Journal of Happiness Studies (2025) 26:102
https://doi.org/10.1007/s10902-025-00941-0

RESEARCH PAPER

Unemployment's Life-Satisfaction Cost and Loneliness

Tim Friehe[1] · **Christian Pfeifer**[2]

Accepted: 15 July 2025
© The Author(s) 2025

Abstract
Unemployment consistently lowers life satisfaction on average, yet the individual impact of job loss varies significantly. The underlying factors driving this heterogeneity remain a subject of ongoing research. Using data from the German Socio-Economic Panel, we demonstrate a compelling link between unemployment and loneliness, suggesting that a substantial portion of unemployment's detrimental impact on life satisfaction can be attributed to the social isolation it induces. This finding is robust across various estimation methods and subsamples. Notably, the indirect effect of unemployment on life satisfaction through loneliness is particularly pronounced among college graduates, while it is less sizable for East Germans. Our results underscore the potential effectiveness of policies aimed at combating loneliness in mitigating the psychological well-being of the unemployed.

Keywords Life satisfaction · Loneliness · Mediation · SOEP · Unemployment

JEL classifications I31, D91, J68

1 Introduction

1.1 Motivation and Main Results

Unemployment has tremendous non-pecuniary costs (e.g., Helliwell & Huang, 2014, Winkelmann & Winkelmann, 1998). Analyses of cross-sectional and panel data repeatedly show that unemployment lowers *life satisfaction* markedly and lastingly (e.g., Clark, 2018, Win-

✉ Tim Friehe
tim.friehe@uni-marburg.de

✉ Christian Pfeifer
christian.pfeifer@leuphana.de

[1] Public Economics Group, Philipps Universität Marburg, Am Plan 2, 35037 Marburg, Germany

[2] Institute of Economics, Leuphana University Lueneburg, Universitätsallee 1, 21335 Lueneburg, Germany

Published online: 29 July 2025

kelmann, 2014).[1] The magnitude of unemployment's life-satisfaction cost is heterogeneous across individuals and influenced by aggregate variables such as the local unemployment rate or labor-market policies on the one hand and individual characteristics such as gender and nativity on the other (e.g., Lawes et al., 2024, Leopold et al., 2017, Longhi et al., 2024, Suppa, 2021).

The individual-level heterogeneity in the life-satisfaction cost of unemployment can be attributed to the multifaceted nature of employment beyond its income-generating function. As Jahoda (1981) articulated, employment is a source of time structure, participation in a collective purpose, personal identity and status, regular activity, and social contact with people outside the family. The significance of these by-products of employment varies across individuals, contributing to the observed heterogeneity in the life-satisfaction impact of unemployment. Consequently, even when income is controlled for, the substantial life-satisfaction cost of unemployment may stem from the loss of these additional benefits. This heterogeneity underscores the importance of considering individual differences in valuing these by-products, such as the varying degrees of importance attached to personal identity and social connection.

Our research contributes to the existing literature by delving into the profound impact of loneliness on the psychological toll of unemployment. Loneliness often defined as a subjective perception of social isolation, can stem not only from a quantitative lack of social connections but also a qualitative dissatisfaction with existing relationships (e.g., Barjakova et al. 2023). Recognized as a pressing public health concern, loneliness has been linked to a myriad of detrimental outcomes, as extensively documented by Hawkley and Cacioppo (2010) and Holt-Lunstad et al. (2015), for example. Given its far-reaching consequences, loneliness has garnered increased attention from the public and policymakers in recent years. Some countries (e.g., Japan, UK) have even established dedicated ministries or departments to address the issue of loneliness, recognizing its significant impact on public health and social well-being.[2] Relating to the by-products articulated by Jahoda (1981), job loss may cause loneliness, meaning that loneliness may be an essential element for a better understanding of unemployment's life-satisfaction cost.

This paper contributes to the literature by showing that unemployment is associated with loneliness and, more importantly, that loneliness can explain a large part of unemployment's adverse impact on life satisfaction. We employ data from the German Socio-Economic Panel (SOEP), a data source used by many contributions to the related literature (e.g., Suppa, 2021).

According to our main results, loneliness can explain about 20% of the average life-satisfaction cost of unemployment. We obtain comparable results from different estimation techniques (including fixed-effects regressions). As a benchmark, Luo (2020) finds that the predominant aspects of household income and financial satisfaction can jointly explain about 38% of the average life-satisfaction cost.

In addition, we consider separate analyses for subpopulations, namely men v. women, college-educated v. no college degree, and West v. East Germans. The principal pattern from the main analysis holds for all subpopulations. Notably, we find that the indirect effect – that

[1] Life satisfaction as the cognitive, evaluative component of subjective well-being is often referred to as "happiness" in the economics literature (MacKerron, 2012, von Scheve et al., 2017).

[2] See, for example, the joint message of the ministers in Japan and the UK at gov.uk/government/news/joint-message-from-the-uk-and-japanese-loneliness-ministers (last accessed October 19, 2024).

is, unemployment's life-satisfaction cost due to induced loneliness – is particularly high among college graduates (25%) and relatively low for East Germans (19%). This heterogeneity of the importance of loneliness is consistent with previous literature on the role of identity and social norms (e.g., Hetschko et al., 2021).

Understanding better how unemployment influences life satisfaction and how loneliness affects the relationship between unemployment and life satisfaction is important for several reasons. First, potential policies to address loneliness differ from policy responses to other adverse consequences of unemployment (e.g., material deprivation). Knowing which policies seem most promising for promoting the well-being of the unemployed is critical (e.g., Winkelmann, 2014). Our results suggest that policies addressing loneliness can bring significant improvements. Second, effectively reducing the adverse effects of unemployment can induce a recalculation of trade-offs between unemployment and inflation. For example, Blanchflower et al. (2014) and Di Tella et al. (2001) analyze survey data and report that unemployment has a much more significant effect on people's well-being than inflation. This suggests that policy should prioritize curtailing unemployment. Based on our results, if instruments to address loneliness are available, the policy focus implied by the relative well-being impact on unemployment may be reduced.

1.2 Related Literature

Our paper hypothesizes that loneliness is, to some extent, driving unemployment's life-satisfaction cost and that loneliness can also contribute to explaining the effect's heterogeneity. Our work is related to several strands of the literature.

We build on Jahoda's (1981) idea that employment is vital for social contact and other by-products of employment. For example, Martella and Maass (2000) and Lawes et al. (2024) also explore whether aspects related to Jahoda's by-products of employment mediate the effects of unemployment on life satisfaction. The former article reports that unemployed individuals who perceive their time use as more structured and purposeful report higher life satisfaction. Relatedly, Fors Connolly and Gärling (2022) explain that the unemployed are less satisfied with their time use despite less time pressure.[3] Lawes et al. (2024) explore whether unemployment is less consequential for people with a high level of psychological functioning before their job loss, where some dimensions of psychological functioning are related to Jahoda's by-products.

Our work contributes to the literature by providing evidence for the critical role of perceived loneliness. The previous literature has considered related topics such as social participation (Kunze & Suppa, 2017), social integration (Pohlan, 2019), and social capital (Winkelmann, 2009). Winkelmann (2009) explores whether higher social capital (defined as participation in the following activities: attending cultural or entertainment events, engaging in active sports, visiting friends, relatives or neighbors, engaging in voluntary work in political or social organizations, and attending church services) can reduce the life-satisfaction cost of becoming unemployed. He finds no support for the hypothesis. In our empirical analysis, we include some of his activities as social capital variables in our covariate vector.

[3] Hamermesh (2020) provides an innovative analysis of time use. He shows that life satisfaction is affected by both "who" people spend time with and "how" they spend it. For example, for married individuals, time spent with their spouse raises life satisfaction while the coefficient of time spent with friends is only close to significance.

Kunze and Suppa (2017) show that unemployment leads to less public but more private social participation. This structural change in the composition of social participation after job loss is intuitive given the income loss, and does not give a strong indication of social isolation after job loss. Similarly, Pohlan (2019) finds no association between unemployment and social engagement or the number of friends. However, there is a negative effect of job loss on a measure labeled social integration.[4] Relatedly, Powdthavee (2012) studies the antecedents and consequences of unemployment, finding that satisfaction with finances and social life drops after unemployment. Unemployment can also destabilize the social network, which would, in turn, directly impact loneliness. For example, Doiron and Mendolia (2012) describe how job loss relates to family dissolution. Rözer et al. (2020) analyze the consequences of unemployment for social networks using several years of the Swiss Household Panel. For example, they find that, on average, network size does not decrease after unemployment, but network support (i.e., practical and emotional support) does, and that effects showed considerable heterogeneity across social groups. As explained above, loneliness is a negative feeling associated with *perceived* deficiencies in the quantity and quality of social relationships (Morrish et al., 2022) and, thus, may not be easily captured by variables such as social contacts or the size of the network.

