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Has social distancing increased our relationships and sense of being connected? Results from a study conducted in Italy, France and Spain during the first COVID-19 lockdown.

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Abstract

Connecting with others is a basic human need, often associated with health and well-being. The COVID-19 pandemic and the related distancing measures have been challenging the way we connect and interact, by raising psychological and social issues. During the first lockdown, we designed a questionnaire to investigate people's social relationships and sense of connectedness. We distributed it online in Italy, France, and Spain (N=672). The survey asked people to rate how much they perceived to be connected to personal (family, friends), local (city), European, or global communities; we related connectedness to other factors, such as quality of social relations, fear of contagion, loneliness, worries for the future. Our results show that the majority of responders reported being moderately to consistently in touch with other people. Yet, to be in contact does not mean to be connected. Compared to the pre-pandemic period, responders reported to be particularly connected with their families/friends, less connected with their town and Europe, while they perceived no variation in the degree of connection with the entire world. Among the predictors we analysed, the fear of being infected and the perception of loneliness revealed significant effects on the connectedness to family and friends. Furthermore, perceiving to be connected to personal and larger groups was associated with fewer worries for the future. Our findings are in line with other psychological studies developed during the pandemic which demonstrate that relationships and the sense of being connected improve the quality of life of people and their expectations for the future.

Keywords: social distancing, social connectedness, COVID-19, pandemic, health, well-being.

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Introduction

In January 2020, cases of COVID-19 started being reported all over the world. On the 11th of March 2020, the WHO officially declared COVID-19 a pandemic (World Health Organization, 2020). Various policies and measures both social and political ensued to manage the outbreak. Many governments called for anti-COVID-19 measures of social distancing, along with a first general lockdown starting from February/March 2020. So far, social distancing has been recognized as the most effective way of containing the virus (Chu et al., 2020) under the constant recommendation of the WHO and of national governments, emerging as the most representative concept of 2020. In public healthcare, social distancing means a series of measures to stop the spread of a contagious disease, among them: wearing masks, staying at home, avoiding large gatherings, keeping at least an interindividual distance of 1,5 meters at work and in public spaces, and washing hands regularly (US Centers for disease control and prevention, 2020). In the current pandemic climate, *social distancing* and *physical distancing* have often been used as synonyms. However, coupling *social* with *distancing* has been criticized as it could convey a negative meaning, a sense of isolation and a decrease in the amount and quality of social relations: the expression *physical distancing* might be preferred in public health measures (Jetten, 2020; Ford, 2021). Nonetheless, physical distancing and social aspects of human life are undoubtedly interconnected. Indeed, recent studies emphasize the effect of anti-COVID-19 distancing rules on various psychological factors (e.g., Nogueira et al. 2021; Ford, 2021; Miller, 2021), on social, economic and political aspects (Smith, Steinman, & Casey, 2020; Santini, Jose, & Cornwell, 2020; Zhang et al. 2020), or compliance with distancing measures (Curşeu et al. 2021; Rieger 2020a, 2020b; Van Assche et al. 2020; Bierwiaczonek, Kunst, & Pich, 2020; Coroiu et al. 2020). The term 'COVID-19 fatigue' has been used to describe the negative effects of social distancing and lockdown: it refers to a behavioural fatigue affecting the compliance with social distancing norms, and psychological issues such as burnout, exhaustion etc. (Jetten, 2020: 6; Harvey, 2020). Measures of physical distancing are not new in the history of epidemics and pandemics, such as in the case of the flu of 1918 (Potter, 2001; Spinney, 2017). Yet the COVID-19 pandemic shows clear specificities due to the contemporary globalization. First, due to the high degree of communication and economic/social exchanges, this virus has spread more rapidly than others. Second, many contextual factors of this pandemic have no comparison with previous similar events, such as the simultaneity of the spread of information or the real-time sharing of medical data about deaths and infected people. In this pandemic, more than ever, we have the opportunity to be constantly updated on scientific and medical information. Third, importantly, contemporary social relations do not necessarily rely on the possibility to be physically close, thanks to the unprecedented use of social networking sites (e.g., Boyd & Ellison, 2007; Sinclair & Grieve, 2017) which permit to communicate and belong to different communities at local and global scales. In this sense, the negative effects of social distancing during this pandemic, might have been - at least partially - contained by the unprecedented levels of technological advancements which allow people to virtually connect all around the world.

