The effects of COVID-19 measures on happiness across European countries

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ABSTRACT

This research measures the effects of stringency of COVID-19 measures on happiness during the COVID-19 pandemic the COVID-19 pandemic across ten European countries. The pandemic started in Wuhan, China, in 2019, and has thus far killed nearly seven million people, with 800 million cases reported since. The first lockdowns in Europe were implemented in March 2020 and the world has irrevocably changed. The short-term results indicate that the stringency had no real effect on happiness. The long-term effects reveal that the more stringent measures were at the start of the pandemic, the less happy people were at the time of the interview. This suggests that some people have long lasting effects on happiness due to the stringency of the measures.

CONTENTS

I. INTRODUCTION

The World Health Organisation (WHO) states that the COVID-19 pandemic has claimed nearly seven million lives worldwide, along with approximately 800 million reported cases. These figures underscore the global impact of the pandemic. Many governments responded by implementing complete lockdowns during the first months of the pandemic. However, most governments were ill-prepared for such an unprecedented event and had to act swiftly. An illustration of this is evident in the UK government's response, which the National Audit Office (NAO) concludes was inadequate. It is reasonable to acknowledge that there are both costs and benefits associated with these measures. Since governments were unprepared, they had to prioritise either the costs or the benefits, with a greater focus on the benefits and relatively less emphasis on the costs. One aspect that received insufficient attention was the effect on happiness, as these lockdowns and other measures potentially diminished people's overall quality of life. Ruut Veenhoven defines happiness as "The degree to which a person evaluates the overall quality of his/her own life as a whole positively."

To determine a suitable trade-off when imposing measures in a pandemic, one must know what the costs of stringent measures are. In response to this concern, my research aims to quantify the impact on happiness and well-being. This is particularly relevant, as researchers have modelled that another pandemic as deadly as COVID-19 might happen in the next 25 years (Smithan and Glassman, 2021).

Therefore, this paper analyses the effects of the stringency of the COVID-19 measures that were taken during the pandemic on happiness.

Studying the effects of pandemic measures on happiness can also help prevent mental health crises. For instance, Czeisler et al. (2020) have revealed that suicidal ideation in the United States doubled during the COVID-19 pandemic. This paper contributes to the existing literature by using survey data and pairing it with COVID-19 measures at the time to observe the effect of the measures on happiness as perceived by individuals.

The methodology I implement to identify a possible causal link between COVID-19 measures and happiness involves using survey data and pairing the time of the survey with the current stringency of measures in place in the country of residence. I also conducted another test to measure the long-term effects of the measures on happiness by taking the average stringency in countries at the start of the pandemic and matching this to the respondents. Using this data, I ran an OLS estimator to measure the effect.

The results indicate that, as the restrictions were more relaxed at the time of interviews, people's happiness was not significantly influenced by the stringency of the measures. When I added the interaction effect between age and stringency effects, the results returned statistically significant estimates, indicating that people were happier when the measures were more stringent. The interaction effect, however, returned a negative value, indicating that older people were less happy as measures became more stringent, this is most likely due to social isolation and loneliness. The measures hit retirement homes and nursing homes the hardest since elderly people were most vulnerable to the virus and had to be protected. I also examined the long-term effects of the stringency of the measures. The results indicate that, as measures grew more stringent at the start of the pandemic, people's happiness declined. This suggests that when governments increase restrictions, their population may see a decrease in happiness. It is possible people felt more isolated and therefore lonelier.

I also conducted several robustness checks. These robustness checks show that while there was a smaller effect on happiness during the interviews, there was also a larger long-term effect.

The remainder of this paper is organised as follows. Section II provides an overview of the existing literature, while Section III discusses background on COVID-19 in addition to, the data, methodology, and possible endogeneity issues. Section IV offers an overview of the short-term and long-term results and robustness checks, and Section V discusses the limitations and possible policy recommendations. Lastly Section VI provides a conclusion to the work.

II. RELATED LITERATURE

This section presents the relevant literature on the impact of the COVID-19 pandemic on happiness. One of the early research papers on this subject was written by Brodeur et al. (2020). During the initial months of the lockdown, the authors utilised Google Trends to examine the search intensity of emotions such as boredom, sadness, loneliness, and worry. They also employed the difference in difference method (DiD) to estimate the effect of the pandemic on the well-being of individuals in nine western European countries and the US. To control for seasonal effects, they compared the Google Trend data with data from the same period in the previous year. The findings revealed a significant increase in search intensity related to these emotions, suggesting a detrimental impact on people's mental health during the early weeks of the lockdown.

Lopez-Ruiz et al.'s (2021) research in Spain focuses on the impact of the pandemic on happiness through the lens of quality of life. They developed a model that assessed various

factors, including life satisfaction, mobility, integration, and public services. This model was combined with a survey targeting individuals aged 16 years and older. By employing multiple regression analysis, the researchers have determined the effect of quality of life on happiness. The findings indicate a negative impact of the COVID-19 pandemic on quality of life for Spanish citizens, consequently influencing their happiness.

Greyling et al. (2021) have investigated the happiness levels of individuals around the time of lockdown announcements and implementations in South Africa, New Zealand, and Australia. These countries were selected due to their diverse lockdown regulations and variations in their economies, social structures, and human capital. Using data from the Gross National Happiness Index, a real-time measure derived from Twitter, the authors observed a decrease in happiness following the announcement and implementation of lockdowns. The lowest levels of happiness occurred precisely during these periods. Employing a DiD estimation, the researchers compared happiness levels between 2019 and 2020 using the same days from each year.