Kuhn and Brulé (2019) consider material, social, religious, and personal resources as potential *buffers* against unemployment (and other adverse life events). Regarding social resources, they consider emotional support, the number of friends, and the frequency of contact with friends. The authors find that at least one person providing strong emotional support buffers unemployment. In contrast, more friends can even have a negative effect. The latter effect is interesting because it has been argued that friends can increase loneliness in the context of other adverse life events (Van Baarsen, 2002). Based on the analysis by Kuhn and Brulé (2019), religious attendance provides the most potent buffer against a loss in life satisfaction after job loss. The number of close friends and religious participation are covariates in our empirical models.

Previous literature has shown that other factors are important moderators of unemployment's life-satisfaction effect. Luo (2020) shows evidence indicating that the subjective well-being implications of unemployment depend on material deprivation. Relatedly, Fors Connolly and Gärling (2022) find that financial satisfaction is relevant as a mediator for the difference regarding life satisfaction and emotional well-being between employed and unemployed. Hetschko et al. (2014) present findings highlighting the strong influence of prevailing social norms on unemployment's life-satisfaction cost, where the relative importance of social norms will vary across individuals.

In addition to our estimates for life satisfaction, we present results for estimations using loneliness as the dependent variable. In this regard, our paper is related to contributions such as Hong et al. (2024). They study antecedents of loneliness and find that changes in certain health behaviors (e.g., increased physical activity), physical health factors (e.g., fewer functioning limitations), psychological factors (e.g., increased purpose in life, decreased depression), and social factors (e.g., a greater number of close friends) were associated with less

[4] The item builds on the survey question "Some people may feel like they are integrated into normal social life and that they are a proper part of society while others may feel excluded. What about in your case? To what extent do you feel that you are part of society or to what extent do you feel excluded? Please use the numbers from 1 to 10 to rate your opinion. 1 means that you feel excluded from social life. 10 means, that you feel part of it. The numbers from 2 to 9 allow you to grade your assessment."

subsequent loneliness. Our results are also comparable to previous research, such as Barjaková et al. (2023) and Hutten et al. (2022), regarding the influence of sociodemographic characteristics such as education and gender.

Loneliness has been found to be an important moderator in other settings. The COVID-19 pandemic drastically reduced the life satisfaction of women, whereas that of men was less affected. Lepinteur et al. (2022) suggest that gender-dependent loneliness explains much of this gender-dependent change in life satisfaction. In our analysis, we argue that unemployment's life-satisfaction cost can, to a large extent, be explained by unemployment-dependent loneliness.

We show that unemployment is associated with more loneliness and that loneliness is an important driver of unemployment's life-satisfaction cost. The first aspect is also discussed in Morrish and Medina-Lara (2021), for example. They survey 37 contributions to the literature and suggest that, on the one hand, job loss may induce loneliness and that, on the other hand, loneliness can also raise the probability of losing employment. Morrish et al. (2022) consider the bidirectionality more closely. Conceptually, how unemployment influences loneliness is unclear as unemployment may also be seen as an opportunity for engaging in social contact (Rözer et al., 2020). Regarding the second aspect (i.e., loneliness as a driver of unemployment's life-satisfaction cost), our paper is related to Kim (2025) who studied 4,447 young adults in one cross-section from Seoul with an interest in how social exclusion, loneliness, and the impact of parents' socio-economic status bear on the effect of unemployment on life satisfaction.

2 Data and Empirical Approach

2.1 Data

We use data from the German Socio-Economic Panel (SOEP). This annual representative panel study collects information about more than 20,000 individuals in more than 10,000 households in Germany (e.g., Goebel et al., 2019). Many survey items, such as unemployment and life satisfaction, are included yearly. Some items, such as loneliness, are included only in selected years. Loneliness is available in 2013, 2017, and 2021. Because COVID-19 strongly impacted our variables of interest (unemployment, loneliness, and life satisfaction), we focus on 2013 and 2017 and neglect 2021.[5]

[5] COVID-19 triggered unobserved regional heterogeneity (e.g., policies and their enforcement varied at the state level and within a year) and unobserved individual heterogeneity (e.g., life circumstances and coping with home schooling, for example; working from home and social contacts at work) that affect life satisfaction, loneliness, and the employment situation simultaneously, creating identification problems. For example, the loneliness gap between unemployed and employed individuals could have increased or decreased during COVID-19 years. The gap could have widened because some employed individuals had social contacts at work, whereas most social contacts outside the workplace were severely restricted. However, the gap could also have narrowed for employed individuals who had to work remotely without their work-related social contacts. Another example relates to unemployment status. During the pandemic, it was more challenging to find new employment and easier to stay employed (as Germany implemented short-time work allowances extensively). Individuals with short-time work allowances would have no social contacts at work, like the unemployed. Against this background, we chose to present results based on the years before the pandemic. While we agree that studying the link between loneliness, life satisfaction, and employment during the pandemic is interesting, our paper is not meant to focus on the pandemic-specific effects and results, some of which may not generalize to years without a pandemic.

We focus on unemployment and, thus, restrict the sample to individuals aged 18 to 65, who are either in registered unemployment or in regular part-time or full-time employment. In addition to unemployment status, we use two variables related to unemployment (namely job loss within the last year and overall unemployment experience in years) in robustness checks. We end up with 22,884 observations in the estimating sample. Approximately 7% of the observations have the status *registered unemployment*, 10.4% have lost their job since the beginning of the previous year, and the average unemployment experience amounts to 1.1 years. When performing fixed-effects panel regressions as a robustness check, we must restrict the sample to individuals observed twice in the data. This leaves a two-year balanced panel with 9,978 observations of 4,989 individuals.

Our first key variable is loneliness based on the well-established three-item version of the UCLA loneliness scale developed by Hughes et al. (2004).[6] Loneliness information is collected using the following questions: "How often do you feel…", followed by "that you lack miss the company of others?", "left out?" and "isolated from others?".[7] Participants answer on a five-point Likert scale: 1 "Very often," 2 "Often," 3 "Sometimes," 4 "Seldom," and 5 "Never." These questions are sufficient for constructing a reliable loneliness score (Hughes et al., 2004). This multi-item approach captures a broader picture of loneliness and reduces measurement error.

We follow the existing literature (e.g., Luhmann & Schupp, 2015) and construct our main loneliness score as the sum of the reverse-coded responses to produce a loneliness score ranging from 3 to 15, where larger numbers correspond to greater loneliness. Luhmann and Schupp (2015) provide a series of tests supporting the internal validity and construct validity of the SOEP loneliness score based on these three five-point Likert scale items. In our estimation sample, Cronbach's alpha is 0.77 for the loneliness score and, thus, in an acceptable range. The empirical literature usually uses the sum of the three-item loneliness scale ranging from 3 to 15. An alternative approach is conducting a principal component analysis. We find that the resulting score is highly correlated with the sum ($r = 0.999$). This is intuitive because the three single items contribute almost to the same degree to the weighted loneliness score in the principal component analysis. Hence, our regression results are not sensitive to different computations of the three-item loneliness scale, as only the scaling differs. To be consistent with the previous empirical literature about loneliness, we present results for the conventional sum of the three-item loneliness score.

The second key variable for our empirical analysis is participants' life satisfaction.[8] In the SOEP, information about life satisfaction uses the question: "How satisfied are you with your life, all things considered?" Participants can answer on a Likert scale ranging from 0 (completely dissatisfied) to 10 (completely satisfied).

[6] The UCLA Loneliness Scale was developed in the late 1970s and included 20 questions regarding the frequency of feelings and states related to loneliness. It demonstrated high validity and reliability, and became widely used as a measure of loneliness (Mauri et al., 2024). In the early 2000s, Hughes et al. (2004) developed a short, 3-item version of it. The UCLA scale is presently the most commonly used loneliness measure (Maes et al., 2022; Mauri et al., 2024; Osborne et al., 2018). For example, a large share of the papers included in the survey by Morrish and Medina-Lara (2021) rely on some version of the scale.

[7] Hughes et al. (2004) use the item "I lack companionship". The SOEP provides answers to the German translation of the question "How often do you feel that you miss the company of others?". Since companionship may suggest a greater extent of closeness, it may be that the German version of the loneliness scale performs differently from the original one.

[8] Subjective well-being as an explicit guideline to policy is discussed in Frijters et al. (2020).

In addition to unemployment, loneliness, and life satisfaction, we use several variables at the individual and household levels in our empirical models. More specifically, we account for variables that include health status (five-point scale), secondary schooling degrees (low, medium, and high), apprenticeship and college degrees (as dummy variables), age (as dummy variables for 18–29, 30–49, and 50–65 years), gender, migration background, number of persons living in the household, having children younger than 16 in the household as a dummy variable, marital status (married, divorced, widowed), federal state, and per-capita household income.

