Health behavior adherence and emotional adjustment during the COVID-19 pandemic in a US nationally representative sample: The roles of prosocial motivation and gratitude

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ABSTRACT

Rationale: Substantial health behavior change (e.g., social distancing, mask-wearing) is needed to slow COVID-19. Yet, adherence to these guidelines varies, and avoiding social contact may contribute to declines in emotional adjustment.
Objective and Methods: Drawing on prior research linking social motives to health behavior and well-being, we investigated the associations among social motives (prosocial motivation, gratitude) and resilience to social distancing (health behavior adherence, emotional adjustment) in a US nationally representative sample ($N =$ 1007) collected in April 2020.
Results: Prosocial motivation, but not gratitude, correlated with health behavior adherence and social distancing practice. Conversely, gratitude, but not prosocial motivation, correlated with emotional adjustment (daily accomplishments, meaning in life, thriving, psychological distress, positive and negative affect). Analyses controlled for gratitude/prosocial motivation, self-focused motivation, COVID-19 worries, work arrangement, stay-at-home order, likelihood of COVID-19 diagnosis, and demographics.
Conclusion: Public health campaigns focusing on the benefits of health behaviors for others, rather than just oneself, may promote adherence and emotional adjustment.

1. Introduction

"Now is the time, if there ever was one, for us to care selflessly about one another."

~Dr. Anthony Fauci

On March 11, 2020, the World Health Organization classified COVID-19 as a global pandemic (World Health Organization, 2020). By March 26, the United States (US) became the epicenter of the virus with more cases than any other country in the world (McNeil, 2020). By May 1st, nearly 1.1 million people in the US had been diagnosed with COVID-19 with approximately 64,000 deaths (USA Facts, 2020). Despite continued increases in COVID-19 cases throughout spring and early summer, many states and regions reopened businesses, restaurants, and entertainment venues by June 2020. Thus, reliance on the community's willingness to follow public health measures is necessary to slow the spread of COVID-19.

Widespread public health campaigns encourage people to stay at home, maintain at least six feet from other people outside their homes (i. e., social distancing), wash their hands frequently, and wear a mask in public (Centers for Disease Control and Prevention, 2020). These public health measures are simple, yet adherence to these guidelines varies. Maintaining long-term adherence to social distancing efforts may be challenging, as people adapt to perceptions of risk, combat feelings of loneliness, and feel the urge for life to return to "normal." Furthermore, given the fundamental need to belong (Baumeister and Leary, 1995) and the importance of social relationships for mental health and well-being (Algoe, 2019; Hawkley and Cacioppo, 2010; Thoits, 2011), social

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distancing may contribute to declines in emotional adjustment. Indeed, clinical levels of depression and anxiety have risen among the adult population (Aknin et al., in press; Centers for Disease Control and Prevention & National Center for Health Statistics, 2020; Zheng et al., 2021), which may reduce adherence to COVID-19 health behaviors. Therefore, more than ever it is important to understand factors that may contribute to adherence to COVID-19 health behaviors and improved emotional adjustment (Waters et al., 2021; Waters et al., in press). Drawing on prior research linking social motives (i.e., care and concern for others; Crocker et al., 2017) with emotional well-being, health behavior, and physical health (Algoe, 2019; Betsch et al., 2013; Crocker et al., 2017; Pfattheicher et al., 2020), we investigate the benefits of social motives (i.e., prosocial motivation and gratitude) for adherence and adjustment to social distancing efforts in a US nationally representative sample during the initial response to the COVID-19 pandemic.

1.1. Social motives, health behavior adherence, and emotional adjustment

1.1.1. Prosocial motivation

Prosocial motivation, in contrast to self-focused motivation, involves desires to benefit the well-being of others—including family, friends, acquaintances, and strangers (Crocker et al., 2017). Evidence suggests that prosocial motivation is independent of other similar constructs, such as empathy. For example, prosocial motivation uniquely predicted positive emotions and giving to strangers and close others after accounting for empathy, compassionate love, and communion (Canevello and Crocker, 2020). Prosocial motivation may also be linked to behavioral adherence. In one experiment in a fundraising organization, participants who interacted briefly with a beneficiary of their actions—thus increasing participants' understanding of the prosocial impact of their efforts—spent more time making phone calls and raised more money than those who did not interact with a beneficiary (Grant et al., 2007). Similarly, participants who identified how their tax contributions would help other citizens (i.e., perceived prosocial taxation) were more willing to continue paying taxes and to contribute larger sums to a tax-like payment (Thornton et al., 2019). Finally, experimental evidence demonstrates that highlighting the social benefits of vaccination (i.e., herd immunity) increased vaccination intentions, whereas highlighting the individual benefits of vaccination decreased vaccination intentions (Betsch et al., 2013, 2017). Notably, however, few studies have investigated whether prosocial motivation is associated with specific health behaviors that would confer personal, as well as communal benefits.

Substantial research also supports the emotional benefits of giving to others via prosocial behavior. For example, people report greater happiness after spending money on others or performing acts of kindness for others rather than themselves (Aknin et al., 2013; Nelson et al., 2016). Furthermore, prosocial behavior that is motivated by other-focused concerns leads to greater increases in positive affect than prosocial behavior motivated by self-focused concerns (Wiwad and Aknin, 2017). Based on this evidence, we hypothesize that recognizing the benefits of social distancing for protecting other people (i.e., prosocial motivation) will be linked with greater behavioral adherence and emotional adjustment to social distancing (*Hypothesis 1*).

