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RESEARCH ARTICLE

WILEY

No man is an island: Men living alone during COVID-19 report lower need satisfaction and well-being

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Abstract

Based on data from a large-scale social survey in the United Kingdom, the present work examines the influence of household situation and gender on individuals' psychological needs and subjective well-being during the COVID-19 pandemic. Asked to compare their current state to that before the pandemic, men but not women living alone report a subjective decline in their basic psychological needs for meaningfulness and self-esteem, as well as lower subjective well-being. A mediated moderation analysis indicates that the lower subjective well-being for men living alone is mainly mediated by the decline in the satisfaction of their need for self-esteem. The present findings suggest that social isolation during the pandemic may have affected men and women's psychological needs differently and highlight the special role of need for self-esteem, offering insights for potential well-being interventions in times of crisis.

KEYWORDS

COVID-19, gender, living alone, need satisfaction, self-esteem, subjective well-being

Melissa Jauch and Fanny Lalot have co-shared first authorship.

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1 | INTRODUCTION

For many people, the global COVID-19 pandemic has translated into prolonged periods of social isolation, as governments imposed lockdowns and other restrictions on face-to-face social interactions. In the United Kingdom, three lockdowns were imposed over the course of 2020–2021, starting respectively in March 2020 (for approx. 7 weeks), November 2020 (4 weeks), and January 2021 (12 weeks). In other words, everyone living in the United Kingdom had gone through a minimum of 160 days in social isolation during these 2 years, noting that local lockdowns were also in place at points in time, so some individuals might have been isolated for much longer (Institute for Government, 2021).

Research suggests that periods of social isolation have a negative impact on people's mental health and more generally on their subjective well-being (Brummett et al., 2001; Chappell & Badger, 1989; Clair, Gordon, Kroon, & Reilly, 2021; Cudjoe & Kotwal, 2020). Crucially, as in-person social contact was limited to people within the same household, lockdowns might have had an especially strong impact on people *living alone*. We draw here from a large-scale social survey of responses to COVID-19 in the United Kingdom to investigate how respondents' household status (i.e. whether they lived alone) and their gender relate to their psychological need fulfilment (Williams, 2009) and subjective well-being. More precisely, we tested whether living alone has a differential impact on men and women's psychological need satisfaction and whether this, in turn, affects subjective well-being.

In the following, we elaborate why living alone in times of a pandemic might be a reasonable proxy for social isolation and illustrate its adverse psychological effects. We then argue why social isolation in times of a pandemic may not only affect belongingness needs, but might also threaten other fundamental psychological needs (Williams, 2009). Finally, we point to gender differences in the consequences of social isolation on psychological health and subjective well-being.

1.1 | Living alone: Accrued risk for social isolation

Considering the evolution of humankind, living alone is a relatively new phenomenon. Until the midst of the 20th century, people worldwide usually lived in social groups, most often with extended family (Klinenberg, 2016). Nowadays, a substantial proportion of people are living alone, with, for example, 12% of the total UK population living in single households (UK Office for National Statistics, 2021). Given that individuals are assumed to have a fundamental need for belonging (Baumeister & Leary, 1995) and given the long history of life in social groups, this raises the question whether people living alone are especially at risk to feel socially isolated, particularly in times of physical distancing measures imposed during the COVID-19 pandemic.

Social isolation is characterised by objective markers such as a low number of social contacts (de Jong Gierveld, Van Tilburg, & Dykstra, 2006; Leigh-Hunt et al., 2017). *Perceived* social isolation, on the other hand, is a subjective state that is often equated with loneliness (Hawkey & Cacioppo, 2010). Perceived social isolation—or loneliness—arises from a perceived discrepancy between individuals' actual and desired interpersonal relationships (Perlman & Peplau, 1981; Rokach, 2004). Living alone is often considered as an indicator of social isolation, yet it is important to note that the two are not redundant. That is, people living alone may still have many social contacts (e.g. via social media) and may thus not be objectively isolated; at the same time, living alone can increase the risk of social isolation and may have adverse effects (Smith & Victor, 2019).

In non-pandemic times, evidence suggests that living alone is associated with negative affect (Beller & Wagner, 2017), lower emotional and physical health (Hanna & Collins, 2015; Ren & Treiman, 2015), and lower subjective well-being (Tamminen, Kettunen, Martelin, Reinikainen, & Solin, 2019). Yet, while in non-pandemic times, people living alone might benefit from a strong social network outside the household, this protective effect was likely reduced or even nullified during the COVID-19 lockdowns.