Following papers such as Kuhn and Brulé (2019), we include information on the number of friends in our models. The survey question reads: "How many close friends would you say you have?" Based on the idea that social capital may be relevant to unemployment's life-satisfaction cost (Winkelmann, 2009), we include information about survey respondents' participation in religious, sports, and volunteering activities at the individual level. This information is measured on a four-point ordinal scale. In our empirical models, this information is included using a dummy variable equal to one when the participation is at least monthly.

Table 1 presents the means (standard deviations) of the life satisfaction rating and the three-item loneliness scale for unemployed and employed individuals. We tested for differences in the group means using a t-test. The average life satisfaction level in the sample is 7.34 (on the scale of 0–10). Unemployed individuals are, on average, 1.25 points less satisfied than employed individuals. The average loneliness score in the sample is 5.89 (on the scale of 3–15). Unemployed individuals feel, on average, 1.51 points lonelier than employed individuals, which holds for each item separately. The largest difference between unemployed and employed individuals arises for feeling socially isolated. Moreover, unem-

Table 1 Loneliness and life satisfaction of unemployed and employed individuals

	Total sample (n=22,884)	Unemployed (n=1,601)	Employed (n=21,283)	Difference Unemployed-Employed
Life Satisfaction (0–10)	7.34 (1.60)	6.18 (2.15)	7.43 (1.51)	-1.25 ***
Loneliness Score (3–15)	5.89 (2.15)	7.30 (2.81)	5.79 (2.06)	1.51 ***
Feel socially isolated (1–5)	1.58 (0.84)	2.28 (1.17)	1.52 (0.78)	0.76 ***
Feel left out (1–5)	2.01 (0.86)	2.37 (1.08)	1.99 (0.84)	0.38 ***
Miss company of others (1–5)	2.30 (0.91)	2.65 (1.06)	2.28 (0.89)	0.37 ***
Number of close friends	4.07 (3.42)	3.47 (3.41)	4.11 (3.41)	-0.64 ***
Participation (at least monthly) in sports	54.2%	33.2%	55.8%	-22.6 ppt ***
Participation (at least monthly) in volunteering	20.8%	9.7%	21.6%	-11.9 ppt ***
Participation (at least monthly) in policy	3.0%	1.6%	3.1%	-1.5 ppt ***
Participation (at least monthly) in religion	14.5%	11.4%	14.7%	-3.3 ppt ***

Notes: Mean (standard deviation). Differences in group means are tested using a two-sample t-test. *** p<0.01, ** p<0.05, * p<0.10.

ployed individuals have less friends and are less often active in sports, volunteering, policy, or religion than employed individuals. In our mediation analysis, we explore whether the significant differences in loneliness translate into significant differences in life satisfaction between unemployed and employed individuals.

The previous literature has explored whether personality may influence how unemployment influences life satisfaction (e.g., Hahn et al., 2015, Lawes et al., 2024). We include the Big 5 personality traits inventory (conscientiousness, agreeableness, neuroticism, extraversion, openness).[9] Regarding economic preferences, we include respondents' risk attitudes. Unemployment introduces a significant amount of uncertainty, for example, regarding future income. General risk-taking preferences are measured on an eleven-point Likert scale from 0 (low) to 10 (high).

Table A.1 in the appendix shows descriptive statistics and frequencies for our dependent variables, loneliness and life satisfaction, and our covariates.

2.2 Empirical Approach

Regarding our interest in loneliness, we estimate the determinants of loneliness as the combined measure and the three loneliness items separately. Our focus in the regressions is on unemployment as a risk factor for loneliness. Regarding our interest in life satisfaction, we estimate the determinants of life satisfaction and apply mediation analysis to distinguish between the overall, direct, and indirect effects of unemployment on life satisfaction.[10] Luo (2020) employs a similar methodology to understand the indirect effect of material deprivation. Accordingly, our first specification for life satisfaction does not include loneliness to estimate the *total effect* of unemployment on life satisfaction. In contrast, the second specification includes loneliness to assess the *direct effect* of unemployment. The *indirect effect* results from the difference between the total and the direct effect. It indicates how much unemployment's total effect on life satisfaction is mediated by its impact on loneliness.

Our preferred technique is ordinary least squares regressions. It allows us to interpret the coefficient size quantitatively in the context of our mediation analyses. As explained above, we include a large set of control variables to deal with observed heterogeneity (e.g., gender, migration background, marital status, age, health status, education, household income, household characteristics, number of friends, participation in sports, political parties, religion, volunteering, risk-taking preferences, Big 5 personality traits). In our mediation analysis, we do not include all available potential variables as controls because some might be endogenous (e.g., domain satisfaction). Despite such concerns, we keep the number of friends, participation in sports, political parties, religion, and volunteering as control variables. Importantly, we checked the sensitivity of our results due to potential

[9] We generated the Big 5 variables using a standard set of own assessments ("I see myself as someone who…"). In the following, we list the different items after mentioning the relevant trait: Openness (1. is original, comes up with new ideas; 2. values artistic, aesthetic experiences; 3. has an active imagination; 4. is eager for knowledge), Conscientiousness (1. does a thorough job; 2. tends to be lazy; 3. does things effectively and efficiently), Extraversion (1. is communicative, talkative; 2. is outgoing, sociable; 3. is reserved), Agreeableness (1. is sometimes somewhat rude to others; 2. has a forgiving nature; 3. is considerate and kind to others), Neuroticism (1. worries a lot; 2. gets nervous easily; 3. is relaxed, handles stress well).

[10] Please note that the terms "overall, direct, and indirect effects" use the terminology of the mediation analysis. We do not claim referring to "causal effects", even though we include a large set of control variables, individual fixed effects, and use potentially exogenous reasons for job loss such as company closures.

endogeneity and potential mediation in additional regressions without these activities and without friends. Although these activities (especially sports and religion) and the number of friends significantly correlate with loneliness and life satisfaction, we could not detect any noteworthy mediation for loneliness or unemployment.

In a robustness check, we add individual fixed effects to deal with time-invariant unobserved heterogeneity. We use a two-year balanced panel for the fixed-effects regressions so that within variance (i.e., individual changes between 2013 and 2017) is not that large. To deal with the ordinal nature of the dependent variables, we additionally present results from ordered probit regressions. The results support the findings obtained using ordinary least squares. At last, we repeat the mediation analysis for several subsamples (men vs. women, East vs. West, college vs. non-college) to explore whether the role of loneliness differs across identifiable groups.

3 Results

3.1 Main Results

Table 2 presents the main results obtained using ordinary least squares regressions and the pooled data from 2013 to 2017. Due to space constraints, the coefficients of the many control variables are not listed (see Table A.2 in the appendix for the full output). Column (1) contains the coefficients obtained when using loneliness as the dependent variable. Loneliness has a mean of 5.9 and a standard deviation of 2.2 (Table 1). The coefficient for the unemployment status is statistically and economically significant. Unemployed individuals have a loneliness score higher by 0.79 points, that is, higher by about 13% relative to mean loneliness (0.792/5.894 = 0.134) or by more than one-third of a standard deviation of loneliness (0.792/2.154 = 0.368). Our full results in Table A.2 also contribute to the literature on the correlates of loneliness (e.g., Barjaková et al., 2023, Barreto et al., 2021, Hutten et al., 2022). For example, in our sample, women and middle-aged, less healthy, and more neurotic individuals are lonelier, and the more educated and richer individuals are less lonely.

Next, we turn to life satisfaction as the dependent variable. The specification in Column (2) does not contain loneliness as a covariate. This specification produces the *total effect* of unemployment on life satisfaction using the terminology of mediation analysis. Our data confirms what is known from the literature (e.g., Suppa, 2021): unemployment is associated with lower life satisfaction. On our eleven-point Likert scale for life satisfaction, ranging from 0 (very unhappy) to 10 (very happy) with a mean of 7.3 and a standard deviation of 1.6, unemployed peoples' life satisfaction is lower by 0.64 points. This translates to an almost 9% reduction relative to the mean (-0.642/7.342=-0.087) or by more than one-third of a standard deviation of life satisfaction (-0.642/1.599=-0.402). The size is comparable to the literature (e.g., Winkelmann, 2014). Our full results in Table A.2 are consistent with the findings of the happiness literature (e.g., MacKerron, 2012). For example, healthier and more extroverted individuals have a higher life satisfaction score in our sample.

