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## Security motives and negative affective experiences during the early months of the COVID-19 pandemic

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### ABSTRACT

**Objective:** Self-regulation can help individuals cope during stressful events, but little is known about why and when this might occur. We examined if being more focused on prevention was linked to negative affective experiences during the COVID-19 pandemic. We also examined possible underlying mechanisms for this association, and whether social support buffered it.

**Design:** Pre-registered longitudinal study, with surveys every 2 weeks over one month ( $N = 1269$ ).

**Main outcome measures:** Regulatory focus and worry for health (T1), adherence to self-isolation and preventive health behaviours (T2), negative affective experiences, positive affect, frequency of online interactions, and perceived social support (T3).

**Results:** Prevention focus was associated with health worries at baseline and linked to greater adherence to preventive health behaviours (T2). Only adherence to self-isolation was linked to more negative affective experiences (T3). Exploratory analyses showed that prevention focus was linked to more negative affective experiences (T3), but only for participants with fewer online interactions with their family and less perceived social support from family and friends.

**Conclusions:** Prevention motives in threatening times can be a double-edged sword, with benefits for health behaviours and consequences for negative affective experiences. Having a strong social network during these times can alleviate these consequences.

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### KEYWORDS

COVID-19; regulatory focus; prevention focus; loneliness; health behaviours; negative affect; social support

## Introduction

The first wave of the COVID-19 pandemic posed several challenges to physical and psychological health, and social connectedness. Social distancing policies that were put in place to reduce the spread of the virus led to individuals experiencing a host

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of external stressors, including financial, social and interpersonal disruptions (Clemente-Suárez et al., 2020). The way individuals perceived and reacted to pandemic-related threats had mixed consequences to how they felt. For example, individuals who were more threatened by the pandemic reported more negative affective experiences (e.g. sadness, anxiety, anger; Pérez-Fuentes et al., 2020), whereas those who successfully reappraised their negative responses experienced less fear and better mental health later on, but at the same time were less likely to enact preventive health behaviours (Smith et al., 2021). This highlights a potential trade-off between physical health outcomes and affective experiences.

The COVID-19 pandemic provided a unique opportunity to investigate how high levels of external stressors and threats impacted how individuals felt. Past research has shown that the ability to regulate one's feelings and control over one's actions (i.e. self-regulation) is crucial for well-being, as it shapes individuals' coping strategies, health behaviours and affective experiences (Aspinwall, 2004; de Ridder & de Wit, 2006; Mann et al., 2013). This ability may be particularly crucial in times of greater stress. We argue that self-regulation played a key role in helping individuals cope with the pandemic, particularly at its onset when less information was available and there was more uncertainty about the possible health consequences (e.g. Koffman et al., 2020). Hence, a broader understanding of how the pandemic impacted individuals' lives must take into consideration *if* and *why* individual differences in self-regulation determined negative affective experiences, and *when* these impacts were more likely to occur. Because individuals' reactions to external stressors can change over time, such understanding must also consider how these processes unfold longitudinally.

### Regulatory focus, health and negative affective experiences

Regulatory Focus Theory (for a review, see Higgins, 2015) proposes that goal pursuit is driven by two motivational systems that serve distinct survival needs (security vs. nurturance). Individuals who are more focused on prevention are driven by security and seek to maintain the absence of negative outcomes from risky situations, whereas those who are more focused on promotion are driven by growth and seek to obtain gains (Scholer & Higgins, 2012). Relevant to our current purposes, this theory rests on the assumption that individuals more focused on prevention are more aware of threats and are risk averse in several domains of their life (e.g. health and safety and financial decisions), strive to protect themselves from harm (e.g. enact diverse preventive health behaviours), believe they have greater control over their behaviours, and feel calmer when a safe state is achieved (Ferrer et al., 2017; Fuglestad et al., 2013; Leder et al., 2015; Lemarié et al., 2019; Rodrigues et al., 2019, 2020; Rodrigues, Lopes, & Balzarini, 2022; Rodrigues, Lopes, & Carvalho, 2022).

The belief that one's health is vulnerable to threats has been associated with health-protective behaviors (Ferrer et al., 2018), including during the COVID-19 pandemic (e.g. Harper et al., 2021; Shiloh et al., 2021; Stangier et al., 2021). Acting in accordance with one's security motives helps individuals feel they are successful at maintaining a state of security and avoiding COVID-19 infection, therefore, experiencing

an absence of negativity. Aligned with this reasoning, research has found that individuals who perceived a lower (vs. higher) likelihood of contracting COVID-19 also reported having more coping strategies and were less stressed (Lawal, 2021). Likewise, being more focused on prevention motivated risk perception and preventive behaviours during the pandemic (Rodrigues, 2021), which contributed to less pandemic-related anxiety (Rodrigues, Lopes, & Balzarini, 2022; Rodrigues, Lopes, & Carvalho, 2022). Being more focused on prevention also motivated individuals to retrieve pandemic-related information from more objective and scientific sources and increased threat perceptions later on (Rodrigues, 2021; Rodrigues, Lopes, & Balzarini, 2022; Rodrigues, Lopes, & Carvalho, 2022; Rodrigues et al., 2021).

Despite its benefits for health (e.g. avoiding potentially risky social gatherings) and anxiety at the onset of the pandemic, having a predominant focus on prevention can also have costs and foster negative affective experiences (e.g. Delegach & Katz-Navon, 2021; Schmalbach et al., 2017). Indeed, individuals who perceived themselves to be more vulnerable to COVID-19 also reported greater isolation (Boyras et al., 2020), those who were more worried at the onset of the pandemic felt lonelier later on (Okruszek et al., 2020), and those who feared the pandemic felt less happiness, more negative emotions and had worse interactions with close others (Sit et al., 2021). This conflicting evidence uncovers a possible paradox between the benefits and costs of regulatory focus on health decisions and negative affective experiences during the pandemic. Hence, not only must we seek to understand the reasons behind this trade-off in health-threatening contexts and its implications for negative affective experiences over time (see also Smith et al., 2021), we must also explore conditions under which such effects are more likely to occur.

Research has consistently shown that social relationships can help buffer negative experiences (e.g. Holt-Lunstad et al., 2010; Morina et al., 2021). Given that protective health behaviours during the COVID-19 pandemic required less in-person contact and greater physical distancing, the extent to which individuals more focused on prevention experienced more social connections might have been key in determining whether they incurred more costs or benefits related to their preventative behaviours.

### **Social relationships during the pandemic**

The stress-buffering hypothesis suggests that social support helps to reduce or eliminate the negative effects of a stressful situation by helping individuals to reinterpret it as less threatening and activate adequate coping strategies (Cohen & Wills, 1985; for a review, see Cohen, 2004). Indeed, research has shown that social support buffers threat appraisals and negative affective experiences (e.g. Che et al., 2018; Lüscher et al., 2015). In a health-threatening context like the COVID-19 pandemic, social relationships were also a protective factor against external stressors. For example, having more social connections (e.g. living with others; connecting over the phone/internet) and perceiving more social support during the pandemic were associated with less loneliness and depression, better sleep quality, greater happiness and higher life satisfaction (e.g. Bu et al., 2020; Cantarero et al., 2021; Grey et al., 2020; Groarke et al., 2020; Haliwa et al., 2021; Hubbard et al., 2021). In contrast, spending more time

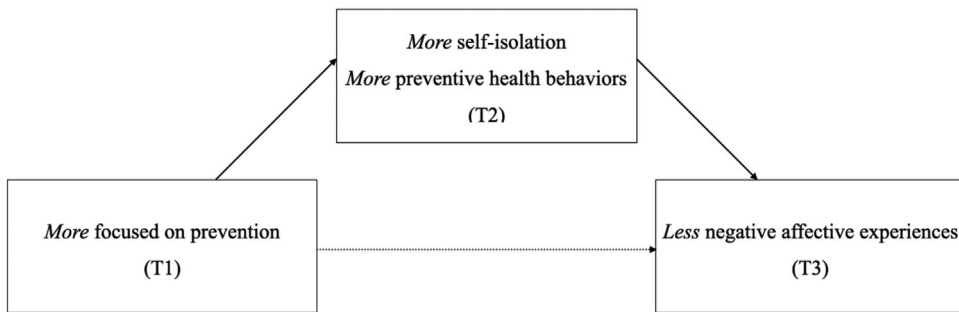
socially isolated and receiving less support from family and friends was associated with poorer psychological health (e.g. Szkody et al., 2021; Xu et al., 2020). This may have been particularly relevant for individuals more focused on prevention, for whom threat awareness tends to be more salient, and who are more likely to protect their health. In the case of the COVID-19 pandemic, prevention-focused individuals may have protected themselves by physically isolating more from others, thus reducing their chance of infection, but they may have also suffered from the psychological consequences of greater physical isolation. Indeed, individuals who perceived more risk from the pandemic also reported more depressive symptomatology, particularly if they received less support from their friends and family (Liu et al., 2021).