1.1.2. Gratitude

Given the prosocial functions of gratitude (Algoe, 2012; Bartlett and DeSteno, 2006; DeSteno et al., 2010), we expand the definition of social motives to include feelings of gratitude as well. Gratitude is a social emotion that is often felt after benefitting from another person's actions (McCullough et al., 2001), and like prosocial motivation, feeling grateful encourages people to focus on the needs of others rather than the self (Stellar et al., 2017). Existing evidence suggests that gratitude may also be linked to behavioral benefits. Theory suggests that gratitude serves as a motivator of positive change (Armenta et al., 2017). In support of this theory, empirical work indicates that feelings of gratitude in daily life are associated with enhanced patience and self-control (Dickens and DeSteno, 2016), two qualities that may be helpful as people inhibit their impulses to break social distancing practices. In addition, evidence suggests that gratitude motivates cooperation with others at the expense of personal gains (Bartlett and DeSteno, 2006; DeSteno et al., 2010), which may be especially important in motivating health behavior change in response to COVID-19. Finally, although few studies connect gratitude to specific health behaviors, in one longitudinal experiment, expressing gratitude led to increases in healthy eating behavior (Fritz et al., 2019).

Gratitude is also linked with benefits to emotional well-being and mental health (Cregg and Cheavens, 2020; Davis et al., 2016; Dickens, 2017). Trait gratitude is associated with greater overall well-being (McCullough et al., 2002), less stress (Wood et al., 2008), and fewer depressive symptoms (Lambert et al., 2012). Additionally, experimental evidence demonstrates that writing gratitude letters leads to immediate boosts in positive emotions (Layous, Sweeny, et al., 2017), and longitudinal improvements in happiness and well-being (Lyubomirsky et al., 2011). Given these benefits of gratitude, we hypothesize that gratitude will also be associated with greater health behavior adherence and emotional adjustment to social distancing (*Hypothesis 2*).

Moreover, gratitude and prosocial behavior are inextricably linked: People feel grateful in response to the prosocial actions of others, which in turn motivates the grateful person to behave in a more prosocial manner in the future (Armenta et al., 2017; Layous, Nelson, et al., 2017). Despite these associations, few studies investigate prosocial behavior and gratitude together to consider how they are each uniquely linked with behavioral and emotional outcomes. Such an investigation would inform not only current responses to the COVID-19 pandemic, but could provide a more nuanced understanding of the potential benefits of prosocial behavior and gratitude for behavioral and emotional outcomes.

Despite existing literature on the benefits of social motives for behavioral adherence and emotional adjustment, public communications about COVID-19 health behaviors have primarily focused on individual, rather than community, benefits. For example, the CDC provides recommendations for "protecting yourself" (Centers for Disease Control and Prevention, 2020), and communications from the White House have similarly focused on personal preparation and protection (www.coronavirus.gov). Furthermore, the individualistic focus on personal experiences and benefits has been the subject of public critique regarding the US response to COVID-19 (O'Rourke, 2020; Thomas, 2020). Conversely, countries that adopted a communal approach to combating COVID-19 (e.g., South Korea, New Zealand) demonstrated much stronger compliance to following COVID-19 health behavior guidelines (Baker et al., 2020; Choi, 2020). Thus, a more efficacious approach might be to draw on social motives by encouraging people to adhere to health behavior practices to protect others, rather than themselves.

1.2. Current study

In the current study, we assessed the associations between social motives (prosocial motivation, gratitude) and COVID-19 health behavior adherence and psychological adjustment during the early stages (April 2020) of the COVID-19 pandemic in a nationally representative sample of individuals from the US. Building on prior studies of prosocial motivation for specific behaviors (e.g., vaccine intentions, paying taxes), we operationalize prosocial motivation for social distancing by assessing the extent to which participants' social distancing efforts are motivated by concern for others or themselves, as well as the extent to which they perceive their social distancing efforts as benefitting others (Betsch et al., 2013, 2017; Thornton et al., 2019; Wiwad and Aknin, 2017). Given the importance of a number of health behaviors to curb the proliferation of this virus, we used two assessments of behavioral adherence: self-reported frequency of several relevant health behaviors (e.g., hand washing, avoiding touching one's face) and

frequency of practicing social distancing. We also included positive well-being and distress as indicators of emotional adjustment in the current study, given evidence that these constructs are independent of one another (Keyes, 2002). Positive well-being has been operationalized as multidimensional, including feeling good (i.e., hedonic well-being) and functioning well (i.e., eudaimonic well-being; Ryan and Deci, 2001). We incorporate three measures of positive well-being (i.e., positive affect, meaning in life, thriving) to capture these dimensions. We also include two indicators of distress (i.e., psychological distress, negative affect) to demonstrate the robustness of our findings. Finally, we include a measure of behavioral adjustment (i.e., daily accomplishments) to evaluate daily functioning (e.g., showered, completed household chores) beyond self-reported emotional adjustment.

We hypothesized that social motives—namely, prosocial motivation and gratitude—would be associated with greater behavioral adherence and emotional adjustment to social distancing during the early stages of the COVID-19 pandemic. We examined prosocial motivation and gratitude in the same models to account for their associations with one another and to determine whether they are related to comparable or distinct outcomes. Finally, we included several psychological and demographic covariates in our models to evaluate the unique associations among gratitude and prosocial motivation and behavioral adherence and emotional adjustment. First, because social motives are associated with self-focused motivation and a general inclination towards being helpful (Crocker et al., 2017), we include self-focused motivation and general prosocial motivation as covariates to consider the distinction of social motives from these relevant constructs. Next, we include several demographic (i.e., age, gender, ethnicity, urbanicity, education, and socioeconomic status) and COVID-related (i.e., work arrangement, worries about COVID, stay-at-home order, and the likelihood of current or prior COVID diagnosis) variables that may be related to an individual's ability to follow public health recommendations and emotional adjustment.