In Column (3), we add loneliness to our empirical model. We find that it significantly and negatively correlates with life satisfaction. This estimation produces the *direct effect* of unemployment on life satisfaction. The *indirect effect* via the effect of unemployment

Table 2 Loneliness and unemployment's Life-Satisfaction cost: main results

	(1)		(2)		(3)		(4)	
	Loneliness		Life Satisfaction without a loneliness covariate		Life Satisfaction with aggregate loneliness as covariate		Life Satisfaction with three loneliness covariates	
Unemployed	0.792	***	-0.642	***	-0.514	***	-0.468	***
	(0.054)		(0.037)		(0.036)		(0.036)	
Loneliness					-0.161	***		
					(0.004)			
Feel socially isolated								
Seldom							-0.245	***
							(0.023)	
Sometimes							-0.503	***
							(0.036)	
Often							-0.822	***
							(0.060)	
Very often							-0.757	***
							(0.120)	
Feel left out								
Seldom							-0.016	
							(0.024)	
Sometimes							-0.179	***
							(0.032)	
Often							-0.439	***
							(0.053)	
Very often							-0.777	***
							(0.117)	
Miss the company of others								
Seldom							-0.060	**
							(0.026)	
Sometimes							-0.183	***
							(0.029)	
Often							-0.373	***
							(0.043)	
Very often							-0.558	***
							(0.084)	
Constant	7.626	***	6.819	***	8.049	***	7.421	***
	(0.174)		(0.120)		(0.122)		(0.120)	
Control variables	Yes		Yes		Yes		Yes	
N	22,884		22,884		22,884		22,884	
R^2	0.197		0.306		0.344		0.348	

Notes: Results from pooled OLS regressions. The dependent variable in Column (1) is the three-item loneliness scale, ranging from 3 to 15. The dependent variable in Columns (2)-(4) is life satisfaction, ranging from 0 to 10. All models include the covariates explained in Table A.1. Full results are shown in Table A.2 in our appendix. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

on loneliness (*mediation*) results from the difference between the total effect and the direct effect.

The unemployment coefficient amounts to -0.514 after controlling for loneliness (direct effect). Compared to the specification in Column (2), the unemployment coefficient is reduced by 0.642 − 0.514 = 0.128 points. This *absolute* indirect effect of more than 0.1 points translates into a *relative* indirect effect of about 20% (0. 128/0.642 = 0.199). In other words, about 20% of unemployment's life-satisfaction cost is mediated by loneliness. This indirect effect is also statistically significant ($p < 0.001$).[11]

This large effect is consistent with von Scheve et al. (2017) finding that sadness (an emotion often related to loneliness) is significantly and lastingly impacted by unemployment while other emotions rapidly return to pre-unemployment levels. Luo (2020) employs a very similar approach using SOEP data. Starting from a coefficient of -0.619, Luo (2020, Table 3) finds that adding log household income lowers it to -0.561, while also adding financial satisfaction information reduces the coefficient to -0.379. In our regressions, household income is always included as a control (see Table A.2).

In Column (4), we replace the three-item loneliness scale with separate ratings for the three individual items. This allows for heterogeneity between the three items and uses categories instead of treating the loneliness answers as quasi-continuous to account for potential non-linearity.[12] The coefficient of unemployment status is -0.468, indicating that the mediation is even stronger than in the previous specification. The absolute indirect effect is 0.642 − 0.468 = 0.174 points, translating into a relative indirect effect of more than 25% (0. 174/0.642 = 0.271).

When we use the separate items in Column (4), we find support for the hypothesis that the three items are of different importance. Feeling socially isolated seems to have the strongest impact on life satisfaction. For example, *often* feeling socially isolated (compared to *never*) is associated with a life-satisfaction score lower by 0.822. In contrast, the coefficients are −0.439 for *often* feeling left out and −0.373 for *often* missing company (compared to *never*). Running the mediation analysis separately for the three single items also supports that social isolation seems more important in unemployment than feeling left out or missing company, which has already been indicated in the unconditional differences displayed in Table 1.

3.2 Heterogeneity

We split the sample to explore whether there are notable differences regarding loneliness's mediation role in unemployment's life-satisfaction cost. We consider comparisons of men

[11] In order to give a simple assessment of the indirect effect's statistical significance, we use the estimated standard errors and the Sobel formula. Note that the indirect effect can be computed alternatively by multiplying the coefficient of unemployment status on loneliness in the specification shown in Column (1) with the coefficient of loneliness on life satisfaction in the specification shown in Column (3): 0.792*(-0.161)=-0.128. The estimated standard error for this indirect effect is, which results into a Z-value of -0.128/0.007=-18.286 and $p<0.001$.

[12] We might encounter a multicollinearity problem when we use the three separate loneliness items in one specification. However, it turns out that the correlation coefficients of the three items range only between 0.46 and 0.61. Moreover, the variance inflation factors (VIFs) do not indicate multicollinearity problems. The VIFs for the separate loneliness variables range from 1.4 to 2.5 and values below 10 are conventionally seen as unproblematic (mean VIF for the entire model is only 2).

Table 3 Loneliness and unemployment's Life-Satisfaction cost: subsamples

	(1)		(2)		(3)		(4)	
	Loneliness		Life Satisfaction without a loneliness covariate		Life Satisfaction with aggregate loneliness as covariate		Life Satisfaction with three loneliness covariates	
Men								
Unemployed	0.707	***	-0.656	***	-0.544	***	-0.493	***
	(0.075)		(0.052)		(0.051)		(0.051)	
Control Variables	Yes		Yes		Yes		Yes	
N	11,561		11,561		11,561		11,561	
R^2	0.196		0.321		0.356		0.362	
Women								
Unemployed	0.878	***	-0.619	***	-0.475	***	-0.433	***
	(0.077)		(0.053)		(0.051)		(0.052)	
Control Variables	Yes		Yes		Yes		Yes	
N	11,323		11,323		11,323		11,323	
R^2	0.203		0.295		0.336		0.340	
East Germany								
Unemployed	0.538	***	-0.491	***	-0.398	***	-0.352	***
	(0.103)		(0.073)		(0.071)		(0.072)	
Control Variables	Yes		Yes		Yes		Yes	
N	4,741		4,741		4,741		4,741	
R^2	0.219		0.313		0.353		0.361	
West Germany								
Unemployed	0.867	***	-0.639	***	-0.503	***	-0.459	***
	(0.064)		(0.044)		(0.043)		(0.043)	
Control Variables	Yes		Yes		Yes		Yes	
N	18,143		18,143		18,143		18,143	
R^2	0.194		0.304		0.341		0.345	
College								
Unemployed	1.090	***	-0.795	***	-0.594	***	-0.525	***
	(0.138)		(0.094)		(0.091)		(0.092)	
Control Variables	Yes		Yes		Yes		Yes	
N	6,642		6,642		6,642		6,642	
R^2	0.204		0.295		0.346		0.351	
No College								
Unemployed	0.615	***	-0.513	***	-0.421	***	-0.385	***
	(0.061)		(0.042)		(0.041)		(0.042)	
Control Variables	Yes		Yes		Yes		Yes	
N	16,242		16,242		16,242		16,242	
R^2	0.198		0.308		0.341		0.345	

Notes: Results from pooled OLS regressions. The dependent variable in Column (1) is the three-item loneliness scale, ranging from 3 to 15. The dependent variable in Columns (2)-(4) is life satisfaction, ranging from 0 to 10. Column (2) does not include loneliness as a covariate. Column (3) includes the three-item scale, whereas Column (4) the individual items. All models include the covariates explained in Table A.1. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.10$

and women, East Germans and West Germans, and individuals with and without a college degree.

It seems reasonable to assume that some of Jahoda's (1981) by-products of employment have varying relevance to members of these subgroups. For example, providing personal identity and status is likely more critical for men and educated individuals (e.g., Winkelmann, 2014). In addition, when unemployment rates have historically been much higher in East Germany (e.g., Rinne & Schneider, 2017), this will presumably also affect the relevant social norms. This could imply that unemployed people in East Germany perceive less stigma than those in West Germany (e.g., Clark, 2003), which could influence their socializing activities. For individuals from a context with strong work norms and where identity relies on peoples' jobs, avoiding social contact after a job loss may seem like a reasonable coping strategy. However, this coping strategy will induce loneliness and thereby reduce life satisfaction.

We find that the main results discussed previously (Table 2) hold for each subsample (Table 3). Unemployment significantly correlates with loneliness and life satisfaction for men, women, respondents in East and West Germany, and people with and without a college degree. More importantly, the results for all subsamples confirm that loneliness is a crucial mediator of how unemployment affects life satisfaction.

Using loneliness as the dependent variable in Column (1) in Table 3, we obtain a positive and significant coefficient for the unemployment status in all subsamples. Whereas the coefficients for men and women are not significantly different from each other (overlapping 95% confidence intervals, coefficient of the interaction term "female*unemployed" insignificant in joint sample estimate), the coefficients for East vs. West Germany and individuals with vs. without a college degree differ significantly (no overlap of 95% confidence intervals, coefficients of the interaction terms "subsample*unemployed" are significant at $p<0.05$ in joint sample estimates). The conditional correlation is larger in West than East Germany and larger for people with than without a college degree.

Regarding the life satisfaction regressions, the total unemployment effects in Column (2) and the direct effects in Columns (3) and (4) are negative and significant in all subsamples. Considering the 95% confidence intervals of the estimated coefficients in Column (2), we find that they overlap only for the subsample comparison between men and women. When estimating the regression for the total effect in Column (2) with additional interaction terms "subsample*unemployed" for the joint sample, the coefficients of the interaction terms are significant at $p=0.06$ for men vs. women, at $p=0.10$ for college vs. no college, and insignificant for East vs. West Germany.

