



Research article

Has Covid-19 left an imprint on our levels of life satisfaction? Empirical evidence from the Netherlands

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A B S T R A C T

Many papers have investigated the effects of Covid-19 on people's well-being shortly after the epidemic's outbreak. In this article, we use the joint World Values Survey (WVS) and European Value Study (EVS) 2017–2022 dataset and employ OLS (Ordinary Least Squares) regressions and Coarsened Exact Matching, to evaluate the possible existence of a persistent effect on life satisfaction, two years after the start of the pandemic. We have chosen to focus on the Netherlands -a country which appears among the happiest in the world and for which we have available data- to assess the impact of the Covid-19 pandemic at this later stage. The results of our analysis seem to indicate that the pandemic has contributed to reducing the levels of life satisfaction significantly, particularly among the younger generation. These findings show that specific intervention programmes should be created focusing on different age groups.

1. Introduction

The year 2020 was hit by the Covid-19 outbreak, an infectious disease, which spread quickly from one country to another, from one continent to another part of the world, causing an ever-rising death toll. Consequently, national authorities around the world ordered lockdowns as a measure to avoid contamination, save lives and prevent the collapse of national health systems. These confinements lasted several months. They caused both economic damages in major economies, characterised by huge output drops and its inevitable loss of job [1,2] and many social detrimental consequences such as depression, anxiety, a rise in domestic violence [3] and an increase in mental and health problems among the population [4].

Some governments, particularly in OECD countries, put in place financial compensations systems-especially job retention schemes- to reduce the impact of the lockdown measures and allow people to maintain their income levels.¹ Children and students of different ages were left with no other choice than to follow their classes online, whether they had adequate internet connections and computer equipment or not. Companies were encouraged by their national authorities to let their employees work from home, which on occasions created additional problems to workers with big families and small homes. Works such as [5] show that employees may decrease their engagement when their work setting becomes more distracting.

Since the virus appeared, policymakers have mostly focused on the trade-off between health and the economy [6]. But taking into consideration the impact of Covid-19 - and of associated government measures- on people's life satisfaction is also important for public decision-making, not the least to determine optimal lockdown policies during potential future pandemic situations [7], and, in weighing up loss of happiness against loss of lives [8]. In our research, we adopt the definition of life satisfaction as the overall appreciation of one's life as a whole, in other words, how much one likes the life one lives (See Ref. [9], for a research synthesis on this concept).

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¹ By May 2020, job retention schemes already supported 50 million jobs across the OECD [41].

Such a catastrophic phenomenon has affected everybody negatively one way or the other. What kind of consequences has it had on people's well-being? Have the effects only lasted the time of the lockdown and the following months of restrictions (short-time work, social distancing, masks, working from home, online classes ...), or has Covid-19 left a long-term imprint on people's life satisfaction? Much of the literature investigating the effects of the Covid-19 outbreak has used data corresponding to the first two waves of the epidemic (during 2020), that is from a period where vaccines were not yet available (vaccines started to be administered at the end of 2020/beginning of 2021) and when government restrictions, to avoid social contacts and the spread of the virus, were the toughest. In this article we aim at shedding some light on the answer to the second question regarding a possible lasting effect on life satisfaction. We have chosen to focus on the Netherlands and to analyse the changes in citizens' levels of life satisfaction between a period before the appearance of Covid-19 and the first month of 2022, when life had practically gone back to normal. This type of work has not been carried out so far, as studies have usually focused on information obtained by examining how people's emotional experiences were after the appearance of Covid-19 [10–12].

This paper will be structured in the following way. We will first provide some data about the general happiness levels experienced by the Dutch population during the last decade. We will also discuss the public opinion's general feeling about the Covid-19 situation and the measures taken by the authorities to curb the epidemic. Additionally, we will review literature focusing on factors having a negative impact on our subjective well-being and that are related to the Covid situation. We will also consider circumstances that may compensate these adverse reactions. Thereafter, in the following section, we will describe the data and empirical strategy used to study the impact of Covid-19 on life satisfaction in the Netherlands. We will then describe and analyse our results and offer a discussion section before summarising our conclusions.

2. Background and literature review

In this paper we will study the impact of the Covid-19 pandemic on the levels of life satisfaction in the Netherlands two years after its appearance. The Netherlands is a country listed annually among the "happiest" nations in the world according to international rankings. It is always among the eight happiest countries in the World Happiness Reports (2012–2022), and it appears in the sixth position in the OECD Better Life Index [13].

Fig. 1 shows average life evaluation data for the Netherlands, on a scale where 0 represents the worst possible life and 10, the best possible life. The national average of Dutch citizens has fluctuated within the range of 7,32 and 7,63 in the period 2005 and 2021.

