ARTICLE

The comeback effect:
How happy are people who have recovered from a COVID-19 infection?

Micael Dahlen · Helge Thorbjørnsen · Petra von Heideken Wågert · Charlotta Hellström · Birgitta Kerstis · Daniel Lindberg · Jonas Stier · Maria Elvén

Abstract: There is already a large body of research on the dramatic negative effects of COVID-19 on peoples' mental and physical health. Millions of people have died, and the pandemic has negatively influenced the lives of billions of people. Luckily however, the vast majority of people infected with the virus, recovers. The happiness and wellbeing of these people have not been extensively studied. In the current paper, we ask the question: Are people who have recovered from a COVID-19 infection happier than those who have not been infected at all? Building on previous research on hedonic adaptation and counterfactual thinking, we hypothesize, and find, that those who have had an infection appear slightly happier than others. The study relies on two surveys conducted in Sweden during the pandemic in 2020 (n=1029) and 2021 (n=1788).

Keywords: COVID-19; recovery; happiness; Sweden; pandemic

1. Introduction

"A healthy person has a thousand wishes, a sick person only one". Most people can probably recognize the sentiment, even from having a common cold: Nothing would make you happier than being well again. Indeed, a study of about 1,000 Swedes found that those who had recovered from a cold flu in the past seven days rated their life satisfaction slightly but significantly above the average (Dahlen, 2016). The aim of this paper is to test whether the same applies to people who have recovered from a COVID-19 infection: Are people who have had a COVID-19 infection as happy as – or perhaps even happier – than those who have not been infected at all? Happiness is here conceptualized as global subjective wellbeing (cf. Kim-Prieto et al., 2005).

There is a growing body of research on how the COVID-19 virus indirectly impacts people's happiness and subjective wellbeing. For instance, it has been found to reduce wellbeing by way of stress (e.g., Vazquez et al., 2021), and restriction-induced impacts on physical activity (e.g., Dahlen et al., 2021), and life situations, such as loneliness (e.g., Stieger et al., 2021), work-life boundary-blurring (Pluut & Wonders, 2020), and financial worry (e.g., Bono et al., 2020). However, to the best of our knowledge, no study to date has investigated the effect on happiness of *actually having been infected* by the virus.

Since the outbreak of the COVID-19 pandemic in early 2020, an estimated 420+ million people worldwide have been infected by the coronavirus. While the infection can be fatal or lead to critical illness, the vast majority recovers within a number of weeks. In February 2022, about 342

Micael Dahlen
Stockholm School of Economics
micael.dahlen@hhs.se

million people were estimated to have recovered from the coronavirus (Worldometers, 2022). Are these people slightly happier than the average? We believe that the question would make sense in light of the previous finding that people recently recovered from the cold flu are happier, since, from a virological perspective, COVID-19 is actually a mutated form of the corona cold flu virus (e.g., Chathappady et al., 2021).

Our prediction of a happiness-boost after recovering for COVID-19 is far from trivial. In fact, recent studies find that people's actual post-recovery health is overall lower than before being infected with COVID-19 (e.g., Hampshire et al., 2021; Higgins et al., 2021; Xie et al., 2021). In general, poorer health would be associated with lower levels of happiness (Debnar et al., 2021; Palmore & Kivett, 1977). Hence, based on recent studies of COVID-19 and 'long-COVID' health effects, one would expect that people recovering from the infection would be *less* happy than those not infected.

However, several factors also point in the other direction. From a theoretical perspective, there are reasons to believe that people who recovered from COVID-19 could be a bit happier than the average. First, hedonic adaptation theory suggests that people to a large part adapt to a steady state, such as good (and bad) health, and therefore derive more or less happiness primarily when this steady state is upset for better or worse (e.g., Brickman et al., 1978; Lykken & Tellegen, 1996). Second, research on counterfactual thinking suggest that the relief and pleasure people derive from not having to experience something worse (death or serious illness) may inflate their overall happiness. Relatedly, gratitude theory suggests that people can increase their happiness by appreciating what they have previously taken for granted, such as their health, or even being alive (e.g., Frias et al., 2011). Having a COVID infection would both be an upset of the steady state of and a reminder not to take one's health for granted.

We put our main hypotheses of a positive comeback effect after recovering from an infection to the test in two independent surveys. The first was conducted in December 2020, and the second, which also tested whether recovered people rated their perceived health and gratitude higher, was conducted in April 2021. Both studies were thus conducted in the midst of the pandemic and long before the later and 'milder' Omicron-mutation was widespread.