The magnitude of the indirect effect (difference between total effect in Column (2) and direct effect in Column (3)), namely unemployment's life-satisfaction cost due to induced loneliness, varies across subsamples. The indirect effect amounts to 23.3% of the total effect for women and 17.1% for men. For people with a college degree, the indirect effect amounts to 25.3% of the total effect. In contrast, for people without a college degree, it is 17.9%. In West Germany, the indirect effect amounts to 21.3% of the total effect; in East Germany, it is only 18.9%. The smaller influence of loneliness in East Germany and among people without college degrees is consistent with less pronounced social norms.

We note that the indirect effects in Tables 2 and 3 seem larger when we employ the three loneliness covariates instead of the aggregate one. This suggests that avoiding the loss of

information associated with the use of the aggregate measure is important to come closer to unemployment's life-satisfaction cost net of the loneliness implications.

To explore whether a higher regional unemployment rate moderates how unemployment influences loneliness, we ran additional regressions where we interacted the individual unemployment status with the unemployment rate at the regional level (federal state - year).[13] In the pooled OLS regressions, the positive correlation between loneliness and individual unemployment is smaller when the regional unemployment rate is higher. This moderation supports the relevance of social norms and is consistent with the reported differences between East and West Germany. We do not find a significant moderation for the relationships involving life satisfaction.

3.3 Robustness Checks

Our first set of robustness checks considers the event job loss since January 1st of the previous year and unemployment experience in years as a substitute for the unemployment status. The results are shown in Table A.3 in our appendix. We find that having lost a job recently and having more unemployment experience are significantly and positively correlated with loneliness and significantly and negatively with life satisfaction.

The mediation effects seem stronger for the job loss variable. In Column (2) of Table A.3, we find that people who lost their job within the last year are on average 0.161 points less satisfied with life (total effect) of which $0.161-0.114=0.047$ points or 29.2% ($0.047/0.161=0.292$) are mediated by the three-item loneliness score in Column (3). When using the three loneliness items separately in Column (4), $0.161-0.107=0.054$ points or 33.5% ($0.054/0.161=0.335$) of unemployment's life-satisfaction cost is mediated by loneliness. For unemployment experience in years, we can find similar mediation via loneliness of approximately 20% (0.009/0.05) or 27% (0.013/0.05), respectively. Our findings on unemployment experience are consistent with longer lasting scars from unemployment (e.g., Filomena, 2024).

A job loss can result for different reasons, and this heterogeneity may be relevant. Table A.4 lists regression results distinguishing different reasons for job loss. Although we have 2,388 job losses in the data, some kinds of job loss are rare: 126 job losses after firm closures, 418 job losses after a layoff by their employer, 932 quits by employees, 237 job losses after a mutual agreement, and 675 other reasons we do not know including missing values. We only report estimates for the different job-loss reasons because the coefficients of the other variables are very similar to those in Table A.3. We find a significant association between the different reasons for job loss and loneliness, which is largest for layoffs. We find a significant negative association between job loss and life satisfaction for job losses after firm closures and layoffs (i.e., clearly involuntary job losses). For people laid off within the last year, we find a mediation via loneliness of $0.347-0.244=0.103$ points or 29.7% ($0.103/0.347=0.297$) by the multi-item loneliness scale and of $0.347-0.226=0.121$ points or 34.9% ($0.121/0.347=0.349$) by the separated loneliness scales, respectively.

[13] For brevity, we do not present these regression results here. They are available upon request from the authors. Our data is not well suited to study regional differences such as unemployment rates at the level of 16 federal states. With only two years due to the availability of our loneliness variable, the variance of regional characteristics is rather low (only $2*16=32$ data points).

As a next step, we focus on within-subject changes using individual fixed effects. The idea is that an individual's loneliness or life satisfaction changes over time when the unemployment status changes. Despite the marked reduction of our estimating sample and the low within variance of status changes (93 left unemployment and 71 entered unemployment from 2013 to 2017), the results still support our main findings (Table A.5). The estimated coefficients for the unemployment status are only slightly smaller than in the full sample without fixed-effects (shown in Table A.2). They are still significant and sizeable with 0.618 in Column (1), -0.596 in Column (2), -0.514 in Column (3), and −0.491 in Column (4), which indicate a significant mediation of unemployment via loneliness by almost 0.1 points or 20%.

As a final robustness check, we address concerns about treating the dependent variable as continuous. In Table A.6, we present results from ordered probit regressions. They are qualitatively the same as our main results.

4 Conclusion

Unemployment reduces life satisfaction markedly and lastingly. Unemployment's life-satisfaction cost differs across contexts and individuals. We hypothesize that unemployment induces loneliness and that loneliness reduces life satisfaction. Our loneliness measure builds on both a *quantitative* lack of social connections and a *qualitative* dissatisfaction with existing relationships.

Our correlational results are consistent with our hypotheses. The share of unemployment's life-satisfaction cost attributable to loneliness amounts to about 20% of the total life-satisfaction loss. The relevance of the indirect effect differs across important social groups. For example, it is more relevant for college graduates and less relevant for East Germans. These results are consistent with the idea that expectations about stigmatization of the unemployed in contexts with strong work norms lead to self-selected social exclusion.

We believe policies designed to improve the well-being of unemployed people are important (e.g., Winkelmann, 2014). Our results can inform policymakers. Policies meant to manage loneliness can be instrumental in lowering the adverse effects of unemployment. For example, the Ministry for Family Affairs, Senior Citizens, Women and Youth in Germany supported sports clubs in the context of the government's "strategy against loneliness" to showcase the potential of sports and sports clubs as hubs for social interaction and community building. Such activities may help addressing loneliness, and thereby limit unemployment's life-satisfaction cost.

The importance of loneliness may also induce a re-assessment of more traditional policies. Whereas the provision of income support during unemployment tackles the loss of employment's income-generating function, it does not help alleviate the life-satisfaction cost of the loneliness induced by unemployment. In contrast, loneliness induced by unemployment can be at least partially addressed by subsidized employment. However, this instrument probably cannot ensure re-capturing all work-related identity or social-contact benefits. The social dimension of training programs may also help cast a more positive light on these labor market policies (e.g., Card et al., 2018), although it remains to be explored whether participation in such programs can effectively lower loneliness.

5 Appendix

Table A.1 Definitions and descriptive statistics for complete sample

	Mean	SD	Min	Max
Loneliness	5.894	2.154	3	15
Feel socially isolated:				
Never	0.598		0	1
Seldom	0.272		0	1
Sometimes	0.093		0	1
Often	0.029		0	1
Very often	0.008		0	1
Feel left out:				
Never	0.294		0	1
Seldom	0.460		0	1
Sometimes	0.193		0	1
Often	0.045		0	1
Very often	0.008		0	1
Miss company of others:				
Never	0.193		0	1
Seldom	0.406		0	1
Sometimes	0.319		0	1
Often	0.067		0	1
Very often	0.014		0	1
Life satisfaction (Likert 0–10)	7.342	1.599	0	10
Unemployed	0.070		0	1
Job end last year (dummy)	0.104		0	1
Unemployment experience in years	1.097	2.896	0	35
Health status:				
Very good	0.106		0	1
Good	0.448		0	1
Satisfactory	0.313		0	1
Poor	0.113		0	1
Bad	0.019		0	1
Female (dummy)	0.495		0	1
Direct or indirect migration background (dummy)	0.215		0	1
Secondary schooling degree:				
Low (dummy)	0.190		0	1
Mid (dummy)	0.343		0	1
High (dummy)	0.348		0	1
Apprenticeship degree (dummy)	0.692		0	1
College degree (dummy)	0.290		0	1
Age Group				
18–29 years	0.105		0	1
30–49 years	0.514		0	1
50–65 years	0.381		0	1
Household income per capita (in 1000 real 2015 Euros)	1.440	4.674	0	490
Number of persons in the household	2.882	1.333	1	13
Children < 16 years in the household (dummy)	0.400		0	1

Table A.1 Definitions and descriptive statistics for complete sample

	Mean	SD	Min	Max
Married (dummy)	0.632		0	1
Divorced (dummy)	0.111		0	1
Widowed (dummy)	0.015		0	1
Number of close friends	4.066	3.415	0	99
Participation (at least monthly) in:				
Sports	0.542		0	1
Volunteering	0.208		0	1
Policy	0.030		0	1
Religion	0.145		0	1
Risk-taking preference (Likert 0–10)	4.841	2.339	0	10
Big 5 on a seven-item scale:				
Openness	4.647	1.159	1	7
Conscientiousness	5.840	0.879	1	7
Extraversion	4.934	1.135	1	7
Agreeableness	5.343	0.951	1	7
Neuroticism	3.706	1.211	1	7
Survey years = 2013	0.379		0	1
Survey years = 2017	0.621		0	1
Federal state:				
Schleswig-Holstein	0.032		0	1
Hamburg	0.017		0	1
Lower Saxony	0.095		0	1
Bremen	0.007		0	1
North Rhine-Westphalia	0.198		0	1
Hesse	0.071		0	1
Rhineland-Palatinate	0.046		0	1
Baden-Wuerttemberg	0.115		0	1
Bavaria	0.161		0	1
Saarland	0.009		0	1
Berlin	0.040		0	1
Brandenburg	0.038		0	1
Mecklenburg-Western Pomerania	0.022		0	1
Saxony	0.069		0	1
Saxony-Anhalt	0.038		0	1
Thuringia	0.040		0	1