Comparing the data for the Netherlands with the average of 28 other European countries² in the years 2012–2021 (Fig. 2), we can see that average life satisfaction in the Netherlands has been constantly higher than the European average. It was more than 1 point higher until the middle of the decade. By the end of the decade, European countries' average life evaluation had increased quite considerably, reducing the gap with the Netherlands to 0,64 in 2021.

Even shortly after the darkest moment of the pandemic (first and second waves of Covid-19), 80 % of the Dutch public opinion considered that the situation in the country was good and 71 % was satisfied with the measures taken by the government to fight the coronavirus outbreak (winter 2020/2021).³ During winter 2021/2022, that is one year later, only 59 % of Dutch citizens declared that they were satisfied (very or satisfied) with the measures taken by their government, but they were still 78 % who judged the situation of the country as particularly good or rather good. Six months later in the summer 2022, this figure dropped to 67 %. These results were still among the highest among the European countries (except for Nordic countries, Luxembourg, and Switzerland, where they never seem to fall below 80 %).

However, how has individual life satisfaction been affected by Covid-19? Has the coronavirus crisis had any lasting consequences after most restrictions were lifted?³ There are different mechanisms impacting life satisfaction, and these can change under some conditions, as is shown in different theories of well-being [15,16]. Studies show that there is a strong relationship between subjective well-being and both physical and psychological health [17–19]. [20] show for instance how moving from a good health situation to a poor physical health situation can reduce one's life satisfaction by more than one point on a scale from 0 to 10 (for example 1,08 in the UK, 0,98 in Germany).

[21] find that in the USA (United States of America), Australia and Great Britain, diagnosed mental illness is the factor impacting most negatively on life satisfaction. Depression, anxiety and emotional health problems are also the factors that contribute the most to misery (lowest levels of happiness) in the USA and Great Britain. Physical health is also important but in no country as much as mental health. [22] provide an interesting review of this literature.

During the Covid-19 lockdowns, restrictions on movement and the loss of social interactions have had a negative impact on our health. [23] using Google trends data and the search for specific terms associated to mental suffering, have found evidence that suggests that people's mental health has been affected negatively by the lockdowns and not necessarily only temporarily. [11] also find that type of results in a four-wave longitudinal study in the United States and China. So, if mental health is one of the factors with the most negative impact on life satisfaction and if people's mental health has been affected negatively by the lockdowns-lastingly- how can we describe the result on life satisfaction two years after the start of the epidemic?

In addition to the above, the fear of losing one's job and/or income, the unpredictability surrounding the progress of the epidemic

² These countries are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK.

³ The very last Covid-19 travel restrictions, affecting mostly incoming travellers from non-EU countries, were removed in September 2022. Self-quarantine requirements for travellers coming from high-risk countries were already lifted in February 2022.

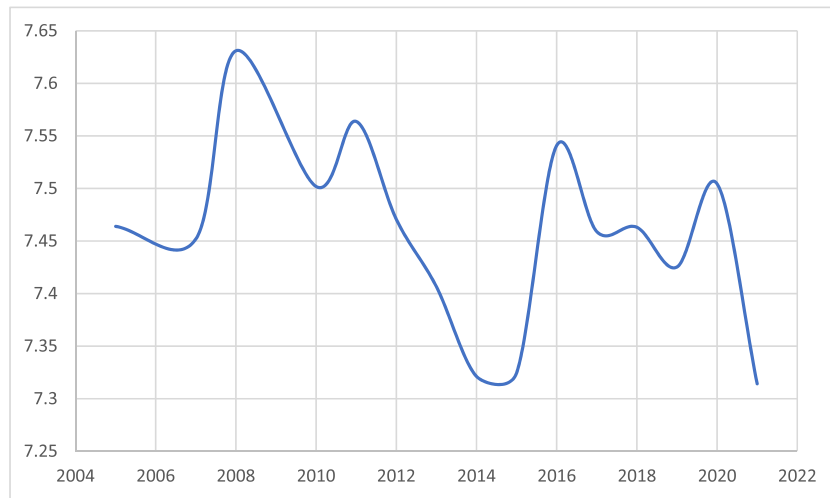


Fig. 1. Progress of national average of life evaluation in the Netherlands, 2005–2021.
 Source: Authors' graph using Gallup World Poll data from World Happiness Reports [14].

