



How Did COVID-19 Change Opinions and Behaviors in the Netherlands?

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The early stages of the COVID-19 pandemic may have led to a number of behavioral adaptations among Dutch citizens, possibly due to restrictions because of lockdowns, changed orientations toward work, and changes in consumer sentiment. These factors theoretically predict a number of changes in behavior that may have affected people in diverse circumstances in different ways. Among the variables that we study are financial behaviors, health, happiness and emotions. We explore how these variables were affected among households with different sociodemographic conditions, including urbanization, income, gender and age. We use representative panel data from 2019 and 2020 including relevant information from about 2,800 Dutch citizens to study a number of changes primarily during the initial lockdown period in 2020 as compared with the normal situation in 2019. We use regression analysis to estimate the Difference-in-Difference effects of the lockdown in 2020 as compared with the state of affairs in 2019. We find several lockdown effects on transitory thoughts and feelings, i.e., price perceptions, household financial management, emotions, and social relations, of which some effects strongly differ between urban and rural areas. We did not find evidence for more long-lasting effects, for example, on savings, perceived health, and (un)healthy behaviors, although these might have occurred later during the pandemic.

Keywords: lockdown, finance, happiness, emotions, social relations, residence

OPEN ACCESS

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Specialty section:

This article was submitted to
Climate Change and Cities,
a section of the journal
Frontiers in Sustainable Cities

Received: 22 January 2022

Accepted: 28 February 2022

Published: 07 April 2022

Citation:

Antonides G, Goedegebure R and van
Leeuwen E (2022) How Did COVID-19
Change Opinions and Behaviors in the
Netherlands?
Front. Sustain. Cities 4:860151.
doi: 10.3389/frsc.2022.860151

INTRODUCTION

The worldwide COVID-19 pandemic as of November 2021 has lasted about 2 years and has resulted in over 250 million confirmed infections and over 5 million deaths (John Hopkins University, 2020). From the start of the pandemic countries have taken severe measures, including economic lockdowns, to curb the disease and to limit the number of hospital cases. Despite the development of several powerful vaccines, the virus is hard to control, and further lockdowns are still in effect in many countries.

Severe measures, such as lockdowns, may have economic and social effects, including decreased labor activity and loss of income; decreased opportunities of spending, decreased social contacts; diminished opportunities for education; and diminished wellbeing of citizens, among others. The success of coping with such situations, either individually or as a household, is further dependent on a country's financial situation, health infrastructure and regime type, among others. Since still little is known about the socioeconomics effects of lockdown measures against COVID-19, we aim at providing more insight into these effects using a unique Dutch panel dataset including consumers' economic perceptions and expectations, feelings, and social interactions¹.

¹In this article use is made of data of the DNB Household Survey administered by Centerdata (Tilburg University, The Netherlands).

Many different studies have been conducted to gauge various effects and conditions, including medical (Kapteyn et al., 2020), economic (Crossley et al., 2021), health (Galasso et al., 2020), and social psychological factors (Schraff, 2021; Van der Velden et al., 2021). Such studies have faced limited opportunity to assess causal effects because systematic (and randomized) treatments or conditions are hard to establish in the natural environment. Several studies have used non-systematic variation in conditions, such as differences across countries in dealing with the pandemic, using quasi-experimental designs. For example, Amare et al. (2021) studied the effects of COVID-19 on food security and labor participation in different regions of Nigeria where lockdowns were either present or absent. Greyling et al. (2021a) used lockdown variations in South Africa, New Zealand, and Australia to study the effects on happiness over time. Lasisi and Eluwole (2021) showed a positive relationship between number of COVID-19 infections and temperature in the Russian Federation.

However, the most common method of studying lockdown effects is by using either repeated cross sections or panel data from the same population. For example, the Office for National Statistics in the UK (2020) has studied life satisfaction and anxiety measures in repeated cross-sections before and after the 2020 lockdown. Helliwell et al. (2021) have reported changes in happiness, and positive and negative affect, from 2017–2019 to 2020 for 95 countries using repeated cross-sections. Greyling et al. (2021a) have used longitudinal wellbeing measures derived from Twitter data before, during and after the lockdown in South Africa. Schraff (2021) studied the trust in the Dutch national government using panel data gathered in the weeks before and after the Dutch lockdown was declared.

The above-mentioned studies vary in the topics studied and the methodologies used. Apart from the study by Crossley et al. (2021) on labor market shocks, there appears to be a research gap related to the effects of the lockdown on socioeconomic factors. Here, we aim to fill this gap by studying the effects of the Dutch lockdown in 2020 on reported financial, social psychological, health, and social relation perceptions, using longitudinal data from over 2,500 individuals from 2019 to 2020. Since the Dutch lockdown was nationwide (Antonides and Van Leeuwen, 2020), we cannot compare lockdown with non-lockdown regions. We compare data from 2020 with data from 2019. We believe that the longitudinal data set is adequate for analyzing these effects. The first Dutch lockdown lasted from mid-March to the beginning of June and resulted in shops, restaurant, bars, and recreation areas being closed. Also, public transportation, and visits to office and educational facilities were heavily reduced (see Antonides and Van Leeuwen, 2020).

The contribution of our study is showing the effects of the Dutch lockdown on relatively short-term perceptions and experiences regarding prices, financial management, emotions, and social relations. Also, we show that relatively long-term perceptions regarding savings, health, and wellbeing are minor.

We proceed by stating several theoretical expectations for our analysis and describe our method and data. We then describe our results and provide a discussion.

THEORY

Financial Behaviors and Perceptions

Katona's measure of consumer confidence (Katona, 1975) has been studied by statistical bureaus in many countries around the world to predict consumer spending, credit and saving. The measure consists of consumer opinions about the past and future general economic situation, about their past and future economic situation (whether it has/will become better or worse), and whether it is a good time to buy durable goods. Consumer confidence measures have been found to lead consumer spending—especially on durable goods—even in the presence of economic variables (Eppright et al., 1998; Ludvigson, 2004). Van Raaij and Gianotten (1990) showed that in the Netherlands, apart from the income, it were mainly consumer opinions about their personal or household economic situation that explained expenditures, credit and saving, rather than their opinions about the general economic situation. Consumer opinions dealt with past, current, and expected household financial situation, expected saving behavior and whether saving makes sense. Garrat (2000) shows that consumer confidence measures in the EU explained two-thirds of the variation in the annual growth of house prices. Consumer confidence generally is considered as willingness to buy, whereas income is considered as ability to buy.