Table A.2 Loneliness and unemployment's Life-Satisfaction cost: complete results

	(1)	(2)	(3)	(4)
	Loneliness	Life Satisfaction without a loneliness covariate	Life Satisfaction with aggregate loneliness as covariate	Life Satisfaction with three loneliness covariates
Unemployed	0.792 ***	-0.642 ***	-0.514 ***	-0.468 ***
	(0.054)	(0.037)	(0.036)	(0.036)
Loneliness			-0.161 ***	
			(0.004)	

Table A.2 Loneliness and unemployment's Life-Satisfaction cost: complete results

	(1)		(2)		(3)		(4)	
Feel socially isolated								
Seldom							-0.245	***
							(0.023)	
Sometimes							-0.503	***
							(0.036)	
Often							-0.822	***
							(0.060)	
Very often							-0.757	***
							(0.120)	
Feel left out								
Seldom							-0.016	
							(0.024)	
Sometimes							-0.179	***
							(0.032)	
Often							-0.439	***
							(0.053)	
Very often							-0.777	***
							(0.117)	
Miss company of others								
Seldom							-0.060	**
							(0.026)	
Sometimes							-0.183	***
							(0.029)	
Often							-0.373	***
							(0.043)	
Very often							-0.558	***
							(0.084)	
Health status								
Good	0.218	***	-0.366	***	-0.331	***	-0.347	***
	(0.045)		(0.031)		(0.030)		(0.030)	
Satisfactory	0.557	***	-0.964	***	-0.874	***	-0.891	***
	(0.048)		(0.033)		(0.032)		(0.032)	
Poor	0.931	***	-1.681	***	-1.531	***	-1.531	***
	(0.058)		(0.040)		(0.039)		(0.039)	
Bad	1.437	***	-2.866	***	-2.635	***	-2.595	***
	(0.103)		(0.071)		(0.070)		(0.070)	
Female (dummy)	0.084	***	0.107	***	0.121	***	0.119	***
	(0.028)		(0.019)		(0.019)		(0.019)	
Direct or indirect migration background (dummy)	0.075	*	0.091	***	0.103	***	0.112	***
	(0.042)		(0.029)		(0.028)		(0.028)	
Secondary schooling								
Low	-0.450	***	-0.190	***	-0.262	***	-0.261	***
	(0.058)		(0.040)		(0.039)		(0.039)	
Mid	-0.466	***	-0.173	***	-0.248	***	-0.255	***
	(0.057)		(0.039)		(0.038)		(0.038)	
High	-0.545	***	-0.127	***	-0.215	***	-0.226	***
	(0.057)		(0.039)		(0.038)		(0.038)	

Table A.2 Loneliness and unemployment's Life-Satisfaction cost: complete results

	(1)		(2)		(3)		(4)	
Apprenticeship degree (dummy)	0.014		-0.069	***	-0.067	***	-0.075	***
	(0.035)		(0.024)		(0.023)		(0.023)	
College degree (dummy)	-0.053		0.029		0.020		0.012	
	(0.039)		(0.027)		(0.026)		(0.026)	
Age group 30–49 years	0.048		-0.153	***	-0.145	***	-0.143	***
	(0.050)		(0.035)		(0.034)		(0.033)	
Age group 50–65 years	-0.103	*	-0.155	***	-0.172	***	-0.167	***
	(0.055)		(0.038)		(0.037)		(0.037)	
Household income per capita (in 1000 real Euros 2015)	-0.006	**	0.006	***	0.005	**	0.005	**
	(0.003)		(0.002)		(0.002)		(0.002)	
No. of persons in the household	-0.089	***	0.056	***	0.042	***	0.043	***
	(0.014)		(0.009)		(0.009)		(0.009)	
Children < 16 years in the household (dummy)	0.150	***	-0.042		-0.017		-0.017	
	(0.038)		(0.027)		(0.026)		(0.026)	
Married (dummy)	-0.306	***	0.259	***	0.209	***	0.202	***
	(0.039)		(0.027)		(0.026)		(0.026)	
Divorced (dummy)	0.116	**	0.016		0.035		0.038	
	(0.051)		(0.035)		(0.035)		(0.034)	
Widowed (dummy)	0.077		0.019		0.031		0.020	
	(0.111)		(0.077)		(0.075)		(0.075)	
No. of close friends	-0.024	***	0.018	***	0.014	***	0.013	***
	(0.004)		(0.003)		(0.003)		(0.003)	
Participation (at least monthly) in								
Sports	-0.071	***	0.078	***	0.067	***	0.055	***
	(0.027)		(0.019)		(0.018)		(0.018)	
Volunteering	0.048		0.040	*	0.048	**	0.037	
	(0.034)		(0.023)		(0.023)		(0.023)	
Policy	0.034		-0.064		-0.059		-0.054	
	(0.078)		(0.054)		(0.052)		(0.052)	
Religion	0.113	***	0.113	***	0.131	***	0.126	***
	(0.039)		(0.027)		(0.026)		(0.026)	
Risk-taking preference	0.018	***	0.013	***	0.016	***	0.016	***
	(0.006)		(0.004)		(0.004)		(0.004)	
Openness	0.054	***	0.060	***	0.068	***	0.069	***
	(0.012)		(0.008)		(0.008)		(0.008)	
Conscientiousness	-0.185	***	0.102	***	0.072	***	0.078	***
	(0.016)		(0.011)		(0.011)		(0.011)	
Extraversion	-0.276	***	0.113	***	0.068	***	0.067	***
	(0.013)		(0.009)		(0.009)		(0.009)	
Agreeableness	-0.089	***	0.092	***	0.078	***	0.078	***
	(0.014)		(0.010)		(0.010)		(0.010)	
Neuroticism	0.402	***	-0.218	***	-0.153	***	-0.155	***
	(0.012)		(0.008)		(0.008)		(0.008)	
Survey years								
2017	-0.161	***	0.114	***	0.088	***	0.092	***
	(0.027)		(0.019)		(0.018)		(0.018)	

Table A.2 Loneliness and unemployment's Life-Satisfaction cost: complete results

	(1)		(2)		(3)		(4)	
Federal states								
Hamburg	-0.451	***	0.058		-0.015		-0.000	
	(0.121)		(0.083)		(0.081)		(0.081)	
Lower Saxony	-0.014		-0.072		-0.074		-0.064	
	(0.082)		(0.057)		(0.055)		(0.055)	
Bremen	0.173		-0.133		-0.105		-0.094	
	(0.165)		(0.114)		(0.111)		(0.110)	
North Rhine-Westphalia	-0.288	***	-0.122	**	-0.168	***	-0.154	***
	(0.077)		(0.053)		(0.052)		(0.052)	
Hesse	-0.044		-0.154	***	-0.162	***	-0.161	***
	(0.086)		(0.059)		(0.058)		(0.058)	
Rhineland-Palatinate	-0.149		-0.233	***	-0.257	***	-0.242	***
	(0.093)		(0.064)		(0.062)		(0.062)	
Baden-Wuerttemberg	-0.184	**	-0.220	***	-0.250	***	-0.235	***
	(0.081)		(0.056)		(0.054)		(0.054)	
Bavaria	-0.049		-0.158	***	-0.166	***	-0.159	***
	(0.078)		(0.054)		(0.053)		(0.052)	
Saarland	-0.051		-0.203	*	-0.211	**	-0.219	**
	(0.153)		(0.106)		(0.103)		(0.102)	
Berlin	0.051		-0.304	***	-0.296	***	-0.292	***
	(0.096)		(0.066)		(0.064)		(0.064)	
Brandenburg	-0.023		-0.286	***	-0.290	***	-0.282	***
	(0.097)		(0.067)		(0.065)		(0.065)	
Mecklenburg-Western Pomerania	0.152		-0.216	***	-0.191	**	-0.186	**
	(0.112)		(0.078)		(0.075)		(0.075)	
Saxony	-0.181	**	-0.289	***	-0.318	***	-0.308	***
	(0.087)		(0.060)		(0.058)		(0.058)	
Saxony-Anhalt	-0.134		-0.379	***	-0.400	***	-0.394	***
	(0.097)		(0.067)		(0.065)		(0.065)	
Thuringia	0.147		-0.299	***	-0.275	***	-0.258	***
	(0.096)		(0.066)		(0.064)		(0.064)	
Constant	7.626	***	6.819	***	8.049	***	7.421	***
	(0.174)		(0.120)		(0.122)		(0.120)	
N	22,884		22,884		22,884		22,884	
R^2	0.197		0.306		0.344		0.348	

