeff.(SE)**	**Coeff. (SE)**	**Coeff.(SE)**
Dependent variable	**Investments**	**Time investments**	**Monetary investments**
Independent variables			
High locus of control before COVID (Dummy)	-.173(.124)	-.190 (.109)	-.208(.109)
Reductions in non-financial job satisfaction	-.591(.154)***	-.537 (.138)***	-.379(.136)**
Reductions in financial job satisfaction	-.092(.193)	-.021 (.174)	-.299(.153)
Reductions in non-financial job satisfaction X high locus of control	.380(.173)*	.252 (.155)	.230(.153)
Reductions in financial job satisfaction X high locus of control	.265(.205)	.321 (.184)	.477(.184)*
Controls	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Observations	6,955	6,955	6,955
Chi^2	720.58	942.55	814.88
Pseudo-R^2	0.05	0.04	0.03

Wald test	**Chi2**	**p>Chi2**	**Chi2**	**p>Chi2**	**Chi2**	**p>Chi2**
H_0: $\hat{\beta}$ (reductions in financial job satisfaction X high locus of control) - $\hat{\beta}$ (Reductions in financial job satisfaction) = 0	0.87	0.351	0.99	0.320	5.10	0.024
H_0: $\hat{\beta}$ (reductions in non-financial job satisfaction X high locus of control) - $\hat{\beta}$ (Reductions in non-financial job satisfaction) = 0	9.44	0.002	7.77	0.005	4.70	0.030

5 Discussion and limitations

There is extensive research on the direct effects of (exogenous) crises on self-employment and entrepreneurship (see, *inter alia,* Batjargal et al., 2023; Stephan et al., 2023). This study is one of the first to examine the subsequent indirect effects of crises on the affected individuals and their ventures. We examine how a decline in job satisfaction of self-employed individuals during a major crisis is associated with the investment behavior for their ventures. By applying a performance feedback and a broadening-and-build perspective to the context of self-employment, we provide two new behavioral perspectives to explain how the self-employed decide about their investments when they experience a reduction in financial and non-financial job satisfaction. We find that reductions in job satisfaction are associated with changes in investment behavior during crises with these associations being larger than the effects of socio-demographic and venture characteristics typically used to explain investment behavior. So far, the role of declines in job satisfaction is neglected in this context and our study emphasizes the importance of considering such aspects beyond traditional individual and venture characteristics when analyzing the behavior and strategies of self-employed in crisis times.

5.1 General discussion

Our results identify significant differences between reductions in financial and non-financial job satisfaction that can be explained by the two aforementioned behavioral perspectives. Reductions in financial job satisfaction increase the likelihood of time investments. In line with the performance feedback perspective, financial underperformance may be seen as negative performance feedback to the self-employed, leading them to increase their search efforts (Alexy et al., 2016; Greve, 2003). In such situations, when the existence of their venture is threatened, they might show increased time commitment to improve the venture's resilience and increase its survival chances. Our results support this view and confirm previous literature arguing that self-employed individuals are more likely to act when they face a critical business situation (Foo et al., 2009; Nguyen et al., 2024).

Yet, the result only exists for time investments. Reductions in financial job satisfaction are not significantly associated with monetary investments. One possible explanation is the overall lower availability of financial resources during crises (Backman et al., 2023; Yue & Cowling, 2021). This corroborates prior research that individuals do not account for time in the same way as they account for money (Aeon & Aguinis, 2017; Soman, 2001; Thaler, 1999). Moreover, the different results of reduced financial job satisfaction for time and monetary investments underscore the importance of considering investments beyond the traditional monetary aspects. We agree with Verheul et al. (2009) that research and entrepreneurship policy should not neglect the fundamental role of non-financial resources such as time investments. Recent research from Gutierrez et al. (2024) also shows that entrepreneurs distinguish between present and future time investments in different ways compared to other individuals. Entrepreneurs seem to perceive the future as more distant than non-entrepreneurs and discount future time investments to a stronger extent. It would be interesting to learn more about how an exogeneous event such as the COVID-19 pandemic changes the perception of the future and the time investments in the venture. Our results suggest that financial and non-financial job satisfaction might play a role leading to second-order effects of the pandemic on the amount of time investments by entrepreneurs. Finally, the study of Bullock & Aghaey (2024) shows that fear of failure is a predictor of entrepreneur's time investments into the venture. This result is in line with our finding that financial dissatisfaction and negative performance feedback can have a positive effect on venture-related time investments.