## Overview and hypotheses

In a pre-registered longitudinal study that drew its data from the Love in the Time of COVID study (<https://loveinthetimeofcovid.me>), we examined for the first time if having a greater focus on prevention (i.e. having more security motives) had costs and benefits for negative affective experiences over time, and if adherence to self-isolation and preventive health behaviours explained these effects. We further examined if social connections during this period determined when these effects occurred.

Being more focused on prevention during the pandemic has been associated with more threat perceptions and a greater likelihood of engaging in preventive health behaviours (Rodrigues, 2021; Rodrigues et al., 2021; Rodrigues, Lopes, & Balzarini, 2022; Rodrigues, Lopes, & Carvalho, 2022). Aligned with this reasoning, then, we expected individuals more focused on prevention (T1) to also be more worried about contracting COVID-19 at baseline (Hypothesis 1), and to report greater adherence to self-isolation and preventive health behaviours 2 weeks later (T2; Hypothesis 2). Individuals more focused on prevention feel calmer when acting according to their security motives (Higgins, 2015; Scholer & Higgins, 2012). Indeed, for individuals more focused on prevention, enacting preventive behaviours during the pandemic contributed to them feeling less anxiety (Rodrigues, Lopes, & Balzarini, 2022). As such, we expected preventive health behaviours enactment to predict fewer negative affective experiences 2 weeks later (at T3; Hypothesis 3). As prevention focus has been mostly associated with negative – and not positive – affect (e.g. Gödöllei & Beck, 2020), we did not advance any *a priori* hypothesis for positive affect and controlled for these effects. The hypothesised mediation model is depicted in Figure 1.

Drawing from research showing the importance of social relationships to cope with the pandemic (e.g. Bu et al., 2020; Hubbard et al., 2021; Szkody et al., 2021; Xu et al., 2020), we conducted exploratory analyses to examine the role of social connectedness and perceived social support. Specifically, we examined if being more connected to, or perceiving to have more social support from, family and friends moderated the expected temporal effects of being more focused on prevention on affective experiences. Lastly, we ruled out potential confounds by examining *a priori* differences in demographic characteristics and local physical distancing policies. All hypotheses and exploratory analyses were pre-registered on our Open Science Framework OSF page.



**Figure 1.** Hypothesised mediation model.

## Method

### *Participants and procedure*

The Love in the Time of COVID study is an ongoing study that aims to examine how individuals all over the world cope and relate to others throughout the COVID-19 pandemic (for details, see Balzarini et al., 2022). This study was launched on 27 March 2020, in English and made available in 10 other languages shortly after. Prospective participants were invited through social media posts (e.g. Facebook, Instagram), by word of mouth, and through the project's website (<https://loveinthetimeofcovid.me>) to complete a baseline online survey and follow-up online surveys every 2 weeks. Participation was voluntary and no compensation was offered. All study materials and procedures (see OSF) were approved by the Institutional Review Board of the primary university before the project was launched (IRB ID: PROJECT00002117).

To be eligible for this study, individuals had to provide their consent to participate and had to be 18 years or older. A total of 5441 eligible participants completed the survey at T1, 1940 eligible participants completed the survey at T2 and 1464 eligible participants completed the survey at T3. As our analysis focused on the first three waves of data collection (T1–T3), we considered only participants who completed all three waves and had less than 10% missing data on our main measures across waves. This yielded 1291 individuals. As commonly employed in the literature (e.g. Berinsky et al., 2014; Curran, 2016), we also included four attention check questions. At T1, two items asked participants to select a particular answer choice for that question (e.g. 'Please select "Agree a little." This is not a trick question'). At T2 and T3, we asked 'How much attention did you pay to this questionnaire while you were completing it?' (1 = *No attention*, 2 = *Very little attention*, 3 = *Moderate amount of attention*, 4 = *Very close attention*). Participants who failed at least one of the attention checks at T1 ( $n=12$ ), and those who paid very little or no attention to the survey at T2 ( $n=6$ ) or T3 ( $n=4$ ) were excluded from the sample. This resulted in a final sample size of 1,269 participants from 46 countries. Participants had a mean age of 33 years ( $M=33.22$ ,  $SD=12.07$ ), and were mostly heterosexual (79.1%), identified as women (82.6%), were university graduates (29.2%), and were seriously dating (34.3%) or in a long-term romantic relationship (36.2%) for an average length of 9 years ( $M=8.92$ ,  $SD=10.24$ ) (for details, see Supplemental Materials S1).

## Measures

As this study was part of a larger research project that included several other measures, we used shorter versions of previously validated measures when possible. This allowed us to reduce the burden associated with participation, and minimise attrition between waves (Bolger et al., 2003).

### Regulatory focus

We used the two most face valid items from the General Regulatory Focus Measure (validated by Lockwood et al., 2002) to assess prevention focus ('In general, I am focused on preventing negative events in my life') and promotion focus ('In general, I am focused on achieving positive outcomes in my life') at T1. Responses were given on 9-point scales (1 = *Not at all true of me* to 9 = *Very true of me*). Analyses of publicly available data from recent research showed strong correlations between the prevention focus item we used and its composite score,  $r = .60$ ,  $p < .001$ , and between the promotion focus item we used and its composite score,  $r = .74$ ,  $p < .001$  (Oiknine et al., 2021). Higher scores indicated a greater focus on prevention or promotion goals. As in the original scale validation study, both items had a small positive correlation,  $r = .22$ ,  $p < .001$ , and were treated separately in our analyses.

### Worry for health

We adapted two items from The Pandemic Project (<https://utpsyc.org/covid19/>) to assess the extent to which individuals were worried for their health ('To what degree are you worried about getting or having COVID-19?') and the health of close others ('To what degree are you worried about family members or friends getting COVID-19?') at T1. Responses were given on 5-point scales (1 = *Not at all* to 5 = *Completely*). Items were mean aggregated,  $r = .60$ ,  $p < .001$ , with higher scores indicating more health worries.

### Adherence to self-isolation and preventive health behaviours

We adapted two items from The Pandemic Project (<https://utpsyc.org/covid19/>) to assess how much individuals adhered to self-isolation ('Over the past 2 weeks, to what degree have you self-isolated [staying at home, avoiding public spaces]?') and other preventive health behaviours ('Over the past two weeks, to what degree have you practiced other preventative measures [e.g. washing hands]?') at T2. Responses were given on 5-point scales (1 = *Not at all* to 5 = *Completely*). Both items had a small positive correlation,  $r = .29$ ,  $p < .001$ , and were treated as two distinct variables.

### Negative affective experiences

We included items assessing feelings of loneliness ('Over the past two weeks, I've felt lonely'; 1 = *Very slightly or not at all* to 5 = *Extremely*), isolation ('Over the past two weeks, I've felt isolated'; 1 = *Very slightly or not at all* to 5 = *Extremely*) and time spent feeling alone ('Over the past two weeks, on average, roughly how many hours have you spent each day feeling alone'; 1 = 0, 2 = *Up to 1 hour*, 3 = *1-3 hours*, 4 = *3-7 hours*, 5 = *8 hours or more*) at T3. We also used nine items from the Positive



and Negative Affect Schedule-Expanded Form (PANAS-X; Watson & Clark, 1999) assessing negative (five items: 'Over the past two weeks, I've felt...' distressed, scared, angry, irritable, and stressed) and positive affect (four items: "Over the past two weeks, I've felt..." happy, excited, inspired and active) at T3. Responses were also given on 5-point rating scales (1 = *Very slightly or not at all* to 5 = *Extremely*). Items assessing loneliness and negative affect were mean aggregated ( $\alpha = .88$ ), with higher scores indicating more negative affective experiences<sup>1</sup>. Items for positive affect were mean aggregated, with higher scores indicating the experience of more positive affect ( $\alpha = .76$ ).

