

## Does a pandemic context attenuate people's negative perception and meta-perception of solitude?

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Solitude—the state of being alone without social interactions—is a common experience in everyday life. Despite that spending time alone can be enjoyable and functional, solitude is often stigmatised: People who engage in solitary activities are perceived negatively (negative perceptions of solitude) and anticipate a negative judgement from others (negative meta-perceptions of solitude). Using the COVID-19 pandemic as a backdrop, we examined whether a pandemic context, in which solitary behaviours were easily attributable to external reasons, would reduce people's negative perceptions and meta-perceptions of solitude. Across three preregistered experiments (total  $N = 767$ ) conducted during the first wave of the COVID-19 pandemic, we found that the presence (vs. absence) of a pandemic context attenuated both the negative meta-perceptions and the negative perceptions of solitude. Yet, people believed that the pandemic context produced a stronger shift away from the stigmatisation of solitude than it actually did. These findings revealed the limits of contextual cues in mitigating the negative perceptions of being alone—even when these cues were explicit and readily available. The current research sheds light on the potential challenges of destigmatising solitude.

**Keywords:** Social perception; Meta-perception; Solitude; Stigma.

Solitude—the state of being alone without social interactions—is a common experience in everyday life (Larson, 1990).<sup>1</sup> Despite the fact that solitude can be desirable, enjoyable, and functional (Coplan et al., 2019; Long et al., 2003), people feel inhibited from engaging in solitary activities (Ratner & Hamilton, 2015). One reason why people avoid solitude is that solitude has been associated with negative reputational costs (Ratner & Hamilton, 2015; Ren & Evans, 2020). Specifically, solitude triggers negative perceptions and meta-perceptions. For example, if we hear that Megan spends most of her weekends alone, we might view Megan as someone who is unlikeable and has few friends (negative social perceptions). Similarly, Megan might anticipate that others would view her as someone who is unlikeable and has few friends if she spends a weekend alone (negative meta-perceptions).

Do these negative attributions of solitude persist even when solitary behaviours can be easily attributable to contextual factors? The COVID-19 pandemic represents a unique opportunity to answer this question. In this

research, we seek to explore (a) how the information of a pandemic context shapes people's judgement of others' solitary activities (i.e., perceptions); (b) how the information of a pandemic context of a pandemic shapes people's reputational concerns when engaging in solitary activities (i.e., meta-perceptions); and (c) does the contextual information affect both perceptions and meta-perceptions to the same extent? The present work sheds light on how environmental cues may shape the stigma of solitude, broadening our understanding of why people avoid solitude even though solitude can be beneficial.

### Perceptions and meta-perceptions of solitude in a pandemic context

Negative meta-perceptions and perceptions of solitude abound. Past studies have shown that, during “normal times,” people worry about engaging in solitary activities due to reputational concerns. For example, people anticipate negative evaluations from others (e.g., “others would think I have no friends”) when dining alone in a

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<sup>1</sup> Solitude is different from loneliness. Loneliness is the subjective perception that one's social needs are not met (Hawley & Cacioppo, 2010). People can feel lonely when they are alone or with others.

restaurant (Her & Seo, 2018). People even refrain from engaging in solitary activities in public, anticipating that they will be evaluated negatively by others (Ratner & Hamilton, 2015). Studies on social perceptions of solitude validate people's reputational concerns of engaging in solitary activities. For example, people ostracise those who express a preference for solitude, considering them to be cold and indifferent to belonging cues (Ren & Evans, 2020). When describing someone who is single versus partnered, participants are more likely to use a range of negative traits such as lonely, shy, unhappy, insecure, among others (DePaulo & Morris, 2005; Greitemeyer, 2009). Even children report a lower preference for a peer who have a tendency to engage in solitary play compared to a social peer (Zava et al., 2020). Theories argue that people have evolved to avoid poor social exchange partners such as those who appear to be socially disengaged or have few social connections (Kerr & Levine, 2008; Kurzban & Leary, 2001)—both are possible inferences of one's solitary behaviours. Finally, people have a fundamental need to belong (Baumeister & Leary, 1995). Given this ubiquitous strong need to be socially connected with others, people may interpret others' solitary behaviour as the outcome of others' unlikability and being socially excluded.