Consumer confidence may be negatively related to the consumer's uncertainty about the economic situation (Nowzohour and Stracca, 2020)—uncertainty capturing both the riskiness of a situation associated with a certain probability, and ambiguity, i.e., the impossibility to assess such a probability. Although risk may be assessed by certain indicators, for example *beta* capturing the volatility of a stock price, ambiguity usually cannot be measured. However, ambiguity may arise in many economic and societal hazardous situations, such as the global financial crisis in 2008, and the COVID-19 pandemic. Uncertainty may be reflected in consumer confidence measures because of the downside of possible negative events, and fear leading to consumer pessimism in the case of uncertainty (Van Dalen et al., 2017).

Teresiene et al. (2021) studied the influence of COVID-19 on consumer confidence indicators in the EU as a whole, the U.S., and China. They found no significant effect for the EU but negative effects for the U.S. and China. However, for the Netherlands, a significant drop in consumer confidence was observed during the first lockdown period in 2020 (Antonides and Van Leeuwen, 2020). Also, median consumer savings have shown an increase of 7% from 2019 to 2020 (Statistics Netherlands, 2021a). To the extent that the increase is due to precautionary saving, and the inability to spend money during the lockdown period, COVID-19 might have been a factor explaining this behavior.

An economically relevant indicator of financial perceptions is income evaluation. Van Praag and Frijters (1999) report on a measure of income evaluation comprising six survey questions of the type: “In your circumstances, which net household income would you consider as very good?” The other five questions use the verbal labels “good,” “sufficient,” “insufficient,” “bad,” and

“very bad.” Each question is answered with an income statement, which tends to be higher for questions with a higher verbal qualification. On the basis of the six answers, a lognormal income evaluation function is estimated, the location of which tends to be positively related to the own household income, family size, and the average income of one’s social reference group (Kapteyn et al., 1978). Possibly, income evaluation may also depend on the lockdown situation, depending on whether one believes more or less income is needed in such a situation.

Findings from the literature show reduced consumption in case of decreased consumer confidence. Also, the Dutch government took measures to mitigate the financial effects of the lockdown, despite limited ways of household spending. Because of this, we hypothesize that the Dutch lockdown has not affected, or may have even improved the financial situation, financial flexibility, income evaluation, and savings of Dutch households.

Happiness and Emotions

People in general do not like uncertainty and ambiguity about negative outcomes (Ellsberg, 1961; Kahneman and Tversky, 1979). People’s happiness also appears to be negatively related to risk aversion and ambiguity intolerance (Kokkinos et al., 2021). The uncertainty experienced during the COVID-19 crisis might be associated with lower levels of happiness, less positive moods and more negative moods, in a similar vein as with respect to consumer confidence described before.

Indeed, Yamamura and Tsutsui (2020) found higher levels of anxiety, fear and anger among inhabitants of affected areas in Japan. Using Big Data from Weibo users in China, Li et al. (2020) found significantly more negative emotions, less positive emotions, and lower life satisfaction after the outbreak of COVID-19 than before. Greyling et al. (2021a,b) also showed declining happiness in South Africa, New Zealand and Australia the more stringent the lockdowns were applied. Similar results concerning life satisfaction were obtained in the UK (Office for National Statistics, 2021).

In contrast, Van der Velden et al. (2021) found no increases in anxiety and depression among Dutch citizens during the lockdown period, but emotional loneliness did increase somewhat. The World Happiness Report (Helliwell et al., 2021) shows non-significant changes in global wellbeing² and positive affect but a significant increase in negative affect across 95 countries. The latter findings were also found for the Netherlands, except for a significant decrease in positive affect. The report shows that the effects of a lockdown on happiness may be different than on emotions, and that such effects are country specific.

The study of happiness in case of the lockdowns is relevant because of several societal consequences (Greyling et al., 2021a). Lower happiness may be associated with less altruistic behavior in the long run, less activity and creativity, and more anti-social behavior. Also, unhappier people may engage in more smoking and drinking, and generally are less healthy (cf. Argyle, 1997). Finally, unhappy workers are likely to be less productive (Oswald et al., 2015).

²We use the terms wellbeing and happiness interchangeably.

The results from the literature concerning happiness are ambiguous, sometimes indicating negative changes, and sometimes no changes. Since global happiness usually is rather stable, we hypothesize no change in happiness during the relatively short Dutch lockdown. However, since emotions may reflect transitory effects of the lockdown, we hypothesize that the occurrence of positive emotions has been negatively affected, whereas the occurrence of negative emotions has been positively affected.

Social Relations

The lockdown measures largely disrupted people’s opportunities to maintain social relations and interactions outside their households. People derive utility from interacting with others (Becker, 1974). Socializing is known to positively affect people’s wellbeing in the U.S. (Schultz et al., 2008). The ability to maintain social relations may impact how people come out of the lockdown. For instance, upholding social interactions with others such as neighbors tended to buffer the negative effects of the lockdown restrictions on mental wellbeing in the U.S. (Laurence and Kim, 2021). Also, Chinese people that have a strong sense of community tend to worry less about the pandemic and its consequences (Zhou and Guo, 2021). Yet, the pandemic has had a negative impact on the social cohesion that people experience in England (Borkowska and Laurence, 2021). Zhou and Guo (2021) found that people living in larger families tend to worry more. Schmid et al. (2021) show that relationship satisfaction in Germany on average decreased during the lockdown by 0.29 for women and 0.36 for men on a 10-point satisfaction scale. As a hypothesis, the lockdown may thus have positively impacted the extent to which people were concerned with others and the extent of social interactions they maintained, although the impact may have been reduced by the limited opportunities for social interaction.