By taking into account these specificities of the COVID-19 pandemic, the aim of this exploratory study was to analyse how people coped with lockdown and social distancing measures. We focused on people's perception of social connectedness in relation to different social and spatial frameworks: on a personal (family and friends), local, European, or global scale. We investigated people's sense of social connectedness as related to other potentially relevant factors such as age, sex, feeling of loneliness, judgements on the quality of social relationships, and fears and hopes for the future. Recent studies have underlined the importance of social connectedness during COVID-19 in containing stress, worries, and fatigue (Nitschke et al., 2020), and in promoting healthy coping behaviours. The risks of loneliness and social disconnection during this pandemic have been extensively discussed and monitored, especially in potentially vulnerable groups, e.g. elderly adults (Ayalon et al., 2020). The importance of promoting a sense of belonging to contrast loneliness and isolation has been already highlighted by previous studies (Martino, Pegg, & Frates, 2017; Flett, & Heisel, 2020). The innovative aspect of the present study consists in describing how the first lockdown has challenged the sense of connectedness, with respect to different social and spatial scales: personal (family and friends), local (city), European, or global scale. A questionnaire was thus created for this purpose, and distributed online in a very limited period (10 days) during the first lockdown, to capture the first reaction of people to social distancing. Considering the exceptionality of the pandemic event, which was difficult to compare with previously investigated social event or psychological conditions (e.g., Ford, 2021), the items of the questionnaire were created for the purposes of this study, and they did not belong to existent scales from psychological or sociological study. The different sections of the questionnaire mainly consisted of self-report measures investigating, among other topics, perceptions and beliefs on health, pandemic, and social connections. The questionnaire was distributed in three European countries among the most hit by the COVID-19 pandemic: Italy, France, and Spain.

Methods

The Questionnaire

The study has been approved by the Ethical Committee for the Psychological Research of the University of Padova (Italy) on April, 1st, 2020 (Protocol number: 3522). The study is based on a questionnaire diffused online from the 13th of April 2020 to the 24th of April 2020. In that specific period Italy, France and Spain's populations were in lockdown. Italy started the confinement for all its 20 regions on the 25th of February 2020 (until the 16th of May 2020); Spain lockdown was applied to all of its 19 'comunidades' starting 14th of March until the 28th of April 2020. France applied the lockdown all over the State starting the 17th of March 2020 until the 11th of May 2020.

The questionnaire we designed consisted of self-report measures, measured by open and closed questions, organised in the following 6 sections:

- General data: 7 multiple choice questions (format response: single answer), including sex, age, occupation, province of residence;
- Health and contagion: 13 questions, including multiple-choice questions on personal experience with COVID-19 ("*Have you been personally affected by COVID-19?*" 5 answers from: *I was not infected with COVID-19 and I know no one who got it* to *I have/had COVID-19 and I am/was hospitalized*), fear of being contagious ("*Are you afraid of infecting others?*" 6 points Likert scale answers from *Not at all* to *A lot*) or of being infected ("*Are you afraid of getting COVID-19?*", 6 points Likert scale answers from *Not at all* to *A lot*), habits regarding the use of the mask ("*Since the spread of COVID-19, how often have you worn a mask or something similar to protect you by covering your mouth and/or nose (e.g. a scarf) outside your workplace?*", 5 points Likert scale from *Never* to *Always*); "*If you wore the mask outside your workplace or something similar to protect you by covering your mouth and/or nose, why did you do it?*", 4 answers from *To protect myself and others in equal measure* to *I have never worn a mask*), judgments on the clarity of information on COVID-19 ("*How would you judge the information provided by mass media and the Government on the spread of COVID-19 and on the containment of the contagion?*", 5 points Likert scale from *Very clear* to *Unclear*), and compliance with the anti-COVID-19 rules ("*What do you think of anti-COVID-19 social distancing rules?*", 5 points Likert scale from *Very useful* to *I cannot judge*);
- Social and geographical distances: 8 questions (this section is not part of this scientific report);
- The space where you live: 5 questions (this section is not part of this scientific report);
- Social relationships: 9 questions, including multiple-choice questions on perceived improvement in social relationships ("*Has the quality of your social relations (in person or on the Internet) improved compared to before measures of social containment were enforced?*", 5 points answers scale from *A lot* to *It has worsened*), perceived quantity of social contacts ("*Aside from the people living with you and the people you see at work, how much are you in contact with friends and family via phone/texts/the Internet/social networking sites?*", 6 points Likert scale answers from *Not at all* to *Constantly*), and in the feeling of being connected to family and friends ("*How connected do you currently feel to your family and your closest friends?*", 5 points Likert scale from *A lot more than usual* to *A lot less than usual*), their own city ("*How connected do you currently feel to people of the town where you are living at the moment?*", 5 points Likert scale from *A lot more than usual* to *A lot less than usual*), Europe ("*How connected do you currently feel to the rest of Europe?*", 5 points Likert scale from *A lot more than usual* to *A lot less than usual*), and the entire world during lockdown ("*How connected do you currently feel with the rest of the world?*", 5 points Likert scale from *A lot more than usual* to *A lot less than usual*);
- Imagining the future: 4 questions, including multiple-choice questions about the expected positive ("*Do you think that this period will have positive consequences?*" with 11 eleven answers from *Yes, an improvement in the Italian political situation* to *No, I do not think there will be any improvement*) and negative outcomes ("*Are you afraid that this unusual period will have negative consequences?*" with 8 answers from *No, I am not* to *Yes, I am afraid of getting COVID-19 even after the end of the pandemic*) arisen from the COVID-19 pandemic.