Cheng et al. (2021) have explored the effects of urban parks on happiness during the COVID-19 pandemic, specifically in Nanjing, the capital city of Jiangsu province in China. With a population of approximately eight million people, Nanjing is a significant city in the Yangtze River Delta region and has been recognised as a model site for green space planning. The researchers employed a similar methodology as Greyling et al. (2021), gathering data on people's happiness from the Chinese version of Twitter called Sina Weibo. By analysing geotagged locations of forum posts and connecting them with active parks and green spaces, Cheng et al. (2021) conducted a regression model to examine the relationship between the "greenery" of urban parks and happiness. The findings revealed that as parks became greener and individuals had greater access to them, their happiness levels increased. This suggests that people in isolation tend to experience greater happiness when they have greener options available outside their homes.

Flaxman et al. (2020) have researched the effects of non-pharmaceutical interventions on the spread and consequences of the COVID-19 pandemic. In particular, the authors study major interventions across ten European countries from the start of the pandemic in February 2020 until May 4th, 2020, when the first lockdowns began to be lifted. The interventions were considered sufficient if the reproduction number was lower than 1. The authors faced challenges due to the high proportion of undetected infections and limited testing availability at the beginning of the pandemic. They utilised a model that estimated infections based on

fixed epidemiological parameters and conducted a sensitivity analysis on these parameters, including the onset-to-death distribution, infection fatality rate, and generation distribution. Through this model and sensitivity analysis, they have found that non-pharmaceutical measures such as lockdowns prevented approximately three million deaths across the ten European countries.

Yang and Ma (2020) have researched the early effects of the pandemic on emotional well-being, determining that the pandemic led to a 74% drop in overall emotional well-being. They used two nationally representative surveys: the first survey was conducted before the pandemic, and the second survey was conducted after the start of the pandemic. They conclude that older people experienced a larger drop in emotional well-being than younger people. They also argue that the reasoning for this, is that the elderly being more vulnerable to the virus.

Whitehead and Torossian (2020) have researched the experiences of older adults during the COVID-19 pandemic. They surveyed older adults in the U.S. at the beginning of the pandemic to assess three psychological well-being indicators: perceived stress, negative effects, and positive effects. They also analysed the survey using a conventional qualitative content analysis approach, captured the themes of the answers, and produced a list from this data. The three most commonly reported stressors were confinement/restrictions, concern for others, and isolation/loneliness.

Given the results of the above papers, I hypothesise that as measures grow more stringent, people become unhappier. The reason for the decline would be social isolation and loneliness. This hypothesis is supported by research conducted by Greyling et al. (2021). They performed similar research in Australia, New Zealand, and South Africa, and have discovered that people became unhappier around the announcement and implementation of lockdowns. This hypothesis is also supported by research conducted by Brodeur et al. (2020). They conclude that people's mental health deteriorated at the start of the lockdowns. I also hypothesize that older people's happiness is hit harder by the restrictions as compared with younger people. Both Whitehead and Torossian (2020) and Yang and Ma (2020) have both shown that older people were impacted extremely hard by COVID-19 and its measures.

III. METHODOLOGY AND DATA

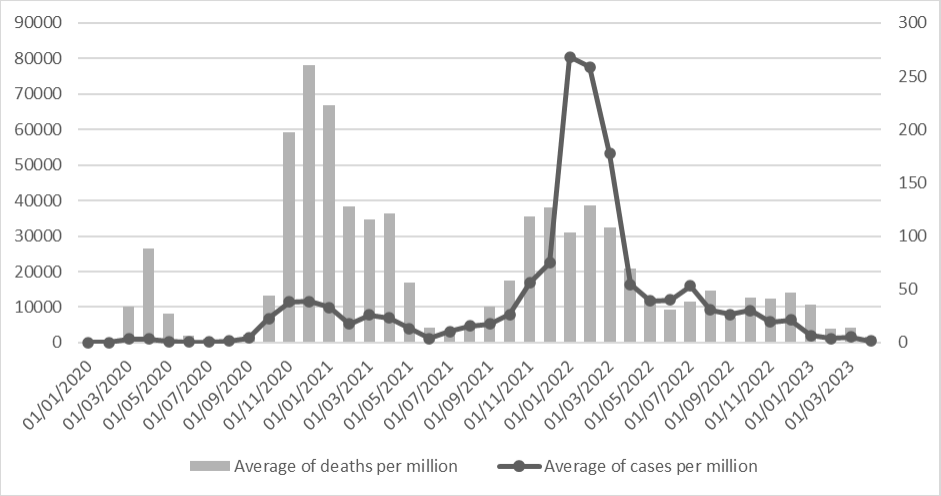
The following section outlines the primary empirical method employed in my thesis to accurately estimate the impact of stringency measures on individuals' happiness. Following this, I provide a comprehensive explanation of my dataset, precisely define the variables of interest within the dataset, and clarify the specific samples are utilised throughout my analyses.