2. Literature review

2.1 Hedonic adaptation: Transitory versus long-term effects

There is ample evidence that people adapt to steady states, so that effects of both positive and negative factors on happiness deteriorate over time. The weather is a classic example. A survey of residents in California and in the Midwest found that both groups believed that those living in the more pleasant Californian climate would be happier, but a comparison found that, in reality, they were not (Schkade & Kahneman, 1998). Similarly, a study of US retirees found that, while expecting to be happier from relocating to a place with nice weather, after settling in, the weather had only marginal effect on their happiness (Oishi et al., 2009).

Conversely, numerous studies have found that transitory weather significantly impacts people' reported daily happiness. For example, people are happier than average when the sun is shining (Kämpfer & Mutz, 2013) and less happy when it is cloudy (Barrington-Leigh & Behzadnejad, 2017), and also vary in daily happiness depending on the temperature and humidity (Connolly, 2013), and wind (Peng et al., 2016).

Hedonic adaptation has been described as a kind of psychological immune system, which mitigates the long-term effects on people's wellbeing from even the most dramatic life events (Wilson & Gilbert, 2005). The theory has been used to explain why changes in marital status seem to impact happiness more than the marital status itself (Lucas et al., 2003), why the increased

wellbeing derived from improvements in basic housing needs was found to have a half-life of about two years (Galiani et al., 2018), why the majority of the positive effect of an income increase wears off in about the same time (Di Tella et al., 2010), and even why lottery winners and accident victims would eventually report comparable levels of daily mundane pleasure (Brickman et al., 1978).

Related to the topic of this paper, people have been found to partially adapt to long-term illness (Graham, 2011), permanent disability (Oswald & Powdthavee, 2008), and to deteriorating health with age, even into their 100s (Jopp & Rott, 2006). Similar to the reported effects of transitory weather, we expect that transitory illness would have a parallel effect on people's happiness, by way of upsetting their steady state of good health to which they have been immune. An international comparison of cohorts revealed that the levels of people's satisfaction with their health differed far less than their actual levels of health, implying that they are indeed adapted to their steady states of health (Graham, 2011). This would potentially explain why people reported slightly but significantly above average levels of happiness within one week of recovering from a common cold (Dahlen, 2016), coming back to their state of good health. We believe that the notion of contrast, which was conceived by Brickman and colleagues (1978) to explain how lottery winners fail to derive long-term happiness from *having won* in contrast to the peak feeling of *winning*, could be applied to recovering from a covid infection as well. That is, in contrast to suffering the infection, coming back to the steady state of good health would make people feel significantly better.

2.2 Counterfactual thinking and gratitude

The notion of a happiness boost as a result of people experiencing a contrast to a previous temporary negative state, also resonates well with the literature on counterfactual thoughts (Roese & Olson, 2014; Teigen & Jensen, 2010; Yang, Gu & Galak, 2017). Counterfactuals are potential alternatives states of the world that are mentally stimulated and spontaneously generated after an outcome is experienced (Markman et al., 1993). Imagining alternative circumstances worse than the current state ("I could have died!") are conceptualized as downward counterfactual thinking. Extant research suggest that such downward counterfactuals are more likely to occur when people obtain a positive outcome (e.g., recovering from a Covid-19 infection) and nearly avoid a negative outcome (e.g., not becoming seriously ill) (Markman et al., 1993; Teigen & Jensen, 2011). For instance, in a study of 85 individuals exposed to the tsunami disaster in Southeast Asia in 2004, Teigen and Jensen (2011) demonstrated that downward counterfactuals occurred 10 times more frequently than upward counterfactuals and that this contributed to peoples' feeling of being fortunate and lucky. In fact, none of these 85 individuals considered themselves victims or unfortunate, and in a follow-up study two years later, 95% reported having been lucky. Avoiding an (even more) negative outcome is thus associated with feelings of being lucky, and the closer people consider themselves to having been to the counterfactual alternative (seriously ill or dead), the luckier and more fortunate they feel.

Moreover, research on gratitude and happiness suggest that reflections on death and illness may lead to increased feelings of appreciation and gratitude (Frias et al., 2002). As people are reminded that good health and even life are benefits that are not given, they become more grateful. The positive relationship between gratitude and happiness is fairly robust and well documented, both in correlational studies (e.g., McCullough, Emmons & Tsang, 2002) and experimental studies (e.g., Frias et al., 2011; Emmons & McCullough, 2003). Hence, not only are gratitude and happiness correlated, but evidence also suggest that gratitude causes happiness and well-being.