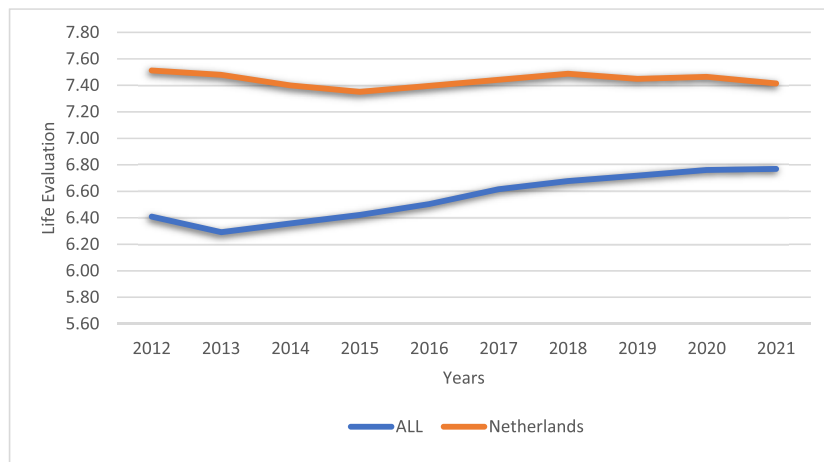


Fig. 2. Average life evaluation in the Netherlands and in 28 European countries- 2012–2021.
 Source: Authors' graph using Gallup World Poll data from World Happiness Reports (2012–2021) [14].

with its increasing number of waves and the general concern about one's future health, economy and social life, also bring their dose of worry and anxiety. However, even though we associate negative consequences with Covid-19, with the lockdowns and other restrictive measures that have been applied, some individuals have also experienced positive repercussions from certain aspects of the decisions taken by governments. For instance, for some people, the transition from office work to remote work/work from home, as requested by public authorities to public and private companies in many countries, has been experienced as a positive thing [24]. In the Netherlands, in 2019, before the pandemic, just under 40 % of employed persons worked from home regularly or occasionally. This figure reached 60 % in 2021 [25]. The Netherlands is thus the country in the EU (European Union) with the largest proportion of people who have declared (in 2019, 2020 and 2021) to work occasionally or regularly from home [25].

Another consequence of the confinements has been an increase in the time family members have spent together, which also has implications on a person's well-being [26], as time spent in company is often more enjoyable than time spent alone. In a simulated lockdown situation, [26] find that the effects of a confinement on an individual's level of enjoyment vary depending on the type of activity taking place, the sex of the person, whether they are married and have children or not, and the country in which they live. For instance, in the UK, only single mothers would experience higher levels of utility when *working in confinement circumstances*. Women without children would experience lower levels of utility in the same situation, and married women with children would experience greater enjoyment being confined during *leisure time*. [6] come to a similar conclusion in Germany where lockdown consequences are different from one individual to another depending on sex and whether they have children or not. [10] exploited the surge in unemployment over the Covid-19 pandemic and suggested that the psychological benefit of marriage helps insure against unanticipated fluctuations in job and income loss. [27] in a study for Canada found that being single and separated or divorced are risk factors for

more severe outcomes, such as stress, anxiety, and depression, specifically during the Covid-19 pandemic.

Other work has covered the effect of Covid-19 on different age groups. [28] has focused on children and suggests that higher parental stress is associated with higher volatilities in child well-being trajectories and thus constitutes an important factor explaining interindividual differences in child coping with the Covid-19 pandemic. These studies also highlight the interest in understanding the effects of Covid-19 with reference to age. [29] in a study for USA find differences between younger and older adults in the factors motivating people to adopt recommended behavioral changes in response to the coronavirus disease. [30] concentrate on young people and find a high prevalence of depression and anxiety in this group. In other cases, the focus has been on the effects of socio-economic differences, as in the case of [12] in Nigeria.

3. Data and methodology

3.1. Participants

Each person generates her own perception of her satisfaction with life based on her experiences and assigns her own (subjective) weights to the different elements beneficial or detrimental to her well-being. To analyse the possible impact of Covid-19 on life satisfaction in the Netherlands we have used data from the joint World Values Survey (WVS) and European Value Study (EVS) 2017–2022 dataset. The WVS and EVS are large-scale, cross-national and repeated cross-sectional survey research programmes, which include questions on subjective life satisfaction levels.

The joint 2017–2022 dataset provides information and answers to survey questions asked both before the Covid-19 pandemic started (the survey took place in the Netherlands between August 2017 and February 2018) and after the major Covid-19 restrictions had been removed (the survey took place in the Netherlands in January 2022). On January 28, 2022, 67,5 % of citizens in the Netherlands had received two doses of the vaccine and a total of more than 72 % were at least partly vaccinated [31]. In early 2022, only few restrictions were still imposed on an on- and-off basis.

3.2. Study design

In both surveys, respondents could express their level of life satisfaction on a scale going from 1 (completely dissatisfied) to 10 (completely satisfied). The question asked was either, “All things considered, how satisfied are you with your life as a whole these days? Using this card on which 1 means you are “completely dissatisfied” and 10 means you are “completely satisfied” where would you put your satisfaction with your life as a whole?” (WVS) or “All things considered, how satisfied are you with your life these days? Please use this card (from 1 to 10) to help with your answer” (EVS).