Regarding our second perspective, the finding that reductions in *non-financial job satisfaction* negatively relate to investments corroborates our theoretical reasoning grounded in the broadening-and-build theory (Fredrickson, 1998, 2001, 2004). It indicates that the self-

employed have narrower thought-action repertoire and reduced cognitive abilities due to the negativity induced by reductions in non-financial job satisfaction, leading to a lower probability of time and monetary investments. This is consistent with previous research showing that lower cognitive resources hamper creative coping abilities (Grözinger et al., 2022). It is also in line with the view that a restricted cognitive perspective hinders efficient resource deployment. Thus, the self-employed lose their long-term perspective regarding their venture, reducing their current resource commitment (Cohn & Fredrickson, 2006). To some extent, this is moderated by locus of control: the negative influence of a decline in non-financial job satisfaction on investment behavior is lower when the self-employed score high in internal locus of control.

Our result that non-financial job satisfaction is more strongly associated with investment behavior than financial job satisfaction further emphasizes the importance of analyzing decision making during crises. Thereby, our results confirm previous insights that non-financial aspects are often decisive in self-employment (Croson & Minniti, 2012; Dawson, 2017; Murnieks et al., 2020) and emphasize why we should connect economic with psychological approaches.

5.2 Theoretical implications

Our study applies two behavioral perspectives to the context of job satisfaction in self-employment. The performance feedback literature describes the behavior of decision makers in firms and is predominantly used in a firm-level context (Alexy et al., 2016; Argote & Greve, 2007; Greve, 2003). We show that the theory can also predict the (investment) behavior of the self-employed in relation to their ventures. Like large firms, the self-employed in our sample increase their search efforts with regard to time investments in response to negative performance feedback (Alexy et al., 2016; Greve, 2003).

Moreover, we contribute to the use of the broadening-and-build perspective in entrepreneurship research. The theory focuses on outcomes of positivity, such as a broader thought-action repertoire and higher cognitive resources (Fredrickson, 1998, 2001, 2004). Although the reverse logic of negativity is mentioned in Fredrickson (2004) and Cohn and Fredrickson (2006), it is often neglected in research. We show that negativity and its behavioral consequences can help to determine an individual's behavior and decision-making during crisis times. Specifically, in the context of self-employment, reductions in non-financial job satisfaction may induce negativity, altering and restraining the individuals' investment behavior into their ventures. Our study also connects the broadening-and-build perspective with research on internal locus of control explaining the conditions under which a narrower thought-action

repertoire has behavioral consequences. This highlights the potential of combining (static) psychological traits with established behavioral concepts to explain entrepreneurial behavior.

5.3 Practical implications

From a practical perspective, our results contribute to a better understanding of those factors that determine the investment behavior of the self-employed in times of crises. This improved understanding is helpful for policymakers who want to stimulate investment behavior of entrepreneurs and firms in times of crisis. Job satisfaction seems to play an important role for self-employed individuals when making investment decisions. Notably, we observe that the self-employed are more likely to invest time rather than money into their venture development when their financial job satisfaction suffers. Increased time investments can be an important step to address critical business situations, particularly in a situation when financial resources may be depleted during a crisis. Policymakers should account for this and consider setting up programs teaching effective time use and time management in times of crisis. To this end, the self-employed may benefit from targeted coaching helping them use their time in a way that the resilience of their ventures is actually strengthened. During crises, the self-employed may also be more willing to educate themselves, acquiring skills needed to develop and grow their venture, e.g. regarding digitalization or business model innovation. Ideally, these skills not only improve their entrepreneurial capabilities and ventures but also enhance their broader human capital, ensuring transferability across industries and roles. This adaptability becomes particularly valuable if their current venture cannot be sustained.

