
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Research Paper

# The role of equanimity in mediating the relationship between psychological distress and social isolation during COVID-19

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ABSTRACT

*Background:* Social isolation and the impact on mental health is a major concern during COVID-19. Trait equanimity is expected to protect individuals from psychological distress associated with social isolation. The aim of this study is to examine the link between social isolation and psychological distress via the mediator equanimity. It was hypothesised that objective (few social contacts) and perceived social isolation (loneliness) would predict psychological distress and that equanimity would mediate these relationships.

*Methods:* Five hundred and seventy-eight adult United States participants were recruited and completed measures of objective social isolation and perceived social isolation (De Jong Gierveld Social Isolation scale), trait equanimity (Phenomenological Experience of Meditative Equanimity Scale), and psychological distress (Depression, Anxiety, and Stress Scale, Short Form, DASS-21).

*Results:* Objective social isolation negatively predicted psychological distress, but equanimity did not mediate this relationship. Perceived social isolation positively predicted psychological distress and equanimity mediated this relationship.

*Limitations:* This study is limited by its cross-sectional and self-report design and by a United States sample, which may affect the generalisability of findings.

*Conclusions:* Rather than a lack of social contact it is the "perceived" nature of isolation that is related to psychological distress and this relationship indirectly operates through trait equanimity. Individuals high in trait equanimity may be better protected from the impact of perceived social isolation. Clinical interventions can be adapted to include equanimity skills to mitigate perceived social isolation for individuals and reduce adverse outcomes.

The coronavirus disease (COVID-19) is a rapidly evolving scenario that has led to global social distancing measures to contain the spread of viral contagion. Pandemic-related social distancing measures have been largely successful in protecting physical health (Hellewell et al., 2020) yet, the long-term impact on mental health is anticipated to be largely negative (Holmes et al., 2020). Fear can be a normal and adaptive response when facing an outbreak of a highly contagious virus, but psychological distress can be exacerbated in response to restricted social contact (Brooks et al., 2020). Objective and perceived social isolation or loneliness are both robustly associated with psychological distress (Luo et al., 2012; Menec et al., 2020). While social support is an established protective factor for psychological wellbeing (Cruwys et al., 2013), current social distancing measures can mean a lack of access to these networks for many. Thus, restricted access to social networks during the COVID-19 increases the risk of stress, anxiety, and depression symptoms in the general population.

Psychological distress is being reported globally in response to pandemic-related social distancing measures. Government mandated social distancing measures are typically defined in terms of objective characteristics (number of social contacts), while subjective or "perceived" isolation, is defined as a painful feeling of being alone (Cacioppo and Cacioppo, 2014). Literature shows when individuals experience a combination of objective and perceived social isolation this is related to higher levels of psychological distress compared to those who were either isolated or lonely (Menec et al., 2020). Early research collected during COVID-19 supports previous empirical evidence that adults isolating were reporting moderate to severe anxiety levels, which dominated thoughts and impaired normal functioning (Qiu et al., 2020). Further research is needed to evaluate psychological distress in response to social distancing measures as the current pandemic continues to

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impact lives on a global scale.

Psychological distress in general populations may stabilise overtime as individuals adapt to pandemic-related measures. Literature from the current and previous pandemics observed patterns in psychological distress in the general population stabilise after several months or post-pandemic (Brooks et al., 2020; Chua et al., 2004). During the Middle East Respiratory Syndrome (MERS) outbreak in South Korea, a study found 7.6% of individuals who were isolating reported Generalised Anxiety Symptoms (GAD) whilst in isolation, which then dropped to a relatively normal population level of 3% six months post-isolation (Jeong et al., 2016). Comparably, longitudinal research during COVID-19 found moderate to high depression and anxiety symptoms declined to relatively normal population levels over a four-month period (Shelvin, 2021). In contrast, psychological distress remained high for those who were lonely or had a history of mental illness (Bu et al., 2020; Jeong et al., 2016). One reason for this may be the increased difficulty in accessing professional mental health support during a pandemic (Whaibeh et al., 2020). Heterogeneity in patterns of psychological distress in the empirical evidence indicates while most individuals adapt to brief periods of social isolation overtime, vulnerable groups continue to face challenges. It is therefore necessary to identify possible protective factors for mental health during longer periods of social isolation both for the general population and vulnerable groups.

A variety of strategies have been found to attenuate psychological distress, such as mindfulness. Mindfulness is a broad term used to describe both a trait that varies in levels across individuals and a state that can be enhanced with practice (Sovereign and Walker, 2021; Spijkerman et al., 2016). A leading definition of mindfulness within psychological literature is a mental state or trait where full attention is given to an experience in the present moment and without judgment (Kabat-Zinn, 2003). There has been considerable empirical support for the association between both state and trait mindfulness and improved wellbeing in both clinical and non-clinical populations (Basso et al., 2019; Dolatyar and Walker, 2020; McKay and Walker, 2021). A systematic review of the benefits of Mindfulness-Based Interventions (MBIs) found moderate effects on improved anxiety and depression as well as small effects on stress across 47 randomised controlled trials (Goyal et al., 2014). While reported psychological benefits have been small to moderate to date (Van Dam et al., 2018), even a mild to moderate distress reduction can be efficacious for people facing acute stress that may lead to the detriment of daily functioning.