3. Hypotheses

Together, previous research on hedonic adaptation, counterfactual thinking and gratitude suggest that recovering from a COVID infection should lead to increased feelings of happiness. A COVID-19 infection is a transitory, negative experience which not only leads to sickness and fatigue, but also introduces feelings of uncertainty, fear and potential reflections on death. Recovering from COVID-19 relieves these thoughts and states, introduces a stark contrast to suffering the infection, and likely induces counterfactual thinking ('it could have gone wrong') with related feelings of appreciation and gratitude. We argue that this will lead to a (transitory) boost in happiness, which will bring people that has recovered from COVID-19 to a level of happiness that is higher than for people not being infected at all.

Hence, our main hypothesis is:

> **H1.** People who recovered from a COVID infection rate their happiness higher compared to those who have not been infected with the virus.

Several recent studies on post COVID-19 health effects (long-COVID) point to a wide array of negative long-term effects of attracting the virus, including fatigue, neurocognitive disorders, mental health disorders, metabolic disorders, gastrointestinal disorders and cardiovascular disorders (Al-Aly, Xie & Bowe, 2021; Hampshire et al., 2021; Higgins et al., 2021; Xie et al., 2021). Together, these studies suggest that there indeed are significant overall negative long-COVID health effects in the population, and that these effects are more pronounced for people with poorer baseline-health and for people who have had a more severe infection (e.g., hospitalized patients).

Although these long-COVID health effects are significant and well-documented, we still expect that recovering from a COVID infection will have an overall *positive* impact on peoples perceived health, and subsequent happiness. First, whereas recent estimates suggest that perhaps as many as 4-10% of those infected get long-COVID health disorders (Al-Aly et al., 2021; Xie et al., 2021), the vast majority (over 90%) do not. The changes in perceived health among those *not* affected by long-COVID disorders will thus likely determine the direction of effects. Second, extant research suggests that people's *perception* of and satisfaction with their health differ far less than their actual levels of health (Graham, 2011). Long-COVID effects may thus have a smaller impact on peoples perceived health and wellbeing than one might expect based on their health data.

The reason why we expect that recovering from COVID, on average, will positively influence people's perceived health is also twofold: First, by way of contrast, their (steady state) health will seem better coming back from a period of illness. Second, the infection would potentially lower people's aspiration levels pertaining to their own health.

Aspiration has been used to explain why people adapt and fail to derive happiness from previous events and steady states. For example, Sheldon and Lyubomirsky (2012) found that students who experienced positive life events also raised their aspiration levels in the same domains so that what they had achieved did not suffice to make them happier. Graham (2011) reports on similar patterns related to health, where people in countries with higher health levels overall seem to also have higher health aspiration levels, and do not necessarily rate their health satisfaction higher.

Conversely, we expect that a lowered aspiration level would make people rate their perceived health higher. Associating a COVID infection with a lowered health aspiration level resonates with this paper's beginning quote, "a healthy person has a thousand wishes, a sick person only one": To recover. Therefore, regardless of the actual and absolute level of health, we hypothesize

that people who come back from a COVID infection rate their perceived health higher:

> **H2.** People who recovered from a COVID infection rate their perceived health higher compared to those who have not been infected with the virus.

An additional reason why we expect that recovering from a COVID infection will have a positive impact on happiness is that people will feel more grateful in general, for being alive. Gratitude theory suggests that being grateful mitigates hedonic adaptation by way of appreciating things that over time have been taking for granted, such as previous positive life events and achievements (e.g., Sheldon & Lyubomirsky, 2012) or a steady state of good health (e.g., Jans-Beken et al., 2020; Watkins et al., 2003).

Whereas gratitude can be conceived of as both a trait and an intervention (e.g., Witvliet et al., 2019), it can potentially also be evoked by critical life events. For example, having a near-death experience can make people more grateful for being alive (Frias et al., 2011), and people recovering from suicidal ideation may report above average appreciation of life (Bryan et al., 2021). These findings also align well with the research on downward counterfactual thinking and feelings of luck and gratitude (Teigen & Jensen, 2011). If the factual outcome is better than the imagined, counterfactual, alternative, people likely feel lucky and likely experience feelings of gratitude.