We suggest that a pandemic context may attenuate the negative perceptions and meta-perceptions associated with solitude. A pandemic context provides ample external reasons for solitude. For example, a person may be alone due to the government policies. To combat the COVID-19 pandemic, governments around the world have implemented social distancing measures, which substantially reduced in person contact and increased time spent alone (e.g., Courtet et al., 2020). Besides government policies, a person may avoid social contact and stay in isolation due to pathogen concerns. Disease avoidance represents one of the fundamental human motives (Kenrick et al., 2010). The salient cues of pathogen threats may decrease people's social interests, and motivate people to avoid others who pose infection risks (Sacco et al., 2014). In brief, a pandemic context provides a number of justifications for spending time alone (e.g., following social distancing policies, avoiding infection risks), which may reduce the possibility that people make negative attributions of solitude. Concretely, when the contextual information of a pandemic is present (vs. absent), people's judgement of someone who engages in solitary behaviours would be less negative and people would be less concerned about damaging their social image by engaging in solitary behaviours themselves.

## To what extent does the context matter? Perceptions versus meta-perceptions

We predicted that a pandemic context affected both, perceptions of solitude (i.e., how people perceive others) and

meta-perceptions of solitude (i.e., how people think others perceive them when in solitude). But does it affect both, perceptions and meta-perceptions, to the same extent?

We speculate that it does not. The contextual information may play a relatively minor role in shaping people's perceptions (i.e., how they perceive others who are alone) compared to meta-perceptions (i.e., how they think others would perceive them if they were alone). Put differently, meta-perceivers may overestimate the role of the context in attenuating the negative perceptions of solitude. There is past research consistent with this idea. First, research on the fundamental attribution error (Ross, 1977) shows that, as perceivers, people tend to underestimate the role of situational constraints when interpreting others' behaviours. This research suggests that people's perceptions of others' solitary behaviours are likely to be resistant to the influence of situational cues (e.g., a pandemic context). Second, decades of research has demonstrated that stigma and stereotypes are generally difficult to mitigate (Haines et al., 2016; Jaeger et al., 2020; Moors et al., 2013). For example, a study tracking gender stereotypes between 1980 and 2014 showed that, despite the actual changes in men's and women's social roles across these 30 years, there were barely any change in gendered trait attributions (Haines et al., 2016). In a similar vein, a recent study demonstrates that participants continue to rely on facial stereotypes even when they receive clear information about how inaccurate facial stereotypes are (Jaeger et al., 2020). Taken together, these findings suggest that the presence of contextual information for solitude may not reduce the stigma of solitude to the extent that people expect.

## Current Research

Using the COVID-19 pandemic as a backdrop, we examined the role of a pandemic context in perceptions and meta-perceptions of solitude in three preregistered experiments. All participants were residents of the United States (US), recruited via Prolific. Data were collected in May and June of 2020, 2 months after the US declared a national emergency due to the COVID-19 crisis (March 13, 2020). From a meta-perceiver's perspective, Studies 1 and 2 assessed participants' anticipated evaluations from others about spending time alone with the context of a pandemic present and/or absent. From a perceiver's perspective, Study 3 assessed participants' actual evaluations of a target person who spent time alone with a pandemic context present or absent. To assess whether the contextual information changed both perceptions and meta-perceptions to the same extent, we compared the effect of the manipulation observed in Study 2 and in Study 3. This comparison was made possible by the fact that these two studies used identical manipulations, scenarios, and measures. In all studies, we focus on a key

attribute of social perception: (lack of) likability, as the outcome variable.<sup>2</sup>

Data analyses were conducted using R (R Core Team, 2022). In all studies, we included an additional outcome measure (i.e., enjoyment of solitude; see *Supplementary Materials*) that were beyond the scope of current research. Results of this measure and their relevance for future research are summarised in the General Discussion section of this manuscript. All study materials, data, and analysis scripts are available at the Open Science Framework: <https://osf.io/8eubz/>.