Health and Health-Related Behavior

The health effects of contracting COVID-19 tend to be worse for people that have existing health problems and people that smoke or consume a lot of alcohol also are at a higher risk of dying (OECD, 2021). Yet, smoking and alcohol consumption are health-related behaviors that people may take up because they are bored, feeling depressed or have something else they want to cope with. Being in a lockdown may be a trigger that can cause people to engage in unhealthy behavior as a coping mechanism (Gonçalves et al., 2020). For instance, people in Belgium indicated that they consumed slightly more alcohol and increased smoking during the lockdown (Vanderbruggen et al., 2020). A large survey across 21 European countries found that the lockdown had indeed changed drinking habits, yet reported that alcohol consumption in general had actually decreased during the lockdown (Kilian et al., 2021). In the Netherlands people indicated that the lockdown and the health risk of COVID-19 would be a motivation to quit smoking (Elling et al., 2020). Yet, they may only do so when they think it is probable that they contract COVID-19 and experience severe reactions (Nyman et al., 2021). Theoretically, one could argue that the lockdown would have increased in unhealthy behavior. Yet, the available

evidence seems mixed. In this study we approach the matter with an exploratory perspective.

Degree of Urbanization

The impact of COVID-19 on the behavior of people also depends very much on the characteristics of their environment, for example, whether they live in more urban or rural areas, in regions with or without internet access, or areas with more or less outdoor space.

First of all, people in more urban and rural areas differ because of sorting. *Sorting* involves the (non-random) clustering of similar people into areas where their (similar) preferences are best met (van Leeuwen, 2020). Some people prefer liveliness and diversity, while others prefer natural amenities and quietness. This can result in clustering of people with similar values and attitudes. In a recent study, van Leeuwen (2020) found that *self-focused people, who score high on values such as importance “to be rich,” “show abilities and be admired,” “try new things,” “have a good time,” “be successful,” “have an exciting life,” and “seek fun”* are more often living in urban areas. Also, the presence of certain types of (social) houses, jobs or (lack of) education institutes results in clustering. Knowledge-intensive jobs, that allow teleworking from home, are more often found in cities, outside jobs are often found in rural areas, while cities in countries like the Netherlands also host more unemployed people and people living in poverty. These external factors not only result in a different context, but also in different behaviors of otherwise similar people (through different reference points, attitudes, and social norms) (van Leeuwen, 2020).

Already before the emergence of COVID-19, distinct urban-rural differences were found in terms of happiness, in the developed world mostly in favor of rural areas (Burger et al., 2020). This has to do with the household composition in cities, i.e., more single person households, more people depending on low incomes, and relatively high housing costs. However, also the context matters, i.e., the environmental quality.

In times of lockdown, both indoor and outdoor spaces are very important for wellbeing and health. When being restricted in going out, the direct environment becomes much more important. Several studies have shown how the presence of green, and safety and walkability of a neighborhood influence the impact of COVID-19. Finucane et al. (2022) focused on wellbeing in predominantly Black urban areas in the U.S. and found that walkability is very important to reduce the impacts of lockdown on health and wellbeing. Tomasso et al. (2021) find that, particularly in urban contexts, people that value urban green higher, are more likely to remain exposed to it, even during lockdowns, with higher wellbeing as a result. This result points out the importance of not only a green environment in general, but also of high (perceived) quality of the environment.

Another difference between urban and rural areas is sense of community and social interaction. Generally, the sense of belonging and the sense of community is lower in cities (i.e., Kitchen et al., 2012). This mostly has to do with the high population dynamics in cities. According to Mair and Thivierge-Rikard (2010) urban areas facilitate more formal and rationalized

interactions (weak ties), while more intimate and informal interactions (strong ties) appear in rural areas.

Liu et al. (2021) studied the impact of the Pandemic in China. Based on 3,000 observations they concluded that the impact was stronger in urban areas compared to rural ones in terms of mental health problems. As an explanation, they give higher stressors due to a higher experienced risk of infection, as well as more loneliness due to the limited amount of (inside) space and less social interactions during the lockdowns in urban areas. Also, Burger et al. (2020) partly explain the higher happiness scores in rural areas in Western countries by higher degrees of community attachment.

Therefore, we hypothesize that the negative effects of COVID-19 will be more severe in more urbanized areas.

Factors in COVID-19 Effects

In addition to their main effects on the socioeconomic indicators, several factors have turned out to either increase or diminish the effects of the lockdown under the COVID-19 pandemic, to be considered next.

Gender

In a study among 25 advanced and developing countries from four continents, females tend to experience more anxiety than men under lockdown (De Pedraza et al., 2020), possibly caused by their relatively high risk aversion as compared with males (Croson and Gneezy, 2009).

Age

Age has a non-linear relationship with both dissatisfaction (as reverse life satisfaction), depression and anxiety, such that the middle-aged experience it the least, and both young and old experience it more (De Pedraza et al., 2020). Helliwell et al. (2021) report higher levels of wellbeing in 95 countries in the 60+ age cohort in 2020 as compared with 2017–2019. In contrast, older adults in the U.S. felt generally less anxious during the second quarter of 2020 (Kapteyn et al., 2020). Household earnings of the 60–65 age cohort has decreased relatively much in the UK (Crossley et al., 2021).

Income

Lower socioeconomic strata tend to suffer more from health and health risks in the second quarter of 2020 in the U.S. (Kapteyn et al., 2020). Higher incomes reported significantly lower happiness in 2020 as compared with 2017–2019 in 95 countries (Helliwell et al., 2021). In The Netherlands, income has been rather stable during the lockdown period due to business support measures, focused on both wages and other business expenses, taken by the government (Antonides and Van Leeuwen, 2020).

Employment

Having a paid job tends to decrease dissatisfaction, depression and anxiety but lower income and changes in workload (whether increased or decreased) tend to increase these effects (De Pedraza et al., 2020).

BMI

People with higher BMI's have a higher risk of being more severely affected by COVID-19, including a higher mortality risk (Du et al., 2021). In itself, BMI may also have been influenced by lockdown measures (Chang et al., 2021).

As a conclusion, female gender, high age, income, having a job, and BMI, seem to have affected several psychological reactions in the period of lockdown.