2. Methods

2.1. Participants

A nationally representative sample of 1017 US adults was recruited online from PROLIFIC between April 24, 2020, and April 27, 2020. PROLIFIC is an online platform for recruiting participants for web-based research in the social sciences (Palan and Schitter, 2018; Peer et al., 2017). Researchers can recruit convenience samples using this platform, but PROLIFIC also includes a tool to recruit nationally representative samples by age, sex, and ethnicity, as we did in this study. Participants completed a 20-min online questionnaire. Following participation, participants were provided with a link to general and COVID-19 specific community services available to them and compensated (approximately $2.85) for their time. Participants ($n = 10$) who missed more than one attention check were excluded from analyses. After participant exclusion, our total sample size was 1007 participants (50.9% women, 48.1% men, 0.9% non-binary) ages 18–79 years (M age $= 44.73$, $SD = 16.24$). Most participants were married/cohabiting (48.0%), employed (52.5%), White (70.6% White, 14.1% African American, 6.7% Latinx, 7.2% Asian, 1.3% Other), were college graduates (39.8%), had an annual household income between $40,000 and $60,000 (18.2%), and lived in a suburb (40.8% suburb, 30.8% city, 14.5% small town, 13.9% rural). On average, participants reported slightly fewer than 3 people living their household (including themselves; $M = 2.60$, $SD = 1.41$). The overwhelming majority reported being under stay-at-home orders (91.4%) for at least 3 weeks (86.3%) at the time of the data collection.

Prior to data collection, we decided to recruit 1000 participants, which would provide >99 % power to detect medium effect sizes in regression models with 14 predictors. Several additional questionnaires were included to test separate hypotheses not reported here. For a full list of measures, see Supplementary Material.

2.2. Measures

2.2.1. Social motivation measures

Prosocial Motivation for Social Distancing. Prosocial motivation (Thornton et al., 2019) was measured using 5 items adapted from prior studies of prosocial motivation (see Supplementary Material; Thornton et al., 2019; Wiwad and Aknin, 2017). Items measured the extent to which participants' social distancing practices were driven by their concern about their friends, family and society (e.g., "To what extent are your social distancing practices driven by concern about your family and friends?" $0 = not\ at\ all,\ 100 = completely$), and have a positive impact on other's health (e.g., "To what extent do you think that your social distancing will have a positive impact on OTHERS' health?" $1 = not\ at\ all,\ 10 = extremely$). A mean score was created by adjusting response items to a 0–10 scale (using this equation: $[((X\text{-}X_{min}/X_{range})) \times 10]$) with higher scores indicating greater prosocial motivation for social distancing and low scores indicating little motivation for practicing social distancing for others' interests ($M = 8.07$, $SD = 1.76$). The scale demonstrated adequate internal consistency ($\alpha = .81$).

Gratitude. Gratitude was assessed with the 6-item Gratitude Scale (e.g., "Lately I notice I have much in life to be grateful for"; McCullough et al., 2002). Responses ranged from $1 = strongly\ disagree$ to $7 = strongly\ agree$. A mean score of the 6 items was created ($M = 5.02$, $SD = 1.23$). The scale demonstrated high internal consistency ($\alpha = .86$).

Self-Focused Motivation for Social Distancing. Self-focused motivation for social distancing was assessed with 2 items from Wiwad and Aknin (2017) and Thornton et al. (2019; see Supplementary Material). Participants were asked to rate the extent that their social distancing practices were driven by concern for themselves (responses ranged from $0 = not\ at\ all$ to $100 = completely$), and have a positive impact on their own health (response ranged from $1 = not\ all$ to $10 = extremely$). A mean score of the items was created by adjusting the first item to a 10-point scale (using this equation: $[((X\text{-}X_{min})/X_{range})) \times 10]$) and averaging the two items with higher scores indicating greater motivation to practice social distancing for one's own interest and low scores indicating low levels of self-focused motivation for social distancing ($M = 7.53$, $SD = 2.42$). The scale demonstrated moderate internal consistency ($\alpha = .71$).

General Prosocial Motivation. General prosocial motivation was assessed by a single question asking participants to rate the extent to which they agreed with the following statement, "In general, I am the kind of person who enjoys helping other people." Response items ranged from $1 = strongly\ disagree$ to $7 = strongly\ agree$. To facilitate comparison with the prosocial motivation for social distancing and self-focused motivation for social distancing, responses to this question were adjusted to a 10-point scale ($M = 8.10$, $SD = 1.93$) using this equation $[((X\text{-}X_{min})/X_{range})) \times 10]$.

2.2.2. Health behavior adherence and social distancing

Health Behavior Adherence. COVID-19 health behavior adherence was measured with 8 items assessing how often participants performed various health behaviors each day (e.g., "stay at home as much as possible," "wash your hands often"). Response options ranged from $1 = not\ at\ all$ to $5 = very\ often$, and the mean score of the items was generated such that higher scores indicated greater health behavior adherence ($M = 4.16$, $SD = 0.64$). The scale demonstrated adequate internal consistency ($\alpha = .74$).

Frequency of Practicing Social Distancing. Frequency of practicing social distancing was assessed by a single question: "To what extent are you practicing social distancing in your daily life?" Response items ranged from $1 = not\ at\ all$ to $5 = a\ great\ deal$ ($M = 4.56$, $SD = 0.77$).

2.2.3. Emotional adjustment

Positive and Negative Affect. The Positive and Negative Affect Schedule (Watson et al., 1988) captured the extent participants felt 15 positive (e.g. "caring''; "interested") and 15 negative (e.g. "upset";

"ashamed") emotions. Response ranged from scale 1 = *very slightly or not at all* to 5 = *extremely*. Mean scores for positive affect (*M* = 2.77, *SD* = 0.84) and negative affect (*M* = 2.07, *SD* = 0.83) were calculated. Both positive (α = .92) and negative (α = .91) affect demonstrated high internal consistency.

Meaning in Life. Participants completed the Daily Meaning Scale (e. g., "How meaningful do you feel your life has been in the past 2 weeks?"; Steger et al., 2008). Responses ranged from 1 = *not at all* to 7 = *very much*. A mean score of the 2 items was created (*M* = 4.38, *SD* = 1.73), which demonstrated high internal consistency (α = .98).

Brief Inventory of Thriving. To measure thriving, participants completed the 10-item Brief Inventory of Thriving Scale (Su et al., 2014). Participants were asked to rate their agreement with each statement (e.g., "I feel good most of the time") on a scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. A mean score of the 10 items was created (*M* = 3.56, *SD* = 0.78), with higher scores indicating greater levels of thriving. The scale demonstrated high internal consistency (α = .92).