## STUDY 1

Study 1 examined the effect of a pandemic context on participants' meta-perceptions of solitude. The study was preregistered at <https://aspredicted.org/blind.php?x=ye63ue>.

### Method

#### Design

We used a within-subject design. Participants reported their meta-perceptions in two conditions: when the pandemic context was present (i.e., during COVID-19), and when the pandemic context was absent (i.e., before COVID-19).

#### Procedure and materials

Participants were told this was a study on "social distancing and social relationships." A brief text was presented to remind participants of the ongoing pandemic, and the social distancing policies (see *Supplementary Materials* for the full text). Then participants were asked to compare their life before versus during COVID-19, and indicate how negatively others would view them in terms of likeability if they engaged in solitary activities before and during COVID-19 (3 items;  $\alpha = 0.87$ ; e.g., "How likely would people think that you don't have a lot of friends if they observe you being alone?"; 1 = *not at all*, 7 = *a lot*). The order of before versus during measures was random for each participant. No evidence suggested the effect of the manipulation was moderated by the order variable ( $p = .375$ ); thus, this order variable is not discussed further. Finally, participants reported their gender and age.<sup>3</sup>

<sup>2</sup> Note that in this research, we did not include a social condition as a control condition. This is because the solitude versus social comparison is uninformative in the context of our research question and challenging to interpret in a pandemic context (see *Supplementary Materials* for details).

<sup>3</sup> Participants completed additional measures such as their relationship status. Our exploratory analyses showed that the effect of the manipulation remained robust against adjusting for relationship status; further, there was no evidence that relationship status moderated the effect of the manipulation. See *Supplementary Materials* for details and similar analyses exploring the role of living situation and participant age.

<sup>4</sup> Results of the preregistered analytic approach support the same conclusion (see *Supplementary Materials*).

### Participants

We recruited participants who were residing in the US on Prolific. Sample characteristics and steps undertaken to arrive at the final sample are summarised in Table 1.

### Results and discussion

A visual inspection of the data is presented in Figure 1, using raincloud plots (Allen et al., 2021).

To test the effect of the manipulation on participants' meta-perceptions, we preregistered to use *t*-test. Deviating from this preregistered analysis approach, we used regression for the following considerations: (a) regression is equivalent to *t*-test in the context of this study; (b) unstandardised regression coefficients are directly interpretable (i.e., estimated mean difference between the two conditions) whereas *t* values are not; (c) regression is more flexible than *t*-test (e.g., adding covariates; see Study 2) which allows us to use a unified approach throughout studies in this manuscript. For these reasons, we adopted a regression approach (vs. *t*-test) throughout studies.

In this study, to account for the clustered nature of the data (each participant provided two ratings), we estimated a multilevel regression model with a dummy coded condition variable (context-absent condition as the reference category) as the predictor and participants' meta-perceptions (i.e., lack of likeability) as the outcome variable; random-intercepts were estimated for each participant. We used R packages *lme4* and *lmerTest* (Bates et al., 2015; Kuznetsova et al., 2017). Participants believed that being alone would be judged less negatively when a pandemic context was present ( $M = 3.03$ ,  $SD = 1.65$  vs. absent:  $M = 4.00$ ,  $SD = 1.52$ ),  $b = -0.98$ , 95% CI =  $[-1.18, -0.76]$ ,  $p < .001$ , Cohen's  $d = 0.61$ . This finding showed that the presence of a pandemic context attenuated meta-perceivers' reputational concerns associated with solitude.<sup>4</sup>

One limitation of Study 1 is demand characteristics. Participants may have guessed the purpose of the research, given that they went through both conditions (the presence/absence of a pandemic context). Study 2 was designed to address this limitation.