3.3. Methodology

In order to evaluate the possible change in Dutch citizens’ subjective well-being levels due to the outbreak of Covid-19 and its consequences, we have decided to use an impact evaluation method called the Simple Difference Method.

The application and utility of the Simple Difference Method in observational research settings has been described in foundational works. [32] discuss the theoretical underpinnings and practical considerations of using this method for causal inference in economics, which has parallels with our analysis of changes in life satisfaction levels due to Covid-19.

This evaluation method consists of a comparison between two groups: the group of individuals affected by an event (here Covid-19), also referred to as the treatment group, and the untreated group (used as a counterfactual). As described in Fig. 3, we have the comparison or control group, which includes those individuals interviewed prior to the start of the pandemic (between August 2017 and February 2018), and the treatment group, made up of individuals who have been affected by the event and whose interviews took place in February 2022.

We have chosen this methodology for two reasons. First, we do not have access to a group of individuals unaffected by the event (Covid-19 epidemic) in 2022, and secondly, we do not have panel data for the same individuals before and after the event.

A first approximation to the evaluation could be determined by the elaboration of a multiple linear regression model (OLS) that is normally expressed using the following mathematical function:

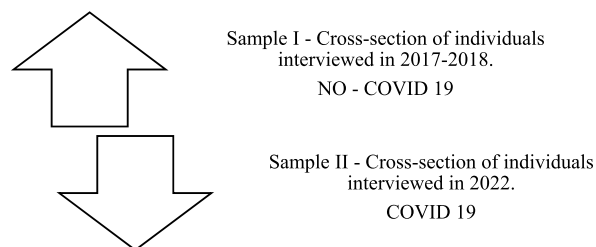


Fig. 3. Distribution of individuals by treatment or control group membership.

Source: Authors’ own elaboration.

$$lifesatisfaction_i = \alpha + \beta \cdot Covid_i + \gamma \cdot Controls_i + \varepsilon_i$$

where $lifesatisfaction_i$ will take values from 1 to 10, depending on the individual's perception of his or her satisfaction with life. β represents the coefficient showing the impact of the Covid-19 variable on the dependent variable. $Covid_i$ will take value 0 or 1 depending on the moment in time when the individual has been interviewed, i.e., in 2017 or 2018 ($Covid_i = 0$) and in 2022 ($Covid_i = 1$).

$Controls_i$ represents the set of control variables that allow the effect of the event to be filtered and the final impact of the event to be observed with greater robustness. However, in our case, the independent variable $Covid_i$ is a random external shock, not determined by any specific factor, which implies that there are no confounding variables that can be controlled for. A confounding variable affects both the independent and dependent variables, the treatment and the outcome, and needs to be considered to isolate the real impact of the independent variable on the result, and thus avoid a confounding bias [32].

We could have been tempted, out of habit, to include variables such as age, gender, marital status, education etc. as common examples of control variables, but among these we have mediators that intervene in the relationship between the independent and dependent variable [33]. Controlling for mediators would lead to a biased estimation as it omits part of the indirect effects produced by the independent variable. In our case, we could suspect that employment status, education and (subjective) health condition are intervening variables, as Covid-19 has an impact on these variables (as seen in previous sections), which in turn have consequences on life satisfaction.

Variables such as age, gender or being native only have an impact on the dependent variable, life satisfaction, but not on the independent one which is a completely random event, their effect on β would therefore be trivial.

We will thus estimate the following regression which eliminates controls:

$$lifesatisfaction_i = \alpha + \beta \cdot Covid_i + \varepsilon_i$$

We know that the determinants of life evaluation may change with the process of ageing. Various authors have investigated the influence of age on individuals' well-being [20,34,35]. We have therefore decided to divide the samples into three distinct age groups and to repeat the proposed OLS regression process for each group. The idea is to evaluate whether a certain age group is more vulnerable to the effect of Covid-19.

The division of respondents into three specific age groups—from 18 to 30 years, 31–65 years, and over 65 years—has been informed by both theoretical considerations and empirical precedents. This categorisation reflects critical life stages faced with contrasting social, economic, and psychological challenges. We believe that these distinct life circumstances contribute to different degrees to the impact of the Covid-19 pandemic on life satisfaction. The youngest group (18–30 years) represents individuals in their early adulthood, often experiencing significant life transitions such as completing education, entering the workforce, and starting to form new households. These transitions may amplify the pandemic's disruptive effects. The middle group (31–65 years) typically encompasses individuals in more established career paths and family lives, potentially offering more stability but also more responsibilities that could be enhanced by the pandemic. The oldest group (over 65 years) includes mostly retirees, who might be less affected by job-related worries but more vulnerable to health risks associated with Covid-19. Selecting these age groups allows us to capture and compare the pandemic's nuanced effects across distinct stages of adult life, enriching our understanding of its broader societal impact.