1.2 | Living alone during a global pandemic

When the British government, as many others at that time, imposed a first lockdown in March 2020, individuals were obligated to stay home in order to reduce physical contacts to contain the spread of the virus. As a result, whereas for people living with others, it was still possible to have daily face-to-face interactions, people living alone were deprived of this possibility. Possibility for online connections remained; however, online connections were found to alleviate psychological distress during lockdowns only under certain circumstances, acting as “suboptimal surrogates of offline ones” (Marinucci, Pancani, Aureli, & Riva, 2022). Importantly, a study across 115 countries has shown that only face-to-face contact, but not computer-mediated communication, was associated with better well-being during the pandemic (Newson et al., 2021). This suggests that for people living alone, switching to online communication during lockdown may be a suboptimal surrogate at best, but most likely an ineffective means to counteract the negative consequences of social isolation.

Social isolation imposed by physical distancing regulations has been shown to negatively affect mental health and well-being (Clair et al., 2021; Pancani, Marinucci, Aureli, & Riva, 2021), with several studies suggesting particularly negative effects for individuals living alone. For instance, studies found individuals living alone during the pandemic to report more depressive symptoms (Delmastro & Zamariola, 2020) and anxiety (Robb et al., 2020), reduced life satisfaction, and increased loneliness (Fancourt et al., 2020).

1.3 | Social isolation as a threat to psychological needs

In addition to the well-documented negative impact on mental health and well-being, the imposed social isolation might also threaten fundamental psychological needs. If individuals' interpersonal relationships do not meet a desired standard, they feel socially isolated and lonely (Beller & Wagner, 2017) and may experience a threat to their fundamental need to belong (Baumeister & Leary, 1995). However, not only does social isolation affect belongingness needs; research suggests that it may also pose a threat to other fundamental psychological needs. More precisely, it has been argued that social isolation due to physical distancing measures parallels feelings of social exclusion (Hales, Wood, & Williams, 2021). Importantly, even though individuals know that the pandemic and not themselves is the cause of their social isolation, it may still hurt. As a consequence, social *isolation* just like social *exclusion* may fundamentally threaten individuals' needs for self-esteem, meaningfulness, and control (Hales et al., 2021; Rossi et al., 2020; Williams, 2009).

The need for self-esteem refers to individuals' need to see themselves in a positive light and to feel valuable. According to sociometer theory, individuals do not strive for a high self-esteem as an end in itself, but self-esteem serves as a reliable gauge for social acceptance (Leary, 2005). In line with this notion, social exclusion, which is characterised by a lack of social acceptance, has been found to result in decreased self-esteem (Arslan, 2019). Second, the need for meaningfulness refers to individuals' need to be recognised as a person and to follow a purpose. Social exclusion poses a threat to this need, as it is characterised by the neglect of a person's existence (Williams, 2009). Finally, the need for control refers to individuals' need to perceive control over things in their life. As socially excluded individuals may no longer influence the course of events, they often experience a loss of control (Williams, 2007, 2009).

Importantly, the deprivation of psychological needs is not just an unpleasant state people would prefer to avoid; it also has tremendous dysfunctional consequences for individuals' physical and psychological well-being (Leary, 2005). For instance, low self-esteem undermines psychological well-being in adolescence, specifically by mediating the negative association between social exclusion and well-being (Arslan, 2019). In sum, we posit that social isolation may pose a threat to individuals' psychological needs just as social exclusion does, and this may have detrimental consequences for individuals' well-being. Ostracism research suggests that social exclusion threatens the four needs of belonging, self-esteem, meaningfulness, and control to a similar extent. In consequence, most of this

research considers the four needs as a single composite construct (see, e.g. Rudert & Greifeneder, 2016). However, although social exclusion and social isolation share many similarities, they remain conceptually different constructs, and it is *ex ante* uncertain whether social isolation threatens the four needs to the same extent. Therefore, we will explore the influence of living alone on each of the four needs separately, as further detailed below.

1.4 | Does social isolation impact men and women differently?

An important individual factor to consider in the study of living alone and subjective well-being is gender. Some work suggests gender differences in the impact of social isolation, but findings are not always consistent. For example, men have been reported to be objectively more socially isolated, since they maintain fewer and less intimate social relationships compared to women and tend to primarily focus on their partner as a source of emotional relatedness. As a result, the consequences of widowhood on physical and mental health are more detrimental for men than for women (Vandervoort, 2000). With regard to loneliness, a meta-analysis found very small gender differences, with men feeling slightly lonelier compared to women (Maes, Qualter, Vanhalst, Van den Noortgate, & Goossens, 2019). However, since the assessment of loneliness is susceptible to social desirability, men might tend to underreport their feelings of loneliness as well as any other negative psychological consequences of social isolation in fear of gender-stereotypical stigmatisation (Borys & Perlman, 1985).

On the other hand, some research suggests that the influence of pandemic-associated social isolation may be more detrimental for women than for men, as women have reported more depressive symptoms and worse well-being than men since the beginning of the pandemic (Newson et al., 2021; Pieh, Budimir, & Probst, 2020). Other research also suggests that women feel lonely more often and, as a consequence, experience more depression-related symptoms (Dahlberg, Andersson, McKee, & Lennartsson, 2015).