Psychological Distress. To examine psychological distress 10 items were adapted from pre-existing measures of distress, depression, and anxiety, such as the General Health Questionnaire (Goldberg and Blackwell, 1970). Participants were asked to rate their experience of 10 symptoms or behaviors (e.g. "felt constantly under strain"; "been thinking of yourself as a worthless person") over the past two weeks. Responses ranged from 1 = *very slightly or not all* to 5 = *extremely*. A mean score was calculated with higher scores indicating greater psychological distress (*M* = 1.71, *SD* = 1.00). The scale demonstrated high internal consistency (α = .89).

Daily Accomplishments. Daily accomplishments were assessed with 23 items rated on a five-point scale (1 = *never*, 5 = *every day*; 6 = *not applicable or did not do before COVID*) assessing daily behaviors (e.g., "carried out your normal daily household routines [e.g., cleaning, trash]", "accomplished what you set out to do for the day") over the past two weeks. After excluding items marked as not applicable, we created four subscales based on conceptual groupings: hygiene (e.g., "bathed/showered"; α = .70), appearance (e.g., "brushed/styled hair"; α = .69), functioning (e.g., "carried out your normal work/school routine"; α = .68), and physical activity (e.g., "exercised"; α = .70), as well as an overall composite of all items (*M* = 3.53, *SD* = 0.59; α = .62) with higher scores indicated more daily accomplishments. Preliminary analyses revealed that our results were consistent across the four subscales and the overall composite for daily accomplishments. We present the results for the overall composite here and the subscales in the Supplementary Material.

2.2.4. COVID-19 measures

Work Arrangement. Work arrangement was assessed with a single question, "Are you currently working remotely or still going into your work/school place?" Response options included 1 = *remote* or 2 = *going into the workplace*. A plurality of the sample (48.1%) indicated that they were working remotely, and 13.4% were going into work or school. The remaining participants with missing data on this item indicated that they were unemployed, unemployed due to COVID-19, or retired when asked about employment status; thus, we recoded those individuals as "not working" for this variable (38.5%).

Worries about COVID-19. Worries about COVID-19 were assessed with 7 items, including 5 items from the Perceived Coronavirus Threat Questionnaire (e.g., "I am afraid of the coronavirus (COVID-19)"; Conway, Woodard and Zubrod, 2020), and two additional questions (i.e., "How worried are you about catching COVID-19?" and "How likely do you believe you are to get COVID-19?"). Responses ranged from 1 = *not true of me at all* to 7 = *very true of me* and a total COVID-19 worry score was created by averaging scores (*M* = 4.27, *SD* = 1.47) from the individual items. The scale demonstrated a high internal consistency (α = .91).

Stay at Home Order. In March–May 2020, many states in the US issued mandatory stay-at-home orders requesting all residents to stay home to limit community spread of COVID-19. Stay at home order was assessed with a single question, "Are you currently under stay at home order in your city/state?" Response items consisted of 1 = *yes*, 2 = *no*, and 3 = *don't know*. The majority of participants reported that they were under a stay-at-home order (91.4%), and 6.4% reported that they were not under a stay-at-home order.

COVID- 19 Likelihood. COVID- 19 likelihood was measured by asking "What is the likelihood that you think you have (or have had) coronavirus?" Responses ranged from 0 to 100% chance (*M* = 19.04, *SD* = 24.12).

2.3. Preliminary analyses and analytic approach

Preliminary analyses revealed that prosocial motivation and gratitude for social distancing were positively correlated with one another, and they were both positively correlated with indicators of health behavior adherence and emotional adjustment (see Table S1 in the online supplements for correlations). To evaluate our hypotheses regarding the unique associations among prosocial motivation for social distancing, gratitude, and health behavior adherence and emotional adjustment, we conducted hierarchical linear regression analyses, including gratitude and prosocial motivation for social distancing in Step 1, adding psychological covariates (self-focused motivation for social distancing, general prosocial motivation) in Step 2, and sociodemographic and COVID-19 covariates in Step 3.

Fifty-three cases (5.2%) were missing data on at least one of our variables of interest. Participants with missing data reported greater worries about COVID, health behavior adherence, social distancing adherence, prosocial motivation for social distancing, and self-focused motivation for social distancing, *t*s > 2.66, *p*s < .05. Missingness was unrelated to other demographics or variables of interest. We used multiple imputation to account for missing data with 10 imputed datasets, each with *N* = 1007. All variables within our conceptual framework were included in the imputation procedure. This technique provided pooled regression estimates calculated from the estimates for each of the ten imputed datasets. Results using multiple imputation were comparable to those using the original data (see Supplementary Material for original results). Finally, tests to determine if these data met the assumption of collinearity indicated that multicollinearity was not a concern, Tolerance = .37 to .98, VIF = 1.02 to 2.64.

3. Results

3.1. Prosocial motivation, gratitude, and health behavior adherence and social distancing

Hierarchical linear regression analysis demonstrated that after including both prosocial motivation for social distancing and gratitude (Step 1), prosocial motivation for social distancing, but not gratitude, was related to health behavior adherence, *b* = 0.20, *p* < .001, and frequency of practicing social distancing, *b* = 0.23, *p* < .001. Furthermore, when all study variables (prosocial motivation for social distancing, gratitude, self-focused motivation for social distancing, general prosocial motivation, sociodemographics, COVID measures) were included in Step 3, the relationship between prosocial motivation for social distancing and health behavior adherence, *b* = 0.14, *p* < .001, and frequency of practicing social distancing, *b* = 0.21, *p* < .001, remained significant, and gratitude was associated with greater health behavior adherence, *b* = 0.04, *p* = .01 (see Table 1).

3.2. Prosocial motivation, gratitude, and emotional adjustment

After adjusting for gratitude, prosocial motivation was associated with fewer daily accomplishments, *b* = −0.04, *p* = .001, greater psychological distress, *b* = 0.11, *p* < .001, and greater negative affect, *b* =

Table 1

Hierarchical linear regressions predicting health behavior adherence and social distancing practice.