For this analysis we have therefore categorised participants into the following age groups:

- The first group includes individuals who are between 18 and 30 years old. They are either studying or at the beginning/pre-consolidation stage of their working life. They do not have many family responsibilities yet. 18 is the first year for which we have a sample which is big enough. We decided to extend the group up to the age of 30 considering that 29–30 years is the average age at which young people leave their family home.
- The second group, between 31 and 65 years of age, represents individuals who are either starting to consolidate their career or whose working life reaches maturity in terms of achievements and positioning. They usually may be supporting a family.
- Finally, the last group, including people older than 65, is made up of individuals who have reached the last stage of their professional life, and the majority is about to retire or has already retired. They usually have less family responsibilities.

As earlier, for the reasons already mentioned, no control variables are included in the regressions. However, we would like to make sure that the treated group and the control group in our model are as similar as possible and aim at reducing the imbalance in covariates that could exist between treated and control groups [36]. Our correct evaluation of the results of the impact of Covid-19 on life satisfaction will depend on our capacity to ensure that the treatment group, which has experienced the Covid-19 pandemic and the counterfactual which has not experienced the epidemic are as similar as possible, as ideally, we would have liked to compare the same individuals in one situation and in the other. Various statistical matching techniques can provide a solution by finding statistical twins. The Coarsened Exact Matching (CEM) is one of these techniques that pre-processes a dataset and creates a matched dataset to evaluate the effect of a treatment by coarsening each variable to a reasonable degree of clustering. It then performs an exact match on these coarsened variables [37].

The first step that needs to be taken is to choose the covariates or pre-treatment variables that will be included in the matching. Then different combinations of the possible values of each one of the chosen variables will form clusters or bins, in each one of the treatment and control groups. An individual from the treatment group belonging to one of these bins with a series of defined characteristics will only match an individual with the same defined characteristics (e.g. female, 25 years, married, good health condition etc.) in the control group. Only a specific percentage of the treatment sample will find exact matches within the control population. Certain individuals with specific values for their covariates in the treatment group may not find an exact match in the control group

and vice versa. The CEM technique therefore assigns a weight to each unit depending on whether they are matched or not and whether they belong to the treatment or to the control population. Once matched and weighted, the treatment and control groups can be compared. When the match is not exact, a linear regression can be run using the weights produced by CEM to evaluate the effect of the treatment.

The CEM serves as a pre-processing technique designed to enhance the integrity of causal inferences by minimising reliance on model assumptions. This approach distinguishes itself from traditional matching methods by not requiring exact matches across all covariates. Instead, CEM groups observations into broader, coarsened categories based on similarities. For instance, rather than matching individuals by exact age, CEM categorises them into age groups (e.g., '18–25', '26–35'), which simplifies the matching process, increases the likelihood of identifying comparable individuals across treatment and control groups, and reduces the influence of outliers. Such categorisation facilitates a more refined comparison for estimating treatment effects by ensuring that the matched samples are closely aligned on key variables. This methodology is particularly beneficial for our study, enabling us to establish a balanced comparison group that closely resembles the treatment group, thereby accurately assessing the impact of Covid-19 on life satisfaction while controlling for potential confounders.

The selection of covariates for matching, critical for the robustness of our analysis of the Covid-19 pandemic's impact on life satisfaction in the Netherlands, was thoughtfully executed. Chosen variables include age, gender, employment status, education level, marital status, subjective health condition, and religiosity. These covariates play a vital role in capturing the pandemic's differential impact across various demographic and socioeconomic groups. By accounting for these variables, our aim is to offer an accurate and equitable evaluation of the pandemic's genuine effect on life satisfaction.

Reflecting on our methodological decisions, including the use of categorical variables in multiple regression analysis and the implementation of CEM, we recognise and address the inherent challenges these methods present. These include the potential for decreased statistical power and biases in estimating effect sizes. The choice of CEM, despite its limitations such as the risk of mis-identifying treatment effects and reducing sample size, was driven by our goal to improve group comparability. We openly discuss these methodological hurdles, underscoring our commitment to methodological rigor and the exploration of innovative analytical approaches in future research. This ongoing pursuit aims to mitigate existing limitations and deepen our comprehension of the pandemic's enduring effects on life satisfaction.

4. Results

The first result of our OLS regression (Table 1), on the general population, points towards a negative impact of the Covid-19 pandemic on life satisfaction in the Netherlands, two years after the epidemic's outbreak. The effect is equal to -0,415 on a scale where life satisfaction is expressed from 1 to 10. [8] obtain for the Netherlands results that show that average life satisfaction has fallen by about 4 % within a year, between spring 2020 and spring 2021, with the bulk of it occurring between summer 2020 and spring 2021. These findings are in line with our results. [38], after analysing the data of 15 European countries during the first wave of Covid-19, concluded that life satisfaction was negatively correlated with the spread of Covid-19 in Northern Europe, whereas this correlation was insignificant in Southern and Western Europe. Our research differs from the ones mentioned earlier in the sense that our study focuses on the level of life satisfaction after several waves of covid, when vaccines had already been widely introduced, most social restrictions removed, and life was slowly going back to normal.