Despite the evidence on the benefits of mindfulness for psychological wellbeing, issues in the literature exist regarding the conceptualisation and measurement of mindfulness. A vast number of studies in western mindfulness literature have based measures on the broad definition by Kabat-Zinn (2003), while historical mediation teachings theorise that there are several complementary yet distinct components to being mindful (Fernandez and Walker, 2021; Zeng et al., 2015). For example, equanimity – an open and receptive towards all experiences - is considered a vital outcome of meditative practice in Buddhist contemplative traditions (Desbordes et al., 2015; Hosemans, 2017). Where equanimity has been empirically measured as a discrete outcome of mindfulness practice it was related to improved emotional reactivity and reduced stress (Juneau et al., 2020). For example, Lindsay et al. (2019) found a brief combined equanmity and awarenss intervention decreased objective and perceived social isolation levels in stressed adults. Findings are consistent with other research where taught equanimity and insight (change in awareness) skills were connected in effecting beneficial outcomes in mindful practice (Shoham et al., 2018). However, as equanimity skills were taught alongside other mindfulness skills (awareness) in both studies and is frequently conflated with similar yet distinct constructs, such as acceptance (Lindsay et al., 2019), further research is required to isolate the discrete benefits of equanimity. Overall, empirical evidence suggests equanimity is a psychological skill that is related to psychological wellbeing and may offer a protective factor in times of stress.

Given the inconsistencies in definitions and measurement of equanimity within the mindfulness literature, it is necessary to measure trait equanimity as a distinct construct associated with social isolation and psychological distress (Juneau et al., 2020). It is anticipated that trait equanimity can explain individual differences in response to social isolation, specifically that it can provide individuals with a protective factor for wellbeing. The findings can inform and refine population-level mindfulness interventions to increase state-based equanimity skills as a protective factor for the public in times of social isolation, particularly when facing future pandemics.

Therefore, the aim of this study was to explore the relationship between social isolation and psychological distress during the COVID-19 and whether trait equanimity mediated these relationships. Hypothesis 1 was objective social isolation during COVID-19 will positively predict psychological distress. Hypothesis 2 was perceived social isolation during COVID-19 will positively predict psychological distress. Hypothesis 3 was objective social isolation during COVID-19 will positively predict psychological distress mediated by equanimity. Finally, Hypothesis 4 was perceived social isolation during COVID-19 will positively predict psychological distress. Psychological distress contains the facets of depression, anxiety and stress and therefore will be examined at both the domain-level and facet-level. The study will control for age, gender and education as these variables have relations with the main analysis variables.

## 1. Method

### 1.1. Participants

Participants were recruited using Prime Panels from Cloud Research, an online research panel, and were required to be 18 years or over, proficient in the English language, and from the United States. Participants were 578 adults (59.5% female, 40.5% male), aged between 18 and 79 years ($M_{age}$ = 39.22, $SD_{age}$ = 14.27). Most participants were white Caucasian (72%) or African American (11.2%) and typically resided with 1–4 people. Participant education was undergraduate degree (35.6%), some tertiary study (16.4%), vocational training (4.5%), high school (16.8%), postgraduate degree (23.3%), and less than high school (3.3%). An a priori power analysis using G*Power (Faul, 2007) with two predictors suggested 168 participants were required to determine a medium effect size at the corrected alpha of 0.003 (assessed through dividing .05 by the 16 analyses). This analysis suggests the sample size of 578 possessed sufficient power.

### 1.2. Measures

The study included four scales: equanimity, psychological distress, and two measurements of social isolation - objective and perceived. Key demographics of gender, age, number of people they reside with, and ethnicity were also collected in the survey.

#### 1.2.1. Objective social isolation scale

This single-item objective measure was created for the purpose of the current study for participants to report on their time spent in social isolation, due to COVID-19, during the past week. Participants were asked *"How much of the time have you spent in the physical presence of others outside of your immediate household, within the past week?"*. Time spent with others was measured on a continuous scale ranging from 1 (*very little*) to 10 (*a lot*) in response to the question. Total scores range from 1 to 10, with lower scores indicating more time spent socially isolating from others outside of their immediate household.

#### 1.2.2. Perceived social isolation scale

Participants self-reported perceived social isolation, or loneliness, on the short version of the De Jong Gierveld Social Isolation scale (Gierveld and Tilburg, 2006). This is a 6-item unidimensional measure of

loneliness, consisting of three positively worded items assessing emotional loneliness and three negatively worded items assessing social loneliness, the latter is required to be reverse coded. Each item was answered on a 5-point scale ranging from 1 (*none of the time*) to 5 (*all of the time*), asking participants how much the statements apply to them. An example item of emotional loneliness is *"I miss having people around"* and an example of social loneliness is *"There are plenty of people I can rely on when I have problems"*. Total scores range from 6-30, with higher scores indicating higher perceived social isolation.

The short version of the De Jong Gierveld Social Isolation scale was used in the current study as it is a widely used measure in loneliness in populations between 18 and 79 years and is brief to administer in large scale studies (Gierveld and Tilburg, 2006). In a large study of general adult populations across seven countries the scale reported adequate reliability α = .72 and validity in measuring emotional and social loneliness (Gierveld and Tilburg, 2006). In the current sample, the De Jong Gierveld Social Isolation scale demonstrated high internal consistency with Cronbach's alpha level of α = .82. In addition, the scale shows good convergent validity, being strongly related to single-item direct questions about loneliness in large-scale studies (Nicolaisen and Thorsen, 2014).