III.A COVID-19 Background

The COVID-19 pandemic first emerged in Wuhan, China, in December 2019. It is believed that the virus' first jump from animal to human was made here. A *New York Times* article written by Taylor (2021) provides a timeline of the outbreak of the COVID-19 pandemic. On January 30th, 2020, the World Health Organisation (WHO) declared a global health emergency after several other countries reported their first known cases of the virus. On February 14th, France recorded its first COVID-19 related death. The WHO declared the virus as a pandemic on March 11th, and on March 17th, the EU barred most travellers from outside the E.U. This is also when most of the lockdowns started in different countries. The first lockdowns entailed social distancing, limited gatherings, working from home, school closures, and other measures. April entailed the first peak of cases of infection. On April 26th the global death toll surpassed 200,000. The pandemic also launched the economy into a recession. During the summer, cases of infection went down, and countries started opening their borders to travellers. In September, the global death toll surpassed one million. In November 2020, the second lockdowns were announced since cases of infection started rising again.

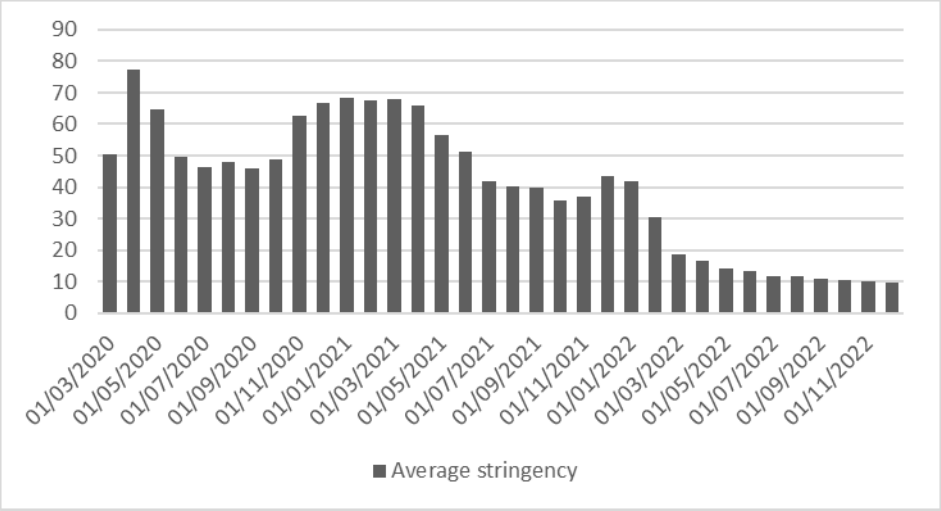
COVID-19 has various variants. According to Katella (2023) at Yale Medicine, the most prominent variants are Alpha, Beta, Delta, and Omicron. The Alpha variant was the first variant, and it was discovered in Great Britain in November 2020. The variant was more deadly and was thought to land more people in the hospital than the original strain of the virus. The Delta variant was then identified in India in December 2020. It was estimated that it caused more than twice as many infections as previous variants Beta and Alpha. It also caused more severe diseases for those infected with the Delta variant. While the Delta variant surfaced, the Beta variant was identified in South Africa. This variant was 50% more contagious than the original strain. Lastly, Omicron was the variant that spread the virus most efficiently. It was first identified in Southern Africa in November 2021. All these variants caused a surge in cases of infection around the winter period. Figure I shows the development of the pandemic in the ten countries used in the research, and it also shows that deaths spiked at the beginning of the pandemic, and during the first period with variants. Cases also spiked during the Omicron variant. As of April 26th, 2023, almost seven million people had died due to COVID-19 and almost 800 million had contracted the virus. Figure II shows the average measures for the ten countries used in the research. It shows the peak in April 2020. Furthermore, the start of the second lockdowns can be seen around November 2020, which lasted until April 2021. The final measures were lifted in 2022.

Figure I: Development of COVID-19



Notes: Figure I shows the average cases per million and average deaths per million for the ten countries analysed in this research.

Figure II: Average stringency of measures



Notes: Figure II shows the average stringency of measures in the ten countries analysed in this research.

III.B. Data and Sample Selection

I use data from the European Social Survey (ESS), which is a biennial cross-national survey of attitudes and behaviour established in 2001. It uses cross-sectional, probability samples, which are representative of all persons aged 15 and over living in private households in each country. The dataset provides me with data on demographics, health, happiness, income, political affiliation, religion, and people's opinion on the government's COVID-19 response. I primarily use the tenth wave, which contains interview data from the period between October 2020 and April 2022, during which COVID-19 measures had different stringencies. I examine the COVID-19 data provided by Our World in Data. The dataset

provides me with data on COVID-19 cases, COVID-19 deaths, and the stringency of the COVID-19 measures.

Regarding the construction of this study's variables, happiness acts as a continuous variable. Respondents were asked to rate their happiness on a scale from 0 to 10, with 0 being extremely unhappy and 10 being extremely happy. The definition of happiness that I will be using is one provided by Ruut Veenhoven: "The degree to which a person evaluates the overall quality of his/her own life as a whole positively."

The stringency Index is calculated by the Oxford Coronavirus Government Response Tracker. It is a composite measure of the following nine response metrics: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on internal movements, and international travel controls. On any given day the index is calculated by the mean score of the nine response measures, with each having a value between 0 and 100. This means that the stringency index is a continuous variable. It is matched to an individual's interview on a per-month basis and is an average for the respective month. The variable indicating that an individual had had COVID-19 at the time of the interview is a dummy variable, with 1 indicating the respondent had contracted the virus at the time of the interview. Lastly, it is noteworthy that household income is defined in deciles and not in absolute numbers.