Table A.3 Loneliness and unemployment's Life-Satisfaction cost: replacing unemployment status with job loss and unemployment experience

	(1)		(2)		(3)		(4)	
	Loneliness		Life Satisfaction without a loneliness covariate		Life Satisfaction with aggregate loneliness as covariate		Life Satisfaction with three loneliness covariates	
Job end last year (dummy)	0.287	***	-0.161	***	-0.114	***	-0.107	***
	(0.043)		(0.029)		(0.029)		(0.029)	
Unemployment experience (years)	0.061	***	-0.049	***	-0.040	***	-0.036	***

Table A.3 Loneliness and unemployment's Life-Satisfaction cost: replacing unemployment status with job loss and unemployment experience

	(1) Loneliness	(2) Life Satisfaction without a loneliness covariate	(3) Life Satisfaction with aggregate loneliness as covariate	(4) Life Satisfaction with three loneliness covariates
	(0.005)	(0.003)	(0.003)	(0.003)
Loneliness			-0.162 ***	
			(0.004)	
Feel socially isolated				
Seldom				-0.248 ***
				(0.023)
Sometimes				-0.513 ***
				(0.036)
Often				-0.835 ***
				(0.060)
Very often				-0.782 ***
				(0.120)
Feel left out				
Seldom				-0.010
				(0.024)
Sometimes				-0.170 ***
				(0.032)
Often				-0.427 ***
				(0.053)
Very often				-0.774 ***
				(0.117)
Miss company of others				
Seldom				-0.063 **
				(0.026)
Sometimes				-0.187 ***
				(0.029)
Often				-0.377 ***
				(0.043)
Very often				-0.561 ***
				(0.084)
Control Variables	Yes	Yes	Yes	Yes
N	22,884	22,884	22,884	22,884
R^2	0.197	0.305	0.343	0.347

Table A.4 Loneliness and unemployment's Life-Satisfaction cost: replacing unemployment status with job loss and unemployment experience

	(1) Loneliness	(2) Life Satisfaction without a loneliness covariate	(3) Life Satisfaction with aggregate loneliness as covariate	(4) Life Satisfaction with three loneliness covariates
Firm closure (dummy)	0.292 *	-0.489 ***	-0.441 ***	-0.448 ***
	(0.173)	(0.119)	(0.116)	(0.116)

Table A.4 Loneliness and unemployment's Life-Satisfaction cost: replacing unemployment status with job loss and unemployment experience

	(1)		(2)		(3)		(4)	
	Loneliness		Life Satisfaction without a loneliness covariate		Life Satisfaction with aggregate loneliness as covariate		Life Satisfaction with three loneliness covariates	
Layoff (dummy)	0.643	***	-0.347	***	-0.244	***	-0.226	***
	(0.096)		(0.066)		(0.065)		(0.064)	
Quit (dummy)	0.145	**	-0.009		0.014		0.018	
	(0.065)		(0.045)		(0.044)		(0.044)	
Mutual agreement (dummy)	0.346	***	-0.052		0.004		-0.001	
	(0.126)		(0.087)		(0.085)		(0.085)	
Other (dummy)	0.240	***	-0.232	***	-0.193	***	-0.181	***
	(0.076)		(0.053)		(0.051)		(0.051)	
Control variables	Yes		Yes		Yes		Yes	
N	22,884		22,884		22,884		22,884	
R^2	0.197		0.306		0.344		0.348	

Table A.5 Loneliness and unemployment's Life-Satisfaction Cost: Fixed-effects regressions

	(1)		(2)		(3)		(4)	
	Loneliness		Life Satisfaction without a loneliness covariate		Life Satisfaction with aggregate loneliness as covariate		Life Satisfaction with three loneliness covariates	
Unemployed	0.618	***	-0.596	***	-0.514	***	-0.491	***
	(0.179)		(0.157)		(0.154)		(0.156)	
Loneliness					-0.133	***		
					(0.012)			
Feel socially isolated								
Seldom							-0.184	***
							(0.043)	
Sometimes							-0.373	***
							(0.082)	
Often							-0.447	***
							(0.152)	
Very often							-0.923	**
							(0.361)	
Feel left out								
Seldom							-0.006	
							(0.042)	
Sometimes							-0.145	**
							(0.063)	
Often							-0.275	***
							(0.112)	
Very often							-0.425	*
							(0.366)	
Miss company of others								
Seldom							0.011	

Table A.5 Loneliness and unemployment's Life-Satisfaction Cost: Fixed-effects regressions

	(1)		(2)		(3)		(4)	
	Loneliness		Life Satisfaction without a loneliness covariate		Life Satisfaction with aggregate loneliness as covariate		Life Satisfaction with three loneliness covariates	
							(0.047)	
Sometimes							-0.182	***
							(0.057)	
Often							-0.410	***
							(0.098)	
Very often							-0.722	**
							(0.235)	
Control Variables	Yes		Yes		Yes		Yes	
Observations	9978		9978		9978		9978	
Groups	4989		4989		4989		4989	
R^2 (within)	0.067		0.111		0.141		0.147	

Table A.6 Loneliness and unemployment's Life-Satisfaction Cost: Ordered probit regressions

	(1)		(2)		(3)		(4)	
	Loneliness		Life Satisfaction without a loneliness covariate		Life Satisfaction with aggregate loneliness as covariate		Life Satisfaction with three loneliness covariates	
Unemployed	0.354	***	-0.407	***	-0.326	***	-0.313	***
	(0.028)		(0.029)		(0.029)		(0.029)	
Loneliness					-0.119	***		
					(0.004)			
Feel socially isolated								
Seldom							-0.202	***
							(0.018)	
Sometimes							-0.367	***
							(0.029)	
Often							-0.508	***
							(0.048)	
Very often							-0.330	***
							(0.095)	
Feel left out								
Seldom							-0.039	**
							(0.019)	
Sometimes							-0.154	***
							(0.026)	
Often							-0.299	***
							(0.042)	
Very often							-0.478	***
							(0.093)	
Miss company of others								
Seldom							-0.071	***
							(0.021)	

Table A.6 Loneliness and unemployment's Life-Satisfaction Cost: Ordered probit regressions

	(1) Loneliness	(2) Life Satisfaction without a loneliness covariate	(3) Life Satisfaction with aggregate loneliness as covariate	(4) Life Satisfaction with three loneliness covariates	
Sometimes				-0.192	***
				(0.023)	
Often				-0.306	***
				(0.035)	
Very often				-0.410	***
				(0.067)	
Control Variables	Yes	Yes	Yes	Yes	
cut1	-2.162	-3.075	-4.112	-3.721	
	(0.093)	(0.108)	(0.113)	(0.112)	
cut2	-1.665	-2.725	-3.747	-3.358	
	(0.093)	(0.101)	(0.106)	(0.104)	
cut3	-1.084	-2.298	-3.299	-2.910	
	(0.093)	(0.097)	(0.102)	(0.100)	
cut4	-0.473	-1.855	-2.831	-2.440	
	(0.093)	(0.095)	(0.100)	(0.098)	
cut5	-0.031	-1.533	-2.490	-2.099	
	(0.093)	(0.095)	(0.099)	(0.098)	
cut6	0.360	-0.917	-1.848	-1.454	
	(0.093)	(0.094)	(0.098)	(0.097)	
cut7	0.782	-0.477	-1.393	-0.997	
	(0.093)	(0.094)	(0.098)	(0.097)	
cut8	1.113	0.301	-0.592	-0.194	
	(0.094)	(0.094)	(0.098)	(0.097)	
cut9	1.402	1.459	0.590	0.989	
	(0.095)	(0.094)	(0.098)	(0.097)	
cut10	1.727	2.476	1.619	2.017	
	(0.097)	(0.095)	(0.099)	(0.098)	
cut11	1.966				
	(0.099)				
cut12	2.178				
	(0.103)				
N	22,884	22,884	22,884	22,884	
Pseudo R^2	0.051	0.099	0.112	0.113	

Author Contributions All authors contributed to the study's conception and design. Christian Pfeifer performed material preparation, data collection, and analysis. Tim Friehe wrote the manuscript draft, and both authors commented on previous versions. All authors read and approved the final manuscript.

Funding Open Access funding enabled and organized by Projekt DEAL.

Data Availability This paper uses data from the German Socio-Economic Panel (doi: https://doi.org/10.5684/soep.core.v36eu). Details of the data set are provided here: https://www.diw.de/en/diw_01.c.814095.en/edition/soep-core_v36eu__data_1984-2019__eu_edition.html. Instructions for accessing the data can be found here: https://www.diw.de/en/diw_01.c.601584.en/data_access.html.

Declarations

Compliance of Ethical standard/Informed Consent This study reports results from analyses of pre-existing survey data. Participants volunteered and were fully informed.