### **Frequency of online interactions**

We developed three items to assess how many social interactions individuals had at T3. We asked participants to indicate their living arrangement ('How many individuals other than you are staying in the same place you are now'; 0 = 0 to 10 = 10+), and how much time they spent interacting online with family ('Indicate how often over the past two weeks you have spent time with family online [e.g. Skype, Facetime]') and friends ('Indicate how often over the past two weeks you have spent time with friends online [e.g. Skype, Facetime]'). Responses to the latter items were given in 4-point scales (1 = *Never*, 2 = *Few days*, 3 = *Most days*, 4 = *Everyday*). Items were z-scored but showed low reliability ( $\alpha = .25$ ). Moreover, the online interaction items were only moderately correlated,  $r = .35$ ,  $p < .001$ . Hence, items were treated separately in our analyses.

### **Perceived social support**

We developed four items to assess how much social support individuals perceived to have from close others at T3. We asked participants "Since the pandemic began, I have had the emotional help and support I needed from my family", "Since the pandemic began, I have had the emotional help and support I needed from my friends", "Since the pandemic began, I feel like I can count on my family if things go wrong", and "Since the pandemic began, I feel like I can count on my friends if things go wrong". Responses were given in 7-point scales (1 = *Strongly disagree* to 7 = *Strongly agree*). Items were mean aggregated according to the source of support, with higher scores indicating more perceived support from family,  $r = .76$ ,  $p < .001$ , and friends,  $r = .74$ ,  $p < .001$ .

### **Personality**

As a control measure, we used 15 items from the extra-short form Big Five Inventory-2 (BFI-2-XS; Soto & John, 2017) at T1 to assess extraversion (three items,  $\alpha = 0.58$ ; e.g. 'Is full of energy'), agreeableness (three items,  $\alpha = .47$ ; e.g. 'Is compassionate, has a soft heart'), conscientiousness (three items,  $\alpha = .52$ ; e.g. 'Is reliable, can always be counted on'), negative emotionality (three items,  $\alpha = .70$ ; e.g. 'Worries a lot') and openness (three items,  $\alpha = .50$ ; e.g. 'Is original, comes up with new ideas'). Responses were given on 5-point rating scales (1 = *Strongly disagree*, 2 = *Disagree a little*, 3 = *Neutral, no opinion*, 4 = *Agree a little*, 5 = *Strongly agree*). We mean aggregated the items for each personality trait (for overall means see Supplemental Materials).

### Local physical distancing policies

As a control measure, we asked participants to indicate the policies in effect at T3 ('In the last 2 weeks, what policies are your local or national government currently enacting?'). Participants selected 'There are no restrictions that I am aware of' (0.4%), 'Social distancing has been encouraged' (35.6%), 'Social distancing has been ordered' (33.3%), and 'Social distancing is being enforced by the police' (30.7%).

### Data analytic plan

We used bivariate correlations to test Hypothesis 1 and the PROCESS 4.0 macro for SPSS (Hayes, 2017) to test the remaining pre-registered hypotheses. We computed one mediation model with 10,000 bootstrap samples (for a discussion, see Hayes, 2009) by estimating the effect of prevention focus while controlling for the effect of promotion focus. This procedure allowed us to determine the unique effect of having a predominant focus on our outcome variables. Adherence to self-isolation (T2) and adherence to preventive behaviours (T2) were included as parallel mediator variables<sup>2</sup>, and negative affective experiences (T3) were the outcome variable. We included positive affect as an additional covariate in our models.

Moreover, we advanced the possibility that some of the effects of regulatory focus on negative affective experiences one month later could be buffered or enhanced by how frequently individuals interacted online with others, or the social support they perceived to have at that time. To examine this, we conducted exploratory analyses and computed four moderation models with 10,000 bootstrap samples. In all models, prevention focus (T1) was the predictor variable, negative affective experiences (T3) were the outcome variable, and promotion focus (T1) and positive affect (T3) were the covariates. Two models tested frequency of online interactions with family (T3) and perceived social support from family (T3) as moderator variables in separate analyses. Two other models tested frequency of online interactions with friends (T3) and perceived social support from friends (T3) as moderator variables in separate analyses. When significant interactions were found, simple slope analyses determined the effects of prevention focus on negative affective experiences at lower ( $-1$  SD) and higher ( $+1$  SD) levels of the moderator variable. Variables that defined products were grand mean-centred prior to analyses.

To rule out potential confounds, we examined if any *a priori* demographic differences explained some of our findings. We computed correlations with age and personality traits and explored differences according to gender (for sake of parsimony, we removed three participants from the "other" category for this analysis), sexual orientation differences (for sake of parsimony, we categorised non-heterosexual participants as LGBTQI+), relationship status (for sake of parsimony, we categorised participants as single vs. in a relationship), and living arrangement (for sake of parsimony, we categorised participants as living alone vs. living with other people) using *t*-tests. When significant results were obtained, we re-ran the models entering additional covariates. Lastly, we examined if our results were consistent after controlling for differences in local physical distancing policies.

## Results

### Pre-registered analyses

#### Correlations

Descriptive statistics and correlations are presented in Table 1. As expected, prevention focus was positively associated with health worries at baseline,  $r = .18$ ,  $p < .001$ , and adherence to preventive health behaviours at T2,  $r = .09$ ,  $p = .005$ . Participants more focused on prevention at baseline had more online interactions with their family at T3,  $r = .06$ ,  $p = .049$ . Unexpectedly, prevention focus was not associated with adherence to self-isolation at T2,  $r = .04$ ,  $p = .197$ , but was associated with more negative affective experiences at T3,  $r = .11$ ,  $p < .001$ . Worth noting, promotion focus was associated with more adherence to preventive health behaviours at T2,  $r = .08$ ,  $p = .010$ , less negative affective experiences,  $r = -.09$ ,  $p = .003$ , and more positive affect at T3,  $r = .20$ ,  $p < .001$ . Furthermore, participants more focused on promotion at baseline had more online interactions with their family,  $r = .12$ ,  $p < .001$  and friends,  $r = .07$ ,  $p = .011$ , and perceived to have more support from their family,  $r = .14$ ,  $p < .001$ , and friends at T3,  $r = .09$ ,  $p = .004$ . Note that all significant correlations were small in magnitude (Cohen, 1988).

**Table 1.** Descriptive statistics and overall correlations.

	M (SD)	Correlations										
		1	2	3	4	5	6	7	8	9	10	
1. Prevention scores (T1)	6.58 (1.96)	–	–	–	–	–	–	–	–	–	–	–
2. Promotion scores (T1)	7.63 (1.36)	0.22***	–	–	–	–	–	–	–	–	–	–
3. Worry for health (T1)	3.50 (0.98)	0.18***	0.05	–	–	–	–	–	–	–	–	–
4. Adherence to self-isolation (T2)	4.30 (0.78)	0.04	0.03	0.25***	–	–	–	–	–	–	–	–
5. Adherence to preventive health behaviors (T2)	4.46 (0.73)	0.09**	0.08**	0.28***	0.29***	–	–	–	–	–	–	–
6. Negative affective experiences (T3)	2.48 (0.88)	0.11***	–0.09**	0.22***	0.14***	0.06	–	–	–	–	–	–
7. Positive affect (T3)	2.56 (0.79)	–0.04	0.20***	–0.08**	–0.12***	0.00	–0.41***	–	–	–	–	–
8. Frequency of online interactions with family (T3)	2.04 (0.89)	0.06*	0.12***	0.13***	0.12***	0.10**	–0.01	0.07*	–	–	–	–
9. Frequency of online interactions with friends (T3)	2.12 (0.79)	–0.02	0.07*	–0.03	0.01	0.04	0.02	0.11***	0.35***	–	–	–
10. Perceived support from family (T3)	5.40 (1.68)	0.04	0.14***	0.11***	0.06	0.16***	–0.26***	0.31***	0.23***	0.06	–	–
11. Perceived support from friends (T3)	5.34 (1.50)	–0.03	0.09**	0.08*	0.06	0.18***	–0.17***	0.25***	0.15***	0.24***	0.41***	–

\*\*\* $p \leq .001$ . \*\* $p \leq .010$ . \* $p \leq .050$ .