The main sample of the analysis consists of observations with no missing values for all variables used in the analysis. If an individual meets this requirement, they are included in our sample. Table I provides the descriptive statistics for the main sample. The main sample consists of 12,466 individuals from ten countries. The sample hosts 54.3% females, and the mean happiness in the sample is 7.506. The mean stringency over the period is 36.568, with a maximum of 58.182, and this shows that the interviews were not conducted at the peak of the pandemic. At the start of the pandemic, the mean stringency of the measures was 56.510, with a maximum of 74.212. The mean satisfaction the government's handling of the COVID-19 pandemic was 6.116, on a scale of 0 to 10. The mean age of the sample is 51.291. At the time of the interview, 13.9% of the respondents had tested positive for COVID-19, while 86.1% had not tested positive for COVID-19. The ten countries in which the respondents are located are Switzerland, Finland, Hungary, Iceland, Italy, Lithuania, the Netherlands, Norway, Portugal, and Slovenia. Italy had the most respondents, 12.5% of the respondents being from Italy, while Iceland had the least respondents with 6.2% of the respondent. This is quite logical since Italy and Iceland have the largest and smallest populations respectively. Furthermore, the mean

income decile is 5.480. The respondents are categorised with respect to their income. The absolute numbers are translated into deciles to ensure that the numbers are relative.

In Table II, I show the summary statistics per country. This table displays the stringency at the time of the interview. The months that the interviews took place, along with the number of interviews in said month, are shown in the Table A.1 in the appendix. At the time of the interviews, Slovenia had the highest stringency index of measures, and Finland had the lowest. At the start of the pandemic Italy had the highest stringency of measures, while Finland and then Iceland having the lowest. Furthermore, Table II shows that Italy has the highest population, while Iceland has the lowest. GDP per capita is the highest in Norway, while the second highest is in Switzerland. The country with the lowest GDP per capita is Hungary, where the GDP per capita is half that of Norway. When examining the severity of COVID-19 in each country, use the total COVID-19 cases per million and the total COVID-19 deaths per million. Slovenia had the most cases per million, while Finland had the lowest number of cases. Hungary had the highest total deaths per million, and Norway had the lowest deaths. Finally, the country with the biggest share of its population aged 65 or older is Italy. The country with the smallest share of the population being 65 years of age or older is Iceland, with only 14.4% of the population.

Table I: Descriptive Statistics

Variable	Mean (1)	Standard Deviation (2)	Min (3)	Max (4)
Happiness	7.506	1.803	0	10
Stringency index	36.568	9.762	11.110	58.182
Stringency index during start pandemic	56.510	8.991	45.000	74.212
Satisfaction with handling by government	6.116	2.441	0	10
Female	0.543	0.498	0	1
Age	51.291	18.210	15	90
Respondents had COVID-19				
Tested positive	0.139	0.346	0	1
No Covid	0.861	0.386	0	1
Country				
Switzerland	0.097	0.296	0	1
Finland	0.118	0.323	0	1
Hungary	0.102	0.303	0	1
Iceland	0.062	0.242	0	1
Italy	0.125	0.331	0	1
Lithuania	0.105	0.307	0	1
Netherlands	0.103	0.304	0	1
Norway	0.105	0.307	0	1
Portugal	0.095	0.293	0	1
Slovenia	0.086	0.281	0	1
Education				
Less than lower secondary	0.058	0.234	0	1
Lower secondary	0.144	0.351	0	1
Upper tier secondary	0.148	0.355	0	1
Advanced vocational	0.238	0.426	0	1
Lower tertiary education	0.133	0.339	0	1
Higher tertiary education	0.155	0.362	0	1
Other	0.001	0.029	0	1
Household income deciles	5.480	2.709	1	10
Happiness in wave 8	7.423	0.599	6.307	8.183
Happiness in wave 9	7.506	0.549	6.644	8.287
Observations	12,466			

Notes: Table I shows descriptive statistics for the full sample among respondents. Column (1) shows the mean of the variables of interest. Column (2) shows the standard deviation of the variables of interest. Column (3) shows the minimum observation of the variables of interest. Column (4) shows the maximum observation of the variables of interest.

Table II: Summary Statistics per Country

Country	Stringency index at time interview (1)	Stringency index during start of COVID (2)	Population (3)	GDP per capita (4)	Total cases per million (5)	Total deaths per million (6)	Total tests per thousand (7)	Fraction aged 65 or older (8)
Switzerland	38.996	50.349	8,740,471	78,304.63	207,867.10	1,081.25	986.47	0.184
	(0.300)							
Finland	28.399	45.000	5,540,745	54,725.13	89,381.12	525.22	857.02	0.212
	(0.118)							
Hungary	31.188	56.386	9,967,304	36,665.30	108,428.70	2,858.01	388.73	0.186
	(0.202)							
Iceland	32.618	45.167	372,903	58,327.95	211,493.40	236.76	1,315.13	0.144
	(0.093)							
Italy	44.801	74.212	59,037,472	50,144.84	160,012.90	1,992.83	1,259.56	0.230
	(0.157)							
Lithuania	33.121	56.164	2,750,058	43,077.00	209,919.60	1,949.45	1,316.18	0.190
	(0.077)							
Netherlands	41.754	59.904	17,564,020	65,741.71	217,999.80	936.31	798.19	0.188
	(0.297)							
Norway	30.125	48.818	5,434,324	79,997.12	112,776.90	348.23	984.84	0.168
	(0.353)							
Portugal	40.403	64.249	10,384,972	37,812.53	223,291.60	1,558.27	1,360.80	0.215
	(0.192)							
Slovenia	48.688	59.825	2,119,843	41,675.83	258,728.80	2,368.95	717.15	0.191
	(0.200)							
N	12,466							

Notes: Table II shows the descriptive statistics for the full sample of the countries that are of interest.