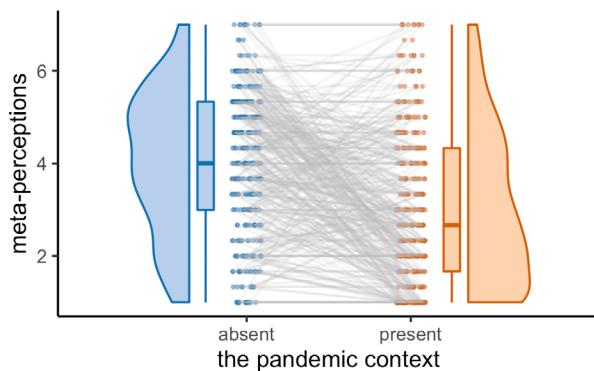
## STUDY 2

Study 2 sought to replicate and extend Study 1, using a between-subject design and a different manipulation. We

**TABLE 1**  
Participants in Studies 1–3

	Study 1	Study 2	Study 3
Power analysis ( $\alpha = .05$ , two-tailed)	351 ( $d = .15$ )	200 ( $d = .40$ )	200 ( $d = .40$ )
Requested $N$ on prolific	380	250	250
Initial $N$ (removed $n$ )	384 (29)	255 (61)	254 (36)
Final $N$	355	194	218
Male %	50%	52%	54%
Age $M$ ( $SD$ )	29.36 (10.68)	32.78 (10.52)	33.22 (12.51)

*Note:* Participants who failed an attention/comprehension check (see *Supplementary Materials*) were removed from analysis. In Study 2, 36 in the context-absent condition and 25 in the context-present condition were removed; In Study 3, 15 in the context-absent condition and 21 in the context-present condition were removed. In Study 3's final sample, one participant did not report gender or age.



**Figure 1.** The effect of the pandemic context on meta-perceptions of solitude (Study 1).

also included the Perceived Awareness of the Research Hypothesis (PARH) Scale (Rubin et al., 2010), in order to check whether our results could be driven by demand effects. The study was preregistered at <https://aspredicted.org/blind.php?x=jk6rq3>.

## Method

### Design

We used a between-subject design. Participants were randomly assigned to one of two conditions: when the pandemic context was present (i.e., during COVID-19), and when the context was absent (i.e., before COVID-19).

### Procedure, materials, and participants

We recruited participants on Prolific (Table 1). Participants were told that this was a study on “everyday activities in times of a crisis.” Participants were asked to imagine spending a weekend alone:

“You wake up around 8 am, eat some breakfast and get ready to go grocery shopping. You are able to get everything on your shopping list, including your favourite snacks. You get tired after the trip so you make yourself

a sandwich and take a nap. You feel refreshed after the nap, so you do some household chores and work on some Prolific studies. Then you order a take-out dinner, watch some Netflix and go to bed early. You spend the whole day alone.”

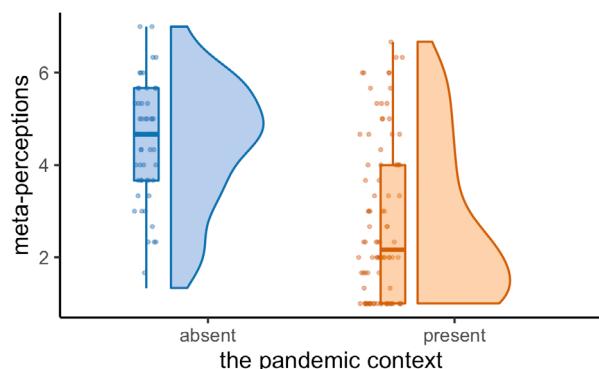
Next, participants were asked to report their meta-perceptions if they spent most of their weekends by themselves as described in the scenario, either before or after the US declared a national emergency due to the COVID-19 crisis in mid-March. The same scale from Study 1 was used (3 items;  $\alpha = 0.92$ ) with items reworded from questions to statements (e.g., “How likely would people think that you don’t have a lot of friends if they observe you being alone?” was reworded to be “People would think that I don’t have a lot of friends”; 1 = *strongly disagree*, 7 = *strongly agree*). To check the possibility of demand effects, participants completed the PARH Scale (4 items;  $\alpha = 0.86$ , e.g., “I knew what the researchers were investigating in this research”; 1 = *strongly disagree*, 7 = *strongly agree*; Rubin et al., 2010). Finally, participants reported their gender and age.