When looking at reductions in non-financial job satisfaction, the induced negativity can be harmful for the investment behavior of the self-employed. A reduction in non-financial job satisfaction is related to reduced investments and may ultimately lead to reduced commitment or the termination of self-employment. Many such crisis-related exits from self-employment could be harmful for society. Therefore, the self-employed should try to counteract the negative outcomes of reduced non-financial job satisfaction by seeking interpersonal feedback (Drencheva et al., 2024) and by increasing their social exchanges (Dutta & Khurana, 2024). Additionally, policymakers may consider supporting activities that help to overcome negative outcomes, for instance by financially supporting coaching (Kotte et al., 2021), which is shown to be important during crises times (Schermuly et al., 2021). Our moderator analysis further indicates that the negative influence is lower when the self-employed score high in internal locus of control. Thus, policymakers can try to reduce business regulations during a crisis that

deprive the self-employed of control over their ventures. Instead, the self-employed would benefit from the psychological reassurance that they are still determining the future of their venture. By taking these steps, the self-employed may be able to mitigate the negative impact of reductions in non-financial job satisfaction on their investments.

5.4 Limitations and future research

Our study is not without limitations. Regarding our data, it is important to note that our analysis has the advantage that it is based on a large sample of about 7,000 self-employed individuals living in Germany who were surveyed during the COVID-19 crisis. While such a large sample size allows for specific and novel investigations, it comes at a cost. Although our results are in line with pre-crisis survey data for Germany, we cannot exclude that there is a certain recall bias that may affect the accuracy of responses related to past job satisfaction. Therefore, future research should include more observation points to deepen our understanding of changes in job satisfaction. Additional research is also required to verify our insights with respect to different individuals, businesses, countries, and crises. Beyond these geographical and crisis-related restrictions, our dataset also includes a limited number of items for our dependent and independent variables. Our analysis is restricted to single-item measures for job satisfaction and venture investments. Although this approach is established in the job satisfaction literature (e.g., Abreu et al., 2019; Brüggen et al., 2017; Kibler et al., 2019; Van der Zwan et al., 2018), further research should consider using multi-item scales to increase measurement validity. Another limitation is rooted in our regression method. We draw on a seemingly unrelated regression to separate financial and non-financial aspects, as recommended in the literature (Croson & Minniti, 2012; Murnieks et al., 2020). However, this method provides only limited information about causality. Future research could employ more sophisticated analytical techniques, such as panel data and time series analyses, to investigate causality.

Moreover, we should acknowledge that job satisfaction has more dimensions than we could capture in our survey. Future research should introduce broader measurements. Similarly, beyond its associations with time and monetary investments, there are likely other consequences of variations in job satisfaction for self-employment that deserve examination: venture internationalization and venture growth are two that come to mind. By exploring these and other dependent variables, future research may gain a more complete understanding of the consequences of variations in job satisfaction in self-employment. This is an important research area since the fast-changing business environment of self-employed individuals may lead to

increased variations in job satisfaction. Thus, we highlight a need for further research of how job satisfaction may fluctuate and how reductions in job satisfaction may affect the behavior of self-employed. Lastly, future research may extend the analysis of reductions in job satisfaction to include the consequences of closing the business and returning to employment.

6 Conclusion

Subjective well-being in self-employment is becoming an increasingly important concept in both theory and practice. We show that declines in two components of subjective well-being – financial job satisfaction and non-financial job satisfaction – are linked to the investment behavior of the self-employed, thus having implications for their ventures. We explain our findings with two behavioral perspectives, using arguments from the performance feedback literature and ´from the broadening-and-build theory. Thereby, we bring new behavioral insights into the discussion on subjective well-being and its consequences for entrepreneurship.