III.C. Methodology

The following section describes the methodology used to find the relationship between COVID-19 measures and the happiness individuals. The data is collected from the European Social Survey and Our World in Data as mentioned above.

The study is designed in the following manner: In my data I will match survey month and year with the average stringency of COVID-19 measures at that time. This provides a direct relation between happiness is and the current stringency of the month. These results will be referenced as the short-term results, since these the effects of the stringency are measured at the time of the interview. I use this to run OLS regression, with the following main regression equation:

$$Y_{ict} = a + \beta_1 \boldsymbol{T}_{ct} + \beta_2 \boldsymbol{T}_{ct} A + \beta C_i + Y_{ct-1} + Y_{ct-2} + \boldsymbol{X}_{it} + \boldsymbol{X}_{ct} + \varepsilon_{ict} \quad (1)$$

where Y_{ict} is the happiness of an individual (i) in country (c) in year (t) graded on a scale from 1 to 10, a is a constant, and $\beta_1 \boldsymbol{T}_{ct}$ is the stringency effect of one additional stringency average score in country (c) and year (t). In addition, $\beta_2 \boldsymbol{T}_{ct} A$ is the interaction effect between the stringency and age, which tests the effect of the stringency on happiness for different age groups, C_i is a dummy variable which returns as 1 if the individual had COVID before the interview, and Y_{ct-1} and Y_{ct-2} are the averages of happiness on country level in wave 8 and wave 9. The latter variables are controls variables for different standards of happiness among countries, while $\boldsymbol{X}_{it}$ are individual control variables, such as age, gender, household income decile, education, and trust in scientists. Furthermore, $\boldsymbol{X}_{ct}$ are country control variables such as GDP per capita, population, the share of population aged 65 years or older, the country's COVID deaths in each month, and the country's COVID cases in each month. Lastly, ε_{ict} is the error term for an individual (i) in country (c) in year (t).

The equation mentioned above is the most complete version of the regression. However, I also run several versions of this equation to determine the effect of stringency on happiness. The first version excludes the variables that show whether the respondent had contracted COVID-19 at any point before the interview and the interaction effect between the stringency index and the respondent's age. The second version of the equation includes the COVID-19 status of the respondent. The third version of the equation also includes the interaction effect between stringency and age. The reason for using the interaction effect is to measure whether there is an additional effect for older people. As indicated in the literature review, older people

had a relatively larger drop in emotional well-being and experienced loneliness and social isolation at a greater rate.

In addition, I run a version of the equation, that includes the respondent's opinions regarding whether they are satisfied with the government's handling of the COVID-19 pandemic. I include this because I believe it also influences the effect that the measures have on happiness. Some people might be unhappy at a given moment because they feel as though the government is making the wrong choices. While this certainly influences happiness, it is not the main focus of this research. The goal of this research is to instead find the influence that the stringency of COVID-19 measures has on people's happiness outside of their happiness with current government measures.

I also examine the long-term effects of the stringency of measures on happiness. I run a version of the equation that does not link the stringency of the measures with the month in which the respondents were interviewed in, but rather take the average of the stringency of the measures during the first year of COVID-19 to measure the long-term effects of stringency on happiness. The first year refers to from March-December 2020, as this was the beginning of the COVID-19 pandemic. To further explain this, I use the following example. During the first ten months, the average stringency in Italy was the highest, with an average stringency of 74.212, while in Finland it was the lowest. This would mean that the citizens of Italy had the most stringent measures in the first ten months of the pandemic. This average was matched to all respondents from Italy. Here the assumption would hold that the effects of the stringency of the measures would have long-lasting effects on people. Ren et al. (2020) has shown that mental health worsened during and after the pandemic in China. Furthermore, Benke et al. (2022) have shown that depressive symptoms and loneliness increased over the course of the pandemic and that life satisfaction decreased, comparing the baseline to a 12-month follow-up. The most vulnerable groups to psychopathological symptoms were younger people and those with existing mental disorders.

III.D. Possible Endogeneity Issues

This research involves some endogeneity issues that may bias the results. The first issue is the fact that the COVID-19 happened, and this changed people's happiness. As previously mentioned, a series of studies have shown that the COVID-19 pandemic led to a decrease in happiness, such as Brodeur et al. (2021) and Lopez-Ruiz et al. (2021). I attempt to mitigate this fact, by noting that all respondents were asked the questions during the pandemic. However,

the interviews were all held at different times. This may affect our results, since COVID-19 might have been less prevalent. This also suggests that the pandemic is at a different stage, which I attempt to control for by adding COVID-19 case and deaths numbers for the month of the interview. Furthermore, the people surveyed by ESS were not asked whether they lost someone due to COVID-19 during the pandemic. Eisma et al. (2021) have shown that people recently bereaved have shown higher levels of grief than people who bereaved due to a 'normal' death. This suggests that these people's happiness was affected differently due to losing someone close to them in the way that they did.