	HB Adherence		Social Distancing Practice	
	b [95 % CI]	*p*	*b* [95 % CI]	*p*
Step 1				
Prosocial Motivation for SD	0.20 [0.18, 0.22]	<.001	0.23 [0.21, 0.26]	<.001
Gratitude	0.03 [0.01, 0.06]	.02	-0.03 [-0.06, 0.003]	.08
Step 2				
Prosocial Motivation for SD	0.17 [0.15, 0.19]	<.001	0.23 [0.20, 0.26]	<.001
Gratitude	0.02 [-0.01, 0.05]	.15	-0.02 [-0.05, 0.02]	.28
Self-Motivation	0.03 [0.01, 0.05]	.0002	0.02 [-0.0005, 0.04]	.055
Gen Prosocial Motivation	0.03 [0.01, 0.05]	.003	-0.02 [-0.05, −0.004]	.02
Step 3				
Prosocial Motivation for SD	0.14 [0.11, 0.16]	<.001	0.21 [0.17, 0.24]	<.001
Gratitude	0.04 [0.01, 0.07]	.01	-0.004 [-0.04, 0.03]	.82
Self-Motivation	0.01 [-0.01, 0.03]	.15	0.001 [-0.02, 0.03]	.96
Gen Prosocial Motivation	0.03 [0.01, 0.04]	.007	-0.03 [-0.06, −0.008]	.01
Age	-0.001 [-0.003, 0.001]	.49	0.001 [-0.002, 0.004]	.47
Gender				
Women	0.02 [-0.04, 0.09]	.50	0.04 [-0.05, 0.12]	.37
Non-binary	0.18 [-0.14, 0.49]	.28	0.33 [-0.08, 0.74]	.11
Ethnicity				
Black/African American	-0.03 [-0.12, 0.07]	.58	-0.04 [-0.16, 0.08]	.53
Latinx	-0.04 [-0.17, 0.09]	.54	0.04 [-0.13, 0.21]	.61
Asian American	-0.05 [-0.18, 0.07]	.42	-0.004 [-0.17, 0.16]	.97
Other	0.17 [-0.10, 0.43]	.23	-0.03 [-0.37, 0.32]	.87
Urbanicity				
Small Town	-0.06 [-0.16, 0.04]	.22	-0.15 [-0.28, 0.02]	.02
Suburb	-0.04 [-0.12, 0.04]	.30	-0.05 [-0.15, 0.05]	.34
Rural	-0.02 [-0.12, 0.09]	.77	0.01 [-0.13, 0.14]	.93
Education	0.0004 [-0.04, 0.04]	.98	0.06 [0.01, 0.10]	.02
Household Income	-0.0004 [-0.02, 0.02]	.96	0.001 [-0.02, 0.02]	.91
Work Arrangement				
Working Remotely	-0.07 [-0.16, 0.03]	.20	0.17 [0.05, 0.30]	.007
Not working	-0.10 [-0.20, 0.003]	.06	0.24 [0.11, 0.37]	<.001
Worries about COVID	0.10 [0.08, 0.13]	<.001	0.07 [0.03, 0.10]	<.001
Stay-Home Order	0.16 [0.03, 0.29]	.02	0.34 [0.17, 0.51]	<.001
COVID Likelihood	-0.00001 [-0.001, 0.001]	.98	-0.002 [-0.004, −0.0005]	.01

Note. HB=Health Behavior, SD=Social Distancing. Prosocial Motivation for SD, Gratitude, Self-Motivation, General Prosocial Motivation, Age, COVID worries, and COVID likelihood were mean-centered. Education and Household Income were centered on modal responses (college education and $20,000-$40,000, respectively). A set of variables controlled in Model 3 include gender (female, non-binary, male as reference group), race (Black/African American, Latinx, Asian American, and Other, with White as the reference group), urbanicity (small town, suburb, and rural, with city as the reference group), work arrangements (working remotely, not working, with going into work/school as the reference group).

0.11, $p < .001$ in Step 1. Conversely, gratitude was associated with improved adjustment on all outcomes, $|bs| > 0.15$, $ps < .001$ after adjusting for prosocial motivation in Step 1. Furthermore, the associations between gratitude and adjustment outcomes remained significant after all study variables were included in the model in Step 3, whereas the associations between prosocial motivation and adjustment outcomes were no longer significant (see Tables 2 and 3).

4. Discussion

For the majority of the pandemic, the US has been the epicenter in the world with high levels of infections and deaths (Dong et al., 2020). Therefore, it is critical to understand how social motives can positively contribute to COVID-19 health behavior adherence as well as emotional adjustment. In a US nationally representative sample during the initial response to the COVID-19 pandemic, we found that prosocial motivation related to higher levels of health behavior adherence and more frequent practicing of social distancing but was not related to emotional adjustment outcomes. By contrast, gratitude was related to all emotional adjustment outcomes, but not to health behavior and social distancing adherence. Specifically, those who reported higher levels of gratitude were able to accomplish more in daily life, reported higher levels of meaning in life, thrived more, showed less psychological distress, more positive affect, and lower levels of negative affect. Importantly, these results were consistent above and beyond significant controls, such as

psychological, demographic, COVID-19 specific covariates.

As hypothesized, prosocial motivation was related to greater health behavior adherence, which is in line with previous experimental studies investigating vaccine intentions (Betsch et al., 2013, 2017). These results indicate that a general desire to benefit the health and well-being of others is a strong correlate of COVID-19 adherence behaviors. Alternatively, given the cross-sectional design, improved health behavior adherence may have promoted prosocial motivation. Future longitudinal studies could disentangle the direction of these findings. Additional research could also consider whether the relationship between prosocial motives and adherence behaviors may stem from an increased salience of COVID-19 that may affect risk perceptions and a sense of responsibility. For example, most people display an optimistic bias, which minimizes personal risk perceptions and leads people to believe they are not likely to develop illnesses, such as COVID-19 (Weinstein, 1987). As a result of this optimistic bias for personal risk, people are less likely to engage in behaviors to maintain their own health (Weinstein, 1987). Considering the benefits of personal actions for others' health may combat the optimistic bias and elicit increased risk perceptions that lead to altruistic health adherence behaviors.