Competing Interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Conflict of interest The authors declare no competing interests when conducting the research.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Barjaková, M., Garnero, A., & d'Hombres, B. (2023). Risk factors for loneliness: A literature review. *Social Science & Medicine*, *334*, 116163.

Barreto, M., Victor, C., Hammond, C., Eccles, A., Richins, M. T., & Qualter, P. (2021). Loneliness around the world: Age, gender, and cultural differences in loneliness. *Personality and Individual Differences*, *169*, 110066.

Blanchflower, D. G., Bell, D. N. F., Montagnoli, A., & Moro, M. (2014). The happiness trade-off between unemployment and inflation. *Journal of Money Credit and Banking*, *46*, 117–141.

Card, D., Kluve, J., & Weber, A. (2018). What works? A meta-analysis of recent labor market program evaluations. *Journal of the European Economic Association*, *16*, 894–931.

Clark, A. E. (2003). Unemployment as a social norm: Psychological evidence from panel data. *Journal of Labor Economics*, *21*, 232–351.

Clark, A. E. (2018). Four decades of the economics of happiness: Where next? *Review of Income and Wealth*, *64*, 245–269.

Di Tella, R., MacCulloch, R. J., & Oswald, A. J. (2001). Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review*, *91*, 335–341.

Doiron, D., & Mendolia, S. (2012). The impact of job loss on family dissolution. *Journal of Population Economics*, *25*, 367–398.

Filomena, M. (2024). Unemployment scarring effects: An overview and meta-analysis of empirical studies. *Italian Economic Journal*, *10*, 459–518.

Fors Connolly, F., & Gärling, T. (2022). Mediators of differences between employed and unemployed in life satisfaction and emotional well-being. *Journal of Happiness Studies*, *23*, 1637–1651.

Frijters, P., Clark, A. E., Krekel, C., & Layard, R. (2020). A happy choice: Wellbeing as the goal of government. *Behavioural Public Policy*, *4*, 126–165.

Goebel, J., Grabka, M. M., Liebig, S., Kroh, M., Richter, D., Schröder, C., & Schupp, J. (2019). The German Socio-Economic panel (SOEP). *Jahrbücher Für Nationalökonomie Und Statistik*, *239*, 345–360.

Hahn, E., Specht, J., Gottschling, J., & Spinath, F. M. (2015). Coping with unemployment: The impact of unemployment duration and personality on trajectories of life satisfaction. *European Journal of Personality*, *29*, 635–646.

Hamermesh, D. S. (2020). Life satisfaction, loneliness and togetherness, with an application to Covid-a19 lock-downs. *Review of Economics of the Household*, *18*, 983–1000.

Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annuals of Behavioral Medicine*, *40*, 218–227.

Helliwell, J. F., & Huang, H. (2014). New measures of the costs of unemployment: Evidence from the subjective well-being of 3.3 million Americans. *Economic Inquiry*, *52*, 1485–1502.

Hetschko, C., Knabe, A., & Schöb, R. (2014). Changing identity: Retiring from unemployment. *Economic Journal*, *124*, 149–166.

Hetschko, C., Knabe, A., & Schöb, R. (2021). Happiness, work, and identity. In K. F. Zimmermann (Ed.), *Handbook of labor*. Human Resources and Population Economics. Springer.
Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: A meta-analytic review. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *10*, 227–237.
Hong, J. H., Nakamura, J. S., Sahakari, S. S., Chopik, W. J., Shiba, K., Van der Weele, T. J., & Kim, E. S. (2024). The silent epidemic of loneliness: Identifying the antecedents of loneliness using a lagged exposure-wide approach. *Psychological Medicine*, *54*, 1519–1532.
Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging*, *26*, 655–672.
Hutten, E., Jongen, E. M. M., Hajema, K., Ruiter, R. A. C., Hamers, F., & Bos, A. E. R. (2022). Risk factors of loneliness across the life span. *Journal of Social and Personal Relationships*, *39*, 1482–1507.
Jahoda, M. (1981). Work, employment, and unemployment: Values, theories, and approaches in social research. *American Psychologist*, *36*, 184–191.
Kim, K. (2025). Impacts of extended unemployment on life satisfaction of young adults through social exclusion and loneliness: Moderating roles of parental socioeconomic status. *Social Indicators Research*, *176*, 309–335.
Kunze, L., & Suppa, N. (2017). Bowling alone or bowling at all? The effect of unemployment on social participation. *Journal of Economic Behavior and Organization*, *133*, 213–235.
Lawes, M., Hetschko, C., Schöb, R., Stephan, G., & Eid, M. (2024). Examining interindividual differences in unemployment-related changes in subjective well-being: The role of psychological well-being and re-employment expectations. *European Journal of Personality*. https://doi.org/10.1177/08902070241231
Leopold, L., Leopold, T., & Lechner, C. M. (2017). Do immigrants suffer more from job loss? Unemployment and subjective wee-being in Germany. *Demography*, *54*, 231–257.
Lepinteur, A., Clark, A. E., Ferrer-i-Carbonell, A., Piper, A., Schröder, C., & D'Ambrosio, C. (2022). Gender, loneliness and happiness during Covid-19. *Journal of Behavioral and Experimental Economics*, *101*, 101952.
Longhi, S., Nandi, A., Bryan, M., Connolly, S., & Gedikli, C. (2024). Life satisfaction and unemployment – The role of gender attitudes and work identity. *Scottish Journal of Political Economy*, *71*, 219–236.
Luhmann, M., & Schupp, J. (2015). Loneliness Scale-SOEP. In C. J. Kemper, E. Brähler, & M. Zenger (Eds.), *Psychologische und sozialwissenschaftliche kurzskalen. Standardisierte erhebungsinstrumente für wissenschaft und praxis*. Medizinisch Wissenschaftliche Verlagsgesellschaft.
Luo, J. (2020). A pecuniary explanation for the heterogeneous effects of unemployment on happiness. *Journal of Happiness Studies*, *21*, 2603–2628.
MacKerron, G. (2012). Happiness economics from 35000 feet. *Journal of Economic Surveys*, *26*, 705–735.
Maes, M., Qualter, P., Lodder, G. M., & Mund, M. (2022). How (Not) to measure loneliness: A review of the eight most commonly used scales. *International Journal of Environmental Research and Public Health*, *19*, 10816.
Martella, D., & Maass, A. (2000). Unemployment and life satisfaction: The moderating role of time structure and collectivism. *Journal of Applied Social Psychology*, *30*, 1095–1108.
Mauri, C., Barjaková, M., & Berlingieri, F. (2024). Measuring loneliness: The European union loneliness survey covering 27 European countries. In S. V. Schnepf, B. d'Hombres, & C. Mauri (Eds.), *Loneliness in europe: Determinants, risks and interventions*. Springer.
Morrish, N., & Medina-Lara, A. (2021). Does unemployment lead to greater levels of loneliness? A systematic review. *Social Science & Medicine*, *287*, 114339.
Morrish, N., Mujica-Mota, R., & Medina-Lara, A. (2022). Understanding the effect of loneliness on unemployment: Propensity score matching. *Bmc Public Health*, *22*, 740.
Osborne, E., Hassell, C., Martin, G., & Cochrane, A. (2018). *Testing of loneliness questions in surveys: Overview of our loneliness question testing, methodology and findings*. UK Office for National Statistics.
Pohlan, L. (2019). Unemployment and social exclusion. *Journal of Economic Behavior and Organization*, *164*, 273–299.
Powdthavee, N. (2012). Jobless, friendless and broke: What happens to different areas of life before and after unemployment? *Economica*, *79*, 557–575.
Rinne, U., & Schneider, H. (2017). The labor market in Germany, 2000–2016. IZA World of Labor 379.
Rözer, J. J., Hofstra, B., Brashears, M. E., & Volker, B. (2020). Does unemployment lead to isolation? The consequences of unemployment for social networks. *Social Networks*, *63*, 100–111.
Suppa, N. (2021). Unemployment and subjective well-being. In K. F. Zimmermann (Ed.), *Handbook of labor*. Human Resources and Population. Springer.
Van Baarsen, B. (2002). Theories on coping with loss: The impact of social support and Self-Esteem on adjustment to emotional and social loneliness following a partner's death in later life. *Journals of Gerontology Series B*, *57*, S33–S42.

Von Scheve, C., Esche, F., & Schupp, J. (2017). The emotional timeline of unemployment: Anticipation, reaction, and adaptation. *Journal of Happiness Studies*, *18*, 1231–1254.
Winkelmann, R. (2009). Unemployment, social capital, and subjective well-being. *Journal of Happiness Studies*, *10*, 421–430.
Winkelmann, R. (2014). *Unemployment and happiness* (Vol. 94). IZA World of Labor.
Winkelmann, L., & Winkelmann, R. (1998). Why are the unemployed so unhappy? Evidence from panel data. *Economica*, *65*, 1–15.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.