#### 1.2.3. Equanimity scale

The 20-item Phenomenological Experience of Meditative Equanimity Scale (Hosemans, 2017) was used to measure trait equanimity, a component of mindfulness, defined as being receptive (open minded to thoughts, emotions, experiences) and centred within oneself. Participants indicated on a 7-point Likert scale from 1 (*never*) to 7 (*always*) how much the statements reflect their experience of equanimity over the past week. An example item is "*I experience a sense of mental balance regardless of what is happening in my life*". Total scores range from 20 to 140, with higher scores indicating more frequent and intense experiences of the themes of equanimity, namely, being receptive and remaining centred or connected within oneself.

The Phenomenological Experience of Meditative Equanimity Scale was used in the current study as it is the only measure (to date) of equanimity as a phenomenological experience, which is consistent with traditional Buddhist meditative teachings of equanimity (Grabovac et al., 2011). In a study of 145 experienced meditators over a one-month interval, the scale demonstrated sufficient test-retest reliability with a canonical correlation of .90 and adequate construct validity with an average variance extracted of .68 (Hosemans, 2017). The current study suggests the scale has a high internal consistency with a Cronbach's alpha level of α = .94. In a further study of 388 meditators the scale showed adequate convergent validity, with moderate to strong canonical relationships with mindfulness, wellbeing, and self-actualisation. Further, it was predicted that the Phenomenological Experience of Meditative Equanimity Scale would be unrelated with the acceptance and this relationship was confirmed (Hosemans, 2017).

#### 1.2.4. Psychological distress scale

The short-form depression, anxiety, and stress scale (DASS-21; Lovibond and Lovibond, 1995) was chosen for this study to assess psychological distress and to identify whether symptoms of depression, anxiety, or stress were more prevalent while isolating during COVID-19. The DASS-21 is widely used in research to assess depression, anxiety, or stress in normative populations and is therefore an appropriate scale for the current study (Crawford et al., 2011). Participants self-reported severity of mood, anxiety, and stress symptoms they had experienced over the past week. Participants were asked to indicate on a four-point severity scale from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time) how much the total 21 statements applied to them. Example items for each sub-scale include: "I found it difficult to work up the initiative to do things" (depression), "I was aware of dryness of my mouth" (anxiety), and "I found it hard to wind down" (stress). Scores for each 7-item subscale range from 0-21, with lower scores indicating normal to mild symptoms and higher scores indicating a state of psychological distress relative to a normative population (Lovibond and Lovibond, 1995).

The DASS-21 sub-scales reported solid reliability in a large-scale Australian normative sample as follows: depression α = .90, anxiety α = .79, and stress α =.89 (Crawford et al., 2011). The current study suggests the overall scale has a high internal consistency with a Cronbach's alpha level of α = .95 and the subscales had Cronbach's alpha levels as follows: depression α = .92, anxiety α = .85, and stress α = .88. The DASS-21 is a well-validated measure demonstrating adequate convergent validity with other established measures of psychological distress, such as the Hospital Anxiety and Depression Scale and the Personal Disturbance Scale (Crawford and Henry, 2003). The DASS-21 sub-scales also demonstrate discriminant validity with higher scores associated with lower positive affect on the Positive and Negative Affect Schedule (Crawford and Henry, 2003).

### 1.3. Procedure

The present study was conducted with the approval of Monash University Human Research Ethics Committee, Australia. A convenience sample were recruited using online research tool, CloudResearch. Participants followed the link in the recruitment message to the survey, which was hosted on Qualtrics. If participants consented, the questionnaire took approximately 10 to 15 min and they received a nominal fee of US$2.50 once the survey was completed. The study closed after total of 578 participants completed the survey.

### 1.4. Statistical analysis

Preliminary analysis will be conducted with Pearson's correlations and the main analyses will be conducted using hierarchical regression and mediation analyses. Hypothesis 1 will be examined using hierarchical regression analysis with age, gender and education in step 1, objective social isolation in step 2 and psychological distress as the dependent variable. For more detail, three more hierarchical regression analyses will be conducted with each of the psychological distress facets of depression, anxiety and stress included as dependent variables. Hypothesis 2 will be examined using hierarchical regression analysis with age, gender, and education in step 1, perceived social isolation in step 2 and psychological distress as the dependent variable. For more detail, three more hierarchical regression analyses will also be conducted with each of the psychological distress facets of depression, anxiety and stress included as predictor variables. Hypotheses 3 and 4 will be examined with mediation analysis using bootstrapping methodology using the SPSS PROCESS macro (Hayes, 2018). Mediation is observed when the confidence interval for the indirect effect is outside zero. Hypothesis 3 includes objective social isolation as the independent variable, psychological distress as the dependent variable and equanimity as the mediator, with age, gender and education controlled. For more detail, three more mediation analyses will also be conducted with each of the psychological distress facets of depression, anxiety and stress included as dependent variables. Hypothesis 4 includes perceived social isolation as the independent variable, psychological distress as the dependent variable and equanimity as the mediator, with age, gender and education controlled. For more detail, three more mediation analyses will also be conducted with each of the psychological distress facets of depression, anxiety and stress included as dependent variables. As 16 regression and mediation analyses were conducted on the same data, a Bonferroni corrected alpha of 0.003 was used to control for familywise error.