We believe that a similar logic can be applied to recovering from a COVID infection. The infection can be fatal, of which most people are aware, meaning that coming back from the infection can indeed be conceived of as coming back to life (e.g., Dahlen & Thorbjornsen, 2021). But even with milder symptoms and without reflections on mortality and death, we expect that coming back from documented illness would evoke a greater appreciation for health and gratitude for (steady state) life. Therefore, we hypothesize:

> **H3.** People who recovered from a COVID infection rate their gratitude higher compared to those who have not been infected with the virus.

4. Study 1

For the test of our main hypothesis, we used a demographically representative sample (49.5% females, mean age 50.6 yrs., age span 18-79 yrs.) that was retrieved from the Novus Sweden panel during the first two weeks of December 2020 for the purpose of gauging physical activities, health and life changes during the pandemic. A total of 1,029 of Swedes (response rate 52%) anonymously filled out a questionnaire, which also included a question about whether they had been diagnosed with and recovered from a COVID infection, which we used for testing our hypothesis. The participants were informed that they consented to be included in the study by answering the web-based questionnaire. The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013). All personal data connections were deleted after the material was collected and were not accessible to the researchers in the present study.

4.1 Measures

People answered "yes" or "no" to the question, *"have you recovered from a diagnosed COVID infection?" Happiness* was gauged with a two-item measure of *global subjective wellbeing* (cf. Kim-Prieto et al., 2005), "how satisfied are you with life right now" and "how would you rate your wellbeing right now" on an 11-point scale from 0-10 (r = .83).

4.2 Data analyses

The hypotheses were analyzed using ANOVA and correlational analyses in SPSS.

4.3 Results

Out of the 1,029 respondents, 55 (5.3%) answered "yes", and 974 (94.7%) answered "no" to the question whether they had recovered from a diagnosed COVID infection. In line with our hypothesis, those who had recovered from an infection rated directionally higher ($M = 6.79$) than those who had not been infected ($M = 6.45$). However, the difference was not statistically significant ($t = 1.17$, $p = .12$).

We also conducted an exploratory correlational analysis between the happiness measure and a single-item measure of reported health (1 "very poor" – 5 "excellent"). Interestingly, the correlation was greater in the COVID-recovered group ($r = .67$) than in the non-infected group ($r = .51$), $z = 1.74$, $p = .04$.

While the mean happiness ratings did not differ significantly between the groups, the direction was in line with our hypothesis. The correlational analysis gave some credence to the notion that people who had recovered from a COVID infection derived greater happiness from their health than those who had not been infected. We therefore conducted a new survey a few months later, to test our main hypothesis when a greater number of people had recovered from the infection, and to also test our additional hypotheses.

5. Study 2

A survey was distributed on Facebook during the second week of April 2021. A total of 1,788 Swedes (60% females, mean age 53.8 yrs., age span 19-85 yrs.) anonymously filled out the questionnaire, The respondents were informed that they consented to be included in the study by answering the web-based questionnaire. The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013).

5.1 Measures

People answered "yes" or "no" to the question, *"have you recovered from a diagnosed COVID infection?"* We also included the option, "have started or finished vaccination treatment". *Happiness* was gauged with a three-item measure of *global subjective wellbeing* (cf. Kim-Prieto et al., 2005)," I am satisfied with my life right now"," I am satisfied with my life overall", and "I have a happy life", on a 10-point scale from 1 (completely disagree) - 10 (completely agree), *alpha* = .92. The three-item measure was chosen for robustness in the replication of Study 1, as well as for multivariate analyses with the other dependent variables. *Perceived health* was measured with two items, "My health is good" and "I am satisfied with my health", on a 10-point scale from 1 (completely disagree) - 10 (completely agree), *r* = .86. *Gratitude* was measured with three items, "I am grateful to be alive", "I appreciate life" and "I am grateful overall", on a 10-point scale from 1 (completely disagree) - 10 (completely agree), *alpha* = .90.

5.2 Data analyses

The hypotheses were analyzed using ANOVA and correlational analyses in SPSS

5.3 Results

Out of the 1,788 respondents, 272 (15.1%) answered "yes", and 1396 (78.2%) answered "no" to the question whether they had recovered from a diagnosed COVID infection. An additional 112

(6.3%) had started or finished vaccination treatment. Correlations between the three dependent variables are reported in Table 1.

