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THE BOOST EFFECT: CAN A COVID-19 INFECTION INCREASE PERCEIVED MEANING IN LIFE?

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Abstract

Although a COVID-19 infection can be fatal, the vast majority of people infected by the virus have, fortunately, survived. In this paper we investigate how recovering from this potentially fatal infection is associated with people's perceived meaning in life. Can contracting and recovering from COVID-19 also have positive effects on people's wellbeing by way of boosting their perceived meaning in life?

Drawing from theory on terror management and mortality salience, which suggest that threats to one's health increase the need for meaning in life, we hypothesized that people who have had a coronavirus infection assess their perceived meaning in life slightly higher than average. We also hypothesized that recovering from this infection has made these people slightly more optimistic. We used data from an online survey in Sweden (April 2021, n = 1788) to examine the differences in perceived meaning in life between people who had recovered from COVID-19 versus people who had not been infected at all. The results show that people who had recovered from a COVID-19 infection indeed rated their perceived meaning in life significantly higher than those who had not been infected. They also scored

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higher on optimism. These findings may suggest that people react to threats to their lives and existences by searching for, and finding, greater meaning in life. The relief of recovering from a COVID-19 infection may also boost people's optimism regarding their future.

***Keywords**: meaning-in-life; COVID-19; terror management; mortality salience; optimism; teleological thinking; cross-sectional study.*

Introduction

For many people, the ongoing COVID-19 pandemic is literally a matter of life and death. Since its outbreak in early 2020, more than 200 million people worldwide have been infected by the coronavirus (WHO, 2021). This infection can be fatal, and has indeed caused the death of more than 4 million people. Fortunately, however, the vast majority recover within a number of weeks. By August 2021, nearly 190 million people were estimated to have recovered from the coronavirus. The research aim of this paper is to apply theory on terror management and mortality salience to answer the following question: has recovering from this potentially fatal infection boosted people's perceived meaning in life?

There is a growing body of research on how the COVID-19 virus has changed people's lives by way of restrictions, uncertainty, and stress, and how it consequently relates indirectly to quality of life and perceived meaning in life (MIL) (Shek, 2021; Ikeda et al., 2021). For instance, pandemic-induced suffering and distress have been found to reduce perceptions of MIL (Arslan & Yildirim, 2021) and increase the intensity of the search for MIL (Chasson et al., 2021). Studies have also shown that MIL can uphold life satisfaction (Lin, 2020) and mitigate stress and depression (e.g., Schnell & Krampe 2020; Trzebinski et al. 2020). However, to the best of our knowledge, no study to date has investigated the direct effect of being infected by COVID-19 on perceived MIL.

Drawing from theory on terror management and mortality salience, which suggest that threats to one's health and reminders of one's mortality increase the need for, and perception of, meaning, we hypothesize that people who have had a coronavirus infection assess their perceived MIL slightly higher than average. We also hypothesize that recovering from this infection has made these people slightly more optimistic. Finally, we draw on teleological theory to hypothesize that these positive effects are greater among those who believe that everything happens for a reason. We test these hypotheses via a survey of 1,788 Swedes.

1. Mortality salience and a COVID-boost effect

According to terror management theory, the greatest fear in life is death. To manage this ultimate terror, people prefer not to think about death at all and, when forced to, search for some kind of meaning to cling to (e.g., Pyszczynski et al., 1999). This meaning can take the shape of, for example, cultural, religious, or political worldviews (e.g., Greenberg et al., 2000), or can even relate to modern art (Landau et al., 2006), a fitness regimen (Arndt et al., 2003), or reckless driving (Ben-Ari et al., 1999). However, the ulti-

mate meaning people search for in the face of death is meaning in their life (e.g., Ben-Ari, 2011; Sullivan et al., 2013).

People's search for, and sense of, meaning in life has been subject to ample research. Conceived of as a person's sense of coherence, purpose, direction, or the general meaningfulness of their life (e.g., Steger et al., 2006), studies have found that MIL impacts favorably on everything from psychological wellbeing (e.g., Zika & Chamberlain, 1992) to personal growth, (e.g., Ryff, 1989), positive affect (e.g., King et al., 2006), physical health (e.g., Steger, 2012), and longevity (e.g., Anderson & Anderson, 2003).