## 2. Results

Prior to the main analysis, Pearson's correlation analysis was run with each of the variables (see Table 1). Effect sizes were interpreted using Cohen's (1988) suggested levels of .1 for a small effect, .3 for a

**Table 1**
Descriptive statistics and Pearson correlations between variables.

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Objective Social Isolation | — | | | | | | | | | |
| 2. Perceived Social Isolation | .04 | — | | | | | | | | |
| 3. Psychological Distress | -.27*** | .57*** | — | | | | | | | |
| 4. Equanimity | -.32*** | -.23*** | .09* | — | | | | | | |
| 5. Depression | -.18*** | .61*** | .93*** | -.03 | — | | | | | |
| 6. Anxiety | -.36*** | .46*** | .93*** | .19*** | .78*** | — | | | | |
| 7. Stress | -.23*** | .54*** | .95*** | .10* | .82*** | .84*** | — | | | |
| 8. Age | -.19*** | -.13*** | -.24** | -.11* | -.20** | -.26*** | -.23*** | — | | |
| 9. Gender | .21*** | -.08 | .02 | .21* | -.02 | .09* | -.02 | -.02 | — | |
| 10. Education | -.14*** | -.14*** | -.01 | .27*** | -.05 | .06 | -.01 | .13*** | .32*** | — |
| Mean | 4.72 | 17.54 | 27.72 | 85.67 | 8.88 | 8.59 | 9.21 | 39.22 | 1.60 | 4.77 |
| Standard deviation | 2.74 | 4.61 | 16.80 | 23.11 | 6.24 | 5.18 | 5.63 | 14.27 | .49 | 2.03 |
| Range | 1–10 | 6–30 | 1–63 | 20–14 | 0–21 | 0–21 | 0–21 | 18–79 | 1–2 | 1–8 |

*Note.* $N = 578$. *$p < .05$. *** $p < .001$.

medium effect, and .5 for a large effect. Objective social isolation had a small negative correlation with psychological distress at the domain level ($r = .07$, $p < .001$). In terms of the psychological distress facets, object social isolation had a small negative association with depression ($r = .03$, $p < .001$), anxiety ($r = .11$, $p < .001$), and stress ($r = .05$, $p < .001$). Perceived social isolation had a medium positive association with psychological distress at the domain level ($r = .33$, $p < .001$). In terms of the psychological distress facets, perceived social had a medium positive association with depression ($r = .37$, $p < .001$), and a small to medium and positive association with anxiety ($r = .21$, $p < .001$), and stress ($r = .27$, $p < .001$). Equanimity had a small positive association with psychological distress at the domain level ($r = .01$, $p < .001$). In terms of the psychological distress facets, equanimity had a small positive association with anxiety ($r = .04$, $p< .001$), and stress ($r = .01$, $p < .001$).

Hypothesis 1 was objective social isolation during COVID-19 will positively predict psychological distress and analysed using hierarchical regression. Four hierarchical regressions were run with age, gender, and education controlled. It was found that, unexpectedly, objective social isolation negatively predicted psychological distress, $b = .226$, $p < .001$, 95% CI [-1.79, -0.84]. At the facet level of psychological distress, it was found that objective social isolation negatively predicted depression, $b$= -.16, $p < .001$, 95% CI [-0.56, -0.18], anxiety, $b = -.28$, $p < .001$, 95% CI [-0.67, -0.37], and stress, $b = 21$, $p = <.001$, 95% CI [-0.59, -0.25].

Hypothesis 2 was perceived social isolation during COVID-19 will positively predict psychological distress and analysed using hierarchical regression. Four hierarchical regressions were run with age, gender, and education controlled. It was found that, as expected, perceived social isolation positively predicted psychological distress, $b = .56$, $p < .001$, 95% CI [1.72, 2.18]. At the psychological distress facet level, it was found that perceived social isolation positively predicted depression, $b = .60$, $p < .001$, 95% CI [0.72, 0.90], anxiety, $b = .46$, $p < .001$, 95% CI [0.43, 0.59], and stress, $b = .51$, $p < .001$, 95% CI [0.54, 0.71].

Hypothesis 3 was objective social isolation during COVID-19 will positively predict psychological distress mediated by equanimity (see Figs. 1–4). This hypothesis was analysed using four bootstrapped mediation analysis with age, gender and education controlled. As the confidence interval included zero, equanimity did not mediate the relationship between objective social isolation and psychological distress, $b$ = -.00, 95% CI [-0.14, 0.15]. At the facet level of psychological distress, equanimity did not mediate the relationship between objective social isolation and depression, $b = .05$, 95% CI [-0.01, 0.12], anxiety, $b = -.04$, 95% CI [-0.09, 0.01], or stress, $b = -.02$, 95% CI [-0.07, 0.03].

Hypothesis 4 was perceived social isolation during COVID-19 will positively predict psychological distress (see Figs. 5–8). This hypothesis was analysed using four bootstrapped mediation analysis with age, gender, education controlled. As the confidence interval was outside zero, equanimity mediated the relationship between perceived social isolation and psychological distress, $b = -.015$, 95% CI [-0.23, -0.08]. At the facet level of psychological distress, equanimity mediated the relationship between perceived social isolation and depression, $b$ = -.03, 95% CI [-0.06, -0.00], anxiety, $b$ = -.06, 95% CI [-0.09, -0.04], and