### Mediation analysis

Results of the mediation model are summarised in Table 2. Contrary to our predictions, prevention focus was not linked to adherence to self-isolation at T2,  $b=0.01$ ,  $SE = .01$ ,  $p = .419$ , but was linked to greater adherence to preventive health behaviours at T2,  $b=0.03$ ,  $SE = .01$ ,  $p = .022$ . However, more negative affective experiences at T3 were only linked with adherence to self-isolation at T2,  $b=0.09$ ,  $SE = .03$ ,  $p = .006$ , and not adherence to preventive health behaviours at T2,  $b=0.03$ ,  $SE = .03$ ,  $p = .353$ . Both indirect effects were non-significant. Instead, prevention focus at T1 was linked to more negative affective experiences at T3,  $b = .05$ ,  $SE = .01$ ,  $p < .001$  (model  $R^2 = .18$ ). These findings suggest that having a predominant focus on prevention was linked to negative affective experiences one month later, but this was not explained by having more health-protective behaviours.

### Exploratory analyses

Building upon our finding that stronger prevention focus was linked to *more* negative affective experiences, we explored whether online interactions or perceived social support moderated these effects.

As shown in Table 3, the effect of prevention focus on negative affective experiences was buffered by the frequency of online interactions with family,  $b = -0.03$ ,  $SE = .01$ ,  $p = .024$  (model  $R^2 = .18$ ), but not with friends,  $b = -0.00$ ,  $SE = .01$ ,  $p = .832$  (model  $R^2 = .18$ ). As depicted in Figure 2, simple slope analyses showed that participants more focused on prevention had more negative affective experiences if they interacted online with their family less often,  $b = 0.07$ ,  $SE = .02$ ,  $p < .001$  (but not more often,  $b = 0.02$ ,  $SE = .02$ ,  $p = .257$ ). Notably, planned contrast revealed that participants who were *less* focused on prevention at T1 experienced less negative affect at T3 if they interacted online less (vs. more) often with their family,  $t(1269) =$

**Table 2.** Mediation analysis: predicting negative affective experiences from prevention scores.

	Adherence to self-isolation (T2)			Adherence to preventive health behaviours (T2)			Negative affective experiences (T3)		
	<i>b</i> (SE)	95% CI	<i>B</i>	<i>b</i> (SE)	95% CI	<i>B</i>	<i>b</i> (SE)	95% CI	<i>B</i>
Prevention focus scores (T1)									
Direct effect	0.01 (.01)	[-0.01; 0.03]	0.02	0.03* (.01)	[0.00; 0.05]	0.07	0.05*** (.01)	[0.03; 0.08]	0.11
Total effect	–	–	–	–	–	–	0.05*** (.01)	[0.03; 0.08]	0.12
Adherence to self-isolation (T2)									
Indirect effect	–	–	–	–	–	–	0.00 (0.00)	[-0.00; 0.01]	–
Adherence to preventive health behaviours (T2)									
Indirect effect	–	–	–	–	–	–	0.00 (0.00)	[-0.00; 0.01]	–
Promotion focus scores (Cov.)	0.03 (0.02)	[-0.01; 0.06]	0.05	0.03* (.02)	[0.00; 0.07]	0.06	-0.03 (0.02)	[-0.06; 0.01]	-0.04
Positive affect (Cov.)	-0.13 (0.03)	[-0.19; -0.07]	-0.13	-0.01 (0.03)	[-0.06; 0.05]	-0.01	-0.43*** (0.03)	[-0.49; -0.37]	-0.39

Note. Cov.: covariate; *b*: unstandardised coefficients; *B*: standardised coefficients; CI: confidence interval  
 \*\*\* $p \leq .001$ . \*\* $p \leq .010$ . \* $p \leq .050$ .

**Table 3.** Moderation analyses: buffering effect of online interactions frequency.

	Negative affective experiences (T3)	
	<i>b</i> (SE)	95% CI
Prevention focus scores (T1)	0.04*** (0.01)	[0.02; 0.07]
Frequency of online interactions with family (T3)	0.02 (0.03)	[-0.03; 0.07]
Interaction between variables	-0.03* (0.01)	[-0.05; -0.00]
Less frequent online interactions with family (-1 SD)	0.07*** (0.02)	[0.04; 0.10]
More frequent online interactions with family (+1 SD)	0.02 (0.02)	[-0.01; 0.05]
Promotion focus scores (Cov.)	-0.02 (0.02)	[-0.06; 0.01]
Positive affect (Cov.)	-0.45*** (0.03)	[-0.51; -0.39]
Prevention focus scores (T1)	0.04*** (0.01)	[0.02; 0.07]
Frequency of online interactions with friends (T3)	0.08** (0.03)	[0.02; 0.13]
Interaction between variables	-0.00 (0.01)	[-0.03; 0.02]
Less frequent online interactions with friends (-1 SD)	-	-
More frequent online interactions with friends (+1 SD)	-	-
Promotion focus scores (Cov.)	-0.02 (.02)	[-0.06; 0.01]
Positive affect (Cov.)	-0.46*** (.03)	[-0.51; -0.40]

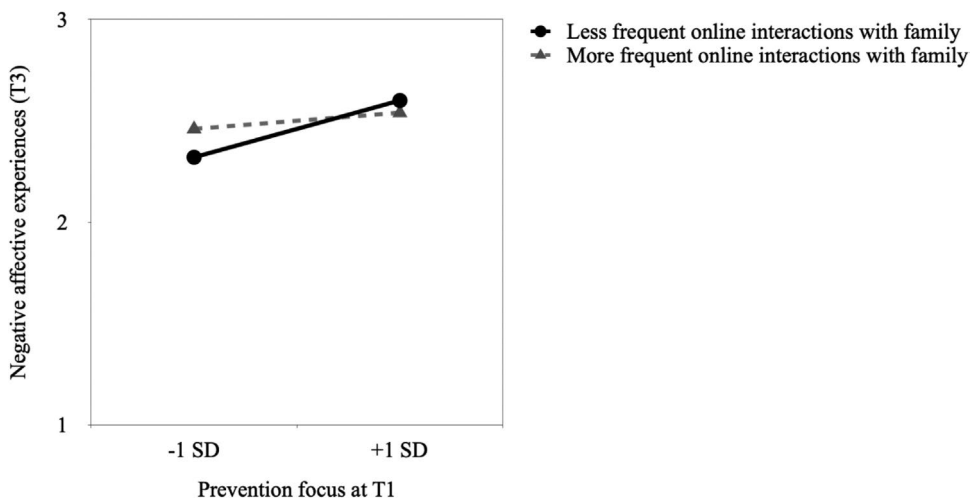
Cov.: covariate; *b*: unstandardised coefficients; CI: confidence interval

The significant interaction should be taken with caution if we adjust the significance threshold according to the number of exploratory models ( $p = .050/4 = .013$ ; see Benjamini & Hochberg, 1995).

\*\*\* $p \leq .001$ . \*\* $p \leq .010$ . \* $p \leq .050$ .

2.14,  $p = .033$ ,  $d = 0.12$ , whereas no differences were found among participants who were *more* focused on prevention at T1,  $t(1269) = 0.99$ ,  $p = .322$ ,  $d = 0.06$ .