## Results and discussion

A visual inspection of the data is presented in Figure 2.

We estimated a regression model with a dummy coded condition variable (context-absent condition as the reference category) as the predictor and participants’ meta-perceptions as the outcome variable. Participants believed that spending weekends alone would be judged less negatively when a pandemic context was present ( $M = 2.78$ ,  $SD = 1.70$  vs. absent:  $M = 4.44$ ,  $SD = 1.39$ ),  $b = -1.66$ , 95% CI =  $[-2.10, -1.22]$ ,  $p < .001$ , Cohen’s  $d = 1.08$ . Consistent with Study 1, this finding showed that the salient cues of the pandemic attenuated the reputational concerns associated with solitude.

Was this finding due to demand effects? Following Rubin (2016), we performed a series of analyses and obtained no evidence that the observed results were influenced by demand characteristics. Specifically, the mean



**Figure 2.** The effect of the pandemic context on meta-perceptions of solitude (Study 2).

PARH score did not significantly differ from the midpoint of the scale (4),  $t(193) = -0.45, p = 0.653$ , showing no evidence that participants agreed that they were aware of the research hypotheses. Moreover, the outcome variable (meta-perceptions) was not significantly correlated with PARH scores,  $r = .09, t(192) = 1.30, p = 0.196$ . Finally, repeating our main analysis after removing participants with high PARH scores (i.e., one standard deviation above the mean, remaining  $n = 160$ ), or including PARH scores as a covariate in our main analysis showed that the effect of the manipulation was robust and remained similar in size (among  $n = 160$  participants:  $b = -1.74, p < .001$ ; using PARH as a covariate:  $b = -1.65, p < .001$ ).

Taken together, our first two studies demonstrated that receiving the information of a pandemic context caused participants' solitude-related meta-perceptions to be less negative. Does the contextual information play a similar role in shaping people's perceptions of others? What is the effect of the pandemic context on solitude perceptions? Study 3 was designed to answer this question.

### STUDY 3

Study 3 was identical to Study 2 except that it examined how people perceive solitude in others. Participants were asked to judge a target person who typically spent their weekends alone when the pandemic context was present or absent, using the same scenario of Study 2 (i.e., during or before COVID-19). We predicted that observers would judge someone engaging in solitary activities less negatively when the pandemic context was present (vs. absent). We also explored whether the attenuation of the negative perceptions of solitude could be explained by observers attributing target solitary behaviours to pandemic-related reasons (e.g., following social distancing orders). To that aim, participants provided written responses about their attributions of the target behaviour. These responses were coded and tested as

a potential mediator of the effect of the manipulation on our key outcome variable (i.e., perceptions of target). The study was pre-registered at <https://aspredicted.org/blind.php?x=rr8ft4>.

### Method

#### Design

We used a between-subject design. Participants were randomly assigned to one of two conditions: the pandemic context was present or absent (during or before COVID-19).

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee at Tilburg University and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

#### Procedure, materials, and participants

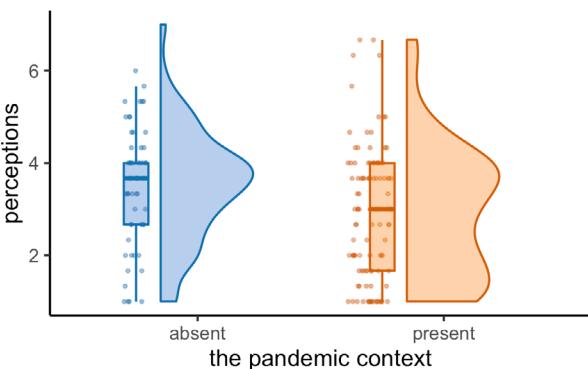
We recruited participants on Prolific (Table 1). Participants were told this was a study on "social perception." Participants were introduced to Robin (a gender-neutral name), a prolific worker who participated in one of our previous studies and shared how they typically spent their weekends. Participants were then randomly assigned to one of two conditions. In one condition (the context-absent condition), participants learned that the study was conducted last year (i.e., 2019), before the US declared a national emergency due to the COVID-19 crisis in mid-March, 2020. In the other condition (the context-present condition), participants learned that the survey was collected last month, after the US declared a national emergency.