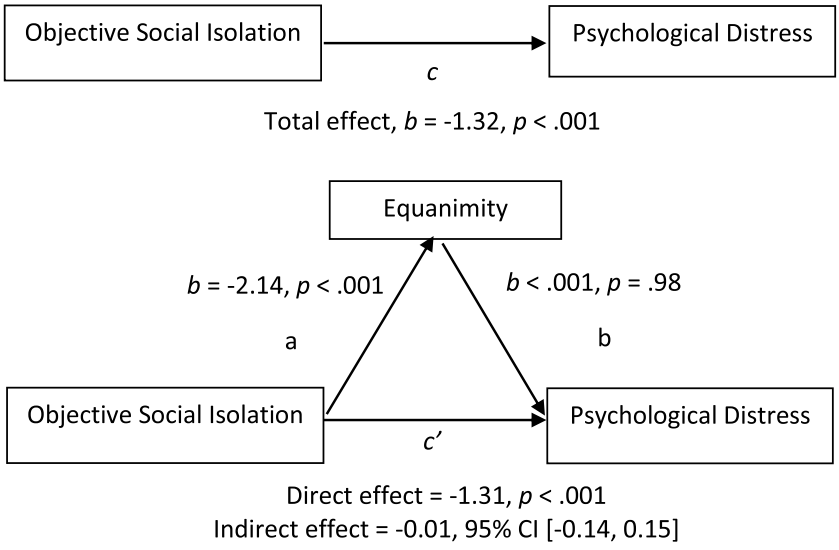


**Fig. 1.** Objective social isolation does not predict psychological distress with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

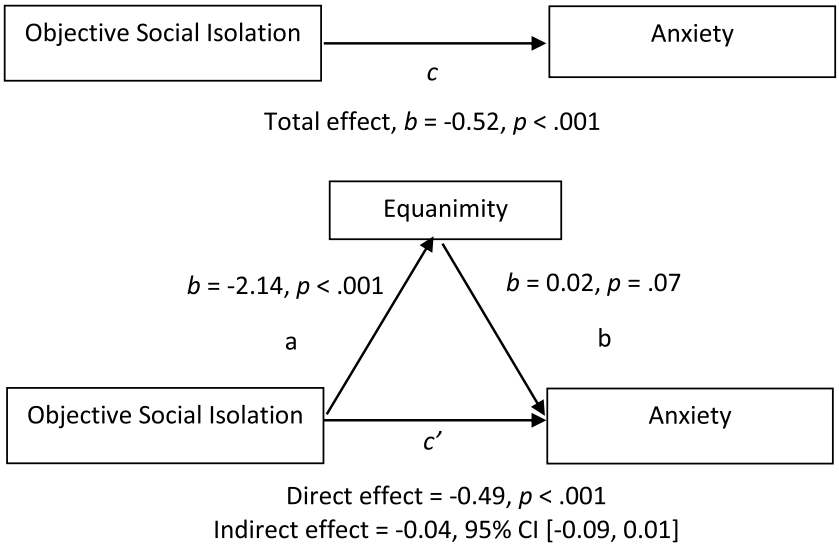


**Fig. 2.** Objective social isolation does not predict anxiety with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

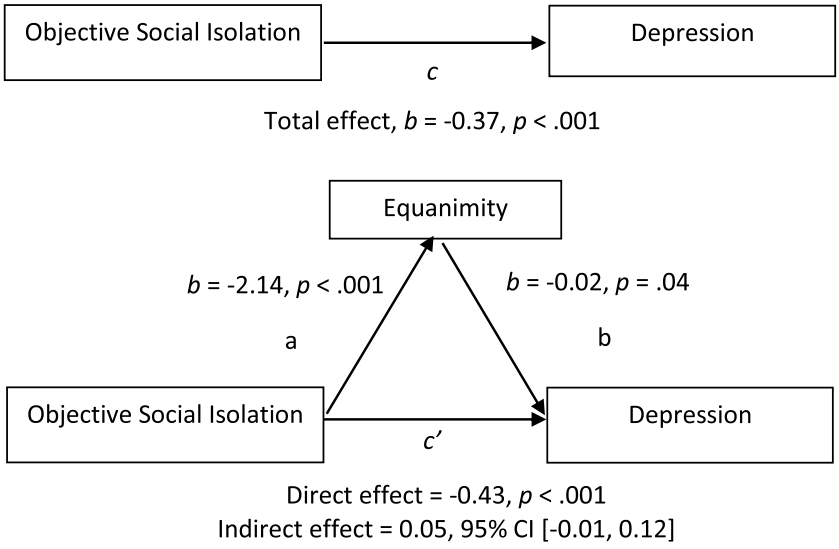


**Fig. 3.** Objective social isolation does not predict depression with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

stress, $b$ = -.02, 95% CI [-0.07, -0.03].

## 3. Discussion

The current study aimed to examine the impact of both objective and perceived social isolation on psychological distress during COVID-19 and to examine trait equanimity – being open and receptive to experience - as a mediator of these relationships. The first hypothesis was not supported as, unexpectedly, objective social isolation negatively predicted psychological distress. The second hypothesis was supported as perceived social isolation was found to positively predict psychological distress. The third hypothesis was not supported as equanimity did not mediate the objective social isolation-psychological distress relationship. The fourth hypothesis was supported as equanimity mediated the perceived social isolation-psychological distress relationship. These results improve understandings of the impact of the "perceived" nature of social isolation on psychological distress and may have implications for mindfulness-based clinical interventions.

Support for Hypothesis 1 was not found as objective social isolation predicted lower levels of psychological distress, contrary to a large body of evidence on the negative effects of isolation on mental health (Lindsay et al., 2019; Matthews et al., 2019). However, the current findings are consistent with emerging research on social distancing measures and mental health during COVID-19. For example, high levels of adherence to COVID-19 social distancing measurespredicted lower levels of anxiety and depression, which was indirectly affected by a sense of meaning attributed to the potential health benefits of the social distancing behaviours (Milman et al., 2020). The discrepancies in the current findings may therefore be attributed to a positive association between isolating and health-related benefits. This suggests that negative affect is lower when isolation is externally driven (public health directives) rather than being driven by internal variables (anxiety).