Surprisingly, prosocial motives were not related to emotional adjustment, which is in contrast to previous studies (Aknin et al., 2013; Nelson et al., 2016). Given the cross-sectional design of the study and the unique parameters surrounding COVID-19, these results bear replication. One possible explanation for these findings were the positive

Table 2
Hierarchical linear regressions predicting daily accomplishments, meaning in life, thriving.

	Daily Accomplishments		Meaning in Life		Thriving	
	b [95 % CI]	p	b [95 % CI]	p	b [95 % CI]	p
Step 1						
Prosocial Motivation for SD	-0.04 [-0.06, -0.02]	.001	0.01 [-0.05, 0.06]	.83	0.001 [-0.02, 0.02]	.96
Gratitude	0.15 [0.12, 0.18]	<.001	0.85 [0.78, 0.93]	<.001	0.43 [0.40, 0.46]	<.001
Step 2						
Prosocial Motivation for SD	-0.04 [-0.07, -0.01]	.003	-0.05 [-0.11, -0.02]	.14	-0.03 [-0.05, -0.0004]	.054
Gratitude	0.15 [0.12, 0.18]	<.001	0.84 [0.77, 0.92]	<.001	0.41 [0.38, 0.44]	<.001
Self-Motivation	0.004 [-0.01, 0.02]	.68	0.06 [0.01, 0.10]	.01	0.02 [-0.001, 0.03]	.07
Gen Prosocial Motivation	-0.0002 [-0.02, 0.02]	.98	0.03 [-0.02, 0.08]	.22	0.04 [0.02, 0.06]	<.001
Step 3						
Prosocial Motivation for SD	-0.01 [-0.03, 0.02]	.70	0.01 [-0.06, 0.08]	.76	-0.0002 [-0.03, 0.03]	.99
Gratitude	0.13 [0.10, 0.15]	<.001	0.79 [0.72, 0.87]	<.001	0.39 [0.36, 0.42]	<.001
Self-Motivation	0.004 [-0.01, 0.02]	.68	0.06 [0.01, 0.10]	.02	0.04 [0.02, 0.06]	<.001
Gen Prosocial Motivation	0.001 [-0.02, 0.02]	.93	0.04 [-0.01, 0.09]	.13	0.05 [0.03, 0.07]	<.001
Age	0.01 [0.008, 0.01]	<.001	0.02 [0.01, 0.02]	<.001	0.002 [-0.001, 0.004]	.15
Gender						
Women	-0.12 [-0.18, -0.05]	<.001	-0.32 [-0.49, -0.15]	<.001	-0.17 [-0.24, -0.10]	<.001
Non-binary	0.19 [-0.13, 0.51]	.24	-0.07 [-0.91, 0.76]	.86	-0.25 [-0.60, 0.10]	.15
Ethnicity						
Black/African American	-0.19 [-0.28, -0.09]	<.001	0.09 [-0.17, 0.34]	.50	-0.04 [-0.15, 0.06]	.40
Latinx	-0.15 [-0.28, -0.01]	.03	-0.08 [-0.42, 0.27]	.66	-0.12 [-0.26, 0.02]	.09
Asian American	-0.14 [-0.26, -0.01]	.03	-0.09 [-0.42, 0.25]	.61	0.13 [-0.01, 0.27]	.07
Other	0.05 [-0.22, 0.32]	.73	1.05 [0.35, 1.76]	.003	-0.04 [-0.33, 0.25]	.81
Urbanicity						
Small Town	0.003 [-0.10, 0.10]	.96	0.03 [-0.23, 0.30]	.80	-0.01 [-0.12, 0.10]	.92
Suburb	0.06 [-0.01, 0.14]	.10	-0.06 [-0.26, 0.14]	.57	-0.06 [-0.15, 0.02]	.13
Rural	0.06 [-0.05, 0.16]	.31	-0.07 [-0.35, 0.20]	.60	-0.06 [-0.18, 0.05]	.28
Education	0.07 [0.03, 0.10]	<.001	0.003 [-0.09, 0.10]	.95	0.02 [-0.03, 0.05]	.46
Household Income	0.03 [0.02, 0.05]	<.001	0.01 [-0.03, 0.06]	.55	0.04 [0.02, 0.06]	<.001
Work Arrangement						
Working Remotely	-0.17 [-0.27, -0.07]	.001	-0.30 [-0.56, -0.04]	.03	-0.12 [-0.23, -0.01]	.03
Not working	-0.18 [-0.29, -0.08]	<.001	-0.39 [-0.66, -0.12]	.01	-0.22 [-0.34, −0.11]	<.001
Worries about COVID	-0.06 [-0.09, -0.04]	<.001	-0.10 [-0.17, -0.03]	.01	−0.09 [-0.12, -0.06]	<.001
Stay-Home Order	-0.002 [-0.13, 0.13]	.97	-0.12 [-0.46, 0.22]	.48	-0.10 [-0.24, 0.05]	.18
COVID Likelihood	-0.001 [-0.003, 0.000]	.04	-0.003 [-0.006, 0.001]	.17	-0.0001 [-0.002, 0.001]	.92

Note. HB=Health Behavior, SD=Social Distancing. Prosocial Motivation for SD, Gratitude, Self-Motivation, General Prosocial Motivation, Age, COVID worries, and COVID likelihood were mean-centered. Education and Household Income were centered on modal responses (college education and $20,000-$40,000, respectively). A set of variables controlled in Model 3 include gender (female, non-binary, male as reference group), race (Black/African American, Latinx, Asian American, and Other, with White as the reference group), urbanicity (small town, suburb, and rural, with city as the reference group), work arrangements (working remotely, not working, with going into work/school as the reference group).

associations among prosocial motivation, gratitude, and emotional adjustment. Notably, gratitude and prosocial motivation were correlated with one another in the current study ($r = 0.30$); however, previous research rarely included both prosocial motivation and gratitude in a single study. Alternatively, better emotional adjustment may make it easier to be grateful, reflecting a reverse causal direction. Positive emotions broaden people's perspectives and promote advantageous behaviors (Fredrickson, 2013; Lyubomirsky et al., 2005), which may have contributed to the pattern of findings presented here. Future longitudinal studies could tease apart the directionality of these associations.