IV. RESULTS

This section presents and discusses the main results of the paper. Section IV.A. provides the main results (i.e., the short-term effects) where the stringency is matched to the interview dates, while Section IV.B provides the results where the average stringency at the start of COVID is matched to individuals in their respective countries (i.e., long-run effects). Lastly, Section IV.C presents the robustness checks conducted by the author.

IV.A. Short-term effects

The main results of this paper are provided in Table III. Table III shows the effects of the independent variable, the stringency of COVID-19 measures, on the dependent variable happiness. In column 1, I use the regression formula mentioned in the methodology section, excluding a COVID dummy, for people who have had COVID-19 at the time of the interview and excluding the interaction effect between stringency and age. Column 1 shows no significant results for the effects of stringency on happiness. In column 2 I add a categorical variable for people who had COVID-19 at the time of the interview, with 1 indicating that the respondent tested positive at the time of the interview. However, these results are insignificant. It is not until I add the interaction effect between age and the stringency index that the results indicate significant results for the stringency index.

Column 3 includes the interaction effect between the stringency effect and age. The interpretation of the coefficient is quite simple. It indicates that an increase of 1 out of 100 on the stringency index leads to a 0.019-point increase on average in happiness, these results are significant at a 5% level. It is notable that adding the interaction effect between the average stringency and age seems to provide statistically significant results, while itself being such a small number that three numbers after the comma are insufficient to show the real results. The interaction effect is negative, which means that as stringency and age grow, the effect on

happiness is negative. This could be explained by the fact that elderly people were considered part of the most vulnerable group, and therefore their restrictions were more imposing. An example of such imposing restrictions was that nursing homes were not to have allowed visitors; this could have had big effects on the happiness of elderly people. The results are surprising, since I hypothesised that the opposite would be the case. Since these results are surprising, one could say that the citizens are happy with how the government handled the pandemic. Table IV provides these results.

Table III Short-term effects

VARIABLES	Happiness: Basic model (1)	Happiness: Included dummy COVID-19 (2)	Happiness: Included interaction effect stringency and age (3)
Stringency Index	-0.001	-0.001	0.020***
	(0.002)	(0.002)	(0.004)
COVID-19			
Tested positive		-0.065	-0.072
		(0.044)	(0.044)
Stringency*Age			-0.000***
			(0.000)
Age	-0.001	-0.000	0.015***
	(0.001)	(0.001)	(0.003)
Female	0.114***	0.105***	0.106***
	(0.030)	(0.030)	(0.030)
Constant	1.871***	2.034***	1.236***
	(0.323)	(0.325)	(0.360)
Controls included	Yes	Yes	Yes
Observations	12,466	12,466	12,466
R-squared	0.1295	0.1261	0.1281

Notes: The regression specifications in columns (1), (2), and (3) are estimated using OLS. The controls included in the regression are age, gender, education, household income, trust in science, GDP per capita, population, fraction of the population aged 65 or older, cases per million in the month of the interview, and deaths per million in the month of the interview. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$.

Table IV shows the results if satisfaction with the handling of the pandemic by the government is included. The results are shown for all three models that are the same as the models discussed in Table III. The coefficient of the variable that indicates the respondent's satisfaction with the government's handling of the pandemic is significant in all three of the models. For interpreting these results, I will look at column (3) since here the results are

significant for our explaining variable. If a person is more satisfied with the government's handling by one on a scale from one to ten, that would mean that they are happier by 0.078. This result is significant at a 5% level. The coefficient for the stringency index is again significant at the 5% level. The interpretation is the same as for the coefficient in Table III: an increase of 1 out of 100 for the stringency measure leads to a 0.022 increase on average in happiness. Note that the coefficient grew in comparison with the model excluding satisfaction with government handling. This would mean that the satisfaction level was causing an underestimation of the effect that the measures had on happiness. People who were dissatisfied with the government's handling of the pandemic reflected so this in their answers about their own happiness. Given these results, it can be concluded that my hypothesis, that the measures would have a negative effect on happiness, can be rejected if I take the stringency of the measures at the time of the interview into account. The reason for these results, is that it could be possible that when the pandemic was not as prevalent anymore, people felt safer when there were some restrictions in place, or some restrictions were not as restricting as at the start of the pandemic.

Table IV Satisfaction with Handling Pandemic

VARIABLES	Happiness: Basic model (1)	Happiness: Included dummy COVID-19 (2)	Happiness: Included interaction effect stringency and age (3)
Stringency Index	0.001	0.001	0.022***
	(0.002)	(0.002)	(0.004)
Satisfied with government handling	0.079***	0.079***	0.080***
	(0.007)	(0.007)	(0.007)
COVID-19			
Tested positive		0.087**	0.094**
		(0.044)	(0.044)
Stringency*Age			-0.000***
			(0.000)
Age	-0.002**	-0.002*	0.014***
	(0.001)	(0.001)	(0.003)
Female	0.101***	0.100***	0.100***
	(0.030)	(0.030)	(0.030)
Constant	2.105***	2.029***	1.220***
	(0.324)	(0.325)	(0.358)
Controls included	Yes	Yes	Yes
Observations	12,270	12,270	12,270
R-squared	0.1357	0.1359	0.1379

Notes: the regression specifications in columns (1), (2), and (3) are estimated using OLS. The controls included in the regression are age, gender, education, household income, trust in science, GDP per capita, population, fraction of the population aged 65 or older, cases per million in the month of the interview, deaths per million in the month of the interview. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$.