Table 1.
Descriptive Statistics and Correlation Between the Dependent Variables, Study 2

	n	*M*	*SD*	Happiness	Perceived health	Gratitude
Happiness	1768	6.85	2.06	-		
Perceived health	1768	6.51	2.24	.53**	-	
Gratitude	1768	8.12	1.82	.72**	.50**	-

** < .001

Before testing the hypotheses separately, we first ran a MANCOVA with COVID infection (recovered vs not infected) as a factor, happiness, perceived health and gratitude as dependent variables, and including age and sex as covariates. The factor produced significant effects on all three dependent variables while controlling for age and sex, $F(3,1646) = 3.90$, $p = .009$. Next, we subjected the hypotheses to t-testing (Table 2).

Table 2.
Differences in Happiness, Perceived Health and Gratitude, Study 2

	Recovered from COVID infection		Not infected				
	M	*SD*	*M*	*SD*	*t*	*p*	*Cohen's d*
Happiness	7.18	2.00	6.78	2.06	3.03	.003	.20
Perceived health	6.87	2.01	6.47	2.27	2.96	.003	.18
Gratitude	8.38	1.58	8.06	1.86	2.93	.004	.17

In support of our main hypothesis H1, those who had recovered from a COVID infection rated their happiness significantly higher ($M = 7.18$) than those who had not been infected ($M = 6.78$), $t =3.03$, $p = .003$. Similarly, and in support of H2, those who had recovered from a COVID infection also rated their perceived health significantly higher ($M = 6.87$) than those who had not been infected ($M = 6.47$), $t =2.96$, $p = .003$. Finally, and in support of H3, those who had recovered from a COVID infection rated their gratitude significantly higher ($M = 8.38$) than those who had not been infected ($M = 8.06$), $t =2.93$, $p = .004$.

For additional comparison, the mean happiness of the people who had started or finished vaccination treatment ($M = 6.90$) rated between the two groups, not significantly different from those who had not been infected (and not started vaccination), $t =0.61$, $p =.54$, nor from the comeback group ($t =1.23$, $p =.12$).

We used the Preacher-Hayes approach (Model 4, 5000 bootstrapping samples, 95% confidence interval, as recommended by Hayes et al. 2011) to test whether perceived health and gratitude would be parallel mediators of the comeback effect on happiness. The comeback effect was significant on both perceived health (0.40, 95% CI: 0.10–0.69), and gratitude (0.31, 95% CI:0.08–0.55). The indirect effects on happiness were also significant through both perceived health, (0.08,95% CI:0.02–0.24), and gratitude (0.22, 95% CI:0.06–0.72).

6. Discussion and implications

This paper investigated whether there is a potential comeback effect from recovering from a COVID-19 infection, which would make people a bit happier than the average. Our conclusion from two independent surveys is that there might be such an effect. While failing to reach statistical significance in the first survey with only a small number of people having been infected and recovered, the pattern was similar in both studies and reached significance with a larger sample in the second study.

Our findings resonate with hedonic adaptation theory, which suggests that people's happiness may be more impacted by changes and transitory states than by steady states. Applying this notion to transitory COVID infections, we found that people were indeed a little bit happier than people who had retained a steady state of health. The study findings are also consistent with the literature on counterfactual thinking and luck. However, future research should further investigate the explanatory mechanisms underlying the effects revealed in the current study. Other mechanisms may be at play as well. For instance, the prospect of getting seriously sick, or even dying, from a COVID-19 infection, is a negative scenario carrying significant levels of unpleasant uncertainty for those infected. Previous research has demonstrated that when an emotional event is negative, uncertainty enhances unhappiness (Herrmann & Wortman, 1985; Wiggins et al., 1992). Hence, removing negative uncertainty may boost happiness. Previous research in both psychology and economics have studied the relief and pleasure people derive from *not* having to experience a negative outcome (Yang, Gu & Galak, 2017). Such feelings, as a result of favorable uncertainty resolution (e.g., recovering from COVID-19), thus likely enhance happiness (Yang, Gu & Galak, 2017; Wiggines et al., 1992). Whereas such a 'comeback effect' in happiness seem to be present for the recovery of COVID-19 and milder infections such as cold flu (cf. Dahlen, 2016), future research should investigate whether this also applies more serious, complex and long-term diseases such as cancer.