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Appendix

Table A1: Variable description

Variable	Description
Dependent variable	
Time investments	Ordinal variable indicating if a lot of time was invested in venture development during crisis, measured in 7 categories from -1 (no agreement) over 0 (neutral) to 1 (full agreement).
Monetary investments	Ordinal variable indicating if a lot of money was invested in venture development during crisis, measured in 7 categories from -1 (no agreement) over 0 (neutral) to 1 (full agreement).
Independent variables	
Reduction in financial job satisfaction	Binary variable (yes/no) capturing negative change in financial job satisfaction, based on measures of the variable before and during COVID-19.
Reduction in non-financial job satisfaction	Variable capturing negative change in job satisfaction net of financial job satisfaction, based on measures of the variable before and during COVID-19. The net effect is computed from residualizing reduction job satisfaction (yes/no) from reduction in financial job satisfaction (yes/no).
Control variables	
Optimism before COVID	Ordinal variable capturing individual's optimism before the COVID-19 pandemic on a 7-point Likert scale (1 = very low, 7 = very high).
Risk tolerance before COVID	Ordinal variable capturing individual propensity to take risks before the COVID-19 pandemic on a 7-point Likert scale (1 = very low, 7 = very high).
Locus of control before COVID	Ordinal variable capturing individual's locus of control before the COVID-19 pandemic on a 7-point Likert scale (1 = very low, 7 = very high).
Digitalization before COVID	Ordinal variables capturing average degree of digitalization of products, processes, and sales based on 7-point Likert scale (1 = very low, 7 = very high).
Export sales	Binary variable (0/1) equal to one if venture generates export sales, zero otherwise.
Female gender	Binary variable (0/1) capturing whether the self-employed is female.
Employees	Binary variable (0/1) equal to 1 if the self-employed has employees, zero otherwise.
More than 25 percent revenue decline	Binary variable (0/1) capturing whether a venture was affected by more than 25% decline in revenue due to the COVID-19 pandemic in 2020 or expects a revenue decline of this magnitude in 2021.
Venture size	Ordinal variable capturing monthly operational expenses (1 = 0 to 500 Euros, 2 = 501 to 1,000 Euros, 3 = 1,001 to 1,500 Euros, 4 = 1,501 to 2,000 Euros, 5 = 2,001 to 2,500 Euros, 6 = 2,501 to 3,000 Euros, 7 = 3,001 to 4,000 Euros, 8= 4,001 to 5,000 Euros, 9 = 5,001 to 10,000 Euros, 10 = 10,001 to 15,000 Euros, 11 = 15,001 Euro and more).
Liquidity of venture	Ordinal variable indicating remaining time of liquidity (1 = Already insolvent, 2 = Living from retirement provisions, 3 = 1 month, 4 = 2 months, …., 9 = 7 to 12 months, 10 = more than 12 months).
Business experience	Ordinal variable indicating experience with self-employment, grouped in 8 categories (1 = 2 years or less, 2 = 3 years, 3 = 4 years, 4 = 5 years, 5 = 6 to 11 years, 6 = 12 to 21 years, 7 = 22 to 31 years, 8 = 32 or more years).
Age	Ordinal variable capturing respondent's age group (1 = less than 29 years, 2 = 30 to 44 years, 3 = 45 to 59 years, 4 = 60+ years).
Education	Ordinal variable indicating respondent's highest educational degree (1 = school graduation, 2 = apprenticeship, 3 = university degree).
Financial job satisfaction before COVID	Ordinal variable capturing individual's financial job satisfaction before the COVID-19 pandemic on an 11-point Likert scale (0 = very low, 10 = very high).
Non-financial job satisfaction before COVID	Ordinal variable capturing individual's job satisfaction net of financial job satisfaction before the COVID-19 pandemic. The net effect is computed from residualizing job satisfaction (ordinal measure with 11-point Likert scale) from financial job satisfaction (ordinal measure with 11-point Likert scale).
Industry	Dummy variables for 27 industries: (1) Other industries; (2) Office services and other business services (debt collection,...); (3) Finance and insurance services; (4) Photography (excluding press photographers); (5) Hairdressers, cosmetics, other personal services; (6) Gastronomy, accommodation; (7) Health, medicine and therapy; (8) Trade (retail, wholesale, also automotive repair, sales representatives); (9) Craft, manufacturing industry; (10) IT, software, web service; (11) Real estate, property management, renting; (12) Engineers and architects; (13) Journalists and press photographers; (14) Communication design, product design; (16) Editors; (17) Legal and tax consulting, accounting; (18) Travel agency and tour operator services; (19) Social work, social services, childcare; (20) Sports and recreational services; (21) Transportation of persons, goods; (22) Management consulting incl. PR, human resources, coaching; (23) Event industry: cultural events; (24) Event industry: business events; (25) Further education, school, teaching; (26) Advertising and market research; (27) Translators and interpreters.