That said, these findings not only improve understanding of current responses to the COVID-19 pandemic in the US, but also contribute to the growing body of research on prosocial behavior and gratitude (Aknin et al., 2013; Algoe, 2012; Armenta et al., 2017). Future longitudinal studies could investigate the possibility that prosocial motives and gratitude reciprocally contribute to improvements in both health behavior adherence and emotional adjustment. For example, people experience gratitude when they benefit from prosocial behaviors of others, which then triggers a cycle of prosocial behaviors and feelings of gratitude (Armenta et al., 2017; Layous, Nelson, et al., 2017). Over time, these positive-other-person oriented motives and states might contribute to COVID-19 health behavior adherence and emotional adjustment. Indeed, prior studies have demonstrated that positive emotions mediate the link between prosocial behavior and

psychological flourishing (Nelson et al., 2016), but studies on health adherence are lacking. Additionally, although only a covariate in the current study, self-focused motivation for social distancing was associated with improved emotional adjustment, but not adherence, in final models and should be investigated further.

The finding that gratitude is related to emotional adjustment is equally important in the fight against the spread of COVID-19. Mental health is significantly challenged during this pandemic (Centers for Disease Control and Prevention & National Center for Health Statistics, 2020; Zheng et al., 2021), and previous studies showed that health adherence is compromised in those who struggle with mental health (DiMatteo et al., 2000). The current results are in line with previous studies that showed that expressing gratitude increases positive emotions, thoughts, behaviors, and psychological need satisfaction (Lyubomirsky and Layous, 2013). One possibility of the strong positive association between gratitude and emotional adjustment is that gratitude promotes our basic human need to belong and affiliate (Baumeister and Leary, 1995). According to the find-remind-and-bind theory, gratitude strengthens relationships by creating mutually positive and rewarding connections (Algoe, 2012; Algoe et al., 2008). Thus, gratitude may be linked with improved emotional adjustment in the current study, in part by enhancing social connectedness, even in times that require that we socially distance.

Table 3
Hierarchical regressions predicting psychological distress, positive affect, and negative affect.

	Psychological distress		Positive affect		Negative affect	
	b [95 % CI]	p	b [95 % CI]	p	b [95 % CI]	p
Step 1						
Prosocial Motivation for SD	0.11 [0.08, 0.15]	<.001	-0.02 [-0.05, 0.004]	.10	0.11 [0.08, 0.14]	<.001
Gratitude	-0.38 [-0.42, -0.33]	<.001	0.39 [0.35, 0.42]	<.001	-0.24 [-0.28, -0.20]	<.001
Step 2						
Prosocial Motivation for SD	0.12 [0.08, 0.16]	<.001	-0.06 [-0.09, -0.02]	.001	0.11 [0.07, 0.14]	<.001
Gratitude	-0.40 [-0.45, -0.36]	<.001	0.38 [0.34, 0.41]	<.001	-0.25 [-0.30, -0.21]	<.001
Self-Motivation	-0.04 [-0.07, -0.02]	<.001	0.03 [0.01, 0.06]	.002	-0.02 [-0.04, 0.01]	.12
Gen Prosocial Motivation	0.06 [0.03, 0.09]	.003	0.03 [-0.0001, 0.06]	.051	0.04 [0.01, 0.07]	.01
Step 3						
Prosocial Motivation for SD	0.03 [-0.01, 0.06]	.21	-0.02 [-0.05, 0.01]	.21	0.0003 [-0.03, 0.03]	.99
Gratitude	-0.33 [-0.37, -0.28]	<.001	0.35 [0.31, 0.38]	<.001	-0.18 [-0.22, -0.15]	<.001
Self-Motivation	-0.08 [-0.11, -0.06]	<.001	0.04 [0.02, 0.07]	<.001	-0.07 [-0.09, -0.04]	<.001
Gen Prosocial Motivation	0.05 [0.02, 0.08]	.001	0.03 [0.01, 0.06]	.01	0.03 [0.01, 0.06]	.01
Age	-0.02 [-0.02, -0.01]	<.001	0.009 [0.006, 0.01]	<.001	-0.01 [-0.02, -0.01]	<.001
Gender						
Women	0.23 [0.13, 0.33]	<.001	-0.23 [-0.31, -0.13]	<.001	0.09 [0.01, 0.17]	.03
Non-binary	-0.17 [-0.65, 0.32]	.50	-0.19 [-0.61, 0.23]	.37	−0.12 [-0.52, 0.28]	.55
Ethnicity						
Black/African American	-0.03 [-0.17, 0.12]	.74	-0.005 [-0.13, 0.12]	.94	0.06 [-0.06, 0.18]	.34
Latinx	0.003 [-0.20, 0.20]	.98	0.03 [-0.14, 0.20]	.75	0.01 [-0.15, 0.18]	.90
Asian American	-0.18 [-0.37, 0.02]	.07	0.07 [-0.10, 0.23]	.43	-0.09 [-0.25, 0.07]	.28
Other	0.22 [-0.19, 0.63]	.30	0.19 [-0.16, 0.54]	.29	0.14 [-0.19, 0.48]	.41
Urbanicity						
Small Town	-0.04 [-0.19, 0.12]	.66	-0.05 [-0.19, 0.08]	.43	-0.08 [-0.21, 0.05]	.22
Suburb	0.05 [-0.07, 0.17]	.39	-0.09 [-0.19, 0.01]	.08	-0.009 [-0.10, 0.09]	.86
Rural	0.08 [-0.08, 0.24]	.30	-0.01 [-0.15, 0.13]	.86	0.03 [-0.10, 0.16]	.66
Education	0.01 [-0.04, 0.07]	.63	0.002 [-0.05, 0.05]	.94	0.02 [-0.03, 0.07]	.40
Household Income	-0.04 [-0.07, -0.01]	.003	0.03 [0.006, 0.05]	.01	-0.02 [-0.04, 0.01]	.19
Work Arrangement						
Working Remotely	0.32 [0.17, 0.46]	<.001	-0.15 [-0.28, -0.02]	.03	0.08 [-0.04, 0.21]	.19
Not working	0.31 [0.16, 0.47]	<.001	-0.21 [-0.34, -0.07]	.003	0.11 [-0.02, 0.24]	.10
Worries about COVID	0.28 [0.24, 0.32]	<.001	-0.09 [-0.12, -0.05]	<.001	0.31 [0.28, 0.34]	<.001
Stay-Home Order	-0.03 [-0.22, 0.17]	.81	-0.05 [-0.21, 0.13]	.61	0.03 [-0.13, 0.20]	.68
COVID Likelihood	0.002 [-0.0005, 0.004]	.13	0.001 [-0.0003, 0.003]	.11	0.001 [-0.001, 0.003]	.18