METHODS

Sample

We use data from the DNB Household Survey, a longitudinal database of economic and psychological aspects of financial behavior of Dutch households run at CentERdata, Tilburg University and sponsored by De Nederlandsche Bank, from 2019 to 2020 (Teppa and Vis, 2012). The online survey includes roughly 2,500 households, annually answering several questionnaire modules concerning income and health, assets and debts, housing and mortgages, work and pensions, and economic and psychological concepts. Within each household, all persons aged 16 or over are interviewed. The CentERpanel is designed to offer an accurate reflection of the Dutch-speaking population. The questionnaires are answered from March to December, with most of the responses occurring from March to June. For our analysis, we assign responses from weeks 10 to 22 in 2020 to the lockdown period, and any other responses to the period thereafter. The last survey period was week 42, before any new restrictive measures were applied.

Measures

The database contained a large number of variables. We selected the indicators that were most relevant to the theoretical concepts explained above.

Financial Indicators

Household Financial Situation

We created one variable for financial situation by combining the questions "How well can you manage on the total income of your household? (1 = 'it is very hard'; 5 = 'it is very easy')," "How is the financial situation of your household at the moment? (1 = 'there are debts'; 5 = 'a lot of money can be saved')," and "How do you think the economic situation of your household will be in 5 years' time in comparison to the current situation? (1 = 'much worse'; 5 = 'much better')." Reliability was satisfactory ($\alpha = 0.79$).

Financial Flexibility

Financial flexibility was measured with a single item "If necessary, we/I can reduce our/my household's expenditures by 5% without a problem" on a 7-point scale (1 = "totally disagree"; 7 = "totally agree").

Household Saving

We created one variable to capture household saving by combining the questions "Does it make sense to save money considering the current general economic situation? (1 = 'certainly not'; 4 = 'yes certainly')," "Did your household put any money aside in the past 12 months? (1 = 'no'; 2 = 'yes')," and

"Is your household planning to put money aside in the next 12 months? (1 = 'certainly not'; 4 = 'yes certainly')." Reliability was satisfactory ($\alpha = 0.67$).

Relative Standing

We created a measure to capture relative standing by combining the items "I think my household has more assets than others in my environment," "If I compare myself with my friends, I think in general I am financially better off," "Most people in my environment are saving money," and "I can spend more on durable consumer goods than others in my environment." Participants indicated their agreement on 7-point scales (1 = "totally disagree"; 7 = "totally agree"). Reliability was satisfactory ($\alpha = 0.75$).

Income Evaluation

From the six income evaluation questions the one dealing with sufficient income was selected as our measure of income satisfaction. This evaluation level corresponds with the average evaluation of the household's own income (Van Praag et al., 2003) and marks the boundary between the income which is deemed sufficient and the income which is deemed insufficient. "The next question again concerns the net income of the household, that is, the net income of all household members taken together. Consider the current situation of your household when answering this question. Which net income of the household would you, in your situation, find sufficient?" The reported income was divided by 1,000 in the statistical analysis.

Housing Prices

"What kind of price movement do you expect on the housing market in the next 2 years? Will the housing prices increase, decrease or remain about the same? (1 = 'the housing prices will decrease'; 2 = 'the housing prices will remain about the same'; 3 = 'the housing prices will increase')."

Housing Price Increase

"What do you consider to be a normal increase percentage per year for houses in 10 years? Please give your answer in whole percentages. If you found a decrease of property prices normal, please enter a negative number."

Price Increase

"What is the most likely (consumer) price increase over the next 12 months, do you think?" (Choice of integer percentage within the 1–10% range).

Health

General Health

"How is your health in general? (1 = 'poor'; 5 = 'excellent')."

Health Change

"Compared to 1 year ago, would you say your health is better now or worse? (1 = 'much worse'; 5 = 'much better')."

Smoking

"Do you smoke cigarettes at all? (1 = 'yes, every day'; 2 = 'yes, every now and then'; 3 = 'no')." This measure was analyzed after

combining options 1 and 2 into one variable (0 = no smoking; 1 = smoking).

Alcohol

“On average, do you have more than four alcoholic drinks a day? (0 = ‘no’; 1 = ‘yes’).”

Emotions

We created two variables to capture the constructs positive emotions and negative emotions. We computed the average of the positive emotions by combining the items “this month I felt calm and peaceful” and “this month I felt happy” ($r = 0.624$, $p < 001$). To capture negative emotions, the following statements were combined: “I have frequent mood swings,” “I get stressed out easily,” “This past month I felt very anxious,” “This past month I felt so down that nothing could cheer me up,” and “This past month I felt depressed and gloomy” ($\alpha = 0.85$). For the first two statements on the negative emotion scale agreement was expressed on 5-point scales (1 = “not at all applicable”; 5 = “highly applicable”), for the remaining statements agreement was expressed on 6-point scales (1 = “never”; 6 = “continuously”). These items together constitute the Mental Health Index 5 (Means-Christensen et al., 2005; Van der Velden et al., 2020). All items were recoded such that higher scores indicated more (less) positive (negative) emotions.

Social Relations

Social Awareness

We created a measure for social awareness by combining the statements “I sympathize with others’ feelings” and “I take time out for others” (1 = “not at all applicable”; 5 = “highly applicable”). Items correlated highly with each other ($r = 0.606$, $p < 001$).

Social Work Interaction

We created a measure to capture interacting with others through work by combining the items “In my work: I interact a lot with other people” and “In my work: I have to cooperate with others.” Items correlated highly with each other ($r = 0.616$, $p < 001$).

Residence

Urban

We created a variable to indicate whether participants lived in cities or densely populated areas (i.e., level 1 on the degree of Urbanization).

Brabant

We created a variable to indicate whether participants lived in the province in which the COVID-19 outbreak started. In the Netherlands, the outbreak started in the province of Brabant. In this province the first lockdown measures were implemented. The remainder of the country followed 1 week later.

Background Variables

In addition to the lockdown variable, we included respondent information on gender (1 = “male”; 2 = “female”), age, having paid work (0 = “no”; 1 = “yes”), and calculated BMI (weight/height squared). Furthermore, the current net

aggregated personal income measure defined over 41 items from the database was included.

Estimation Strategy

We estimated the influence of the lockdown period on the above-mentioned indicators by the following equation:

$$y_{it} = \alpha_0 + \alpha_1 \text{lockdown} * \text{year} + \sum_{j=1}^J \alpha_j x_{ij} + \mu_{it} + \varepsilon_{it} \quad (1)$$

with y_{it} the indicator of interest for individual i at time t , $\text{lockdown} * \text{year}$ the difference-in-difference estimator (DiD), comparing lockdown with non-lockdown periods and years 2019 and 2020. Similar as in Greyling et al. (2021a,b) we assume that the year 2019 provides a true counterfactual for the 2020 levels, such that y_{it} follows the same trend in both years. To the extent that this assumption is not true, we interpret our findings as significant associations, not making causal claims. μ_i denotes the individual fixed effects, and ε_{it} the error term. x_{ij} denotes the j -th background variable for individual i , and α the coefficients to be estimated.