Table A2: Correlations

Variables		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1.	Time investments																		
2.	Monetary investments	.521***																	
3.	Reduction in financial job satisfaction	.082***	.015																
4.	Reduction in non-financial job satisfaction	-.026*	-.024*	-.000															
5.	Financial job satisfaction before COVID	-.029*	.038**	.138***	-.012														
6.	Non-financial job satisfaction before COVID	.066***	.029*	.056***	.145***	.000													
7.	Optimism before COVID	.094***	.102***	.140***	.041***	.396***	.192***												
8.	Risk tolerance before COVID	.151**	.155***	.061***	.031*	.122***	.089***	.219***											
9.	Locus of control before COVID	.045***	.069***	.071***	.015	.324***	.155***	.400***	.172***										
10.	Digitalization before COVID	-.004	-.034**	-.180***	-.074***	.062***	-.027*	-.009	.064***	.020									
11.	Export sales	.025*	.007	-.005	-.008	.019	-.001	-.013	.057***	-.017	.185***								
12.	Female gender	.022	.020	.066***	.017	-.014	.034**	.009	-.137***	-.045***	-.135***	-.108***							
13.	Employees	.054***	.143***	-.084***	-.009	.084***	-.001	.072***	.091***	-.089***	.001	-.061***	-.117***						
14.	More than 25 percent revenue decline	.076***	-.011	.594***	.142***	.033**	.065***	.098***	.080***	-.033**	-.157***	.024*	.038**	-.126***					
15.	Venture Size	.082***	.191***	-.095***	.002	.109***	.003	.105***	.154***	.123***	-.002	-.064***	-.143***	.655***	-.126***				
16.	Liquidity	-.047***	-.014	-.302***	-.091***	.092***	-.088***	-.066***	-.062***	-.006	.123***	.032**	-.093***	.047***	-.351***	.023			
17.	Business experience	-.054***	-.042***	.067***	.025*	.048***	.015	-.034**	.002	.022	-.042***	.053***	-.073***	.040**	.076***	.057***	-.002		
18.	Age	-.037**	-.044***	.027*	-.012	.033**	.036**	-.002	.065***	.032**	-.028*	-.045***	-.032**	.018	.057***	.049***	.007	.432***	
19.	Education	.031*	.005	-.093***	-.037**	-.040**	-.019	-.078***	-.032**	.093***	.080***	.079***	.066***	-.071***	-.097***	-.114***	.153***	-.051***	-.018

Notes: * p < 0.05, ** p < 0.01, *** p < 0.001.

Table A3: Time and monetary investments

		Time investments			
		not agree	neutral	agree	sum
Monetary investments	not agree	.20	.04	.17	.41
	neutral	.01	.08	.11	.20
	agree	.01	.02	.36	.39
	sum	.22	.14	.64	1.00

Notes: Time and monetary investments were collapsed into 3 categories: not agree (1 to 3), neutral (4), and agree (5 to 7). The cells show the fraction of individuals who fall into each category.