Next, all participants were presented with a description of a weekend spent alone, ostensibly written by Robin. The description took a first-person point of view but was otherwise identical to the scenario we used in Study 2.

Participants were then asked to report their perceptions of Robin. The same scale from Studies 1 and 2 was used with the items reworded to measure participants' perception of Robin (3 items;  $\alpha = 0.85$ ; e.g., "I don't think Robin has a lot of friends"; 1 = *strongly disagree*, 7 = *strongly agree*). Next, participants responded to an open-ended question asking why Robin was spending weekends alone. Finally, participants reported their gender and age.

#### Results and discussion

We first examined the role of a pandemic context on participants' perceptions of the target (i.e., lack of likeability; see Figure 3).



**Figure 3.** The effect of the pandemic context on perceptions of solitude (Study 3).

We estimated a regression model with a dummy coded condition variable (context-absent as the reference category) as the predictor and participants' perceptions as the outcome variable. Participants judged those engaging in solitary behaviours less negatively when the context for solitude was present ( $M = 2.90$ ,  $SD = 1.42$  vs. absent:  $M = 3.51$ ,  $SD = 1.21$ ),  $b = -0.62$ ,  $95\% \text{ CI} = [-0.97, -0.26]$ ,  $p = 0.001$ , Cohen's  $d = 0.47$ . This finding showed that the pandemic context attenuated the negative perceptions associated with solitude.

Next, we analysed participants' open-ended responses regarding why Robin spent weekends alone. Before analysis, we coded these responses into a binary variable, with one representing COVID-19 related reasons (e.g., social distancing, self-isolating, fear of infections risks) and zero representing other reasons (e.g., likes spending time alone, had chores to do, an introvert). While no participants in the context-absent condition attributed others' solitary weekends to the pandemic context, 90% of the participants in the context-present condition did so,  $\chi^2(1) = 172.64$ ,  $p < .001$ .

To test the underlying mechanism of the effect of the manipulation on people's judgement, we carried out a mediation analysis testing the indirect effect of the attribution variable. Given that this mediator variable was binary, we used causal mediation analysis which accommodates discrete mediators (Imai et al., 2010). Estimates were calculated based on 50,000 simulations, using the R package mediation (Tingley et al., 2014). Results showed a significant indirect effect ( $-1.05$  [ $-1.55, -0.56$ ],  $p < .001$ ) and a nonsignificant direct effect ( $0.37$  [ $-0.150, 0.88$ ],  $p = 0.164$ ), suggesting that the manipulation increased the probability people attribute others' solitary behaviours to the pandemic, and this external attribution was associated with attenuated negative evaluations of others' likeability.

## COMPARING THE ROLE OF CONTEXT IN SHAPING META-PERCEPTIONS VERSUS PERCEPTIONS

We have so far examined the effect of the pandemic context on solitude related meta-perceptions (Studies 1 and 2) and perceptions (Study 3) separately. But did the context matter to the same extent for meta-perceptions and perceptions? Because Study 2 (meta-perceptions) and Study 3 (perceptions) used identical manipulations, scenarios, and measures, we compared the effect of the manipulation in these two studies. The magnitude of the effect of the manipulation was more than two times as large in meta-perceptions (Study 2 Cohen's  $d = 1.08$ ) than in perceptions (Study 3 Cohen's  $d = 0.47$ ), suggesting that meta-perceivers overestimated the role of a pandemic context in reducing the negative perceptions of solitude.