IV.B. Long-term effects

The results mentioned in section IV.A. are from a period where COVID was not as active anymore. That is why I have also run a regression where the explaining variable is the average of the Stringency Index in a country during 2020, from months March till December. These results are given in Table V. Here it can be seen that all three models return statistically significant estimates for Stringency Index. First, column (1) shows that an increase of 1 out of 100 on the stringency index leads to a 0.014 decrease on average in happiness. This result is significant at a 5% level. In column (2) I add a respondent's COVID-19 status at the time of the interview. Including these estimates, the estimate for stringency indicates that a 1 out of 100 increase in the stringency leads to 0.014 point decrease on average in happiness. In column (3) I add the interaction effect and the results change drastically. The interpretation here would

be that as stringency and age grow, the happiness of individuals declines. A possible reason for this could be that elderly experienced more imposing restrictions, since they were part of the group considered most vulnerable. Nursing homes were completely isolated, and the elderly felt very lonely.

Table V Long-term effects

VARIABLES	Happiness: Basic model (1)	Happiness: Included dummy COVID-19 (2)	Happiness: Included interaction effect stringency and age (3)
Stringency Index	-0.014***	-0.014***	0.034***
	(0.004)	(0.004)	(0.006)
Satisfied with government handling	0.077***	0.077***	0.074***
	(0.007)	(0.007)	(0.007)
COVID-19			
Tested positive		0.092**	0.073*
		(0.044)	(0.082)
Stringency*Age			-0.001***
			(0.000)
Age	-0.002**	-0.002	0.049***
	(0.001)	(0.001)	(0.002)
Female	0.099***	0.098***	0.104***
	(0.030)	(0.030)	(0.030)
Constant	3.296***	3.266***	0.648
	(0.474)	(0.471)	(0.655)
Controls included	Yes	Yes	Yes
Observations	12,270	12,270	12,270
R-squared	0.1365	0.1368	0.1440

Notes: The regression specifications in columns (1), (2), and (3) are estimated using OLS. The controls included in the regression are age, gender, education, household income, trust in science, GDP per capita, population, fraction of the population aged 65 or older, cases per million in the month of the interview, deaths per million in the month of the interview. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$.

IV.C. Robustness

In the following section, I conduct several robustness checks. The first robustness check will be to control for total COVID-19 cases and deaths per million up to the point of the interview instead of the number of cases in the month of the interview. The results from this robustness check are displayed in Table VI. The coefficients stay the same. This would mean that controlling for total COVID-19 cases and deaths or for the COVID-19 cases and deaths in the month of the interview does not change the results.

The second robustness check does the same for the long-term effects. Here the estimates do change: the estimates for the first and second models grow almost threefold, while the third model returns statistically insignificant results. The reasoning behind this is that these were the total COVID-19 numbers at the start of the pandemic and thus control for the severity of COVID-19 in a country at the start of the pandemic. The difference in effects could be interpreted as the impact that the stringency of measures had, as well as the impact that the COVID-19 pandemic had.

Table VI Robustness Checks including total COVID numbers.

VARIABLES	Happiness: Basic model (1)	Happiness: Included dummy COVID-19 (2)	Happiness: Included interaction effect stringency and age (3)
Stringency Index	-0.002	-0.002	0.019***
	(0.002)	(0.002)	(0.004)
COVID-19			
Tested positive		0.069	0.074
		(0.045)	(0.045)
Stringency*Age			-0.000***
			(0.000)
Age	-0.001	-0.000	0.015***
	(0.001)	(0.001)	(0.003)
Female	0.112***	0.104***	0.104***
	(0.030)	(0.030)	(0.030)
Constant	1.874***	1.979***	1.176***
	(0.497)	(0.497)	(0.521)
Controls included	Yes	Yes	Yes
Observations	12,466	12,466	12,466
R-squared	0.1293	0.1259	0.1278

Notes: the regression specifications in columns (1), (2), and (3) are estimated using OLS. The controls included in the regression are age, gender, education, household income, trust in science, GDP per capita, population, fraction of the population aged 65 or older, total cases per million up to the month of the interview, total deaths per million up to the month of the interview. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$.

Table VII Robustness checks long-term effects, Covid numbers at the start of pandemic.

VARIABLES	Happiness: Basic model (1)	Happiness: Included dummy COVID-19 (2)	Happiness: Included interaction effect stringency and age (3)
Stringency Index	-0.040***	-0.041***	0.006
	(0.005)	(0.005)	(0.007)
Satisfied with government handling	0.089***	0.090***	0.086***
	(0.007)	(0.008)	(0.007)
COVID-19			
Tested positive		0.093**	0.077***
		(0.044)	(0.043)
Stringency*Age			-0.001***
			(0.000)
Age	-0.003**	-0.002	0.048***
	(0.001)	(0.001)	(0.005)
Female	0.102***	0.101***	0.108***
	(0.030)	(0.030)	(0.030)
Constant	3.859***	3.833***	1.256
	(0.435)	(0.561)	(0.507)
Controls included	Yes	Yes	Yes
Observations	12,270	12,270	12,270
R-squared	0.1447	0.1450	0.1519

Notes: the regression specifications in columns (1), (2), and (3) are estimated using OLS. The controls included in the regression are age, gender, education, household income, trust in science, GDP per capita, population, fraction of the population aged 65 or older, total cases per million at the start of the pandemic, deaths per million in the month of the interview. ***: $p < 0.01$, **: $p < 0.05$, *: $p < 0.1$.