Knowing that the determinants of life satisfaction change with the process of ageing, we decided to run regressions on three different age groups and to compare the results of the impact of Covid-19. Table 2 shows that the pandemic and its consequences following the outbreak of the virus, have hit negatively the three diverse groups in terms of life satisfaction. The negative impact of Covid-19 is however strongest among younger individuals, aged 18 to 30, where the drop is equal to -0,672 (on a scale from 1 to 10). The second group formed by people older than 30 but younger than 66 years has experienced a weaker impact of Covid-19 ($\beta = -0,366$). Finally, the third group composed of individuals older than 65 years has registered a drop of -0,418 in its life satisfaction level.

The negative impact of the Covid-19 pandemic on life satisfaction appears to be greater among teenagers and young adults. This

Table 1

Regression model for the impact of Covid-19 on life satisfaction, 2 years after its outbreak.

	Coefficient
Covid (Post = = 1)	-0.415*** (0.0490)
Constant	7.848*** (0.0346)
Observations	3916
R-squared	0.019

Robust standard errors in parentheses.

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' own calculations based on data from Joint EVS/WVS 2017–2022 [39].

Table 2
Regression models for the impact of Covid-19 on life satisfaction, 2 years after the outbreak, by age group.

	From 18 to 30	From 31 to 65	66 and older
Covid (Post = = 1)	-0.672*** (0.134)	-0.366*** (0.0637)	-0.418*** (0.0896)
Constant	7.899*** (0.0856)	7.738*** (0.0462)	8.097*** (0.0608)
Observations	453	2383	1080
R-squared	0.047	0.014	0.021

Robust standard errors in parentheses.

Significance: *** p < 0.01, **p < 0.05, *p < 0.1.

Source: Authors' own estimations based on data from Joint EVS/WVS 2017–2022 [39].

could be due to their lack of experience in dealing with crises and limited psychological resilience to adapt to new circumstances, such as those brought on by the Covid-19 epidemic and governmental restrictions.

Even though Covid-19 is a random event and the individuals affected by the pandemic have been submitted to the treatment randomly, we want to obtain two groups, the treated one and the counterfactual one, as similar as possible in their covariates and apply a matching technique, the CEM, which produces a matched dataset to evaluate the effect of a treatment. As matching is simply a data pre-processing technique, it is still necessary to apply statistical estimators to the data after matching, and when the match is not exact, a parametric model must be used to control for the differences in the covariates across treated and control groups, such as a linear regression for example [40].

The size of our treated group is 1635 whereas our control group includes 2281 individuals. We match our chosen pre-treatment variables which are age, gender, if national (born in country), employment status, education level, marital status, subjective health condition and religiosity. We treat the gender, born in country, marital status, subjective health and religiosity variables as dichotomous variables. The education level variable is divided in three categories corresponding to lower, middle and higher education levels. Employment is divided in eight categories. We run CEM and obtain output information which informs us about the total number of matched and unmatched observations both in the control group and in the treatment group, as well as the degree of imbalance in the matched variables.

In our case 1618 observations have been matched in the control group and 1283 in the treatment group. The imbalance in the covariates is measured by the multivariate distance result which amounts to 0,2382. Overall and at each variable's level, the imbalances are small, and have been drastically reduced if compared with the imbalance results before running the CEM technique (see Appendix). In the process of matching, different weights are allocated to everyone depending on whether they are matched or unmatched and whether they belong to the treatment group or to the control group. With these results in mind, we can now run our original regression and simply add the weights that have been created by CEM. Table 3 provides us with the results.

After running the process of coarsened exact matching on chosen covariates, the impact of our independent variable on life satisfaction has increased, β is now equal to - 0.546,

We decide to apply the same procedure to our three different age groups with the only difference that we eliminate the variable *age* from the list of covariates to be matched, given that the groups are created based on individuals' age. We can see the results of the regressions in Table 4.

The process of matching individuals in the treatment (Covid = 1) and control (Covid = 0) groups has contributed to sharpen results. Indeed, if we compare the estimated impact of Covid-19, two years after the outbreak, in our regressions before running CEM and after running CEM, we can see that the effect was softer before matching individuals in the treatment and control group (-0,415) than after (-0, 546).

When comparing the β coefficients for the three age groups (see Table 5), we can draw the same conclusion except for the age group

Table 3
Regression for the impact of Covid-19 on life satisfaction on general population after running coarsened exact matching.

