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Household crowding during the COVID-19 lockdown fosters anti-democracy even after 17 months: A 5-wave latent growth curve study

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Russo S., Colloca P., Cavazza N., Roccatò M. (2022). Household crowding during the COVID-19 lockdown fosters anti-democracy even after 17 months: A 5-wave latent growth curve study. JOURNAL OF ENVIRONMENTAL PSYCHOLOGY, 83, 1-4 [10.1016/j.jenvp.2022.101867].

Availability:

This version is available at: <https://hdl.handle.net/11585/902415> since: 2023-02-23

Published:

DOI: <http://doi.org/10.1016/j.jenvp.2022.101867>

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(Article begins on next page)

This is the final peer-reviewed accepted manuscript of:

Silvia Russo, Pasquale Colloca, Nicoletta Cavazza, Michele Roccato,

Household crowding during the COVID-19 lockdown fosters anti-democracy even after 17 months: A 5-wave latent growth curve study,

Journal of Environmental Psychology,

Volume 83, 2022, 101867,ISSN 0272-4944

The final published version is available online at:

<https://dx.doi.org/10.1016/j.jenvp.2022.101867>

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1 **Household crowding during the COVID-19 lockdown fosters anti-democracy even after 17**
2 **months: A 5-wave latent growth curve study**

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1 **Household crowding during the COVID-19 lockdown fosters anti-democracy even after 17**
2 **months: A 5-wave latent growth curve study**

3 **Abstract**

4 In an earlier cross-sectional study, Roccato et al. (2021) showed that household crowding
5 during the COVID-19 lockdown was positively related to support for anti-democratic political
6 systems. However, little is known about the persistence of these effect over time. In this study, we
7 examined its duration in a longitudinal study structured in five waves, the first in May-June 2019
8 (before the COVID-19 outbreak, $N = 1,504$) and the others during the pandemic, in April 2020
9 (during the lockdown, $N = 1,199$), October 2020 ($N = 1,156$), April 2021 ($N = 1,148$), and October
10 2021 ($N = 1,151$). The increase in support for anti-democratic systems associated with household
11 overcrowding in the initial phase of the lockdown (Wave 2) did not change over the subsequent 17
12 months. Moreover, the effect was stronger among those who had high (compared with low) trust in
13 democratic political institutions before the pandemic. Strengths, limitations, and potential
14 developments of the study are discussed.

15
16 *Keywords:* household crowding, lockdown, COVID-19, authoritarianism, latent growth analysis,
17 longitudinal research

18 Word count (title page and references excluded): 2734

1 **1. Introduction**

2 The lockdown measures taken by many governments in the Spring of 2020 to prevent the
3 spread of the COVID-19 pandemic were an almost unprecedented event in modern history. In Italy,
4 where we conducted this study, people were prohibited from leaving their homes from March 11 to
5 May 3, 2020, except to buy food and medicines at the nearest shop and to go to work if they were
6 key workers. These unique living conditions prompted researchers to conduct several studies on the
7 social-psychological effects of being forced to live with others 24 hours a day, 7 days a week.
8 Cross-sectional studies have shown that locked down people report increases in their stress and
9 anxiety and even their need for mental health care in many countries around the world, including
10 the United Kingdom (Bu et al., 2021), Greece (Fountoulakis et al., 2021), India (Pal & Danda,
11 2021), Singapore (Olszewska-Guizz, 2022), Ecuador (Mautong et al., 2021) and Italy (Somma et
12 al., 2021). These findings were confirmed by Henssler et al.'s (2021) meta-analysis and by some
13 longitudinal studies with at least one pre- and one post-COVID-19 wave (e.g., Probst et al., 2021).
14 However, little is known about the persistence of these effects over time. Are these a trivial shift
15 that is destined to be reabsorbed in a few weeks after the end of the lockdown or do they represent a
16 stable psychological change?

17 In this study we aimed to examine whether the political effects of restriction observed in
18 previous studies can be long-lasting, especially when certain contextual characteristics such as
19 household overcrowding or personal predisposition are present. Three longitudinal studies offer
20 suggestions for our objectives. First, Andersen et al. (2021) showed that pre-COVID-19 affective
21 disorders amplified the negative effects of lockdown on people's well-being, demonstrating the
22 importance in this area of study of focusing on the interaction between individual predispositions
23 and the environment in which people live. Second, these negative effects were still evident two or
24 three weeks after the end of the lockdown (Probst et al., 2021). In a study conducted in South
25 Korea, where the government responded to the 2015 MERS pandemic with a two-week lockdown,

1 the impact on participants' mental health declined significantly after 4-6 months (Jeong et al.,
2 2016).