The questionnaire is available in the original Italian, French and Spanish versions, and in the English translation, on OSF (The questions analysed in this paper and the associated multiple-choice answers are also listed in the Supplementary Material). The estimated time to complete the questionnaire was about 10-15 minutes.

Fig. 1. Geographical distribution of the responders. Circle size represents the number of participants within each region, while circle colour represents the number of COVID 19 deaths within each region during the period of data collection.
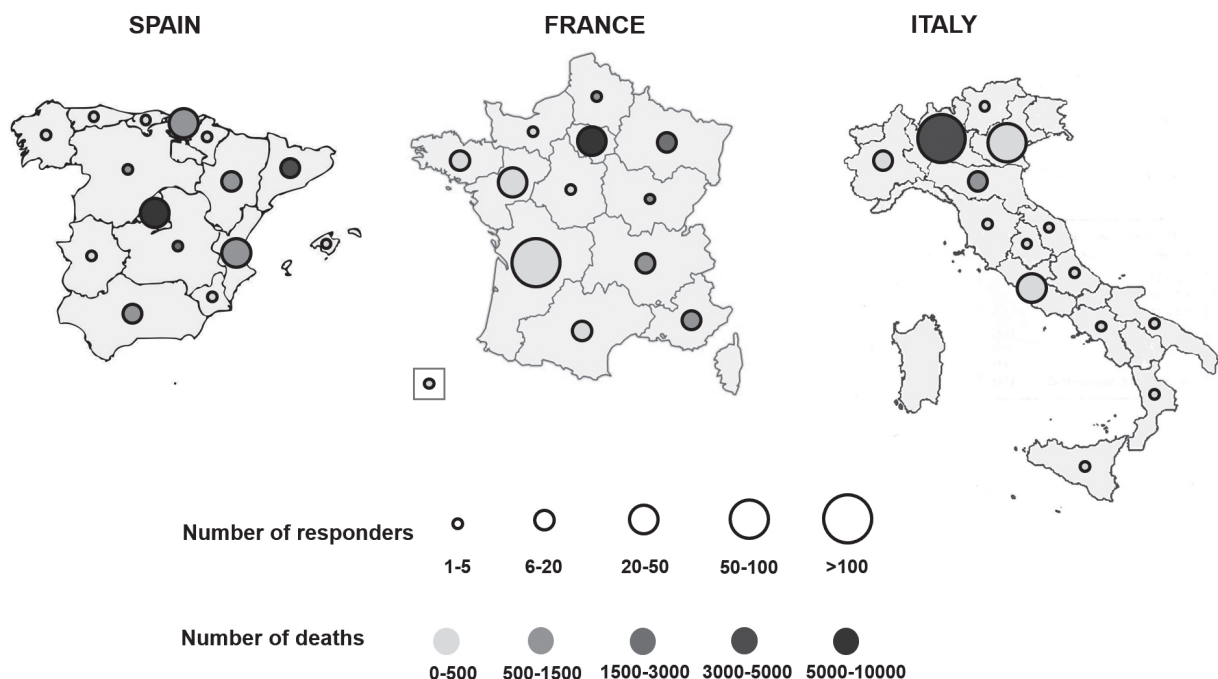
Participants.