Overall, this suggests that social isolation might affect men and women differently. Given that prior evidence allows for multiple perspectives, we did not specify *ex ante* predictions, but decided to test the effect of gender exploratorily.

2 | THE PRESENT STUDY

2.1 | Research question

An abundance of research documents the adverse psychological outcomes of social isolation in non-pandemic times as well as during COVID-19 (for a review, see e.g. Rudert et al., 2021). However, most research focused on loneliness as a consequence of social isolation. We suggest that the imposed social isolation during the pandemic might also deprive needs other than the need to belong, specifically, the needs for control, for meaningfulness, and for self-esteem. At the same time, it is unclear whether these four needs are deprived to the same extent. We therefore did not specify an *a-priori* hypothesis about differential effects on different needs, but considered them in an exploratory fashion.

Whereas in non-pandemic times, household situation may not be an ideal proxy for social isolation since people living alone may still maintain satisfying social contacts, we argue that in times of lockdowns and physical distancing, living alone means being deprived of in-person contacts. We therefore propose that individuals' household status may be particularly informative in studying subjective well-being and psychological need satisfaction in the times of COVID-19. Moreover, given that men and women were differentially affected by the lockdowns, it is instructive to consider whether gender differentially determines how living alone affects psychological needs.

Summing up, we here test the influence of gender and household status, as a proxy for social isolation in times of COVID-19, on psychological need satisfaction and subjective well-being. We further examine whether the

influence of household status on subjective well-being is mediated by need satisfaction. As the different needs might be differently affected by social isolation, and differently related to well-being, we consider them separately. In an additional, complementary analysis, we explore the effects of household status and gender on a single composite score of psychological needs. This analysis (which yielded very consistent results with that of the main analysis) is reported in Supporting Information.

2.2 | Method

2.2.1 | Participants and procedure

Data were collected in the context of a large-scale research project tracking social cohesion in the United Kingdom during COVID-19.¹ A total of 1,004 respondents (500 men, 496 women, and 8 other or undisclosed; $M_{\text{age}} = 41.93$, $SD = 13.50$) completed the online questionnaire. All demographics are reported in Table 1. Sample size was determined prior to data collection based on feasibility and funding capacities. Sensitivity power analyses (Monte Carlo simulations; Schoemann, Boulton, & Short, 2017) indicate that the sample size would provide 0.95 power to detect a small indirect effect ($\alpha = .14$, $\beta = .14$), 0.91/1.00 power for a small-to-medium indirect effect ($\alpha = .39$, $\beta = .14$ / $\alpha = .14$, $\beta = .39$, respectively), and 1.00 power for a medium indirect effect ($\alpha = .39$, $\beta = .39$).

Data were collected between 26 May 2021 and 13 June 2021, between the second and third waves of infection in the United Kingdom (for a detailed timeline of events during data collection, refer to note 2).² Alongside other measures that pertain to separate projects, participants completed measures for perceived change in need satisfaction and subjective well-being, and reported demographics, including whether they were currently living alone. All data are publicly available on the project's OSF page: <https://osf.io/kjgyn/>.

2.2.2 | Materials

Household situation (living alone)

As part of the set of demographics, we asked participants to describe their current household situation by ticking all applicable options (e.g. I live alone; with my partner/spouse; with roommates). We created a dichotomous variable separating those who reported living alone from all others, regardless of whom respondents were living with. Overall, 159 respondents were living alone (16%) and rates were similar amongst men (17%) and women (15%).³

Perceived change in need satisfaction

Based on a four-item need satisfaction scale used in exclusion research (Rudert & Greifeneder, 2016), we developed four items measuring perceived change in need satisfaction since the outbreak of the COVID-19 pandemic: "Comparing your personal situation now to your personal situation before the outbreak of the pandemic: (1) My feeling of being a meaningful part in this world has... ($M = 2.88$, $SD = 0.82$), (2) My feeling of being in control of my life has... ($M = 2.57$, $SD = 1.00$), (3) My feeling of being connected to others has... ($M = 2.53$, $SD = 0.96$), (4) My feeling of being a valuable person has... ($M = 2.91$, $SD = 0.82$)" (1 = Strongly decreased, 2 = Somewhat decreased, 3 = Remained the same, 4 = Somewhat increased, 5 = Strongly increased). As the mean scores reveal, overall participants expressed a deterioration of need satisfaction during the pandemic.

Subjective well-being

We assessed subjective well-being with two items commonly used in research (see e.g. Delhey & Dragolov, 2016; Klein, 2013; Lalot, Abrams, Broadwood, Davies Hayon, & Platts-Dunn, 2022): "All things considered, how satisfied

TABLE 1 Sample demographics.

