# Daily emotional well-being during the COVID-19 pandemic

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## Abstract

The COVID-19 outbreak has become one of the largest public health crises of our time. Governments have responded by implementing self-isolation and physical distancing measures that have profoundly impacted daily life throughout the world. In this study, we surveyed how an Irish sample experience the activities, interactions and settings of their lives during the pandemic. The sample (N = 604) were assessed in Ireland on the 25th March, 2020, following the closure of schools and non-essential businesses. To overcome difficulties in between-person comparisons we examined within-person variance in emotional well-being and how people spend their time. We found that while most time was spent in the home, time spent outdoors was associated with markedly raised positive affect and reduced negative feelings. Exercising, pursuing hobbies and taking care of children were the activities associated with the greatest affective benefits. Home schooling children and obtaining information about COVID-19 were ranked lowest of all activities in terms of emotional experience. These findings highlight key activities that may play a protective role in relation to well-being during the pandemic, the importance of setting personal limits for exposure to COVID-19 related media coverage, and the need for greater educational supports to facilitate home schooling during this extremely challenging period.

## Introduction

In the rapidly changing landscape following the emergence of COVID-19, a constant has been the request from governments across the globe for citizens to practice physical distancing and to isolate themselves at home. Following these guidelines, billions of people have dramatically changed their daily routines and restricted their movements and interactions, potentially with significant welfare effects (1-2). Currently, little systematic evidence exists on how people are experiencing daily life during the pandemic. In this study, we therefore asked a sample of the Irish population to reconstruct the activities, interactions and emotional experiences of the previous day. At the time of sampling, March 25th, the government had closed schools and non-essential business, and citizens and workplaces had been strongly encouraged to move to home-working, with polling indicating widespread support for the restrictions that had been put in place (3).

Set against this backdrop, the existing subjective well-being literature offers some insight into the effects of the dramatic changes in people's daily lives on their emotional well-being. Activities affected by movement restrictions such as spending time in nature (4), exercising (5) and supportive interpersonal interactions (6,7), have been associated with enhanced well-being. In contrast, time spent alone, engaged in social media use and caring for children have been associated with reduced subjective well-being (7-9). While these findings offer suggestive evidence, their applicability to the current situation – daily life during the COVID-19 pandemic – is unclear.

A small set of studies have shown that self-isolation and quarantine following previous virus outbreaks (e.g. SARS, H1N1) may produce negative psychological effects (1). In a Chinese sample one month into the COVID-19 outbreak, the well-being of those who were highly physically active prior to the outbreak was particularly sensitive to the severity of the outbreak in their local area (10). Such studies of well-being during virus outbreaks have chiefly relied on global reports of past "usual" feelings and the dynamics of daily experience have been neglected.

In the current study we therefore generated a snapshot of the experiences of people living through the COVID-19 outbreak in Ireland using the Day Reconstruction Method (DRM). The DRM is a diary-based tool designed to collect data on the experiences a person has on a given day, through a systematic reconstruction conducted on the following day (7). Drawing on the DRM, we aimed to estimate how affective experiences are associated with daily activities, time spent indoors/outdoors and social interaction during the pandemic with a view to providing evidence to inform academic and policy debates on how the emotional consequences of self-isolation measures may be mitigated or exacerbated.

## Results

Our examination of how participants allocated their time showed that they spent the majority of their day at home (73.5%) and in the presence of people from their household (51.8%), as anticipated. The most frequently endorsed activities were eating, watching TV/streaming and working or studying. Participants were alone for 27.0% of the day.

**Location.** Individual fixed effect regression models of the relationship between the location of the individual and affect levels at the same time showed that being outdoors or in nature is the location with highest positive and lowest negative affect. Being at work is perceived as less positive and more negative compared to being at home as is typical (11), as shown in Figure 1, Panel B.

**Everyday activities.** Exercising, going for a walk, gardening and pursuing a hobby were ranked as the most enjoyable activities, as can be seen in Table 1. Our examination of the within-person relationship between activities and affect levels confirmed that these four activities were associated with the largest increase in positive affect. Taking care of children was also linked to raised positive affect and reduced negative feelings. In contrast, levels of negative affect were notably higher when participants were using social media, home schooling children, commuting to work or informing themselves about COVID-19. Within-person effects of daily activities on affect levels also confirmed the importance of these associations, as shown in Figure 1, Panel A.