	Coefficient
Covid (Post = = 1)	-0.546*** (0.0477)
Constant	8.112*** (0.0317)
Observations	2901
R-squared	0.043

Robust standard errors in parentheses.

Significance: *** p < 0.01, **p < 0.05, *p < 0.1.

Source: Authors' own estimations based on data from Joint EVS/WVS 2017–2022 [39].

Table 4

Differences in the impact of Covid-19 on three ages groups, after running coarsened exact matching in each age group.

	From 18 to 30	From 31 to 65	66 and older
Covid (Post = 1)	−0.936*** (0.133)	−0.535*** (0.0590)	−0.402*** (0.0959)
Constant	8.229*** (0.0808)	7.954*** (0.0405)	8.103*** (0.0574)
Observations	341	2143	992
R-squared	0.127	0.037	0.017

Robust standard errors in parentheses.

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' own estimations based on data from Joint EVS/WVS 2017–2022 [39].

“66 and older”, where the impact of Covid-19 is slightly weaker after the matching process. Again, the group of younger adults is more affected than the other two groups, reaching an impact of $-0,936$.

Overall, the reduction in life satisfaction inflicted by the pandemic, 2 years after its outbreak, has been weaker for the age group 30+ and for individuals older than 65 years. This lesser impact could be explained by the fact that the proportion of persons living with a partner/spouse and/or with children is higher above the age of 30, and time spent in company is usually more enjoyable than being alone, especially under the circumstances of an epidemic. As seen earlier, depending on activities, spending time with other members of the family (spouse, children, other members of the family) can contribute positively to one's individual well-being. So even though the pandemic has generated many negative effects in the form of fear of catching the virus, such as economic distress and the imposition of limits to one's social life and freedom in general, the increased amount of time spent at home with members of one's family has somehow partly compensated the negative effects for certain individuals. The possibility to work from home has in some situations added on stress in certain family circumstances while for other persons it has been a positive change. In the oldest age group, individuals have been less worried by professional concerns, such as the possibility to lose one's job or having to work less and being paid less. Obviously, their social life has been very much affected, but they may have more resilience to face demanding situations, simply from having more experience from living life in general.

Our study reveals that the Covid-19 pandemic has exerted a sustained, negative influence on life satisfaction, with young individuals being particularly affected. When examining the explained variance (R^2 values) to gauge the extent of these effects, we find that while the general population experiences a minor impact, the effect on the younger demographic is notably more substantial. This distinction emphasizes the pandemic's varying influence across age groups and calls for a re-evaluation of prevalent theories on well-being, including adaptation and set point theories. These theories traditionally argue that individuals tend to revert to a baseline level of well-being after significant life events. However, our findings, particularly the pronounced effect on young adults, challenge the idea that these theories can universally apply, underscoring the necessity for a more detailed exploration of well-being amidst global crises.

5. Discussion

The pronounced decline in life satisfaction among younger individuals due to the pandemic prompts a reconsideration of how well people are equipped to handle such unprecedented challenges. While it is reasonable to assert that fully preparing for the social and emotional impacts of a global crisis is impossible, research into age-specific coping mechanisms suggests that young adults may encounter distinct difficulties. Evidence from studies on coping strategies employed during the pandemic shows that younger individuals might not have the resilience that comes from broader life experiences, potentially hindering their ability to manage pandemic-induced stress effectively. This discussion aids in understanding the varied effects across different age groups, highlighting the critical need for specialised support and interventions.

Furthermore, the alterations in life satisfaction observed during and after the Covid-19 pandemic provide significant implications for theories of well-being, especially regarding individuals' capacity to adjust to life changes. The minimal or negligible long-term effects on the majority, contrasted with the tangible impact on younger people, may indicate a level of resilience or adaptability that aligns with set point theory.

Nevertheless, the discernible influence on young adults disputes the concept of a universal happiness set point, suggesting that major global events, such as pandemics, have the potential to significantly shift well-being trajectories. This variation calls for a critical reassessment of the prevailing models of subjective well-being and adaptability, offering a valuable perspective on the flexibility of human well-being when faced with external adversities.

Table 5

Results of the impact of Covid-19 on life satisfaction, in three different age groups, before and after running CEM.

	Age group 1 (18–30)	Age group 2 (31–65)	Age group 3 (66+)
Impact of Covid-19, before running CEM	−0.672	−0.366	−0.418
Impact of Covid-19, after running CEM	−0.936	−0.535	−0.402

Source: Authors' own elaboration.