As shown in Table 4, the effect of prevention focus on negative experiences was also buffered by the perceived support from family,  $b = -0.08$ ,  $SE = .02$ ,  $p = .015$  (model  $R^2 = .19$ ), and friends,  $b = -0.03$ ,  $SE = .01$ ,  $p = .002$  (model  $R^2 = .18$ ). As depicted in Figure 3, participants more focused on prevention had more negative affective experiences if they perceived to have less support from their family,  $b = 0.06$ ,  $SE = .02$ ,  $p = .001$  (but not more support,  $b = 0.00$ ,  $SE = .02$ ,  $p = .971$ ), and less support from their friends,  $b = 0.07$ ,  $SE = .02$ ,  $p < .001$  (but not more support,  $b = -0.01$ ,  $SE = .02$ ,  $p = .463$ ). Unlike the previous analyses, planned contrast revealed that participants who were *more* focused on prevention at T1 experienced less negative affect



**Figure 2.** Prevention and negative affective experiences: online interactions with friends as a buffer.

**Table 4.** Moderation analyses: buffering effect of perceived social support.

	Negative affective experiences (T3)	
	<i>b</i> (SE)	95% CI
Prevention focus scores (T1)	0.04* (0.01)	[0.00; 0.06]
Perceived support from family (T3)	-0.08*** (0.02)	[-0.12; -0.05]
Interaction between variables	-0.02* (0.01)	[-0.03; -0.00]
Less perceived support from family (-1 SD)	0.06*** (0.02)	[0.03; 0.10]
More perceived support from family (+1 SD)	0.00 (0.02)	[-0.04; 0.04]
Promotion focus scores (Cov.)	-0.01 (0.02)	[-0.05; 0.03]
Positive affect (Cov.)	-0.40*** (0.04)	[-0.47; -0.32]
Prevention focus scores (T1)	0.03* (0.01)	[0.0; 0.06]
Perceived support from friends (T3)	-0.04* (0.02)	[-0.07; -0.00]
Interaction between variables	-0.03** (0.01)	[-0.05; -0.01]
Less perceived support from friends (-1 SD)	0.07*** (0.02)	[0.03; 0.11]
More perceived support from friends (+1 SD)	-0.01 (0.02)	[-0.05; 0.02]
Promotion focus scores (Cov.)	-0.01 (0.02)	[-0.05; 0.04]
Positive affect (Cov.)	-0.44*** (0.04)	[-0.51; -0.37]

Cov.: covariate; *b*: unstandardised coefficients; CI: confidence interval

The significant interactions should be taken with caution if we adjust the significance threshold according to the number of exploratory models ( $p = .050/4 = .013$ ; see Benjamini & Hochberg, 1995).

\*\*\* $p \leq .001$ . \*\* $p \leq .010$ . \* $p \leq .050$ .

at T3 if they perceived to have less (vs. more) support from family,  $t(927) = 5.23$ ,  $p < .001$ ,  $d=0.34$ , and friends ( $t(927) = 3.71$ ,  $p < .001$ ,  $d=0.24$ ). For participants who were less focused on prevention at T1, perceiving less (vs. more) support from their family was also linked to negative affective experiences,  $t(927) = 2.08$ ,  $p = .038$ ,  $d=0.14$ , whereas no differences emerged for perceived support from friends,  $t(927) = 0.70$ ,  $p = .482$ ,  $d=0.05$ .

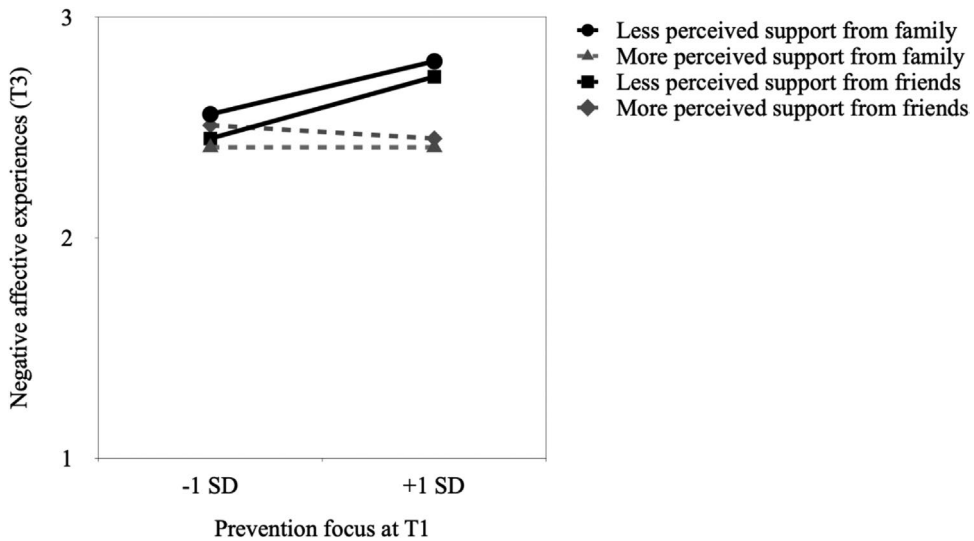
These results indicate that having a predominant focus on prevention at the onset of the pandemic was linked to more negative affective experiences one month later, but only if participants had fewer online interactions with their family or felt less supported by their family and friends. In other words, online interactions and social support buffered against the negative effect of having a prevention focus on negative affective experiences.

### Controlling for demographics and alternative explanations

Results showed significant correlations with age and personality traits (see Supplemental Materials S2), as well as differences according to gender, sexual orientation, relationship status and living arrangement (see Supplemental Materials S3), and physical distancing policies (see Supplemental Materials S4). However, controlling for these variables did not change the overall results of the pre-registered and exploratory models.

### Discussion

Participants from different countries around the world took part in a large-scale longitudinal study with pre-registered hypotheses. Overall, our hypotheses received mixed support. We found that being more focused on prevention – while controlling for individuals' promotion focus scores – was associated with health worries at baseline



**Figure 3.** Prevention and negative affective experiences: perceived social support as a buffer.

(Hypothesis 1) and was linked to greater adherence to preventive health behaviours later on (Hypothesis 2). However, this was not linked to negative affective experiences 2 weeks later (Hypothesis 3). Our exploratory analyses further showed that having a greater focus on prevention was linked to more negative affective experiences one month later. However, this occurred only for those with fewer online connections with their family, and who perceived to have less social support from their close network. These findings highlight the protective role of social relationships when it comes to the benefits and costs associated with regulatory focus in a health-threatening context. These results were largely consistent across demographic differences and were not explained by local physical distancing policies.

Regulatory Focus Theory assumes that having a prevention focus increases threat perceptions and decreases risk-taking (Higgins, 2015; Zou & Scholer, 2016). Aligned with this conceptualisation, we found that individuals more focused on prevention were also more worried for their health at the onset of the COVID-19 pandemic and more often enacted preventive behaviours 2 weeks later. These findings also show the key role of security motives in health protection (e.g. Fuglestad et al., 2013; Leder et al., 2015; Rodrigues et al., 2020; Rodrigues, Lopes, & Balzarini, 2022; Rodrigues, Lopes, & Carvalho, 2022; Uskul et al., 2008). However, enacting these behaviours was not linked to negative affective experiences 2 weeks later. This finding contrasts with those reported in Rodrigues, Lopes, and Balzarini (2022), where prevention focus predicted less pandemic-related anxiety later on, in part because individuals enacted more preventive behaviours. Differences between samples, specific geographical constraints, or time of measurement at different stages during the pandemic might help explain distinct patterns in perceptions, affective reactions and behaviours. Also, individuals more focused on prevention were not more likely to adhere to self-isolation. This lack of temporal association could be explained by several factors, including variability between broader health policies in effect (other than physical distancing) to contain the spread of infection (e.g. Balmford et al., 2020; McKenzie & Adams,

2020), or the need that some individuals had to break confinement to get to work (e.g. unable to work remotely from home), get supplies and groceries, or assist others who became infected with COVID-19. If so, some individuals were forced to expose themselves to risk and interact with others, regardless of whether or not they preferred to do so. Although there was no evidence of an indirect effect, adherence to self-isolation was linked to more negative affective experiences. Again, while more research is needed to assess this possibility, this may be explained by external factors, including the need to adjust to a new reality forced upon by the pandemic (e.g. having to find a work-life balance while confined at home; Graham et al., 2021).