The correlational and cross-sectional design of the current studies put significant restraints on the causal inferences and conclusions to be made. One could, for instance, argue for a reverse causation: What if happy people are less afraid of COVID, and thus get infected more often? Although we cannot rule out such an explanation based on the current data, extant research suggest it is very unlikely. First, previous studies suggest that higher happiness *reduces* (rather than increases) the risk of getting ill or infected. While no study has applied this to COVID, it has been proven for anything from colds to chronic diseases (e.g., Cohen et al., 2003; Lyubomirsky, 2005; Marsland et al., 2006). Second, a recent study finds that happy people are more prone to comply with restrictions to minimize risk of becoming infected (Krekel et al., 2020). These findings, in combination with the results of our two studies, where the effect on happiness is mediated by perceived health and gratitude (study 2), make us more confident in arguing that happiness follows rather than precedes infection. What could be an additional factor in explaining our findings though, is the fact that people after having had an infection, may have enjoyed more freedom (less restrictions and less worries) as compared to those not infected.

Future studies should further investigate the correlates and psychological mechanisms underlying this effect. For instance, people who have recovered from the virus might also be more inclined to go out and maintain social relationships than others – a factor that certainly is positively correlated with both happiness and gratitude.

In the current study, we hypothesized and found that recovering from a COVID infection also would make people rate their perceived health higher. Of course, using a cross-sectional, rather than longitudinal, design, we cannot rule out the possibility that the differences in perceived health would correspond to pre-existing differences in actual health between the two groups that

would not be related to the COVID infection. However, it would be plausible to assume that potential pre-existing differences in actual health would be equally likely to work in the opposite direction, whereby those with lower rather than higher health ratings are more susceptible to the infection.

We also hypothesized and found that recovering from a COVID infection mitigated hedonic adaptation by way of not taking one's health, or being alive for granted. Those coming back from the infection rated their general gratitude and appreciation of life slightly higher.

Due to the temporary nature of hedonic adaptation, we would not expect the comeback effect to be enduring. We did not gauge the elapsed time from recovery, as the samples would be too small, but in all likelihood, the average time elapsed would be far greater than the time frames of a few days or weeks for previously investigated transitory effects, such as the weather or a common cold. It seems plausible that the transitory effect of recovering from an infection would be longer, partly because the infection itself lasted longer, and partly because the pandemic is still ongoing and very salient. In other words, people would be reminded more or less daily about the contrast of their recovered health vis a vis the infection. Also, previous literature on downward counterfactual thinking and feelings of luck and gratitude (Teigen & Jensen, 2011) may suggest that these feeling linger longer.

With larger samples and even more elapsed time in the ongoing pandemic, future research is very likely to find that the comeback effect from an infection dissipates gradually and will cease to exist after the pandemic. But we also believe that this unique situation, wherein a transitory effect would be prolonged by a salient contrast, could provide new perspectives to research on other transitory phenomena. For instance, people have been found to be less happy than average on cloudy days, but would this also be the case when these days are preceded by a rainy day (which would make a more favorable contrast to the present weather salient)?

The findings in the current study put renewed focus on the importance of counterfactual thinking and gratitude in life. In line with previous research on gratitude and happiness, the study results suggest that reflections on illness and negative alternative outcomes may lead to increased feelings of appreciation and gratitude (Frias et al., 2002). Perhaps people should more frequently be reminded that good health and even life are benefits that are not given, in order to become more grateful and happier?

As potential paths for future research, linking the research streams on hedonic adaptation, counterfactual thinking, and uncertainty resolution, may provide new insights into the longitudinal vs. transitory effects of COVID-19 and related phenomena. For instance, although previous research on hedonic adaptation suggest that people quickly return to their own baseline level of happiness after both positive and negative events, research on counterfactual thinking and luck (and even supernatural beliefs) suggest that the effects on gratitude and how fortunate people perceive themselves to be may be more enduring.

Conflict of interest statement

The authors report no conflicts of interest.

Authors

Micael Dahlen
Stockholm School of Economics
micael.dahlen@hhs.se

Helge Thorbjørnsen
Center for Applied Research at NHH (SNF)
Norwegian School of Economics
helge.thorbjornsen@nhh.no

Petra von Heideken Wågert
Mälerdalen University
petra.heideken.wagert@mdu.se

Charlotta Hellström
Mälerdalen University
charlotta.hellstrom@mdu.se

Birgitta Kerstis
Mälerdalen University
birgitta.kerstis@mdu.se

Daniel Lindberg
Mälerdalen University
daniel.lindberg@mdu.se

Jonas Stier
Mälerdalen University
jonas.stier@mdu.se

Maria Elvén
Mälerdalen University
maria.elven@mdu.se

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