3 Most studies on the impact of COVID-19 lockdown have focused on the stressful role of
4 factors such as length of confinement, fear of infection, frustration, boredom and financial loss (e.g.,
5 Brooks et al., 2020). However, household overcrowding is another critical variable that could play a
6 role when people are confined. Household overcrowding is known to have negative effects on
7 health and well-being even in normal times. Studies conducted in animals have shown that living in
8 a crowded environment promotes some stress indicators, such as increased blood pressure and
9 decreased reproductive capacity, and even decreases life expectancy (e.g., Calhoun, 1962; Christian
10 & Davis, 1964). The few studies conducted on human samples, initially in offices, correctional
11 facilities and university dormitories (Baum et al., 1981; Evans, 2003; Veitch, 2012; Wener, 2012),
12 confirmed these findings and showed that living in crowded environments promotes psychological
13 distress, anxiety and even mental illness, both in noncontact and contact cultures (Evans et al.,
14 2000).

15 The lockdown measure, which forces people to spend their entire day together, restricts
16 individual privacy and exposes them to undesirable social interactions, likely exacerbated these
17 effects. Indeed, the study conducted by Amerio et al. (2020) in the context of the COVID-19
18 pandemic found that poor housing was associated with an increased risk of depressive symptoms.
19 Interestingly, one study has documented that household crowding can have an impact that goes
20 beyond individual wellbeing and even affects individual social and political orientations. Indeed,
21 Cavazza et al. (2021) showed that household overcrowding promoted participants' support for anti-
22 democratic political systems during the lockdown, via the partial mediation of their perceptions of
23 the relative impact of COVID-19 on their family and their expectation of future lifestyle
24 restrictions, which these authors considered a measure of perceived social competition. However,
25 the study by Cavazza et al. (2021) left two important questions unanswered.

1 First, we do not know whether the lockdown had a general anti-democratic effect or whether
2 it prompted anti-democracy mainly (or even only) in certain subgroups. The main point of reference
3 in this case is the social-psychological literature on right-wing authoritarianism, which shows that
4 societal (e.g., Mirisola et al., 2014) and environmental (e.g., Russo et al., 2020) threats promote
5 right-wing authoritarianism primarily among low-authoritarian people, who are pushed to increase
6 their authoritarianism to cope with the loss of perceived control over their lives. In this light, the
7 threat makes low- and high-authoritarians similar in terms their socio-political attitudes. Based on
8 this literature, we wondered whether the anti-democratic shift fostered by housing overcrowding
9 identified by Cavazza et al. (2021) is a general process or whether it is limited to people who were
10 particularly trustful in democratic political institutions before the pandemic.

11 Second, we do not know how long this anti-democratic change will last. Is it a temporary
12 change, like the “rally effects” studied in public opinion research (Mueller, 1970), which lead to
13 temporary (typically, lasting a few months) increases in institutional trust in response to exogenous
14 shocks such as wars and terrorist attacks (Parker, 1995)? Or is it a more stable change that
15 permanently threatens democracy by strengthening potential anti-democracy in the population? In
16 this longitudinal study, we explored these research questions using a broad quota sample of the
17 adult Italian population.

18 **2. Material and Methods**

19 **2.1. Participants and procedure**

20 We sought to answer our research questions using the database of the COsequences of
21 COvid-19 project (COCO), a 28-month longitudinal study conducted on a broad quota sample of
22 the Italian adult population, stratified with respect to sex, age, educational level and geographic area
23 of residence. The study consists of 5 waves, the first of which was conducted in May-June 2019
24 (before the COVID-19 outbreak, $N = 1,504$) and the others during the pandemic in April 2020
25 (during the lockdown, $N = 1,199$), October 2020 ($N = 1,156$), April 2021 ($N = 1,148$) and October
26 2021 ($N = 1,151$). A total of 990 participants (51.92% women, $M_{age} = 49.32$, $SD = 14.34$) were

1 included in the analyses. The research protocol was approved by the Bio-Ethical Committee of the
 2 University of Turin. The dataset we used is available at
 3 https://osf.io/j2pyr/?view_only=f8e815f92a9a45388d8cdea2bda2a3d3

4 **2.2. Measures**

5 ***Support for anti-democratic political systems***

6 In Waves 2, 3, 4 and 5, participants were asked to respond to two items from the European
 7 Values Study (<https://europeanvaluesstudy.eu/>), asking them to indicate the extent to which ‘Having
 8 a strong leader who does not have to bother with parliament and elections’ and ‘Having the army
 9 rule the country’ would be good or bad forms of government for Italy. Response categories ranged
 10 from 1 (‘It would be a very bad system’) to 4 (‘It would be a very good system’). Based on *rs*
 11 ranging from .47, $p < .001$ (Wave 5) to .51, $p < .001$ (Wave 2), we calculated four indices of
 12 support for anti-democratic political systems.