Note. HB=Health Behavior, SD=Social Distancing. Prosocial Motivation for SD, Gratitude, Self-Motivation, General Prosocial Motivation, Age, COVID worries, and COVID likelihood were mean-centered. Education and Household Income were centered on modal responses (college education and $20,000-$40,000, respectively). A set of variables controlled in Model 3 include gender (female, non-binary, male as reference group), race (Black/African American, Latinx, Asian American, and Other, with White as the reference group), urbanicity (small town, suburb, and rural, with city as the reference group), work arrangements (working remotely, not working, with going into work/school as the reference group).

4.1. Strengths and limitations

The current study has several strengths, such as the large nationally representative sample and the timing of the data collection, which was within approximately six weeks after the WHO declared a pandemic. Because of the large sample size, this study was well powered to uniquely investigate the covariation between prosocial motives and gratitude alongside several potential covariates.

Despite these strengths, the results should be interpreted in light of its limitations. First, the correlational nature of this study prohibits any causal conclusions between prosocial motives, gratitude, health adherence behaviors, and emotional adjustment. Although our findings are consistent with prior experiments indicating the prosocial motivation improves vaccine adherence (Betsch et al., 2013, 2017) and that gratitude improves emotional well-being (Dickens, 2017), better health adherence behaviors and emotional adjustment could have led to more prosocial motivations and gratitude in the current study. We were also unable to investigate the possibility that prosocial motives and gratitude reciprocally contribute to improvements in both health behavior adherence and emotional adjustment. Longitudinal or experimental studies would be helpful to disentangle the causal roles of prosocial motives and gratitude.

Second, similarities in item wording across measures of gratitude and emotional adjustment, and measures of prosocial motivation and health behavior adherence, may have contributed to our distinct findings for gratitude and prosocial motivation. Specifically, gratitude may have correlated more strongly with emotional adjustment due to similarities in item wording across these measures, which were both general in nature and were not COVID-19 specific. To consider whether the emotional benefits of gratitude extend to measures tapping specific emotional responses to COVID-19, we conducted supplementary analyses considering the links among prosocial motivation, gratitude, and worries about COVID-19 (see Supplementary Material). In final models including all covariates, prosocial motivation for social distancing was associated with greater worries about COVID-19 (b = 0.07, p = .001), whereas gratitude correlated with fewer worries about COVID-19 (b = -0.08, p = .02). These analyses underscore the unique association between gratitude and emotional adjustment and suggests that our pattern of findings may not be due to similarities in item wording.

Third, although we included several potential third variables as covariates in our model, future research could explore the role of other factors, such as personality or pre-existing mental or physical health conditions. Fourth, given the variety of behaviors included, our measure of daily accomplishments demonstrated limited reliability. Fifth, given the quickly-changing nature of the COVID-19 pandemic, health behavior adherence to social distancing was assessed via self-reports to best capture early responses to the pandemic before people adapted or changed their behaviors. Although several studies have relied on self-reported health behaviors, objective measurement of health adherence behaviors would have been preferable, which are less susceptible to response biases (Contzen et al., 2015).

5. Conclusions

In conclusion, the current study found that prosocial motivation was robustly linked to health behavior adherence and social distancing practice, whereas gratitude was more strongly associated with emotional adjustment. These results concerning prosocial motivations underscore the importance of emphasizing community benefits when communicating with the public about COVID-19 health behaviors. This approach might be a more effective prevention strategy than the currently individualistic approach (O'Rourke, 2020; Thomas, 2020) to promote mask-wearing and social distancing. Appealing to people's social motives may be a more effective strategy to promote these public health behaviors. Moreover, encouraging people to practice gratitude may be a beneficial strategy to help them cope with the emotional consequences of social distancing, which may, in turn, increase prosocial motivations and thus increase health behavior adherence.

COVID-19 is anticipated to affect the world population for some time, at least until vaccines are made widely available around the globe. Our study is among the first to provide insight into how prosocial motivation and gratitude may aid in the prevention of the spread of COVID-19. We hope that the current results will impact public health policies to promote COVID-19 health adherence behaviors.

Credit author statement

S. Katherine Nelson-Coffey Conceptualization, Methodology, Writing – Original Draft, Writing – Review & Editing, Supervision. **Mary M. O'Brien** Formal Analysis, Investigation, Data Curation, Writing – Original Draft, Project Administration. **Bailey M. Braunstein** Formal Analysis, Investigation, Data Curation, Writing – Original Draft, Project Administration. **Kristin D. Mickelson** Conceptualization, Methodology, Formal Analysis, Writing – Review & Editing, Supervision. **Thao Ha** Conceptualization, Writing – Original Draft, Writing – Review & Editing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2021.114243.

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