As expected, Hypothesis 2 was supported adding to a robust body of evidence that consistently shows loneliness predicts psychological distress along with the psychological distress facets of depression, anxiety, and stress (Matthews et al., 2017; Santini et al., 2020). While living

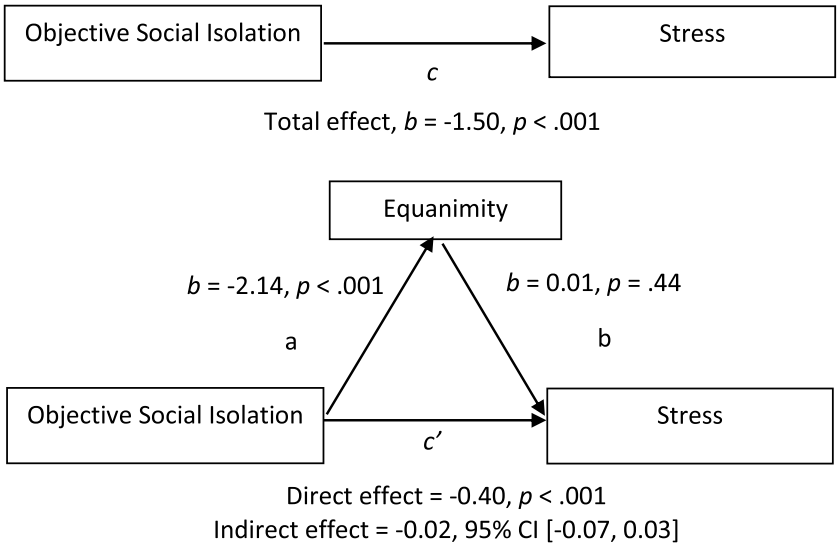


**Fig. 4.** Objective social isolation does not predict stress with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

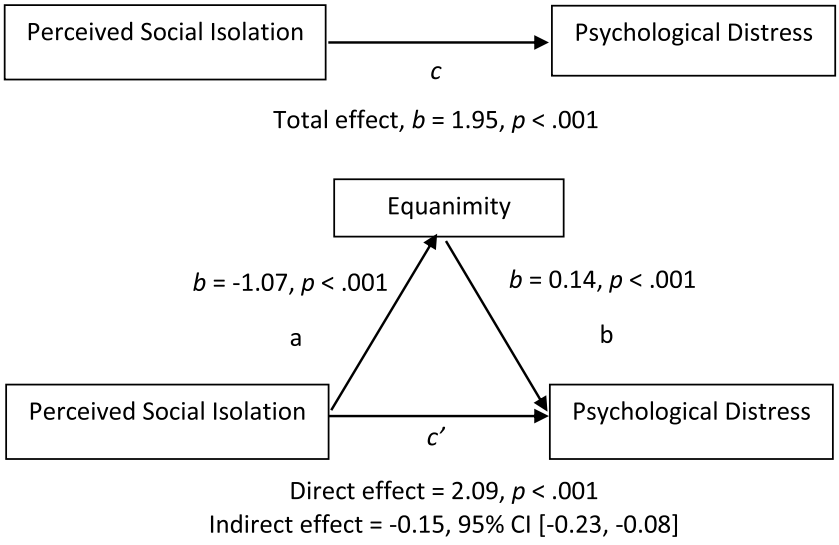


**Fig. 5.** Perceived social isolation predicts psychological distress with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

with others has been identified as a protective factor against loneliness (Cruwys et al., 2013) this was not evidenced in the current findings, despite the majority of the sample residing with two or more people (84.4%). One possible explanation for this finding is that individuals were not residing with their closest ties. For example, Kovac's et al. (2021) found individuals who reported fewer interactions with their "very close" close ties experienced more perceived social isolation during the 2020 lockdown in the United States. Fewer social interactions with close or quality relationships during COVID-19 may indicate that it is the "perceived" nature of social isolation that is a critical contributing factor to psychological distress compared to quantity of social contact. The importance of "perceived" social isolation may also be a contributing factor in the unexpected findings in Hypothesis 1. For example, reduced quantity of contact with others did not adversely affect psychological distress suggesting quality or closeness of ties is more important factor in psychological distress. The current findings indicate perceived social isolation is a vital factor to consider for public mental health during a pandemic.

Hypothesis 3 was not supported as trait equanimity did not mediate the objective social isolation-psychological distress relationship. One possible explanation for this unexpected finding is that equanimity may operate in conjunction with other mindfulness traits to positively effect mental wellbeing. Past research often conflates equanimity with conceptually similar, yet distinct variables and equanimity skills are taught alongside acceptance and awareness skills in mindfulness interventions making it difficult to isolate equanimity derived wellbeing benefits (Shoham et al., 2018). Hence, current findings suggest trait equanimity alone may not explain the objective social isolation-psychological distress relationship and instead a combination of mindfulness-related skills are required.