13 ***Household crowding during the lockdown***

14 Household crowding was measured in Wave 2 using the American Crowding Index
 15 (Torshizian & Grimes, 2020), i.e., the ratio of the number of people living in a house (including the
 16 respondent) to the number of available rooms.

17 ***Pre-pandemic trust in democratic political institutions***

18 In Wave 1, we measured pre-pandemic trust in three democratic political institutions (the
 19 political parties, the President of the Republic and the Italian Parliament), using – like in the
 20 European Social Survey (www.europeansocialsurvey.org) – an 11-category format ($\alpha = .83$). We
 21 estimated participants’ trust in democratic political institutions as a latent variable, by resorting to
 22 confirmatory factor analysis.

23 ***Control variables***

24 In our analyses, we partialled out participants’ gender (0 = man), age, education, size of the
 25 place of residence and perceived economic situation, using the following item from the European
 26 Social Survey: ‘Your present income (or your household’s income if you don’t live alone) allows

1 you to live...'. The response categories were four: 'Finding it very difficult on present income' (= 1), 'Finding it difficult on present income' (= 2), 'Coping on present income' (= 3) and 'Living comfortably on present income' (= 4). All these variables were measured in Wave 1.

4 3. Results

5 As a first step, we used univariate latent growth curve models to determine the rate of change
6 in people's support for anti-democratic political systems over time. These models allow us to
7 estimate the initial level of support for anti-democratic political systems and the linear and quadratic
8 change in that support over time. Because the initial level and change over time are represented as
9 latent factors, it is also possible to estimate the variances of the latent intercept and slope, which
10 represent the extent of interindividual differences in the mean level of anti-democratic attitudes in
11 Wave 2 and change over time (Hertzog & Nesselroade, 2003). Because four time points were
12 available, we were able to construct a baseline model with one linear slope and one quadratic curve.
13 Although the model had good fit indices ($\chi^2(2) = 4.26, p = .12; CFI = .999, TLI = .996, RMSEA =$
14 $.026$), neither the linear (coeff. = .06, $p = .85$) nor the quadratic slope (coeff. = -.03, $p = .28$)
15 indicated significant change over time. The variances also showed no significant individual
16 variation around these flat trends (coeff. = .00, $p = .95$ for the linear slope and coeff. = .00, $p = .85$
17 for the quadratic curve). Overall, this model shows that support for anti-democratic political
18 systems has not changed from Wave 2 and beyond.

19 In a second step, we added time-invariant covariates to our model. Because we found no
20 change in support for anti-democratic systems over time, we limited our investigation to the effects
21 of these covariates on the latent intercept, i.e., the level of support for anti-democratic political
22 systems in Wave 2. This model included the pre-pandemic trust in democratic political institutions
23 and household crowding (both mean-centred), as well as their latent interaction and the control
24 variables.

25 Table 1 shows the results of this model ($\chi^2(27) = 29.97, p = .32; CFI = .998, TLI = .997,$
26 $RMSEA = .011$). Age and education showed a negative association with support for anti-democratic

1 political systems in Wave 2, while the other control variables were not significantly associated with
 2 the dependent variable. More interestingly as concerns our research goals, living in a crowded
 3 household was positively associated with support for anti-democratic political systems in Wave 2,
 4 while pre-pandemic trust in democratic political institution was not associated with the dependent
 5 variable. Moreover, the interaction between these two covariates reached statistical significance. A
 6 simple slope analysis revealed that the effect of household overcrowding on support for anti-
 7 democratic political systems in Wave 2 was stronger (coeff. = .25, $SE = .04$, $p < .001$) among those
 8 who had high trust in democratic political institutions ($-1 SD$) than among those who had a low trust
 9 in them before the pandemic ($+1 SD$, coeff. = .18, $SE = .03$, $p < .001$).