V. DISCUSSION

In this section, I will first discuss the limitations of my approach and then discuss the ideal empirical strategy. Furthermore, I will discuss the implications the research has on policy questions. I will end the section with a discussion on the implications of my data for the generalizability of the results.

V.A Limitations

I have thus far interpreted the estimated coefficients and highlighted their statistical and economic significance. However, there are some limitations that should be kept in mind. The first limitation is that none of the interviews were conducted during the start of the COVID-19 pandemic. This would mean that at the time of the interviews, none of the measures were at

their highest. During the research, I also tried to account for this by using the average stringency at the start of the pandemic. Although research has shown that the effects of the pandemic on mental health are negative and long term, the internal validity of the long-term method is questionable since averages were used of the stringency of the measures for the first ten months of the pandemic. Since the survey results were only from ten countries, and averages were used, it is hard to determine the effects that stringencies at the implementation had, for example, the start of lockdowns, where people were most likely feeling isolated. To account for this limitation, I would advise that for future research, surveys be used that were conducted at the start of a pandemic or conduct surveys at the start of a pandemic.

Another limitation of the study is that the data provided by Our World in Data did not provide enforcement of measures. If it were the case that in some countries enforcement differs significantly from the measures put in place, this research would not hold up. Furthermore, surveys are not as reliable as one would hope. People often lie as to relate to social norms, or they might be embarrassed with themselves.

As for endogeneity issues, like previously mentioned in the methodology section, it would be good to know whether respondents had family members who suffered losses during the pandemic, since research has shown that grief during COVID-19 impacted individuals more. The survey did not provide whether this was the case for respondents, and thus could not be controlled for. If this were the case for some respondents, I believe that the omission of this fact would underestimate the effect of my estimation. For future research, I would urge researchers to include this inquiry in their surveys.

V.B. Policy Implications

The goal of this paper was to highlight the effects of the stringency of measures on happiness. This paper has accomplished that and could help governments decide whether to implement certain measures that could limit people's happiness. Results indicated that older people suffered more in terms of their happiness. After all, they were shut out the most from the outside world. I would recommend policymakers focus some more on the well-being of older people, other than purely their health. Another recommendation would be to be more prepared for a possible pandemic since most governments were not prepared and had to act decisively without all the information they needed to make certain decisions. This was why they had to prioritise health over happiness, which could lead to an unhappier population.

VI. CONCLUSION

In conclusion, this paper has provided evidence on the relationship between the stringency of COVID-19 measures and happiness. The paper looked at two different situations. The first situation looked at the effect of stringency on happiness at the time of the interview. Here, results indicated that stringency and happiness were positively correlated, and that people were happier as the stringency of measures increased. However, as mentioned, the surveys were not conducted at the start of the pandemic, which could negate some effects. These results are not in line with my hypothesis at the start of the research. The second situation looked at the long-term effects of the stringency of COVID-19 measures and showed that those were negative. As the stringency of measures grew during the start of the pandemic, individuals became less happy. These results are in line with the second hypothesis and earlier research done by Greyling et al. (2021).

For future research, I recommend researchers conduct surveys at the start of a pandemic; this could be quite hard, since lockdowns are put into place at the start of pandemics. This would mean that access to possible candidates for surveys would be limited, and working in teams would also be harder. If surveys were conducted at the start of pandemics, the true effect of measures on happiness can be measured. Furthermore, I recommend that researchers conduct research on certain measures that could lead to a decline in happiness, such as social distancing and other measures that make people isolate from others. I would also recommend that future research look at the enforcement of the measures put in place, to make sure that a lockdown in one country is the same as a lockdown in another country.

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APPENDIX

Table A.1 Interview Dates per Country

Month/Year	Switzerland	Finland	Hungary	Iceland	Italy	Lithuania	Netherlands	Norway	Portugal	Slovenia
Sep/20	0	0	0	0	0	0	0	0	0	256
Oct/20	0	0	0	0	0	0	0	0	0	321
May/21	117	0	0	0	0	0	0	0	0	0
Jun/21	143	0	173	0	0	0	0	7	0	363
Jul/21	148	0	645	7	0	166	0	106	0	132
Aug/21	64	0	343	123	0	191	0	212	41	21
Sep/21	137	519	94	338	0	210	0	265	159	0
Oct/21	115	517	44	169	17	240	265	223	208	0
Nov/21	132	321	0	80	129	287	355	188	262	0
Dec/21	53	129	0	37	145	240	205	72	243	0
Jan/22	77	9	0	30	257	0	82	39	142	0
Feb/22	104	0	0	6	152	0	200	42	140	0
Mar/22	82	0	0	0	421	0	185	109	6	0
Apr/22	61	0	0	0	469	0	10	73	0	0