As respondents often took several weeks to answer all questionnaire modules, some responses of the same respondent fall within the lockdown period, whereas others fall outside this period. For this reason, we analyze Equation (1) for each indicator using the relevant questionnaire module. Furthermore, since the data set includes information from more than one person in each household, we allow for correlated error terms within households.

RESULTS

Because of missing responses in both years, the data panel was not completely balanced. Hence, we checked the distribution of the background variables in both years to check if the nonresponse was systematic. **Table 1** shows the relevant sample distributions. Except for degree of urbanization none of the distributions of background variables were significantly different between 2019 and 2020. A low (high) degree of urbanization was about 2.5% more (less) common in 2019 than in 2020. Overall, we considered the differences as minor, suggesting random differences in response to the surveys, and proceeded analyzing the unbalanced panel data.

For each analysis of the relevant variables, we conducted both the fixed-effects and the random-effects panel regressions with clustered error terms, then decided between these regressions based on a test of overidentifying restrictions developed by Schaffer and Stillman (2006). A non-significant ($\alpha > 0.05$) test indicated that the individual-level effects were adequately modeled by a random-effects model, otherwise a fixed-effects regression was accepted. For dichotomous and ordinal variables, a random-effects probit panel regression was conducted throughout. The final predictors per regression may differ because of omission due to collinearity. In each of the regression results tables, we indicate the DiD indicator ($\text{lockdown} * \text{year}$) simply by “Lockdown.” Since our analysis is

TABLE 1 | List of background variables.

Variable	N(%) 2019	N(%) 2020
Gender		
Male	2,683 (48.9)	2,573 (49.2)
Female	2,804 (51.1)	2,659 (50.8)
$\chi^2_{(1)} = 0.084, p = 0.771$		
Age		
≤18	879 (16.0)	844 (16.1)
19–45	1,612 (29.4)	1,540 (29.4)
46–60	1,050 (19.1)	1,066 (20.4)
60+	1,944 (35.4)	1,780 (34.0)
$\chi^2_{(3)} = 3.632, p = 0.304$		
Degree of urbanization		
Very high	373 (11.6)	714 (13.8)
High	771 (24.0)	1,268 (24.5)
Moderate	678 (21.1)	1,130 (21.9)
Low	749 (23.3)	1,149 (22.2)
Very low	644 (20.0)	907 (17.6)
$\chi^2_{(4)} = 15.881, p = 0.003$		
Province		
Groningen	148 (4.6)	251 (4.9)
Friesland	177 (5.5)	217 (4.2)
Drenthe	104 (3.2)	159 (3.1)
Overijssel	206 (6.4)	329 (6.4)
Flevoland	69 (2.2)	101 (2.0)
Gelderland	436 (13.6)	730 (14.1)
Utrecht	196 (6.1)	319 (6.2)
Noord-Holland	430 (13.4)	723 (14.0)
Zuid-Holland	578 (18.0)	950 (18.4)
Zeeland	102 (3.2)	143 (2.8)
Noord-Brabant	553 (17.2)	869 (16.8)
Limburg	216 (6.7)	377 (7.3)
$\chi^2_{(4)} = 11.404, p = 0.410$		
Job		
Yes	1,342 (45.7)	1,314 (46.3)
No	1,598 (54.3)	1,525 (53.7)
$\chi^2_{(1)} = 0.236, p = 0.627$		
BMI		
	26.22	26.42
$F_{(1, 5578)} = 0.808, p = 0.369$		

focused on the effects of the lockdown on people's perceptions, experiences and behaviors, we report the R-squared within the panel regressions throughout.

Financial Behaviors and Perceptions

Table 2 shows the results of the analyses for five perceptions of the household financial situation.

Household financial situation was positively related to the lockdown in 2020. No other significant effects appeared in the fixed effects regression. Household income was dropped from the regression because of collinearity.

Financial flexibility appeared to be positively related to the lockdown, indicating that people could more easily cut back on their expenses than at other times. Obviously, spending during the lockdown was already reduced due to shops and institutions being closed, and events being canceled. In addition, financial flexibility was positively related to living in a highly urban area, which might possibly be due to the abundance of retail outlets in those areas, as opposed to more rural areas.

Household saving appeared to be unrelated to the lockdown in general and only marginally positively related to having a paid job.

Relative standing was positively related to the lockdown in general, which might be related to the phenomenon of overconfidence, since not everyone can be better off than everyone else (Svenson, 1981). Apart from this, living in a highly urban area also tends to increase relative standing. The latter result might be related to the sorting of people who value being admired or being successful in the cities, described above.

The lockdown did not significantly affect the household income that was deemed sufficient. Possibly, the lockdown period was too short to influence one's income evaluation, the more so since the government took measures to support incomes and allowances during this period. Unrelated to the lockdown, the sufficient income was positively related to one's net personal income.

Apparently, both the perceived household financial situation and financial flexibility were positively related to the lockdown. In addition, household saving and relative standing during the lockdown were significantly related to the degree of urbanization, i.e., being more common in larger cities than in rural areas.

Prices

Table 3 shows the results of the analyses for three price perceptions.

The expectations concerning an increase of housing prices in the next 2 years were negatively related to the lockdown. Apparently, during the lockdown as compared with the other periods, people expected a decrease in housing prices in the short term. However, in 10 years the percentage of expected housing price increase (a long-term effect) was not significantly related to the lockdown. These results point to the general expectation of a temporary fall and subsequent recovery of housing prices thereafter.

Interestingly, during the lockdown in the province of Brabant (where COVID-19 started to spread in the Netherlands), the short-run price change was expected to be lower during the lockdown in this province compared to the rest of the Netherlands, while before the lockdown these persons expected a higher short-term increase. It might be that the relatively strong impact of COVID-19 in this region resulted in more negative expectations in the short term.