Studies have found that increased mortality salience – as a result of, for example, asking people to reflect on their own death (e.g., Routledge et al., 2010), visiting dark tourism sites (Prayag et al., 2020), or having near-death experiences (Davis & McKearney, 2003) – can indeed increase MIL. Research has also found that the ongoing COVID-19 pandemic triggers MIL-searching behaviors (Pyszczynski et al., 2021), but, to the best of our knowledge, no study has investigated the direct impact of recovering from COVID-19 on MIL.

Applying terror management theory, we expect that recovering from a coronavirus infection would boost people's perceived MIL to be slightly higher than average. First, regardless of whether people perceive this infection as a near-death experience, it would decrease their health to some extent and potentially remind them of their mortality. Second, by way of the frequent media reports on COVID-19 related deaths, the infection would potentially prime greater reflection on death. Third, forced quarantine during the period of infection would potentially give time and perspective to reflect more on life. Therefore, we hypothesize that:

H1 People who have recovered from a COVID-19 infection rate their perceived MIL higher compared to those who have not been infected with the virus.

Several studies have linked MIL and optimism to promoting wellbeing and mitigating adverse effects in mental health. For example, Ho et al. (2010) found that optimism mediated the positive impact of MIL on adolescent wellbeing, while Steger and Frazier (2010) found that MIL mediated the impact of religiousness on optimism. Additionally, Arslan and Yildirim (2021) found that optimism moderated the buffering impact of MIL on students' depressive symptoms during the COVID-19 pandemic. While the relationship between these two variables can obviously be construed in several ways, there is no doubt that the two are related.

We therefore expect that recovering from a coronavirus infection would also boost people's self-assessed optimism. As argued by Pyszczynski et al. (2021), COVID-19 is a salient doomsday threat to literally everyone's life and existence; a threat that produces fear and anxiety (e.g., Jungmann & Witthöft, 2020). Having and recovering from a COVID-19 infection would potentially relieve this threat, and consequently produce a more optimistic outlook on life. Thus, we hypothesize that:

H2 People who have recovered from a COVID-19 infection are more optimistic about their future compared to those who have not been infected with the virus.

According to teleological theory, people have a tendency to seek explanations for seemingly random events in life – i.e., "everything happens for a reason" (e.g., Banerjee &

Bloom, 2014). This tendency is particularly strong for significant and negative life events, such as accidents (e.g., Pepitone & Saffiotti, 1997), earthquakes (Tsai, 2001), and personal suffering (Gray & Wegner 2010). Not surprisingly, applying the logic of "everything happens for a reason" to such events has been found to also further the individual's sense of MIL (Willard & Norenzayan, 2013).

We expect that proneness to apply teleological thinking and the mantra of "everything happens for a reason" would similarly moderate the effects of recovering from a COVID-19 infection on people's perceived MIL. Previous research has indeed construed being infected by the coronavirus as a significant life event (Parker et al. 2021). It therefore seems plausible that those who are more prone to think teleologically would gain a greater boost from recovering from an infection. Thus, we hypothesize that:

H3 The positive impact of recovering from a COVID-19 infection on MIL (H1) and optimism (H2) is greater among people who are more prone to applying teleological thinking.

2. Methodology

A survey was distributed on Facebook during the second week of April 2021, and a total of 1,788 Swedes (60% female, mean age 53.8 years, age range 19–85 years) anonymously filled out the questionnaire. Sweden has one of the world's highest social media penetrations, and previous research has found that Swedes are representative of how the COVID-19 pandemic has impacted people's subjective well-being (e.g., Dahlen et al. 2021).

The research ethics of this study comply with the Declaration of Helsinki (World Medical Association, 2013). Respondents were informed that they consented to be included in the study by voluntarily opting in and answering the web-based questionnaire. They were anonymous and not identifiable; no personal data was recorded.

Data analysis. Following the cross-sectional study design, data analysis focused on comparing the mean values of those that had recovered versus those that had not been infected by the virus on the dependent variables of MIL (H1) and optimism (H2), and regressing the main effect of the virus recovery versus interaction effects with teleological thinking (H3) per PROCESS Model 1 (Hayes et al. 2011).