Demographic categories	Frequency	Percentage
<i>Gender</i>		
Male	500	49.8
Female	496	49.4
Other/undisclosed	8	0.8
<i>Age</i>		
18–24	99	9.9
25–34	243	24.2
35–44	246	24.5
45–54	221	22.0
55–64	131	13.0
65–74	57	5.7
75+	7	0.7
<i>Ethnicity</i>		
White/White British	822	81.9
Asian/Asian British	75	7.5
Black/African/Caribbean/Black British	74	7.4
Mixed/multiple ethnicity	19	1.9
Other ethnicity	6	0.6
Undisclosed	8	0.8
<i>Annual household income</i>		
Less than £15,000	117	11.7
£15,000 to £30,000	239	23.8
£30,000 to £40,000	174	17.3
£40,000 to £60,000	194	19.3
£60,000 to £100,000	128	12.7
More than £100,000	24	2.4
Undisclosed	128	12.7
<i>Political orientation</i>		
Left-wing	554	55.2
Centre	259	25.8
Right-wing	191	19.0
<i>Subjective socio-economic status</i>		
Mean (SD)	4.25 (1.25)	
Total	1,004	100

Note: Political orientation is measured on a 7-point scale (1 = Left-wing, 4 = Centre, 7 = Right wing). For the table breakout we considered 1–3 as left-wing, 4 as centre, 5–7 as right-wing. Subjective socio-economic status is measured on an 8-point scale (status ladder), a higher rung (higher score) representing a higher subjective status.

are you with your life as a whole nowadays?” (1 = Very dissatisfied, 5 = Very satisfied), “Taking all things together, how happy would you say you are?” (1 = Very unhappy, 5 = Very happy). Items were highly correlated, $r(1002) = .87, p < .001$, allowing us to aggregate them into a single score ($M = 3.39, SD = 0.97$).

2.3 | Results

2.3.1 | Analysis strategy

We tested whether gender and household situation jointly influence perceived change in need satisfaction and well-being, and whether the effect on well-being is mediated by perceived changes in need satisfaction (i.e. a mediated moderation hypothesis, Muller, Judd, & Yzerbyt, 2005). We tested a structural equation model considering the main effects of gender and household situation as well as their interaction on each of the four needs (separately) and on well-being. We added paths from each of the needs to well-being (i.e. parallel mediators). Analyses were run in *R* using the *lavaan* package (Rosseel, 2012). Following recent recommendations (Yzerbyt, Muller, Batailler, & Judd, 2018), we ran a joint-significance test to examine the component paths, then relied on a bootstrap resampling method to examine the magnitude of the indirect effect (percentile bootstrap confidence intervals). Household situation was coded as 1 = Living alone, -1 = Not living alone. Gender was coded as 1 = Woman, -1 = Man. Only 8 participants reported a nonbinary gender (or refused to disclose this information), which was too small a number to consider them as a separate group; they were hence excluded before analyses.

2.3.2 | Interactive effect of household situation and gender

Subjective well-being

First, there was a significant interactive effect of household situation and gender on subjective well-being (see Table 2). As simple slope tests revealed, men living alone reported lower well-being than women living alone, $b = 0.20$, $SE = 0.076$, $t(992) = 2.65$, $p = .008$, $d = 0.168$, 95% confidence interval (CI) [0.044, 0.293] and than men *not* living alone, $b = -0.23$, $SE = 0.057$, $t(992) = -4.06$, $p < .001$, $d = -0.258$, 95% CI [-0.383, -0.133]. In contrast, women reported similar levels of well-being regardless of their household situation, $b = -0.04$, $SE = 0.060$, $t(992) = -0.64$, $p = .53$, $d = -0.041$, 95% CI [-0.165, 0.084]. Amongst people *not* living alone, there was no significant differences between men and women, $b = 0.01$, $SE = 0.033$, $t(992) = 0.25$, $p = .80$, $d = 0.016$, 95% CI [-0.109, 0.140] (see Figure 1).

Need satisfaction

Turning to need satisfaction, the analysis revealed different patterns for the perceived change in the four needs. *Need for control* was unaffected by household situation and gender (neither main effects nor the interaction was significant). *Need for belonging* was only affected by gender, with women reporting a greater decrease in belonging ($M = 2.60$, $SD = 1.02$) than men ($M = 2.47$, $SD = 0.90$).

For *need for meaningfulness*, simple slope tests revealed that men living alone reported a stronger decrease in feelings of meaningfulness than women living alone, $b = 0.16$, $SE = 0.065$, $t(992) = 2.52$, $p = 0.012$, $d = 0.160$, 95% CI [0.035, 0.285] and than men *not* living alone, $b = -0.12$, $SE = 0.048$, $t(992) = -2.47$, $p = .014$, $d = -0.157$, 95% CI [-0.281, -0.032]. In contrast, women reported similar levels of perceived change in meaningfulness regardless of their household situation, $b = 0.04$, $SE = 0.051$, $t(992) = 0.71$, $p = .48$, $d = 0.045$, 95% CI [-0.079, 0.169]. Amongst people *not* living alone, there was no significant differences between men and women, $b = 0.01$, $SE = 0.028$, $t(992) = 0.24$, $p = .81$, $d = 0.015$, 95% CI [-0.109, 0.140].