Hypothesis 4 was supported as perceived social isolation negatively predicted overall psychological distress and depression, anxiety, and stress through trait equanimity. Which corroborates a growing body of evidence suggesting equanimity is a predictor of mental wellbeing (Juneau et al., 2020; Shoham et al., 2018). High trait equanimity is defined as an open and receptive attitude to experiences, regardless of valence, characterised by a balanced emotional and motivational response (Juneau et al., 2020). As such, individuals with high levels of

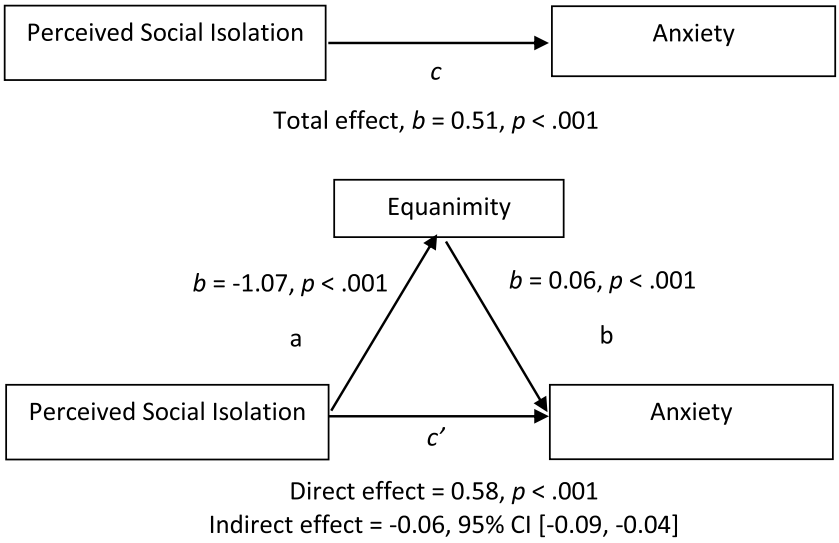


**Fig. 6.** Perceived social isolation predicts anxiety with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

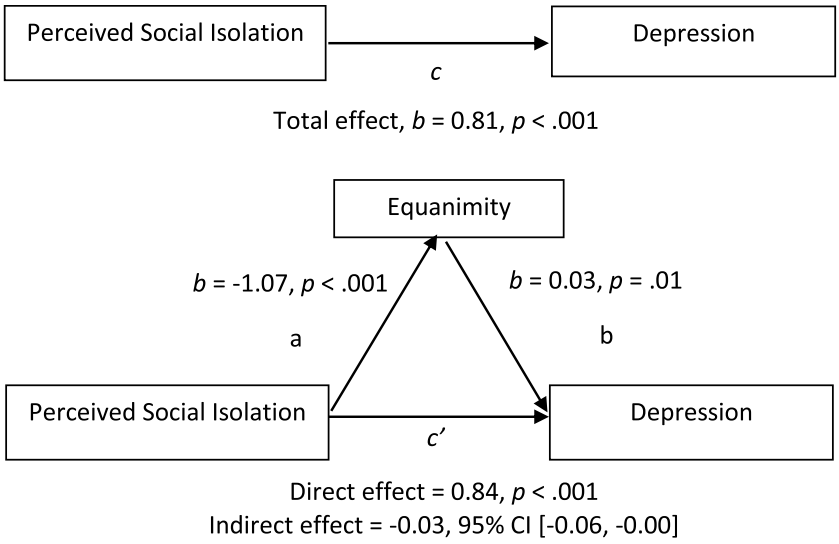


**Fig. 7.** Perceived social isolation predicts depression with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

trait equanimity may be better able to regulate their emotions when they "perceive" the negative valence of social isolation, resulting in less negative affect specifically, depression, anxiety, and stress. The current findings are relevant for assessing how individuals are likely to respond to future pandemic-related social distancing measures.

### 3.1. Clinical implications

The findings of the current study are important for creating or modifying existing mindfulness interventions in response to social isolation. Perceived social isolation along with stress, anxiety, and depressive symptoms, are associated with poor cardiovascular health, cognitive decline, and functional impairment. An increased physiological stress response has been suggested as one mechanism for the impact of perceived social isolation on mental health. Therefore, it is important to identify individuals "at-risk" of perceived social isolation before an overactive stress response negatively impacts their wellbeing. Vulnerable groups such as adults living alone are already understood to have a greater risk of loneliness, but current findings alongside other COVID-19 research indicates a wider range of adults are vulnerable to perceived social isolation during a pandemic. Therefore, psychologists can try to mitigate the "perceived" nature of isolation for individuals to assist in reducing adverse outcomes.

As population-wide social isolation restrictions continue due to COVID-19 this may place an increasing health burden on society. Perceived and objective social isolation have substantial health, financial, and social costs to society from functional impairment associated medical costs. While objective social isolation was not related to adverse outcomes in the current sample, the literature shows fewer social contacts and number of days of confinement positively predict depressive symptomology during COVID-19. Extended and unpredictable periods of social isolation are likely to continue while the virus remains highly transmissible, meaning future research may find that depression in the general population remains high or increases. Even individuals who find meaning or purpose during isolation may begin to experience distress symptomatology as social distancing measures continue. Psychologists can therefore offer preventative interventions for individuals who are socially isolating.