To test whether the effect of the manipulation had different effects on meta-perceptions and perceptions, we pooled the data of Studies 2 and 3 (pooled  $N = 412$ ). We ran a regression model testing the interaction between the manipulation (context-absent as the reference) and the study's perspective (perceptions or meta-perceptions, with meta-perceptions as the reference). Power analysis using simulations ([https://markhw.shinyapps.io/power\\_twoway/](https://markhw.shinyapps.io/power_twoway/)) showed that we had 87% power given the sample size obtained (i.e., 412) at the alpha level of .05 (two-tailed test). Results showed that the interaction term was significant,  $b = 1.04$ ,  $95\% \text{ CI} = [0.49, 1.60]$ ,  $p < .001$ , indicating that the manipulation influenced meta-perceptions and perceptions differently.

One limitation of this analysis is that the pooled data consisted of two independent samples. We believe this analysis is still meaningful, considering that these two samples were drawn from the same population (Prolific participants) and around the same time (May and June, 2020). Not surprisingly, we obtained two samples with highly similar sample characteristics (Table 1). Future research may address this limitation using a two-by-two experimental design (context present vs. absent x meta-perceptions vs. perceptions).

## GENERAL DISCUSSION

Across three preregistered experiments using the COVID-19 pandemic as a backdrop, we examined whether the information of a pandemic context reduced the negative perceptions and meta-perceptions of solitude. People believed that the negative perceptions of solitude attenuated when the context was present (vs. absent; Studies 1 and 2). Converging with people's beliefs, solitude was indeed perceived less negatively in the presence (vs. absence) of a pandemic (Study 3). However, participants overestimated the extent to which the context attenuated the negative perceptions of solitude.

This research contributes to a growing literature on solitude (e.g., Coplan et al., 2019). In particular, our studies focus on the interpersonal consequences of solitude. While a few existing studies have demonstrated that solitude is stigmatised (e.g., Her & Seo, 2018; Ratner & Hamilton, 2015; Ren & Evans, 2020), these past studies have examined solitude during “normal” times when there lacks a clear justification for why someone might spend time alone. Do people still stigmatise solitude, when there is a salient context for spending time alone? Could such a context effectively mitigate the stigma of solitude? In the current research, we examined the role of a pandemic context, and found that providing a pandemic context to participants attenuated participants’ negative perceptions and meta-perceptions of solitude. However, solitude-related stigma is more resistant to the influence of the context than people think. Specifically, compared to people’s beliefs about the context’s effect on the stigmatisation of solitude (Cohen’s  $d = 1.08$ ; Study 2), the magnitude of the actual effect was rather modest (Cohen’s  $d = 0.47$ ; Study 3).

Is this change relatively small due to people’s lack of awareness of the impact of the pandemic on others’ solitary behaviours? We do not think so. Our studies were conducted during the first wave of the COVID-19 pandemic, at a time that social distancing measures were widely implemented or even mandated. Not surprisingly, 90% of the participants in the context-present condition in Study 3 recognised that Robin (a target person) might have been alone due to the COVID-19 pandemic (while zero participants in the context-absent condition did so). This shows that, although perceivers were keenly aware of the context of others’ behaviours, they underweighted this situational factor when they formed impressions of others. Converging with past studies on the robustness of stigma and stereotypes (e.g., Haines et al., 2016; Jaeger et al., 2020), our current research shows the limits of contextual cues in mitigating the negative perceptions of being alone, even when these cues are explicit and readily available.

The current research also adds to the social perception literature by examining the impact of contexts. Past research has focused on participants’ judgement of others when little context was provided (e.g., making judgements of a target group based on their social identity, evaluating face images presented on a computer screen; Xie et al., 2022). Only a few studies have examined contextual factors and there is a lack of consensus regarding whether or not contexts matter. For example, while day-to-day experienced contexts (Xie et al., 2022) have negligible impact on social perceptions, certain specific contextual cues could influence specific judgements (e.g., the presence of a weapon influences perceptions of others’ anger; Holbrook et al., 2014). Our research adds to this literature by showing that a pandemic context influenced people’s perceptions of others’ solitary behaviours. Future work

should continue to examine the role of contexts on social perceptions, and explore the specificity of the context as a potential moderator.