For *need for self-esteem*, similarly, simple slope tests revealed that men living alone reported a stronger decrease in feelings of self-esteem than women living alone, $b = 0.18$, $SE = 0.065$, $t(992) = 2.81$, $p = .005$, $d = 0.178$, 95% CI [0.054, 0.303] and than men *not* living alone, $b = -0.14$, $SE = 0.049$, $t(992) = -2.88$, $p = .004$, $d = -0.183$, 95% CI [-0.307, -0.058]. In contrast, women reported similar levels of perceived change in self-esteem feelings regardless of their household situation, $b = 0.04$, $SE = 0.052$, $t(992) = 0.82$, $p = .41$, $d = 0.052$, 95% CI [-0.072, 0.176].

TABLE 2 Results of the structural equation model testing the effect of gender, household situation, and their interaction, on four separate needs and well-being (parallel-mediated moderation model).

	<i>b</i> (SE)	95% CI	z-test	<i>p</i> -value	Standardised β
<i>Effects on need for meaningfulness</i>					
Household situation	-0.084 (0.070)	[-0.222, 0.053]	-1.20	.23	-.038
Gender	0.164 (0.070)	[0.027, 0.301]	2.34	.019	.101
Household situation \times gender	0.081 (0.035)	[0.012, 0.150]	2.31	.021	.100
<i>Effects on need for control</i>					
Household situation	-0.022 (0.086)	[-0.190, 0.146]	-0.26	.80	-.008
Gender	-0.092 (0.086)	[-0.260, 0.076]	-1.08	.28	-.046
Household situation \times gender	0.065 (0.043)	[-0.019, 0.149]	1.52	.13	.066
<i>Effects on need for belonging</i>					
Household situation	-0.038 (0.083)	[-0.201, 0.125]	-0.46	.65	-.015
Gender	0.178 (0.083)	[0.015, 0.341]	2.14	.032	.093
Household situation \times gender	0.040 (0.042)	[-0.041, 0.122]	0.97	.33	.042
<i>Effects on need for self-esteem</i>					
Household situation	-0.100 (0.070)	[-0.238, 0.038]	-1.42	.16	-.045
Gender	0.177 (0.070)	[0.039, 0.315]	2.51	.012	.108
Household situation \times gender	0.095 (0.035)	[0.026, 0.164]	2.69	.007	.116
<i>Effects on well-being</i>					
Household situation	-0.224 (0.077)	[-0.375, -0.073]	-2.90	.004	-.089
Gender	0.141 (0.077)	[-0.011, 0.293]	1.82	.069	.076
Need for meaningfulness	0.069 (0.035)	[0.001, 0.137]	1.99	.047	.061
Need for control	0.069 (0.028)	[0.013, 0.125]	2.43	.015	.074
Need for belonging	-0.007 (0.029)	[-0.064, 0.051]	-0.23	.82	-.007
Need for self-esteem	0.420 (0.036)	[0.349, 0.492]	11.52	< .001	.371
Household situation \times gender:	0.050 (0.039)	[-0.026, 0.126]	1.28	.20	.054
Residual direct effect					
Indirect effect: meaningfulness	-0.006 (0.004)	[-0.002, 0.013]	-	-	.006
Indirect effect: control	0.005 (0.003)	[-0.002, 0.011]	-	-	.005
Indirect effect: belonging	-0.000 (0.001)	[-0.003, 0.002]	-	-	-.000
Indirect effect: self-esteem	0.040 (0.015)	[0.010, 0.070]	-	-	.043
Total effect	0.099 (0.041)	[0.018, 0.181]	2.40	.016	.107

Note: 95% Confidence intervals are percentile bootstrap confidence intervals.

Amongst people *not* living alone, there was no significant difference between men and women, $b = 0.001$, $SE = 0.028$, $t(992) = 0.02$, $p = .98$, $d = 0.001$, 95% CI [-0.123, 0.126].

2.3.3 | Parallel-mediated moderation model

Results of the parallel-mediated moderation model show that perceived change in all needs except need for belonging was significantly associated with subjective well-being, especially need for self-esteem ($\beta = .37$, $p < .001$).