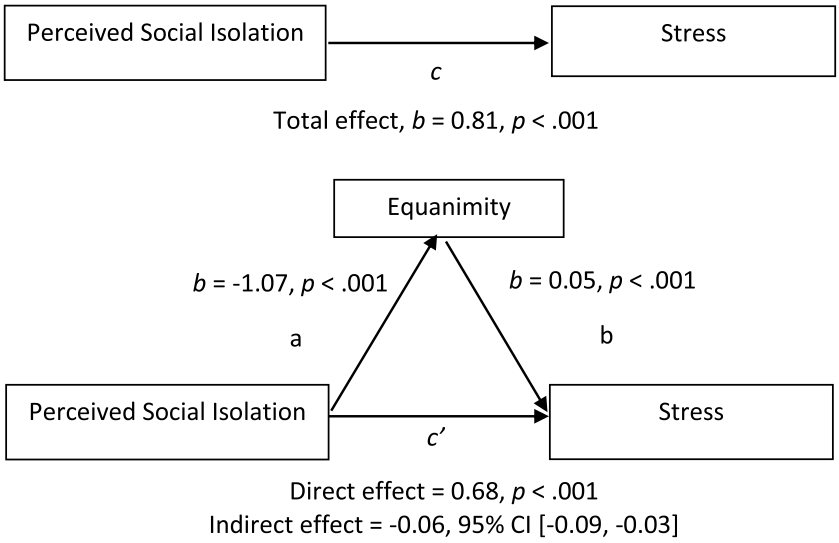


**Fig. 8.** Perceived social isolation predicts stress with mediating equanimity variable. Control variables are age, gender (1 = male, 0 = female) and education (1 = some high school, 8 = doctorate degree).

Increasing protective factors, such as trait equanimity, via mindfulness practice may help to alleviate the potential health burden of social isolation on society. Interventions to improve equanimity outcomes can be designed with COVID-19 in mind, such as brief interventions delivered online while individuals are socially isolating. As the current study measured equanimity as a quality of awareness, specifically being receptiveness (open minded) and centered (returning to oneself and not getting caught up in external events) interventions should be created with this definition to ensure efficacy. Specifically, training to become receptive/open to both positive and negative experiences and remaining centered within oneself when faced with external stressors.

### 3.2. Limitations of the current study

One limitation was the use of a cross-sectional design in the current study. A cross-sectional design was used to investigate a new variable (trait equanimity) and a new context (COVID-19) within the existing research domain of objective-perceived isolation and psychological distress. However, using a cross-sectional design prevents causal conclusions about the variables under investigation. While previous empirical evidence suggested results would be in a particular direction, it is not possible to determine if social isolation caused psychological distress, or whether individuals who are more likely to experience psychological distress perceive themselves to be alone or socially restrict themselves.

The second limitation is the study findings may not generalize outside of the United States or Western counties. The current study design used a convenience sample recruited via the online CloudResearch platform, which afforded efficient data collection within a specific timeframe. However, CloudResearch users are typified as WEIRD (Western, educated, industrialised, rich, and democratic) and are usually from the United States. As the current sample demographics align with a typical CloudResearch user profile, inferences are limited to the United States thereby restricting the generalizability of the findings to other populations.

A third limitation is the use of self-report measures for all variables. Self-report measures were appropriate for this study, owing to the condensed timeframe for data collection, but self-report measures may involve bias due to social desirability responding and inflated correlations between variables. For example, individuals may have underreported social contact with others to appear as complying with social distancing measures. The potential for bias therefore limits the comprehensiveness of the current findings.

### 3.3. Future research

A primary concern for future studies is to overcome the limitations of cross-sectional design and self-report measures. Owing to the cross-sectional design preventing causal conclusions, future studies should employ a longitudinal design to separate the assessment time of objective and perceived social isolation and psychological distress to confirm the relationships found in the current study. Based on the concerns of bias in self-report measures, the use of behavioural measures may overcome this bias and further explain identified relationships. For example, longitudinal research with behavioural measures can control for changes in pandemic-related behaviours such as compliance with social distancing measures or self-isolation orders. Future research as described could inform government health policies around social distancing behaviours related to pandemics.

Future research should also address the current study limitation of findings being limited to a United States population. Due to concerns raised about generalizing findings outside of the United States and WEIRD populations (Hendriks et al., 2019), future studies should be conducted with the current variables within other countries. For example, a recent study found people living in individualistic countries during COIVD-19 reported higher perceived social isolation compared to collectivist countries. Replicating the current findings in other countries and conducting country comparison are important areas of investigation if we are to generalise the current study findings to a global population.

## 4. Conclusion

In conclusion, the present study explains the relationship between perceived social isolation and psychological distress and the mediating mechanism of trait equanimity. Perceived social isolation predicted psychological distress and there was an unexpected relationship with objective social isolation predicting lower levels of psychological distress. The prediction of psychological distress from perceived isolation was partially explained by trait equanimity. These findings can inform the development of adapted mindfulness-based interventions for individuals at risk of psychological distress related to population-wide social isolation restrictions. By understanding how individual trait differences and perceptions of social isolation are linked to stress, anxiety,

and depression symptomology, interventions can be adapted to improve individual outcomes. Such interventions can potentially limit psychological distress in times of pandemic-related social isolation or when isolation is driven by individual factors.

## Author statement

### *Contributors*

The contributors on this paper are Lisa M. Mann and Benjamin R. Walker. I will be serving as the corresponding author. All authors listed in the byline have agreed to the byline order and to submission of the manuscript in this form. I have assumed responsibility for keeping my coauthor informed of our progress throughout the editorial review process, the content of the reviews, and any revisions made to the manuscript. I warrant that the article is the authors' original work, has not received prior publication and is not under consideration for publication elsewhere.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. There were no sources of funding provided for this paper.

My coathor and I do not have any conflicts of interest to disclose. APA ethical standards were followed in the conduct of the study, and we received approval from the Monash University institutional review board.

I will be serving as the corresponding author. All authors listed in the byline have agreed to the byline order and to submission of the manuscript in this form. I have assumed responsibility for keeping my coathor informed of our progress throughout the editorial review process, the content of the reviews, and any revisions made to the manuscript.

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