Unexpectedly, we found that having a greater focus on prevention prompted negative affective experiences (i.e. fostered loneliness and negative affect) 1 month later. This converges with the argument that regulatory focus – and particularly prevention focus – has mixed consequences for the way people feel and react to events. Indeed, even though being more focused on prevention increases the likelihood of enacting protective behaviours (e.g. cancer screening or condom use; Ferrer et al., 2017; Rodrigues, Lopes, & Carvalho, 2022) and improves the effectiveness of health messages (for a review, see Ludolph & Schulz, 2015), it can also lead individuals to have less pleasurable interactions with others (e.g. less sexual satisfaction; Evans-Paulson et al., 2022) or miss out on the interaction with others (e.g. more negative affective experiences, as we found). Notwithstanding, our exploratory analyses provided valuable insights, such that active close social networks were likely a protective factor against the negative consequences of the pandemic (Bu et al., 2020; Hubbard et al., 2021; Szkody et al., 2021; Xu et al., 2020). Specifically, having less online contact with their family lead individuals more focused on prevention to experience more negative affective experiences, similar to the experiences reported by those who interacted with their family more often. On the other hand, being less focused on prevention and having less contact with one's family was linked to less negative affective experiences. Arguably, being more concerned with the consequences of the pandemic and sharing those concerns with family members might have increased the costs of having to deal with the uncertainty. In contrast, individuals more focused on prevention experienced more negative affective experiences if they perceived themselves as receiving less social support from their friends and family. These findings are aligned with the stress-buffering hypothesis (Cohen & Wills, 1985) and converge with other studies conducted during the pandemic (e.g. Bu et al., 2020; Szkody et al., 2021; Xu et al., 2020). In other words, prevention focus might be most effective in threatening contexts when individuals are able to safeguard their health but, at the same time, rely on the support of others to keep their course of action. In this way, when feeling supported by their social network, prevention-focused individuals may be able to reap the benefits of their behaviours without experiencing the associated costs.

### ***Strengths, limitations and future directions***

Our longitudinal study was conducted during a unique context wherein individuals were particularly threatened and disrupted by external pandemic-related stressors.



The way in which individuals responded to these unique challenges was likely shaped by their regulatory focus. Overall, our results showed that having a prevention focus is a double-edge sword for health behaviours and negative affective experiences, particularly when lacking social connections. Not only are these findings potentially relevant to other studies conducted during the ongoing COVID-19 pandemic (e.g. how individuals react and adhere to vaccination; how individuals behave and connect to others after they get vaccinated), but also to better understand the nuances in the role of social interactions and social support during other health-threatening or stressful times (e.g. how individuals connect to others who are coping with a chronic illness). Despite the strengths of this study, there were also some limitations that could limit the generalisability of our findings. We found limited empirical support to the proposed mediation model and some of our key findings were based on exploratory moderation analyses. The high adherence to preventive behaviours at T2 might have restricted the variability of responses and created a ceiling effect that compromised some of the expected effects. Also, the exploratory analyses were based on past research examining the buffering role of social support on negative affective experiences but should be interpreted with caution. Lastly, and despite our large sample size, we must acknowledge that most of our findings were small in magnitude. As such, we highlight the need to replicate and extend these findings in other health-threatening contexts, while also considering additional variables that can help understand (or better account for) some of our associations or effects. For example, even though levels of adherence to self-isolation and preventive health behaviours were high, we did not assess if our participants were in situations that did not allow them to physically confine at home or follow other distancing policies, and instead expose themselves to risk (e.g. essential workers or frontline health workers). Regardless of this possibility, we found that safety motives (i.e. prevention focus) had positive and negative consequences for health and negative affective experiences that must be noted.

Other limitations pertained to demographic characteristics. First, there was a gender and sexual orientation imbalance in our sample, as well as differences in physical distancing policies across countries and regions. However, our findings were robust after controlling for these differences. Also, most of our participants were currently involved in some type of romantic relationship, which may have provided an additional source of support over and above friends and family. Research has already shown the crucial role of romantic partners to cope with external strains imposed by the pandemic (e.g. Balzarini et al., 2022), whereas single individuals were more at risk of added stress and negative affective experiences (Kowal et al., 2020), and decreased their sexual activity (Rodrigues et al., 2021). Even though our results did not change after controlling for relationship status, future studies could explore if the implications of prevention focus were particularly evident for individuals who had to deal with the pandemic alone and less so for those who shared the burden of the pandemic with a romantic partner. Future studies could also seek to examine whether distinct perspectives with friends and family over the threats posed by the pandemic disrupted the implications of regulatory focus. For example, individuals more focused on prevention could consciously decide not to act in accordance with their security motives,

if their friends or family have a different regulatory focus and fail to adhere to restrictive policies.

Furthermore, we mostly used single-item measures to assess each variable. Although this enabled us to reduce participant fatigue and minimise attrition in the longitudinal design, we acknowledge this as a limitation compared to full-scale measurements. That being said, we believe this was a worthwhile trade-off, and previous studies have also made strategic decisions to reduce the burden associated with the participation in large-scale studies with reliable results (e.g. Bolger et al., 2003). Lastly, there is still a generalised lack of knowledge regarding the coping mechanisms activated by individuals with a predominant focus on promotion during the pandemic. Research has shown that individuals more focused on promotion perceived to be well-informed about the pandemic and had stronger intentions to have casual sex, particularly when they felt safer with partners (Rodrigues, 2021). Aligned with this, we found that promotion focus scores were linked to greater adherence to preventive health behaviours (T2). Arguably, having a predominant focus on promotion may have driven these individuals to take some controlled risks (e.g. kept face masks while outside with friends but forgo social distance) and decided to deal with possible consequences of their behaviour afterward (e.g. more frequent testing; for a similar argument, see Rodrigues, Lopes, & Balzarini, 2022; Rodrigues, Lopes, & Carvalho, 2022). Future studies could seek to examine this hypothesis and determine why individuals more focused on promotion were driven toward health risk-taking, how they construct the threats caused by the pandemic, and under which conditions (or for which type of behaviours) were these effects more likely to occur (e.g. pursue casual sex to cope with loneliness).

## Conclusion

In a longitudinal study, we found mixed consequences of having a predominant focus on prevention for perceptions, behaviours and affective reactions during the first months of the COVID-19 pandemic. Still, these negative consequences for affective experiences were alleviated by social relationships. Being focused on security can help individuals to protect themselves from physical harm at the cost of psychological well-being but maintaining an active and supportive close network of family and friends can be key to buffer some of these costs. Past evidence has already shown that having a predominant focus on prevention can help individuals enact health-protective behaviours (e.g. maintain smoking cessation and having fewer relapses over time; Fuglestad et al., 2013) and that having a congruence between individual's regulatory focus and the motives highlighted in health messaging campaigns (e.g. messaging flu vaccines as a way to achieve personal goals or to avoid illness, for promotion or prevention-focused individuals, respectively) can help improve the efficacy of health messages (Fridman & Higgins, 2017). Our findings highlight how, and under which conditions, some individuals react and behave in health-threatening contexts, which could potentially provide interesting insight for practitioners or intervention researchers seeking to develop effective health messaging campaigns. We encourage future research to address this possibility.

## Notes

1. In the pre-registration, we proposed to examine experiences of loneliness and negative affect separately. However, items were highly correlated and therefore aggregated in a single index.
2. In the pre-registration, we proposed two mediation models examining loneliness and negative affect separately, each with a different mediator variable. Given the computation of a single index of negative affective experiences, we decided to include both mediator variables in a single analysis.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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## Data availability statement

The anonymised data, syntaxes and outputs that support all analyses reported for this article are available on our OSF page.

## References

- Aspinwall, L. G. (2004). Dealing with adversity: Self-regulation, coping, adaptation, and health. In M. B. Brewer & M. Hewstone (Eds.), *Applied social psychology* (pp. 3–27). Blackwell Publishing.
- Balmford, B., Annan, J. D., Hargreaves, J. C., Altoè, M., & Bateman, I. J. (2020). Cross-country comparisons of COVID-19: Policy, politics and the price of life. *Environmental & Resource Economics*, 76(4), 525–551. <https://doi.org/10.1007/s10640-020-00466-5>
- Balzarini, R. N., Muise, A., Zoppolat, G., Di Bartolomeo, A., Rodrigues, D. L., Alonso-Ferres, M., Urganci, B., Debrot, A., Pichayayothin, N. B., Dharma, C., Chi, P., Karremans, J., Schoebi, D., & Slatcher, R. B. (2022). Love in the time of COVID: Perceived partner responsiveness buffers people from lower relationship quality associated with COVID-related stressors. *Social Psychological and Personality Science*. <https://psyarxiv.com/e3fh4/>
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, 57(1), 289–300. <https://doi.org/10.1111/j.2517-6161.1995.tb02031.x>
- Berinsky, A. J., Margolis, M. F., & Sances, M. W. (2014). Separating the shirkers from the workers? Making sure respondents pay attention on self-administered surveys. *American Journal of Political Science*, 58(3), 739–753. <https://doi.org/10.1111/ajps.12081>

- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, 54(1), 579–616. <https://doi.org/10.1146/annurev.psych.54.101601.145030>
- Boyraz, G., Legros, D. N., & Tigershtrom, A. (2020). COVID-19 and traumatic stress: The role of perceived vulnerability, COVID-19-related worries, and social isolation. *Journal of Anxiety Disorders*, 76, 102307. <https://doi.org/10.1016/j.janxdis.2020.102307>
- Bu, F., Steptoe, A., & Fancourt, D. (2020). Loneliness during a strict lockdown: Trajectories and predictors during the COVID-19 pandemic in 38,217 United Kingdom adults. *Social Science & Medicine (1982)*, 265, 113521. <https://doi.org/10.1016/j.socscimed.2020.113521>
- Cantarero, K., van Tilburg, W. A. P., & Smoktunowicz, E. (2021). Affirming basic psychological needs promotes mental well-being during the COVID-19 outbreak. *Social Psychological and Personality Science*, 12(5), 821–828. <https://doi.org/10.1177/1948550620942708>
- Che, X., Cash, R., Fitzgerald, P., & Fitzgibbon, B. M. (2018). The social regulation of pain: Autonomic and neurophysiological changes associated with perceived threat. *The Journal of Pain*, 19(5), 496–505. <https://doi.org/10.1016/j.jpain.2017.12.007>
- Clemente-Suárez, V. J., Dalamitros, A. A., Beltran-Velasco, A. I., Mielgo-Ayuso, J., & Tornero-Aguilera, J. F. (2020). Social and psychophysiological consequences of the COVID-19 pandemic: An extensive literature review. *Frontiers in Psychology*, 11, 580225. <https://www.frontiersin.org/article/10.3389/fpsyg.2020.580225> <https://doi.org/10.3389/fpsyg.2020.580225>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203771587>
- Cohen, S. (2004). Social relationships and health. *The American Psychologist*, 59(8), 676–684. <https://doi.org/10.1037/0003-066X.59.8.676>
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98(2), 310–357. <https://doi.org/10.1037/0033-2909.98.2.310>
- Curran, P. G. (2016). Methods for the detection of carelessly invalid responses in survey data. *Journal of Experimental Social Psychology*, 66, 4–19. <https://doi.org/10.1016/j.jesp.2015.07.006>
- de Ridder, D. T., & de Wit, J. B. (2006). Self-regulation in health behavior: Concepts, theories, and central issues. In D. T. de Ridder & J. B. de Wit (Eds.), *Self-regulation in health behavior* (pp. 1–23). Wiley.
- Delegach, M., & Katz-Navon, T. (2021). Regulatory foci and well-being: Coping flexibility and stressor appraisal as explanatory mechanisms. *International Journal of Stress Management*, 28(2), 117–129. <https://doi.org/10.1037/str0000219>
- Evans-Paulson, R., Widman, L., Javidi, H., & Lipsey, N. (2022). Is regulatory focus related to condom use, STI/HIV testing, and sexual satisfaction? *The Journal of Sex Research, Advance Online Publication*, 59(4), 504–514. <https://doi.org/10.1080/00224499.2021.1961671>
- Ferrer, R. A., Klein, W. M. P., Avishai, A., Jones, K., Villegas, M., & Sheeran, P. (2018). When does risk perception predict protection motivation for health threats? A person-by-situation analysis. *PLoS One*, 13(3), e0191994. <https://doi.org/10.1371/journal.pone.0191994>
- Ferrer, R. A., Lipkus, I. M., Cerully, J. L., McBride, C. M., Shepperd, J. A., & Klein, W. M. P. (2017). Developing a scale to assess health regulatory focus. *Social Science & Medicine (1982)*, 195, 50–60. <https://doi.org/10.1016/j.socscimed.2017.10.029>
- Fridman, I., & Higgins, E. T. (2017). *Regulatory focus and regulatory fit in health messaging*. Oxford Research Encyclopedia of Communication. <https://doi.org/10.1093/acrefore/9780190228613.013.257>
- Fuglestad, P. T., Rothman, A. J., & Jeffery, R. W. (2013). The effects of regulatory focus on responding to and avoiding slips in a longitudinal study of smoking cessation. *Basic and Applied Social Psychology*, 35(5), 426–435. <https://doi.org/10.1080/01973533.2013.823619>
- Gödöllei, A. F., & Beck, J. W. (2020). Development and validation of the State Regulatory Focus Scale. *Human Performance*, 33(2–3), 104–129. <https://doi.org/10.1080/08959285.2019.1710513>
- Graham, M., Weale, V., Lambert, K. A., Kinsman, N., Stuckey, R., & Oakman, J. (2021). Working at home: The impacts of COVID 19 on health, family-work-life conflict, gender, and parental responsibilities. *Journal of Occupational and Environmental Medicine*, 63(11), 938–943. <https://doi.org/10.1097/JOM.0000000000002337>

- Grey, I., Arora, T., Thomas, J., Saneh, A., Tohme, P., & Abi-Habib, R. (2020). The role of perceived social support on depression and sleep during the COVID-19 pandemic. *Psychiatry Research*, 293, 113452. <https://doi.org/10.1016/j.psychres.2020.113452>
- Groarke, J. M., Berry, E., Graham-Wisener, L., McKenna-Plumley, P. E., McGlinchey, E., & Armour, C. (2020). Loneliness in the UK during the COVID-19 pandemic: Cross-sectional results from the COVID-19 Psychological Wellbeing Study. *PLoS One*, 15(9), e0239698. <https://doi.org/10.1371/journal.pone.0239698>
- Haliwa, I., Spalding, R., Smith, K., Chappell, A., & Strough, J. (2021). Risk and protective factors for college students' psychological health during the COVID-19 pandemic. *Journal of American College Health, Advance Online Publication*, 1–5. <https://doi.org/10.1080/07448481.2020.1863413>
- Harper, C. A., Satchell, L. P., Fido, D., & Latzman, R. D. (2021). Functional fear predicts public health compliance in the COVID-19 pandemic. *International Journal of Mental Health and Addiction*, 19(5), 1875–1888. <https://doi.org/10.1007/s11469-020-00281-5>
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76(4), 408–420. <https://doi.org/10.1080/03637750903310360>
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis* (2nd ed.). Guilford Press.
- Higgins, E. T. (2015). Regulatory focus theory. In R. A. Scott, M. C. Buchmann, & S. M. Kosslyn (Eds.), *Emerging trends in the social and behavioral sciences: An interdisciplinary, searchable, and linkable Resource* (pp. 1–18). Wiley. <https://doi.org/10.1002/9781118900772.etrds0279>
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine*, 7(7), e1000316. <https://doi.org/10.1371/journal.pmed.1000316>
- Hubbard, G., den Daas, C., Johnston, M., & Dixon, D. (2021). Sociodemographic and psychological risk factors for anxiety and depression: Findings from the Covid-19 Health and Adherence Research in Scotland on Mental Health (CHARIS-MH) cross-sectional survey. *International Journal of Behavioral Medicine*, 28(6), 788–800. <https://doi.org/10.1007/s12529-021-09967-z>
- Koffman, J., Gross, J., Etkind, S. N., & Selman, L. (2020). Uncertainty and COVID-19: How are we to respond? *Journal of the Royal Society of Medicine*, 113(6), 211–216. <https://doi.org/10.1177/0141076820930665>
- Kowal, M., Coll-Martín, T., Ikizer, G., Rasmussen, J., Eichel, K., Studzińska, A., Koszałkowska, K., Karwowski, M., Najmussaïb, A., Pankowski, D., Lieberoth, A., & Ahmed, O. (2020). Who is the most stressed during the COVID-19 pandemic? Data from 26 countries and areas. *Applied Psychology Health and Well-Being*, 12(4), 946–966. <https://doi.org/10.1111/aphw.12234>
- Lawal, A. M. (2021). Toward understanding the mental health of Nigerian residents during lockdown: The influence of age and vulnerability to COVID-19. *Journal of Mental Health (Abingdon, England)*, 30(2), 202–207. <https://doi.org/10.1080/09638237.2021.1922637>
- Leder, S., Florack, A., & Keller, J. (2015). Self-regulation and protective health behaviour: How regulatory focus and anticipated regret are related to vaccination decisions. *Psychology & Health*, 30(2), 165–188. <https://doi.org/10.1080/08870446.2014.954574>
- Lemarié, L., Bellavance, F., & Chebat, J. C. (2019). Regulatory focus, time perspective, locus of control and sensation seeking as predictors of risky driving behaviors. *Accident; Analysis and Prevention*, 127, 19–27. <https://doi.org/10.1016/j.aap.2019.02.025>
- Liu, C., Huang, N., Fu, M., Zhang, H., Feng, X. L., & Guo, J. (2021). Relationship between risk perception, social support, and mental health among general Chinese population during the COVID-19 pandemic. *Risk Management and Healthcare Policy*, 14, 1843–1853. <https://doi.org/10.2147/RMHP.S302521>
- Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology*, 83(4), 854–864. <https://doi.org/10.1037/0022-3514.83.4.854>
- Ludolph, R., & Schulz, P. J. (2015). Does regulatory fit lead to more effective health communication? A systematic review. *Social Science & Medicine (1982)*, 128, 142–150. <https://doi.org/10.1016/j.socscimed.2015.01.021>