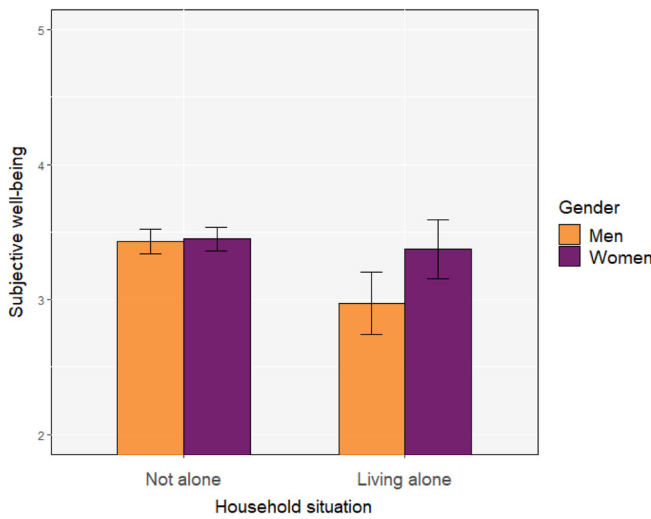


FIGURE 1 Effect of gender and household situation on subjective well-being. Error bars represent 95% confidence intervals.

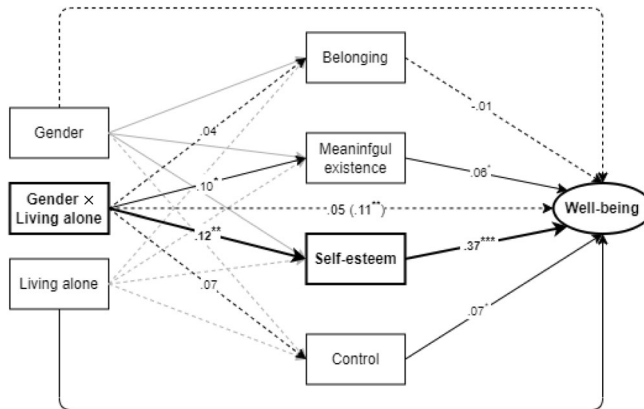


FIGURE 2 Depiction of the parallel-mediated moderation model testing the interactive effect of gender and household situation on the four needs as parallel mediators to subjective well-being. Numbers reported are standardised coefficients. Dashed lines represent nonsignificant paths. The significant indirect effect through need for self-esteem is marked in bold. * $p < .05$, ** $p < .01$, *** $p < .001$.

Moreover, the interactive effect of household and gender on well-being was significantly mediated by perceived change in need satisfaction, more specifically *need of self-esteem* (the bootstrapped 95% confidence intervals for the indirect effect of the interaction mediated through self-esteem did not include zero). Once need for self-esteem (and the other needs) was introduced as a predictor, the residual direct effect was no longer significant (total effect: $\beta = .107$, direct effect: $\beta = .054$; Figure 2).⁴

We finally tested for the simple effects of the mediated moderation. Amongst men, first, results showed a significant indirect effect of household on well-being through need for self-esteem, $b = -0.073$, $SE = 0.024$, 95% CI $[-0.121, -0.025]$, $\beta = -0.057$. In contrast (and consistent with the simple slope tests reported above), amongst women, this indirect effect was not significant, $b = 0.016$, $SE = 0.019$, 95% CI $[-0.022, 0.054]$, $\beta = .013$. Second,

amongst people living alone, there was a significant indirect effect of gender on well-being through need for self-esteem, $b = 0.073$, $SE = 0.032$, 95% CI [0.009, 0.137], $\beta = .077$. Amongst people not living alone, this indirect effect was not significant, $b = -0.003$, $SE = 0.012$, 95% CI [-0.025, 0.020], $\beta = -.003$. The link from need for self-esteem to well-being was positive and significant across the four subgroups (men: $\beta = .409$, $p < .001$; women: $\beta = .341$, $p < .001$; people living alone: $\beta = .393$, $p < .001$; people not living alone: $\beta = .365$, $p < .001$).

3 | DISCUSSION

A vast body of research documents the negative psychological effects of physical distancing during the COVID-19 pandemic, especially for those living alone and thus being at particular risk of social isolation (Keller et al., 2022). The present work adds to these findings, investigating for the first time the influence of gender and household situation (as a proxy for social isolation) on basic psychological needs and subjective well-being.

3.1 | Gender differences in psychological need change and subjective well-being

We find that men compared to women living alone experienced a stronger perceived decline in their basic psychological needs for meaningfulness and self-esteem as well as subjective well-being. The perceived decline in self-esteem additionally mediates the interactive effect of gender and living alone on subjective well-being. These findings support the notion that individuals' household status is informative in studying subjective well-being and psychological need satisfaction, as living alone meant being deprived of all in-person contacts during long periods of lockdown. More importantly, these findings suggest that gender differentially determines how living alone affects psychological needs and well-being. It is important to note that the data were collected between lockdowns where face-to-face contacts were possible again, pointing to an interesting dissociation between the possibility to resume contact and the perception of social isolation. Perhaps one key to this dissociation is that even though face-to-face contact was possible again, life was far away from being back to normal, and people were still asked to be cautious. As such it is possible that while social contact was possible again, it was not the type of social contact that effectively reduced perceived social isolation. These findings support a growing call for gender-responsive healthcare systems and targeted interventions (World Health Organization, 2018) in order to better recognise and address gender-specific needs and develop targeted interventions (see also Lancet, 2019).