Although the short-term effect of the lockdown on housing prices was not significant in highly urban areas, the long-term effect was significantly negative during the lockdown while being positive in other periods. This is not surprising since during the first lockdown, in particular in Amsterdam, population dropped significantly, due to the exit of expats and students, and an overall

TABLE 2 | Regressions on five financial perceptions.

	Income ^a	Financial flexibility ^a	Household saving ^a	Relative standing ^a	Sufficient income ^c
Lockdown	2.238*** (0.698)	0.100** (0.0465)	-0.00933 (0.0152)	0.0598** (0.0263)	-14.04 (15.00)
Lockdown*Age 60+	n/a	n/a	n/a	n/a	19.92 (20.21)
Lockdown*Female gender	n/a	n/a	n/a	n/a	30.31 (29.75)
Lockdown*Urban	-5.709 (5.551)	-0.455 (0.372)	-0.198 (0.394)	-0.206 (0.171)	18.96 (17.02)
Lockdown*Brabant	-1.292 (2.227)	0.223 (0.151)	-0.0130 (0.0622)	0.0586 (0.0986)	16.07 (17.41)
Urban	4.730 (5.416)	0.593* (0.312)	0.217 (0.390)	0.359*** (0.118)	-16.47 (15.64)
Brabant	0.495 (0.502)	n/a	n/a	n/a	-15.24 (16.57)
Personal net income (× 1,000 euro)	n/a	0.00245 (0.00203)	0.000282 (0.000652)	0.00159 (0.00151)	0.228*** (0.0460)
Age 18-	n/a	n/a	n/a	n/a	10.56 (19.90)
Age 19–45	n/a	n/a	n/a	n/a	16.38 (17.28)
Age 46–60	n/a	n/a	n/a	n/a	29.53 (30.06)
Job	-1.066 (1.447)	0.236 (0.190)	0.107* (0.0629)	-0.0165 (0.100)	3.600* (2.185)
Female	n/a	n/a	n/a	n/a	-28.83 (31.05)
BMI	0.0604 (0.0805)	0.00930 (0.0126)	0.00129 (0.00148)	0.00219 (0.00343)	0.229 (0.434)
Intercept	19.65*** (2.766)	3.903*** (0.365)	2.711*** (0.0669)	3.465*** (0.127)	30.96*** (7.563)
N	3,513	3,293	3,293	3,293	3,513
R ² -within	0.011	0.014	0.005	0.013	0.001

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; ^afixed effects, ^cOLS.

sentiment of people wanting to flee big cities worldwide. This also explains higher expectations of housing prices increases in the region of Brabant during the Lockdown.

When looking at the expectations on consumer prices, spatial factors do not seem to play a role anymore. Instead, people with higher incomes, people below 60 years of age, males, and people with lower BMI expected lower consumer prices in the next 2 years than other people. However, during the lockdown period significantly higher consumer prices were expected in the next 12 months than in other periods, although the effect was diminished for people older than 60 years and for females.

Health

Table 4 shows the results of the analyses on health and health-related behaviors.

The lockdown did not have an effect on people's general health condition, nor did people indicate that their health had

improved or worsened during the lockdown. The lockdown did also not affect whether or not people smoked or how much alcohol they consumed. Unrelated to the lockdown; people in the age groups 19–45 and 46–60 indicated that their health had worsened compared to the previous year. People with higher BMI's reported that their health had improved.

Happiness and Emotions

Table 5 shows the results of the analyses on happiness and emotional wellbeing.

Table 5 shows that the lockdown in particular resulted in lower levels of positive emotions across the sample. Happiness and negative emotions did not change significantly.

However, when we focus on particular regions, we see that across the Netherlands, people in urban areas experienced both more positive and negative emotions. However, this decreased significantly during the lockdown, for negative emotions even

TABLE 3 | Regressions on three price perceptions.

	Housing price change in 2 years ^a	Percentage housing price increase in 10 years ^a	Percentage consumer price increase in 1 year ^b
Lockdown	-0.283*** (0.0702)	-1.410 (1.169)	0.190*** (0.0361)
Lockdown*Age 60+	n/a	n/a	-0.380** (0.175)
Lockdown*Female gender	n/a	n/a	-0.440*** (0.156)
Lockdown*Urban	0.577 (0.391)	-11.54* (6.134)	0.310 (0.277)
Lockdown*Brabant	-1.252*** (0.348)	5.590* (3.122)	-0.338 (0.229)
Urban	-0.513 (0.395)	11.31* (6.813)	-0.186 (0.251)
Brabant	1.008*** (0.0137)	n/a	0.191 (0.213)
Personal net income (×1,000 euro)	-0.00502 (0.00569)	-0.0566 (0.0986)	-0.00615*** (0.00191)
Age 18-	n/a	n/a	0.113 (0.510)
Age 19–45	n/a	n/a	-0.560*** (0.180)
Age 46–60	n/a	n/a	-0.397** (0.183)
Job	-0.271 (0.217)	7.938** (3.292)	-0.104 (0.0814)
Female gender	n/a	n/a	0.450*** (0.148)
BMI	-0.00419 (0.00681)	0.174 (0.151)	0.0115** (0.00529)
Intercept	3.466*** (0.312)	-0.985 (5.658)	2.659*** (0.218)
N	640	393	3,513
R ² -within	0.121	0.104	0.015

Standard errors in parentheses; *p < 0.10, **p < 0.05, ***p < 0.01; ^afixed effects, ^brandom effects.

more so than for positive emotions. Overall, this resulted in significantly lower levels of happiness during the lockdown of people living in urban areas.

Social Relations

Table 6 shows the results of the analyses on social relations.

For both years combined, people from Brabant indicate to be more socially aware compared to the rest of the sample. Interestingly, during the lockdown period, people in Brabant felt to be less socially aware, albeit marginally. In the beginning, in Brabant the lockdown was much stricter than in the rest of the Netherlands, and also mortality rates were very high. This can explain the feeling of being less aware of each other. In urban

TABLE 4 | Regressions on health and health-related behavior.