A total of 672 individuals filled in the questionnaire. Responders were recruited through announcements on mainstream social networks (e.g., Facebook, Twitter etc.) and institutional mailing lists. Specifically, 290 (43%) were from France, 244 (36%) from Italy, and 138 (21%) from Spain. The majority of responders were females (N=463; 69%). Age groups were represented as follows: 28% of responders were 18-30 years old; 18% of responders were 30-40 years old; 23% of responders were 40-50 years old; 16% of responders were 50-60 years old; 11% of responders were 60-70 years old; 3% of responders were 70-80 years old; only 3 (0%) of responders over 80 years old. The majority of people were on smart working (48%), the remaining were employees on extraordinary leave (10%), unemployed (29%), or workers in working environments (13%). Only 3% of participants got COVID-19 at the time, while 63% were not personally infected but had known persons who got COVID-19 at the time, and 29% were not infected and did not know persons who got infected. These characteristics of the sample are also reported in the Supplementary Material. The geographical distribution of the responders within each country is depicted in Figure 1, where the number of COVID-19 deaths for each responder's geographical region is also represented.

Analyses

In this study we report the analyses of a part of the items in the questionnaire and, specifically, we analysed those items which we considered potentially relevant in order to describe and explain the sense of being connected. Considering the explorative nature of the study, in the results we first provide a general description of the sample for what concerns our variables of interest, and then we explore factors potentially associated with the sense of being connected at the personal, local, European or global scales. Firstly, we describe the French, Italian, and Spanish samples in terms of attitudes and related factors concerning adherence to norms regarding social distancing. We then treat the three countries as a unique sample, and we provide a generic description of the results from the items that we considered potentially relevant in order to describe and explain the sense of being socially connected. Specifically in the sections "Fear of contagion, loneliness and isolation", "Quality and quantity of social relations" and "Social connections" we report results from non-parametric statistics (i.e., Wilcoxon signed-rank test, Spearman's rank correlation coefficient), and for each statistical comparison we report median (Me), mean (M), or percentages (%), as well as exact p-values, but only of those results that survived to correction for multiple comparisons (Bonferroni correction applied within each set of comparisons). Fear of contagion, loneliness and isolation, as well as social relations, were additionally described in relation to age and sex. All the items considered - with the exception of sex, type of meetings during lockdown, and perception of social distancing impacting one's own life - were ordered factors, and they were additionally treated as continuous variables.

Then, in the section "Factors predicting social connections" we report the results of a series of stepwise multiple regressions where the following continuous variables were considered as predictors of the sense of being socially connected: fear of being infected; fear of being contagious; loneliness; isolation; feeling of improved relations; frequency of keeping in touch with others; age; population of the town/city (i.e., estimated number of inhabitants). The variables sex (female; male), type of meetings (e.g., no meetings, in person or virtual meetings), and the perception about the impact of social distancing on one's own life (no impact, negative impact, or positive impact) were entered in the model as factors. Specifically, a model was fitted for each of the following variables: perception of being connected to the family, perception of being connected to the city, perception of being connected to Europe, perception of being connected to the world. For each model, collinearity across predictors was checked by computing the Variance Inflation Factor (VIF). Across all models, all VIF were < 2, suggesting that the models satisfied the assumption of independency of predictors. For each model, normality of residuals was controlled by contrasting residuals against 0 with t-test: across all models, t-test systematically showed that residuals were not significantly different from 0, suggesting that the models satisfied the assumption of normality of residuals. The backward procedure was adopted: in this way, only the set of variables that best predicted the dependent variable were included in each final model. For each regression model, we reported the results of the fit made including standardised variables, verifying that the final predictors for each model were the same when non-standardised variables were entered in the models. Finally, in the last section of the results, "Exploratory effects of connection on attitudes towards the future", we explore how the sense of connectedness was associated with fears and expectations for the future. Specifically, we computed an index of expectancies (which we call E_index) by subtracting, at the individual level, the percentage of negative expected outcomes to the percentage of positive expected outcomes. In this way, a positive value corresponded to a large amount of positive expected outcomes as compared to the negative ones, and a negative value corresponded to a large amount of negative expected outcomes as compared to the positive ones. We then related this index to the sense of being connected at the different scales investigated, to describe how this sense might have impacted the way people represent the future.