Table A4: Results for time and monetary investments in categorical model

Column	(1)	(2)	(3)	(4)
Statistic	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)	Coeff. (SE)
Dependent variable	Time investments		Monetary investments	
Independent variables				
Reductions in financial job satisfaction		.353 (.107)**		.087(.099)
Reductions in non-financial job satisfaction		-.316 (.077)***		-.209(.070)**
Control variables				
Optimism before COVID	.153 (.027)***	.153 (.027)***	.110(.027)***	.110(.027)***
Risk tolerance before COVID	.162 (.018)***	.163 (.018)***	.162(.017)***	.162(.017)***
Internal Locus of control before COVID	.025 (.028)	.023 (.028)	.029(.026)	.027(.026)
Digitalization before COVID	.057 (.017)**	.058 (.018)**	-.003(.016)	-.003(.016)
Export sales	.143 (.056)*	.144 (.056)*	.112(.051)*	.112(.051)*
Female gender	.200 (.058)**	.204 (.058)***	.193(.052)***	.194(.052)***
Employees (yes/no)	.114 (.091)	.111 (.092)	.210(.081)*	.208(.081)*
More than 25 percent revenue decline	.325 (.061)***	.229 (.073)**	-.077(.057)	-.090(.066)
Venture size	.083 (.014)***	.086 (.014)***	.125(.012)***	.126(.012)***
Liquidity of venture	-.007 (.009)	-.004 (.009)	-.001(.008)	-.001(.008)
Business experience	-.051 (.019)**	-.051 (.019)**	-.027(.017)	-.027(.017)
Age of self-employed	-.132 (.044)**	-.133 (.044)**	-.160(.039)***	-.162(.039)***
Education	.068 (.034)*	.069 (.034)*	.033(.031)	.034(.031)
Financial job satisfaction before COVID	-.164 (.026)***	-.177 (.026)***	-.024(.023)	-.027(.023)
Non-financial job satisfaction before COVID	.060 (.021)**	.071 (.021)**	.002(.019)	.009(.019)
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	6,955	6,955	6,955	6,955
Chi^2	652.60	683.52	658.38	668.77
Pseudo-R^2	.05	0.06	.05	0.05

Notes: * p < 0.05, ** p < 0.01, *** p < 0.001. Reference industry: artists and cultural professionals.

Table A5: Marginal effects of reductions in job satisfaction on time and monetary investments (categorical model)

	Marginal effects (dy/dx)				Comparison	
	Prob(more time investments)		Prob(more monetary investments)		Chi2	p > Chi2
Reductions in financial job satisfaction	.065**	(.023)	.008	(.022)	6.99	.01
Reductions in non-financial job satisfaction	-.065***	(.016)	-.046**	(.015)	2.19	.14

Notes: * p < 0.05, ** p < 0.01, *** p < 0.001. Reference industry: artists and cultural professionals. Comparison based on Wald test with regression coefficients.

Table A6: Marginal effects of control variables

Marginal effects (dy/dx)				
	Prob(more time investments)		Prob(more monetary investments)	
Optimism before COVID	.031***	(.006)	.023***	(.006)
Risk tolerance before COVID	.032***	(.004)	.034***	(.004)
Internal Locus of control before COVID	.005	(.006)	.006	(.006)
Digitalization before COVID	.013***	(.004)	.000	(.003)
Financial job satisfaction before COVID	-.036***	(.005)	-.005	(.005)
Non-financial job satisfaction before COVID	.015***	(.004)	.002	(.004)
Export sales	.030*	(.012)	.021	(.011)
Female gender	.045***	(.012)	.050***	(.011)
Employees	.033	(.019)	.064**	(.019)
More than 25 percent revenue decline	.047**	(.016)	-.021	(.015)
Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Reference industry: artists and cultural professionals.				