Measures. People answered "yes" or "no" to the question: "Have you recovered from a diagnosed COVID-19 infection?" We also included the options: "have started or finished vaccination treatment" and "currently have an active COVID-19 infection".

MIL was measured with two global items: "My life is meaningful", and "I have a clear sense of meaning in my life", taken from Morgan and Farsides (2009). Responses were provided on a 10-point scale from 1 (*completely disagree*) to 10 (*completely agree*), $r = .88$.

Optimism was measured with three items taken from the Life Orientation Scale (e.g., Scheier & Carver, 1987): "I am optimistic about my future"; "If anything bad can happen, it probably will" (reverse-coded); and "I expect more good things to happen to me than bad". Responses were provided on a 10-point scale from 1 (completely disagree) to 10 (completely agree), *alpha* = .79.

Teleological thinking was measured with two items: "everything happens for a reason", and "there's a reason for everything", based on Banerjee and Bloom (2014). Responses were provided on a 10-point scale from 1 (*completely disagree*) to 10 (*completely agree*), $r = .83$.

3. Results

Of the 1,788 respondents, 272 (15.1%) answered "yes", and 1,396 (78.2%) answered "no" to the question of whether they had recovered from a diagnosed COVID-19 infection. An additional 112 (6.3%) had started or finished vaccination treatment, and 8 respondents had an active COVID-19 infection (0.4%). Respondents with an active COVID-19 infection and respondents that had been vaccinated were excluded from the analysis. Correlations between the three variables of interest are reported in Table 1.

Table 1. *Table of correlations*

	n	M	SD	MIL	Optimism	Teleological thinking
MIL	1751	7.69	2.13	-		
Optimism	1751	7.52	1.69	.35**	-	
Teleological thinking	1753	6.05	2.73	.64**	.24**	-

** < .001

In testing our hypotheses, we conducted mean comparisons between the two groups (Table 2).

Table 2. *Mean comparisons*

	Recovered from COVID infection		Not infected				
	M	SD	M	SD	t	p	Cohen's d
MIL	7.96	2.00	7.62	2.17	2.44	.01	.15
Optimism	7.74	1.68	7.50	1.68	2.04	.02	.14

In support of H1, those who had recovered from a COVID-19 infection assessed their perceived MIL significantly higher ($M = 7.96$) than those who had not been infected ($M = 7.62$), $t = 2.44$, $p = .01$ (Cohen's $d = .15$). Similarly, in support of H2, those who had recovered from a COVID-19 infection also assessed their optimism ($M = 7.73$) significantly higher than those who had not been infected ($M = 7.50$, $t = 2.04$, $p = .02$, Cohen's $d = .14$). The main effect postulated in H1 and H2 is still significant and robust when including age and gender in a MANCOVA.

To test H3 – that the effects in H1 and H2 would be moderated by people's teleological thinking – we used the approach recommended by Hayes et al. (2011) (Model 1, 5000

bootstrapping samples, 95% confidence interval). While teleological thinking had a significant effect on MIL (0.24, 95% CI: 0.06–0.43) and optimism (0.17, 95% CI: 0.02–0.32), contrary to H3, the interaction effect with COVID-19 infection recovery was not significant on either MIL (0.02, 95% CI:–0.08–0.12) or optimism (–0.01, 95% CI:–0.09–0.07).

4. Discussion

This paper set out to investigate whether recovering from a COVID-19 infection could boost perceived MIL. The conclusion from our survey is that this may indeed be the case. Those who had recovered from an infection rated slightly and statistically significantly higher than those who had not been infected. While the sizes of these effects were modest, the huge scale of the COVID-19 pandemic makes the potential boost effect substantial.

While previous research has made indirect links between the COVID-19 pandemic and MIL – by way of, for example, stress – this study uncovers a direct link between having been infected and increased MIL. This finding resonates with terror management theory, which suggests that people react to threats to their lives and existences by searching for and finding greater MIL.