	General health ^a	Health change ^b	Smoking	Drinking
Lockdown	-0.0157 (0.0167)	-0.00372 (0.0144)	-0.381 (0.345)	0.141 (0.123)
Lockdown*Age 60+	n/a	-0.0823 (0.0691)	0.421 (4.797)	0.398 (0.666)
Lockdown*Female gender	n/a	-0.0242 (0.0597)	0.268 (3.091)	-0.200 (0.611)
Lockdown*Urban	0.0993 (0.120)	-0.0259 (0.100)	3.286 (4.285)	0.831 (1.124)
Lockdown*Brabant	0.0845 (0.188)	0.0558 (0.126)	-0.0217 (3.275)	-0.591 (1.054)
Urban	-0.143 (0.0937)	0.00177 (0.0942)	-2.678 (4.249)	-0.620 (1.070)
Brabant	-0.201 (0.179)	-0.00399 (0.121)	0.374 (2.817)	0.219 (0.987)
Personal net income (×1,000 euro)	-0.000172 (0.000574)	0.000213 (0.000495)	-0.00934 (0.0170)	0.00415 (0.00329)
Age 18-	n/a	-0.239 (0.166)	1.038 (7.815)	0.418 (1.100)
Age 19–45	n/a	-0.272*** (0.0712)	1.214 (4.560)	-0.298 (0.681)
Age 46–60	n/a	-0.190*** (0.0724)	1.156 (4.743)	-0.105 (0.680)
Job	-0.0214 (0.0509)	-0.0267 (0.0304)	0.122 (1.188)	0.116 (0.265)
Female gender	n/a	0.0163 (0.0569)	-0.371 (2.889)	-0.642 (0.585)
BMI	-0.00335 (0.00322)	0.00718*** (0.00237)	-0.0101 (0.106)	0.00532 (0.0142)
Intercept	2.298*** (0.0969)	2.999*** (0.0893)	-12.65** (5.281)	-4.507*** (0.867)
Insig2u	n/a	n/a	5.015 (.)	1.417*** (0.225)
N	3,513	3,513	3,513	3,513
R ² -within	0.006	0.002	n/a	n/a

Standard errors in parentheses; **p < 0.05, ***p < 0.01; ^afixed effects, ^brandom effects.

areas, it was not so much social awareness, but more social interactions at work that changed. In the lockdown, people from urban regions reported a significant drop in social interactions with others at work. For both years combined, we find that these people tend to interact more with others compared to people from less urban regions. The regression also shows that during the lockdown people from Brabant actually experienced an increase in interactions with others at work.

DISCUSSION

We have analyzed the main variables of interest which were available in the 2019 and 2020 waves of the DNB Household Panel during the COVID-19 lockdown period as compared with

TABLE 5 | Regressions on happiness and emotional wellbeing.

	Happiness ^a	Emotions-positive ^a	Emotions-negative ^a
Lockdown	0.00480 (0.0170)	-0.0804*** (0.0241)	0.0261 (0.0161)
Lockdown*Urban	-0.141** (0.0681)	-1.082*** (0.343)	-1.368*** (0.229)
Lockdown*Brabant	-0.0977 (0.0716)	0.120 (0.0976)	0.0328 (0.0636)
Urban	0.0291 (0.0375)	0.966*** (0.332)	1.305*** (0.218)
Personal net income (× 1,000 euro)	-0.000143 (0.000643)	0.000322 (0.000978)	0.000164 (0.000727)
Job	0.0680 (0.0607)	-0.0659 (0.0893)	0.0108 (0.0639)
BMI	0.00237 (0.00234)	0.000160 (0.00233)	-0.000182 (0.00245)
Intercept	3.973*** (0.0845)	4.628*** (0.101)	4.499*** (0.0827)
<i>N</i>	3,443	3,466	3,466
<i>R</i> ² -within/adj. <i>R</i> ²	0.007	0.016	0.013

Standard errors in parentheses; ***p* < 0.05, ****p* < 0.01; ^afixed effects.

the year before and the period thereafter. These variables mainly comprised financial perceptions and expectations, satisfaction, health and emotions, and social relations. Since the first lockdown period was relatively short, no large changes but several significant changes in these variables were found.

Perceptions and expectations concerning the household financial situation changed somewhat during the lockdown period. Both the perception of the household financial situation and the perceived easiness of reducing household expenses were higher during the lockdown than in other periods, confirming our hypothesis. This result is consistent with the income support from the government, given to businesses to sustain employee wages and other costs. In total, the Dutch government spent 97.5 billion euro on business support and recovery, tax measures, guarantees and loans in 2020 (National Government, 2021). Insofar as the literature has reported negative economic effects of lockdowns, these have likely been caused by lack of government support, resulting in job loss or reduced income. The effects of governmental support in case of lockdown might be studied in future research.

Theoretically, consumer financial perceptions and expectations may be considered as aspects of consumer confidence. However, the official consumer confidence indicator dropped to a historic low level in April 2020, whereas our measure of perceived household financial situation changed positively as compared with the other periods. We have several explanations for this discrepancy. First, our measures are different from the official consumer confidence measures in that they are much more related to the household financial situation. Second, consumer confidence comprises perceptions of both the general economic situation and the household financial situation. The first one had dropped much more

TABLE 6 | Regressions on social relations.

	Social awareness ^b	Social work ^a
Lockdown	-0.0146 (0.0154)	-0.0752 (0.0461)
Lockdown*Age 60+	0.0777 (0.0958)	n/a
Lockdown*Female gender	0.0706 (0.0888)	n/a
Lockdown*Urban	-0.226 (0.193)	-2.081*** (0.434)
Lockdown*Brabant	-0.250* (0.147)	0.331* (0.169)
Urban	0.208 (0.189)	2.107*** (0.412)
Brabant	0.284** (0.141)	n/a
Personal net income (× 1,000 euro)	-0.000674 (0.000573)	-0.000311 (0.00236)
Age 18-	0.132 (0.171)	n/a
Age 19–45	-0.0819 (0.101)	n/a
Age 46–60	-0.0730 (0.103)	n/a
Job	0.0498 (0.0352)	0.131 (0.406)
Female gender	0.310*** (0.0869)	n/a
BMI	-0.000327 (0.00194)	0.00639 (0.0128)
Intercept	3.758*** (0.103)	5.362*** (0.514)
<i>N</i>	3466	1791
<i>R</i> ² -within	0.001	0.014

Standard errors in parentheses; **p* < 0.10, ***p* < 0.05, and ****p* < 0.01; ^afixed effects, ^brandom effects.

dramatically than the second: 69% of consumers expected the general economic situation in the next 12 months to decline, whereas only 16% expected a decline in the household financial situation (Statistics Netherlands, 2021b). Another discrepancy was found between the increase in actual savings from 2019 to 2020, and the fact that our perceived savings behavior measure did not change during the lockdown. Again, we believe that the relatively short lockdown period did not last long enough to build up savings. Furthermore, any increases in invested wealth would have materialized after the lockdown, when stock prices had recovered.