## Future directions and limitations

Building on the current research, future work may explore other aspects of social perceptions (e.g., warmth, competence, morality) beyond the focal outcome variable in our research (i.e., lack of likability). Future work may also explore the contributing factors of people’s negative perceptions of others’ solitary behaviours. For example, it is possible that people used their own solitude experience to guide their judgement of others’ solitude. Thus, when people have more positive experiences being alone themselves, they are likely to judge others’ solitary behaviour less negatively. It is also possible that other aspects of people’s experience with the pandemic shaped their perceptions of others’ solitude. For example, some groups of people (e.g., people who have pre-existing medical conditions) are more likely to suffer from severe consequences of COVID-19 infection, and these people may hold less negative perceptions of a target person who was alone in the context of a pandemic. We encourage future research to examine these possibilities. Exploring the contributing factors to people’s perceptions of solitude is a first step toward developing interventions to de-stigmatise solitude.

Our reliance on experimental methods increased our ability to interpret the results in causal terms, but there are some shortcomings. First, it is important to explore whether the findings of this research extend to naturalistic settings. For example, one possible future direction is to explore perceptions and meta-perceptions of solitude in friend dyads or work teams (e.g., using round-robin designs). Second, because the studies presented a uniquely salient cue—the pandemic—to the participants, it would be interesting to explore whether the stigma of solitude can be reduced when less salient contexts for solitude are provided (e.g., Robin has recently relocated to a different city). Third, the pandemic brought about many changes in daily lives. Future research may explore which pandemic-related changes shaped perceptions and meta-perceptions of solitude. For example, in the pandemic context, multiple reasons could potentially explain why someone might be alone, making solitude a weak signal of someone’s lack of likability. Alternatively, the pandemic could be a context in which spending time alone is perceived to be normative, and thus acceptable. Identifying the underlying mechanisms of the current findings helps to develop interventions for reducing solitude related stigma and reputational concerns.

Finally, our work focused on perceptions and meta-perceptions of solitude as outcomes; future research

may explore their potential downstream consequences. Arguably, reduced stigma and concerns of solitude may contribute to a more enjoyable solitary experience. In other words, as the negative perceptions of solitude attenuated in a pandemic context, enjoyment of solitude might increase. To explore this idea, we included measures of solitude enjoyment in all three studies (see *Supplementary Materials* for the measures). In contrast to our prediction, participants believed that they would enjoy solitude less in the pandemic (vs. before; Study 1:  $b = -0.43$ , 95% CI =  $[-0.58, -0.29]$ ,  $p < .001$ ; Study 2:  $b = -0.43$ , 95% CI =  $[-0.84, -0.03]$ ,  $p = 0.038$ ; Study 3:  $b = -0.71$ , 95% CI =  $[-1.05, -0.38]$ ,  $p < .001$ ). These results suggested that reducing reputational concerns of solitude did not improve people's enjoyment of solitude, at least not in the context of a pandemic.<sup>5</sup> Future work is needed to understand whether (meta-)perceptions of solitude relate to enjoyment of solitude, and more broadly, how to foster one's capacity of enjoying solitude to maximise individual well-being.

## CONCLUSION

This research revealed that salient contextual cues such as a pandemic attenuated the stigmatisation of solitude. However, we also showed that people overestimated the role of the context: participants believed that the pandemic context would produce a stronger shift away from the stigmatisation of solitude than it actually did. These findings imply the potential challenges of destigmatising solitude.

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## SUPPORTING INFORMATION

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

**Appendix S1:** Supporting information

## REFERENCES

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<sup>5</sup> We explored the association between our key outcome variable and enjoyment of solitude in each study. See *Supplementary Materials*.

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