3.2 | Why did men living alone suffer more?

As we did not directly investigate the reasons underlying the gender-specific effect of living alone, in what follows we draw upon prior research to speculate and suggest potential insights why men living alone suffered more than women or men not living alone did. First, it might be that living alone creates a greater risk of social isolation for men than women, possibly because the former, in the aggregate, are less effective in maintaining satisfying relationships in times when they are forced to abstain from face-to-face contacts. This is in line with research showing that men in general have fewer intimate relationships and receive less emotional support (Vandervoort, 2000). Moreover, data suggest that men were less likely to use digital tools (e.g. voice calls, video calls, and text messages) to maintain close contacts with their friends and family during the pandemic (Newson et al., 2021; Nguyen, Hargittai, & Marler, 2021), thus putting them at higher risk of social isolation in the long run (see also Newall & Emily, 2020).

A second possibility is that men living alone do not *quantitatively* experience more social isolation, but *qualitatively* suffer more strongly from this social isolation than women living alone. At first glance, this assumption contrasts with other research suggesting that the pandemic has had a stronger negative impact on women's compared

to men's well-being (Pieh et al., 2020; Prowse et al., 2021). However, as prior studies focused on gender in general rather on the subpopulation of men and women *living alone*, comparability with the current findings is limited. In addition, timing seems crucial for pandemic research. Many of the studies identifying a stronger impact on women's well-being were conducted in the early months of the pandemic (over the course of 2020, e.g. Ausín, González-Sanguino, Castellanos, & Muñoz, 2021; García-Fernández et al., 2021; Giurge, Whillans, & Yemisciğil, 2021; Özdin & Bayrak Özdin, 2020; Pieh et al., 2020; Prowse et al., 2021; Robb et al., 2020; Zamarro & Prados, 2021). The present data in contrast were collected later, in the spring of 2021. An under-investigated possibility is that women were quicker than men to recover from the worst period of the pandemic—especially than those men living alone, for whom the negative impact might have started more slowly but then accumulated over time. Longitudinal studies (ideally continuing until the very end of the pandemic) would be warranted to investigate this idea.

As a third possibility, the effect of gender and household situation may not even trace back to social isolation *per se* but relate to other adverse factors that particularly affect men living alone. For instance, research suggests that men compared to women are more concerned about their social standing when losing their jobs (Michniewicz, Vandello, & Bosson, 2014) and were more worried about work-related issues and the economy during the COVID-19 pandemic (Czymara, Langenkamp, & Cano, 2021), which maps on stereotypical gender roles. Assuming that men tend to derive strong parts of their self-esteem from their work, the insecure economic situation during COVID-19 might have posed a strong threat to their work-related self-esteem, thus decreasing their overall well-being (for other results on stereotypical male gender roles or 'masculinity threat', see e.g. Vescio, Schermerhorn, Gallegos, & Laubach, 2021). Other studies have indeed identified a stronger impact of the pandemic on men's self-esteem; for example, male compared to female teenagers experienced a stronger decrease in their general self-esteem during the COVID-19 lockdown, associated with a further decrease in emotional well-being (González-Valero et al., 2020). Yet, to account for the present findings this reasoning would also imply that men *not* living alone were less threatened by stereotypical work-related threats during the pandemic. This might seem unlikely if these men also have bread-winning roles; on the other hand, they might have managed to compensate the self-esteem threat through other valorising social roles (e.g. as a spouse, father, roommate...). Future research is needed to investigate these questions further.

3.3 | Self-esteem as a determinant of subjective well-being

Above and beyond its mediating role for men living alone, self-esteem generally proved relevant for well-being. Indeed, amongst the four fundamental needs for belongingness, control, self-esteem, and meaningfulness, it was change in self-esteem that was more strongly related to subjective well-being (see also Arslan, 2019). Although the importance of self-esteem for a healthy and adaptive functioning is widely recognised in theory, including during the pandemic (Arima et al., 2020; Matias, Dominski, & Marks, 2020; Rossi et al., 2020), it went rather unnoticed in terms of interventions. To illustrate, many (psychology-oriented) initiatives have focused on maintaining or restoring people's sense of belongingness, since it was the need most obviously threatened by social distancing measures. The video platform Zoom, for instance, lifted time limits on video calls for their free version at the peak of the pandemic (Sozzi & Christoforous, 2020). The present results thus call for a stronger consideration of the need for self-esteem when designing real-life interventions in the future, especially given that self-esteem has an even more direct relation to well-being than belongingness (Dennis & Ogden, 2022). Task forces updating pandemic management plans to meet future challenges may benefit from these insights.