10 **4. Discussion**

11 The lockdown measures used to combat the pandemic COVID-19 promoted short-term and
 12 time-limited negative psychological effects, such as anxiety and stress (Andersen et al., 2021;
 13 Probst et al., 2021). Moreover, they also had political effects and promoted people's support for
 14 anti-democratic political systems (Cavazza et al., 2021). However, while there is evidence of the
 15 short-term duration of the psychological effects of lockdowns (e.g., Jeong et al., 2016), it is less
 16 clear what the nature of these socio-political orientations is and how long they last, as they might
 17 not disappear overnight. Moreover, it is not known whether these effects are pervasive or –
 18 consistent with findings in the literature on authoritarianism (e.g., Mirisola et al., 2014; Russo et al.,
 19 2020) – occur only among people who, under 'normal' conditions, are trustful in democratic
 20 political institutions. Our analysis sought to address this knowledge gap by examining
 21 longitudinally whether the effects of lockdown can be long-lasting, particularly when environmental
 22 characteristics interact with individual socio-political predispositions.

23 Our results show that individual support for anti-democratic political systems fostered by the
 24 lockdown did not change in the subsequent phases of the COVID-19 pandemic; in particular, our
 25 models showed no significant inter- and intra-individual variability over time. It is plausible that the
 26 COVID-19 crisis structurally increased the salience of perceived threat above a certain threshold,

1 thereby triggering more extremist political orientations. These dispositions are potentially more
2 stable and long-term compared to psychological effects on well-being, as they involve value
3 orientations and worldviews that are psychologically costlier to change in the short term. A follow-
4 up of this study, conducted after the end of the COVID-19 pandemic, may be interesting to
5 understand if and when the threats to our democracies caused by the lockdown will subside.

6 We also showed that household overcrowding in the initial phase of the lockdown (Wave 2)
7 had strong anti-democratic effects, in terms of support for anti-democratic systems, especially
8 among those who express high trust in democratic political institutions before the pandemic. This
9 finding is consistent with the social-psychological literature on right-wing authoritarianism (e.g.,
10 Mirisola et al., 2014; Russo et al., 2020), which explains the rise in authoritarian orientation as a
11 coping mechanism triggered by perceived threats. Moreover, the study is particularly interesting
12 because it extends the literature on the consequences of household crowding by showing that the
13 negative effects of environmental discomfort are particularly relevant among citizens that, in
14 ‘normal times’, are the core of the democratic system.

15 The current study has some limitations that should be acknowledged and that depend mainly
16 on the use of secondary data. First, in this study we measured household crowding with an
17 objective index (number of people per room). This measure is widely used (e.g., Torshizian &
18 Grimes, 2020). However, some recent studies have shown that subjective indices related to feeling
19 too close to others (e.g., Fornara, 2022; Thornock et al., 2019) may have even higher predictive
20 power than the objective measures. Therefore, our results on the relationship between household
21 crowding and support for anti-democratic political systems may actually underestimate the true
22 relationship between the two variables. Future studies that consider both indices and examine the
23 interplay between subjective and objective dimensions of crowding could be interesting. Second,
24 we have examined the role of housing crowding, implicitly emphasising the role of housing size.
25 However, as recently stressed, the spatial configuration of the house could also be considered when
26 assessing the housing distress (Campagna, 2016). It might be interesting to extend this study by

1 considering features such as the presence of partitions that promote residents' privacy and protect
2 them from unwanted stimuli and intruders.

3 These limitations should be weighed against the strengths of the study. Because of the
4 longitudinal nature of the dataset, our approach allowed us to capture a trend over a long period of
5 time. Our longitudinal analysis can be considered the more accurate test for assessing changes in
6 anti-democratic orientation induced by housing condition during the lockdown. Moreover, by
7 including variables measured before the pandemic outbreak, our model can rule out the possibility
8 that observed outcomes depend on post-pandemic variables. In sum, we believe that these findings
9 may provide the impetus for more careful evaluation of the socio-political effects of household
10 crowding in future research, possibly examining the conditions under which living in a crowded
11 environment influences political orientations.

12

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1 Table 1. Time-invariant covariates of the latent intercept of the support for anti-democratic political
 2 systems

Covariate	coeff.	SE	<i>p</i>	95% CIs
Woman	-.02	.04	.64	-.09/.09
Age	-.01	.00	.008	-.01/-.00
Size of area of residence	-.01	.02	.51	-.06/.02
Education	-.10	.04	<.001	-.17/-.06
Perceived economic situation	.00	.04	.97	-.09/.06
Pre-pandemic trust in democratic political institutions	.02	.02	.12	-.02/.05
Household crowding	.22	.03	<.001	.13/.27
Pre-pandemic trust in democratic political institutions*Household crowding	.04	.02	.04	.01/.07

3