This study also hypothesized and confirmed the notion that people who had recovered from a COVID-19 infection rated slightly and statistically significantly higher on optimism than those who had not been infected. While previous research has linked increases in MIL and optimism by way of mediation in both directions, we tested them in parallel. We would argue that they are conceptually separate effects. The boost in MIL would be a response to the mortality salience induced by the infection, whereas the boost in optimism would come from a forward-looking relief from the future threat of being infected, with an uncertain outcome.

Contrary to our expectation, people's inclination to think teleologically did not moderate the boost effect of recovering from a COVID-19 infection. While our study found a main effect – the propensity to think that 'everything happens for a reason' elevated MIL and optimism – the boost effects of recovery from COVID-19 infection materialized regardless. In other words, people do not need to believe that "everything happens for a reason" to derive greater MIL and optimism from their recovery from infection.

Limitations and future research. The strength of this study is the relatively large sample size and the collection of timely field data during the COVID-19 pandemic, but before vaccination was widespread. However, the use of social media in data collection may have led to selection bias in the sample. Although a large and representative majority of the Swedish population has active Facebook accounts, the data may contain non-response bias leading to the over-representation of certain demographic groups or people with specific interests. For instance, female and older respondents were slightly over-represented in the survey, yet the conclusions of this analysis hold when controlling for gender and age. Also, the cross-sectional design limits opportunities to make causal inferences. Having said that, assuming that the COVID-19 virus itself has few strong biases in terms of who it infects, and that the infection is fairly randomly distributed in

Sweden, the comparison of people not infected versus recovering from the virus makes for an acceptable quasi-experimental design. There does seem to be a boost in MIL and optimism among those recovering from COVID-19, at least in this sample. Still, future research should further investigate both the mechanisms underlying this effect and the longitudinal effect of this boost. Relying on previous research on reactions to both negative and positive life events, effects on happiness, MIL, and optimism are often temporary in nature.

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Summary

This article investigates a potential positive effect of being infected by, and having recovered from, the COVID-19 virus: an increased sense of perceived meaning in life (MIL). Although a COVID-19 infection can potentially be fatal, the vast majority of people infected by the virus, fortunately, survive. In this paper we investigate how recovering from this potentially fatal infection is associated with people's perceived meaning in life. Drawing from

theory on terror management and mortality salience, which suggest that threats to one's health increase the need for MIL, we hypothesize that people who have had a coronavirus infection assess their perceived meaning in life slightly higher than average. We also hypothesize that recovering from this infection has made these people slightly more optimistic. Relying on teleological theory, we hypothesize that these positive effects are greater among those who believe that everything happens for a reason. We use data from an online survey in Sweden (April 2021, n = 1788) to examine the differences in perceived MIL between people who had recovered from COVID-19 versus people who had not been infected at all. The results show that people who had recovered from a COVID-19 infection rated their perceived meaning in life significantly higher than those who had not been infected. They also scored higher on optimism. While previous research has linked increases in MIL and optimism by way of mediation in both directions, we tested them in parallel. We would argue that they are conceptually separate effects. The boost in MIL would be a response to the mortality salience induced by the infection, whereas the boost in optimism would come from a forward-looking relief from the future threat of being infected, with an uncertain outcome.

Contrary to our third hypothesis, people's inclination to think teleologically did not moderate the boost effects of recovering from a COVID-19 infection. While our study found a main effect – the propensity to think that "everything happens for a reason" elevated MIL and optimism – the boost effects of recovering from a COVID-19 infection materialized regardless. That is, people do not need to believe that everything happens for a reason to derive greater MIL and optimism from their recovery from infection.

The strength of this study is the relatively large sample size and the collection of timely field data during the COVID-19 pandemic, but before vaccination was widespread. However, the use of social media in data collection may have led to selection bias in the sample. Although a large and representative majority of the Swedish population have active Facebook accounts, the data may contain non-response bias leading to the over-representation of certain demographic groups or people with specific interests. For instance, female and older respondents were slightly over-represented in the survey, yet the main effects revealed in the analysis hold when controlling for gender and age.

In sum, these findings suggest that people react to threats to their lives and existences by searching for and finding greater meaning in life. The relief provided by recovering from a COVID-19 infection may also boost people's optimism about their future.

***Keywords**: meaning-in-life; COVID-19; terror management; mortality salience; optimism; teleological thinking; cross-sectional study.*

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