3.4 | Limitations and conclusions

Some limitations to the present study must be recognised. First, the research's cross-sectional design limits causal interpretations, notably on the question of whether change in the satisfaction of psychological needs causes greater

well-being. Longitudinal studies would be helpful to assess the changing aspects of well-being and need satisfaction as a crisis progresses. Such studies would also help understanding individual differences in how people first react to a crisis, cope in the mid-term, and recover when the worst of the crisis is behind them. Relatedly, our design only allowed to assess individuals' *perceived* change in need satisfaction but not actual levels of change. As a result, conclusions about actual change in need satisfaction or well-being remain limited.

We focused here on men and women living alone. This of course constitutes a rather simplified view on things and investigating the experience in other household constellations would provide additional insights. For example, it is likely that experiences of people living with roommates, or their significant other, or children, or in a multigenerational home, differ widely (Okabe-Miyamoto, Folk, Lyubomirsky, & Dunn, 2021). In addition, we only compared men to women based on participants' self-reported gender, but did not include other groups, as the low number of non-binary participants did not allow us to do so. Future studies might want to better distinguish between participants' sex and gender and try to take into account the experience of gender minorities (Peterson, Vaughan, & Carver, 2021).

4 | CONCLUSIONS

As our findings suggest, the consequences of potential social isolation may manifest in different ways, for example, in a threat to the psychological need for self-esteem. Such expression of psychological pain may remain undiscovered when just assessing belongingness needs and loneliness. While the present results remain speculative as to why these gender-specific effects on psychological needs occur, they call for a broader perspective on potential consequences of social isolation.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in OSF at <https://osf.io/kjgyn/>.

ETHICS STATEMENT

This project received approval from the Ethics Committee of the School of Psychology at the University of Kent.

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ENDNOTES

¹ The core questionnaire was distributed to approx. 8,000 respondents across places. Because of time limitation, additional questions on well-being and need satisfaction could not be included in the core survey but were only shown to a subsample of approx. 1,000 respondents. The data presented here are drawn from this subsample.

- ² UK numbers of COVID-19 cases were then relatively low, moving from a 7-day average of 3,200–8,500 positive cases during the period of data collection (new cases would then grow exponentially into the third wave of infection). The country was slowly getting out of its third national lockdown (started 3 January), following a phased roadmap. Schools had reopened on 8 March (“Step 1”), followed by non-essential retail and most shops on 12 April (“Step 2”), and indoor venues on 17 May (“Step 3”). “Stay at home” order remained from 6 January until 29 March, at which date people were still encouraged to “stay local.” People could only meet outside, and only six people or two households at the time, between 29 March and 17 May. It is only from 17 May onwards that people were allowed to mix inside (6 people or 2 households) or in large groups outside (30 people). In other words, data collection occurred when people could finally start meeting others again after long months of isolation, but still with brakes applied. All legal limits on social contact would be removed shortly after data collection concluded (21 June; for a comprehensive timeline, see e.g. Institute for Government, 2021).
- ³ We additionally tested whether age and subjective socio-economic status could be confounded with participants' household status. Subjective status was not statistically different across groups (living alone: $M = 4.07$, $SD = 1.42$; not living alone: $M = 4.29$, $SD = 1.22$; $F(1, 935) = 3.63$, $p = .057$, $\eta_p^2 = 0.004$). Age, however, was, and participants living alone were slightly older on average ($M = 45.70$, $SD = 13.87$) than participants not living alone ($M = 41.21$, $SD = 13.32$; $F(1, 1,002) = 15.08$, $p < .001$, $\eta_p^2 = 0.015$). We therefore conducted an additional analysis including age as a covariate (controlling for its effect on well-being). The analysis showed a significant main effect of age, so that older participants reported higher well-being, $b = 0.011$, $SE = 0.002$, 95% CI [0.007, 0.015], z -test = 5.24, $p < .001$, $\beta = .160$. However, the other effects remained virtually unchanged. The gender by living alone interaction still hold (total effect: $b = 0.095$, $SE = 0.041$, 95% CI [0.014, 0.175], z -test = 2.31, $p = .021$, $\beta = .102$) and so did the indirect effect through need for self-esteem ($b = 0.039$, $SE = 0.015$, 95% CI [0.010, 0.069]).
- ⁴ We considered the following fit indices to investigate model fit: Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR). Fit indices revealed a poor fit of the model with the four needs as parallel mediators, which is easily understandable given the number of nonsignificant relationships ($\chi^2 = 1,593$, $df = 12$, $\chi^2/df = 132.75$, CFI = 0.505, RMSEA = 0.365, 90% CI [0.350, 0.380], SRMR = 0.225). We additionally tested the fit of a simpler model based on the observed results, that is, considering need for self-esteem as the sole mediator of the housing status \times gender interaction on subjective well-being (also including the main effects of housing status and gender). This model, in contrast, revealed excellent fit: $\chi^2 = 0.69$, $df = 3$, $\chi^2/df = 0.23$, CFI = 1.00, RMSEA = 0.000, 90% CI [0.000, 0.026], SRMR = 0.002.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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