**Social interaction.** Engaging in in-person social interactions with friends was associated with higher positive and lower negative affect ratings compared to the respective variable means. In line with prior research (11), time spent in work-related personal or remote interactions was linked to reduced positive and increased negative affect (see Figure 1, Panels C and D). Surprisingly, interactions with one's spouse or significant other were linked to significantly lower positive affect and raised negative affect levels.

Sensitivity tests indicated that the study findings did not differ markedly when fixed effects regressions included activity, location and interaction variables simultaneously or when random effects regressions were employed (for details see: https://doi.org/10.6084/m9.figshare.12085812.v2).

## Discussion

We present a rich snapshot of how people are experiencing the activities and settings of their daily lives during the COVID-19 pandemic. Our analyses provide the first available estimates of how within-person variation in emotional well-being is linked to the ways people are spending their time during the outbreak. The findings also provide important information from a population mental health perspective by highlighting key issues related to everyday activities and experiences that may require policy consideration and inform the mental health guidelines of governments and international bodies during the crisis.

First, in line with prior research (4,12), we find that positive affect is greatest when outdoors and that exercising, going for a walk, gardening or pursuing a hobby are particularly positive activities. The elevated well-being during outdoor activities is an important public policy consideration and needs to be viewed in light of the trade-off between population well-being and compliance with physical distance guidance that form part of virus mitigation efforts. Second, our results suggest that spending time with children following the closure of schools and childcare facilities may benefit rather than reduce parents' emotional well-being, as suggested by prior research (7,9). In contrast, taking on the role of educator poses significant challenges, and co-ordinated mental health and education policies in relation to home schooling may help to provide necessary supports to parents at this challenging time. Third, we find that social media use and informing oneself about COVID-19 are both associated with elevated levels of negative affect. These results suggest that setting personal limits for news and social media consumption, as recommended by recent research (13) and World Health Organization guidelines (14), may help to safeguard people's emotional wellbeing at this difficult time. Fourth, we observed reduced emotional well-being levels during interactions with one's spouse or partner, which is an atypical finding (7) and may reflect difficulties in adapting to major changes in household routines and responsibilities following the outbreak.

The current study is not without limitations. We captured a snap-shot of one point in time, precluding an understanding of whether and how people's routines and emotional well-being are adapting during the crisis. For instance, as people become more accustomed to virtual interactions, well-being benefits may follow. Further, it is not possible to infer from the current data that elevated well-being observed in outdoor pursuits could not be attained by substitute indoor activities. Multi-wave data from a range of countries is needed to provide insight into the effects of crisis trajectories and isolation measures on well-being on a global scale.

In conclusion, distancing people from others to limit infection is a crucial public health measure but may also pose significant mental health risks. We aimed to untangle the relationship between everyday activities, interactions and emotional well-being at a time when our sample were facing significant restrictions to their daily activities. Our findings point to everyday activities that may mitigate (e.g. outdoor activites, gardening, exercise, pursuing hobbies) or exacerbate (e.g. social media use, home schooling, listening to COVID-19 news) the welfare effects of isolation. The current study also highlights the value in monitoring people's daily emotional well-being during the pandemic to understand how people are faring and to inform actions that may promote well-being and enhance the sustainability of self-isolation measures.