- Lüscher, J., Stadler, G., Ochsner, S., Rackow, P., Knoll, N., Hornung, R., & Scholz, U. (2015). Daily negative affect and smoking after a self-set quit attempt: The role of dyadic invisible social support in a daily diary study. *British Journal of Health Psychology*, 20(4), 708–723. <https://doi.org/10.1111/bjhp.12135>
- Mann, T., de Ridder, D., & Fujita, K. (2013). Self-regulation of health behavior: Social psychological approaches to goal setting and goal striving. *Health Psychology*, 32(5), 487–498. <https://doi.org/10.1037/a0028533>
- McKenzie, G., & Adams, B. (2020). A country comparison of place-based activity response to COVID-19 policies. *Applied Geography (Sevenoaks, England)*, 125, 102363. <https://doi.org/10.1016/j.apgeog.2020.102363>
- Morina, N., Kip, A., Hoppen, T. H., Priebe, S., & Meyer, T. (2021). Potential impact of physical distancing on physical and mental health: A rapid narrative umbrella review of meta-analyses on the link between social connection and health. *BMJ Open*, 11(3), e042335. <https://doi.org/10.1136/bmjopen-2020-042335>
- Oiknine, A. H., Pollard, K. A., Khooshabeh, P., & Files, B. T. (2021). Need for cognition is positively related to promotion focus and negatively related to prevention focus. *Frontiers in Psychology*, 12, 606847. <https://doi.org/10.3389/fpsyg.2021.606847>
- Okruszek, Ł., Aniszewska-Stańczuk, A., Piejka, A., Wiśniewska, M., & Żurek, K. (2020). Safe but lonely? Loneliness, anxiety, and depression symptoms and COVID-19. *Frontiers in Psychology*, 11, 579181. <https://doi.org/10.3389/fpsyg.2020.579181>
- Pérez-Fuentes, M., del, C., Jurado, M., del, M. M., Martínez, Á., M., & Linares, J. J. G. (2020). Threat of COVID-19 and emotional state during quarantine: Positive and negative affect as mediators in a cross-sectional study of the Spanish population. *PLoS One*, 15(6), e0235305. <https://doi.org/10.1371/journal.pone.0235305>
- Rodrigues, D. L. (2021). Regulatory focus and perceived safety with casual partners: Implications for perceived risk and casual sex intentions during the COVID-19 pandemic. *Psychology & Sexuality, Advance Online Publication*, 1–16. <https://doi.org/10.1080/19419899.2021.2018355>
- Rodrigues, D. L., Balzarini, R. N., Zoppolat, G., & Slatcher, R. B. (2021). Individual motives for security influence sexual activity during the COVID-19 pandemic. *PsyArXiv*. <https://doi.org/10.31234/osf.io/eutp2>
- Rodrigues, D. L., Lopes, D., & Balzarini, R. N. (2022). Having a prevention regulatory focus longitudinally predicted distress and health-protective behaviors during the COVID-19 pandemic. *Stress and Health, Advance Online Publication*, <https://doi.org/10.1002/smi.3132>
- Rodrigues, D. L., Lopes, D., & Carvalho, A. C. (2022). Regulatory focus and sexual health: Motives for security and pleasure in sexuality are associated with distinct protective behaviors. *The Journal of Sex Research, Advance Online Publication*, 59(4), 484–492. <https://doi.org/10.1080/00224499.2021.1926413>
- Rodrigues, D. L., Lopes, D., Pereira, M., Prada, M., & Garrido, M. V. (2019). Motivations for sexual behavior and intentions to use condoms: Development of the regulatory focus in sexuality scale. *Archives of Sexual Behavior*, 48(2), 557–575. <https://doi.org/10.1007/s10508-018-1316-2>
- Rodrigues, D. L., Lopes, D., Pereira, M., Prada, M., & Garrido, M. V. (2020). Predictors of condomless sex and sexual health behaviors in a sample of Portuguese single adults. *The Journal of Sexual Medicine*, 17(1), 26–36. <https://doi.org/10.1016/j.jsxm.2019.10.005>
- Schmalbach, B., Spina, R., Steffens-Guerra, I., Franke, G. H., Kliem, S., Michaelides, M. P., Hinz, A., & Zenger, M. (2017). Psychometric properties of the German version of the health regulatory focus scale. *Frontiers in Psychology*, 8, 2005. <https://doi.org/10.3389/fpsyg.2017.02005>
- Scholer, A. A., & Higgins, E. T. (2012). Too much of a good thing? Trade-offs in promotion and prevention focus. *The Oxford handbook of human motivation* (pp. 65–84). Oxford University Press.
- Shiloh, S., Peleg, S., & Nudelman, G. (2021). Making sense of COVID-19: A longitudinal investigation of the initial stages of developing illness representations. *Psychology & Health, Advance Online Publication*. <https://doi.org/10.1080/08870446.2021.1925670>
- Sit, S. M. M., Lam, T. H., Lai, A. Y. K., Wong, B. Y. M., Wang, M. P., & Ho, S. Y. (2021). Fear of COVID-19 and its associations with perceived personal and family benefits and harms in



- Hong Kong. *Translational Behavioral Medicine*, 11(3), 793–801. <https://doi.org/10.1093/tbm/ibab018>
- Smith, A. M., Willroth, E. C., Gatchpazian, A., Shallcross, A. J., Feinberg, M., & Ford, B. Q. (2021). Coping with health threats: The costs and benefits of managing emotions. *Psychological Science*, 32(7), 1011–1023. <https://doi.org/10.1177/09567976211024260>
- Soto, C. J., & John, O. P. (2017). Short and extra-short forms of the Big Five Inventory–2: The BFI-2-S and BFI-2-XS. *Journal of Research in Personality*, 68, 69–81. <https://doi.org/10.1016/j.jrp.2017.02.004>
- Stangier, U., Kananian, S., & Schüller, J. (2021). Perceived vulnerability to disease, knowledge about COVID-19, and changes in preventive behavior during lockdown in a German convenience sample. *Current Psychology, Advance Online Publication*. <https://doi.org/10.1007/s12144-021-01456-6>
- Szkody, E., Stearns, M., Stanhope, L., & McKinney, C. (2021). Stress-buffering role of social support during COVID-19. *Family Process*, 60(3), 1002–1015. <https://doi.org/10.1111/famp.12618>
- Uskul, A. K., Keller, J., & Oyserman, D. (2008). Regulatory fit and health behavior. *Psychology & Health*, 23(3), 327–346. <https://doi.org/10.1080/14768320701360385>
- Watson, D., & Clark, L. A. (1999). *The PANAS-X: Manual for the Positive and Negative Affect Schedule-Expanded Form*. The University of Iowa.
- Xu, J., Ou, J., Luo, S., Wang, Z., Chang, E., Novak, C., Shen, J., Zheng, S., & Wang, Y. (2020). Perceived social support protects lonely people against COVID-19 anxiety: A three-wave longitudinal study in China. *Frontiers in Psychology*, 11, 566965. <https://doi.org/10.3389/fpsyg.2020.566965>
- Zou, X., & Scholer, A. A. (2016). Motivational affordance and risk-taking across decision domains. *Personality & Social Psychology Bulletin*, 42(3), 275–289. <https://doi.org/10.1177/0146167215626706>