6. Conclusion

In this article, we have chosen to focus on the Netherlands to evaluate the possible impact of the Covid-19 pandemic on people's life satisfaction, up to two years after the outbreak of the epidemic (January 2022). Our purpose has been to evaluate whether the Covid-19 crisis has left some kind of imprint on Dutch people's levels of well-being. To do so we have used survey data from the joint World Values Survey (WVS) and European Value Study (EVS) 2017–2022 round, which has provided us with information and answers to survey questions asked in the Netherlands before the appearance of Covid-19 (between August 2017 and February 2018) and after the major Covid-19 restrictions had been removed (January 2022). As the coronavirus crisis can be perceived as a random shock with no clearly defined triggers, we have not included any control variables in our regressions, as none of the usual controls could be considered a confounding variable. On the other hand, to obtain a pre-treatment sample as similar as possible as the post-treatment sample, we have run a Coarsened Exact Matching on our dataset, which has allowed us to perform a second round of regressions with matched and weighted data units. Our results confirm the decline in life satisfaction in the general population two years after the appearance of Covid-19. The results are particularly salient among younger individuals (18–30 years), who have experienced a drop in their life satisfaction levels of $-0,936$ on a scale from 1 to 10. Individuals older than 30 years have also been affected, but to a lesser extent.

The repercussions of the pandemic on young people are worrying and can be explained by the fact that they were not prepared to cope mentally and emotionally with the circumstances brought in by the Covid-19 epidemic and the confinement restrictions. This situation has generated uncertainty about the future and induced a lack of confidence among young people, whose natural social and emotional development has suddenly been disrupted during the crisis. This seems to indicate that it will be necessary to provide support to these young adults to face future challenges. Authorities will also need to take lessons learnt into account when facing similar crises in the future. In years to come additional investigation will be required to determine whether the impact of Covid-19 on this generation's well-being, is fading away or not. It would also be interesting to investigate whether the pandemic has had a similar impact on the 18–30 age group in other European countries.

Declaration regarding informed consent

Our research did not require the involvement of participants.

Data availability

The data used in this study were obtained from publicly accessible sources and are available from European Values Study and World Values Survey: Joint EVS/WVS 2017–2022 Dataset.

CRedit authorship contribution statement

María Jesús Delgado-Rodríguez: Writing – review & editing, Validation, Supervision, Conceptualization. **Fernando Pinto Hernández:** Software, Methodology, Investigation, Data curation. **Karin Tailbot:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation.

Declaration of 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.

Appendix

Results of CEM procedure, using Stata, on our data using the following covariates: gender, age, born in country, employment, education, marital status, health condition, religiosity.

Matching Summary

Number of strata: 1193.

Number of matched strata: 408.

	0	1
All	2281	1635
Matched	1618	1283
Unmatched	663	352

Multivariate L1 distance: 0.23826984.

Univariate imbalance

	L1	mean	min	25 %	50 %	75 %	max
female	3.2e-15	3.3e-15	0	0	0	0	0
age	0.05062	0.02624	1	0	0	0	0
bornincountry	4.1e-16	5.6e-16	0	0	0	0	0
employment2	1.2e-15	1.3e-15	0	0	0	0	0
employment3	3.0e-16	1.6e-16	0	0	0	0	0
employment4	2.1e-15	1.9e-15	0	0	0	0	0
employment5	4.4e-16	2.1e-16	0	0	0	0	0
employment6	3.5e-16	1.4e-16	0	0	0	0	0
employment7	8.5e-17	5.9e-17	0	0	0	0	0
employment8	2.3e-16	1.3e-16	0	0	0	0	0
educationlevel2	2.9e-15	2.6e-15	0	0	0	0	0
educationlevel3	3.1e-15	3.3e-15	0	0	0	0	0
married	2.9e-15	3.7e-15	0	0	0	0	0
healthy	2.7e-16	4.4e-16	0	0	0	0	0
religious	2.7e-15	2.8e-15	0	0	0	0	0

Level of imbalances before running CEM.

Multivariate L1 distance: 0.53293676.

Univariate imbalance:

	L1	mean	min	25 %	50 %	75 %	max
female	0.02616	-0.02616	0	0	0	0	0
age	0.10272	0.7299	1	3	0	-3	0
bornincountry	0.01839	-0.01839	0	0	0	0	0
employment2	0.02635	0.02635	0	0	0	0	0
employment3	0.01739	-0.01739	0	0	0	0	0
employment4	0.06439	-0.06439	0	0	0	-1	0
employment5	0.01363	-0.01363	0	0	0	0	0
employment6	0.01806	-0.01806	0	0	0	0	0
employment7	0.00057	0.00057	0	0	0	0	0
employment8	0.01453	-0.01453	0	0	0	0	0
educationlevel2	0.04508	0.04508	0	0	0	0	0
educationlevel3	0.09935	0.09935	0	0	1	0	0
married	0.1181	0.1181	0	0	0	0	0
healthy	0.00787	-0.00787	0	0	0	0	0
religious	0.08579	-0.08579	0	0	0	0	0

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