**Table 1: Mean levels of positive and negative affect in each activity and the percentage of episodes where each activity was reported**

| | Mean positive affect[a] | Mean negative affect[b] | % of episodes where reported[c] |
|---|---|---|---|
| **Activities** | | | |
| Exercising | 5.53 | 2.05 | 5 |
| Going for a walk | 5.21 | 2.54 | 7 |
| Gardening | 5.19 | 2.15 | 3 |
| Pursuing a hobby | 4.97 | 2.07 | 3 |
| Pray/worship/meditate | 4.75 | 2.53 | 1 |
| Socialising | 4.49 | 2.71 | 6 |
| Eating | 4.39 | 2.67 | 22 |
| Taking care of children | 4.34 | 2.92 | 13 |
| Drinking | 4.29 | 2.82 | 12 |
| Other | 4.26 | 2.68 | 9 |
| Preparing food | 4.26 | 2.76 | 16 |
| Commuting to work | 4.25 | 3.12 | 3 |
| Resting/relaxing | 4.22 | 2.70 | 11 |
| Doing housework | 4.22 | 3.06 | 15 |
| Listening to the radio | 4.17 | 2.92 | 8 |
| Drinking alcohol | 4.13 | 3.10 | 2 |
| Schooling children | 4.07 | 3.50 | 3 |
| Watching TV / Netflix | 4.07 | 2.92 | 19 |
| Internet | 4.03 | 3.04 | 1 |
| Working/studying | 3.94 | 2.86 | 17 |
| Using social media | 3.83 | 3.10 | 12 |
| Shopping | 3.80 | 3.03 | 5 |
| Informing myself about Covid-19 | 3.62 | 3.56 | 11 |
| Doing nothing | 3.26 | 3.69 | 2 |
| | | | |
| **Location** | | | |
| Outdoors/nature | 5.51 | 2.16 | 8 |
| At other people's homes | 4.67 | 2.42 | 1 |
| At home | 4.14 | 2.79 | 74 |
| At work | 4.1 | 2.97 | 9 |
| Somewhere else | 4.09 | 2.87 | 4 |
| At a shop | 3.73 | 3.01 | 4 |

[a] Positive affect is the average of calm and happy affect items.

[b] Negative affect is the average of overwhelmed, sad, bored, frustrated, lonely and worried affect items.

[c] Participants reported on average 2.2 activities per episode.

**Figure 1:** Within-person estimates of the relationship between: (A) activities, (B) locations, (C) personal interactions and (D) remote interactions and affect levels. Each graph presents the results of separate fixed effects regression analyses examining positive and negative affect.
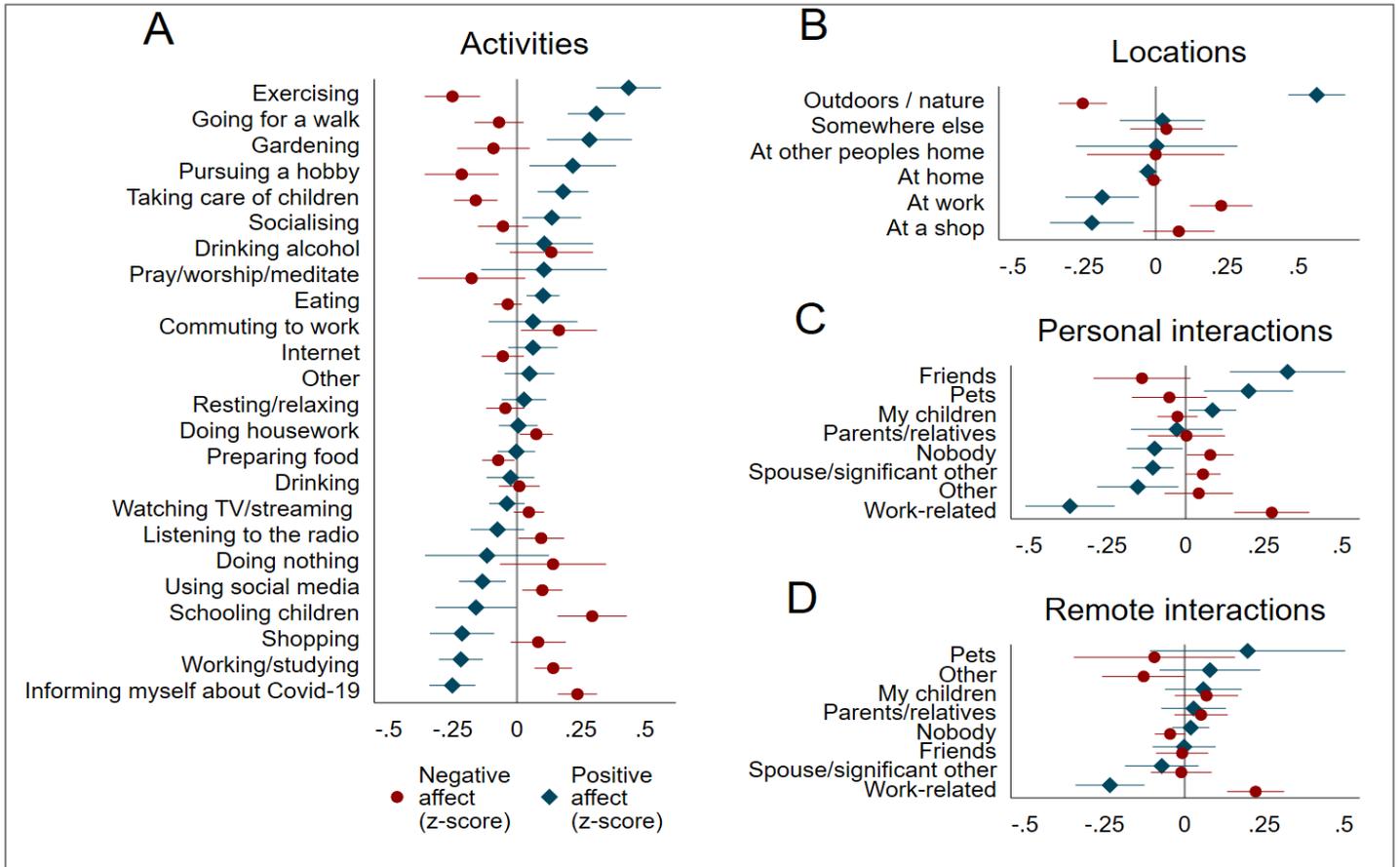