We found different results concerning expected housing prices during the lockdown in the short term than in the long term. During the lockdown, housing prices were believed to decline in the next 2 years, possibly due to uncertainty about the economic situation and consequent declining housing market. However, expectations regarding housing prices in the next 10 years were not different than in other periods, possibly because of

an expected recovery of the market when uncertainty about the economic situation would have been relieved. However, spatial factors are important here: urban residents expected a decrease in housing prices in the longer term, while people in the less urban region of Brabant expected a price increase. This result might be explained by the overall sentiment of people fleeing the large cities in many parts of the world. The expectation of lower housing prices contradicts the actual development of housing prices in 2021. In October/November 2021 housing prices were about 18% higher than the year before (Statistics Netherlands, 2021c), possibly due to the fast economic recovery after the massive vaccination effort in this year.

Perceptions of health and health-related behaviors were not affected by the first lockdown. People did not find their health to be better or worse, nor did they feel that their health had specifically improved or worsened in the first lockdown. We also found no evidence that people consumed more alcohol or smoked more during the lockdown. Research suggests that in times of a lockdown people may engage in coping behavior and display unhealthy behavior (Gonçalves et al., 2020). There is research that supports this and for instance shows that in Belgium people consumed more alcohol and smoked more during the first lockdown (Vanderbruggen et al., 2020). The results of our study do not support this. We argue that the contention that people drink and smoke more because of the lockdown may be more nuanced. A cross-sectional survey across Europa (the Netherlands excluded) reported an average European decrease in alcohol consumption, one instance of increase in the United Kingdom and no difference in consumption in seven other European countries (Kilian et al., 2021). That study suggests that a change in alcohol consumption may be attributed to experiencing financial distress. The participants in our dataset did not indicate their financial situation to have been negatively affected by the lockdown. This may explain why the people in our dataset did not alter their health-related behavior.

We did find some effects of the lockdown on happiness and emotions. The lockdown resulted particularly in lower levels of positive emotions across the population, not on happiness overall, thus partly confirming our hypotheses. One explanation might be that people responded very differently to the lockdown, according to many studies: for some it was a relief to be at home, while for others it was a difficult situation (Statistics Netherlands, 2021d). This had to do with socio-economic characteristics, as well as with physical circumstances. And indeed, when we focus on specific regions, we see that, before the lockdown, people in urban areas experienced both more positive and negative emotions. However, both types of experiences decreased significantly during the lockdown. Overall, this resulted in significantly lower levels of happiness during the lockdown of people living in urban areas. The results from different areas in the Netherlands might also explain conflicting results on happiness and emotions due to lockdowns in different countries, with various degrees of urbanization. We leave this possible explanation for future research.

The social relations that people maintained were affected by the lockdown, as hypothesized, but the specific effects differed by region. People in Brabant, the province in which

the Dutch outbreak started, were generally more socially aware and emphatic of others. Yet, social awareness decreased during the lockdown. This province was the first that was affected by strict regulations such as travel restrictions and public events being canceled. Brabant was also the region with the highest excess mortality in the first wave of the pandemic (Statistics Netherlands, 2020). The increased mortality rate among neighbors, along with seeing the first measures, may have negatively affected the social sentiment during lockdown. Interestingly, we did find some indication that people from Brabant experienced more social interactions with co-workers during the lockdown. This was clearly not the case on the more urban areas, where before the lockdown social interactions at work were higher compared to the rest of the Netherlands. Here, the impact had a significant negative impact on social interactions at work. This further exemplifies that the effect of lockdown measures on people's social relations manifests itself depending on the living environment.

Our hypothesis regarding urban regions that were expected to be hit harder during the lockdown compared to the more rural ones seems to be partly confirmed. In several models, we did not find significant spatial effects, such as for financial perceptions and health. However, when looking at expectations of housing prices, happiness and social relations, we did find differences between regions, all with a more negative impact in urban regions.

Our study has focused mainly on perceptions and experiences rather than on observed behavior, thus providing insight into the psychological experiences and decision-processes taking place during the first Dutch lockdown. Since the lockdown was relatively short (about 3 months), only transitory thoughts and feelings seemed to have been affected, i.e., price perceptions, household financial management, emotions, and social relations. We did not find evidence for more long-lasting effects, for example, on savings, perceived health, and (un)healthy behaviors, although such effects might have occurred later during the pandemic. The theoretical implication of our results is that a short-term shock has more impact on transitory socioeconomic perceptions and experiences than on long-term perceptions and behaviors. The practical implication of our results is that they suggest that the financial support from the Dutch government has prevented adverse financial effects during the lockdown, but that the Dutch government has been unable to avoid the occurrence of negative emotional and social effects. Dutch people reported increased mental health issues as a result of the pandemic (Statistics Netherlands, 2021d). The government would be thus be well advised to include measures of emotional and social support, in particular in urban areas, in addition to financial support, to improve future lockdown strategies.

We have used the measures from 2019 as counterfactual of what happened in 2020, i.e., of what might have happened in 2020 without the COVID-19 pandemic. The comparison of background variable distributions in the 2 years seems to mainly support this assumption. However, a longer time frame, both with and without the pandemic, would give a firmer basis of analysis. We leave this opportunity for future research. Also, the overall picture of relationships between variables of

interest—including those between the dependent variables—is still lacking, and may be investigated in future research.

DATA AVAILABILITY STATEMENT

Publicly available datasets were analyzed in this study. This data can be found at: <http://www.dhsdata.nl>.

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AUTHOR CONTRIBUTIONS

GA, RG, and EL contributed to conception and design of the study and wrote sections of the manuscript. RG organized the database. GA and RG performed the statistical analysis. GA wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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