Note: Estimates are statistically significant at the .05 level when 95% confidence intervals do not cross the zero line. The corresponding regression table is available here: https://doi.org/10.6084/m9.figshare.12085812.v2.

## Materials and Methods

**Sample.** We surveyed a total of 604 participants online on Wednesday March 25th, using the access panel of a large Irish market research company. The sample consisted of 191 men and 413 women, with a mean age of 47 (SD=12). The sample was drawn from across Irish regions (Dublin=31.1%, rest of Leinster=25.8%, Munster=23.7%, Connaught/Ulster=19.4%). The majority of the sample (54.8%) had an ordinary bachelor degree or national diploma, just under half of the sample (47.02%) were in full time employment, and the median household income was €50,000-€59,999.

6

**Emotional well-being.** We utilised a short-version of the DRM (7) where participants completed a diary documenting what they did and how they felt during a set of 5 'episodes' from a randomly allocated section of their day. Participants were prompted to think of episodes as scenes in a movie demarcated by transitions such as going to a different location, or ending one activity and starting another. The survey gauged activities, interactions, and affective states during a total of 2,795 episodes on the previous day (March 24th). Positive affect scores were calculated as the average rating of how happy and calm/relaxed the participants reported feeling during each episode. Negative affect was calculated as the average of how sad, bored, frustrated/annoyed, lonely, worried/anxious and overwhelmed participants were. Emotions were rated on a numerical scale ranging from 1 = not at all to 7 = very much.

**Statistical analysis.** We first examined descriptive statistics of affect levels measured whilst participants were in specific locations or engaged in specific activities. Next, we focused on how affect ratings varied within individuals using individual fixed effect specifications that control for fixed observable and unobservable differences across individuals using a linear regression model:

$$Affect\_it = alpha\_i + \boldsymbol{beta}\_act\ \boldsymbol{act}\_it + epsilon\_it$$

Where *Affect_it* is the affect rating of individual *i* in episode *t*; *__act__* is a vector representing all activities undertaken in episode *t* by individual *i*, and the *__beta__* parameters are to be estimated; *alpha_i* is the individual fixed effect; and *epsilon_it* is the robust error term. We apply this basic model to the whole sample and conduct separate fixed effects regressions examining the role of activities, location and social interactions in predicting affect levels.

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