Overall, we used the software R for data analysis (R Core Team, 2018). In particular, the functions *lm()* and *step()* were used for multiple linear regression models, the function *vif()* from the package *car* (Fox & Weisberg, 2019) was used to check collinearity across predictors, and finally, the packages *dplyr* (Wickham, François, Henry, & Müller, 2019), *tidyr* (Wickham & Henry, 2019) and *ggplot2* (Wickham, 2016) were used for data manipulation and visualisation. The dataset, translated in English from French, Spanish and Italian, is available in the Supplementary Material at the following link: https://osf.io/r7jkg/?view_only=56e907c1059b407491bdb2b181a76832). Additionally, we included in the dataset data published by Spanish, French and Italian Health Ministries during the COVID-19 lockdown[1]. Specifically, for each participant, we included the number of deaths on the day of testing, as well

as the number of additional deaths collected the day before the day of testing since these were the most representative and available data on the diffusion of COVID-19 for each country in that specific time.

Results

Additional descriptive statistics can be found in the Supplementary Material.

Compliance with the anti-COVID-19 distancing measures

Among the three countries, the majority of responders considered the anti-COVID-19 rules from useful to very useful (87%; 85% in France, 88% in Italy, 82% in Spain; item: "*What do you think of anti-COVID-19 social distancing rules?*"). Compliance with the anti-COVID-19 distancing rules was also indirectly confirmed by the feeling that personal behaviour was from quite to very important to contain the spread of the pandemic (96%; 97% in France, 98% in Italy, 95% in Spain; item: "*Do you think your behaviour contributes to limit the spread of COVID-19?*"). The use of the mask differed among countries given the different legislations at that time[2]: 34% of French responders reported having used the mask from sometimes to always; 91% in Italy; 63% in Spain (item: "*Since the spread of COVID-19, how often have you worn a mask or something similar to protect you by covering your mouth and/or nose (e.g. a scarf) outside your workplace?*"). Nevertheless, among those who used the mask, the majority of responders reported having used it to equally protect the others and themselves (77%, 70% in France, 84% in Italy, 73% in Spain; item: "*If you wore the mask outside your workplace or something similar to protect you by covering your mouth and/or nose, why did you do it?*"). Besides the fact that the majority of participants were compliant with the anti-COVID-19 rules, only half of the responders considered from quite clear to very clear the available information regarding the COVID-19 pandemic (49%; 48% in France, 51% in Italy, 44% in Spain; item: "*How do you judge the information provided by mass media and the Government on the spread of COVID-19 and on the containment of the contagion?*"). Since the three groups (Spain, France and Italy) were overall similar in terms of adherence to norms - independently from the fact that lockdown was different in the different countries -, we then analysed the responses from the three countries together.

Fear of contagion, loneliness, and isolation

Overall, responders were more worried of being contagious than of being infected (Me = 4 (i.e., "Quite") vs. Me=3 (i.e., "A little"), respectively; V = 14020, p < .001; items: "*Are you afraid of getting COVID-19?*" vs. "*…and are you afraid of infecting others?*"). This was true for participants below 60 years old (all p<.008), while there was no significant difference between fear of being contagious and fear of being infected among participants over 60 years old (all p>.008). Moreover,

women and men were equally afraid of being infected (Me = 3 (i.e., "A little"), p=.098), while women experienced a larger fear of being contagious as compared to men (Me = 4 (i.e., "Quite") for both women and men, while M = 4.0 for women vs. M = 3.7 for men; W = 54651, p = .006). Interestingly, fear of being infected positively correlated with the increase in the number of deaths in the same country the day before filling in the questionnaire (rs=.17, p < .001; data on deaths reported by Spanish, French and Italian Health Ministries), while this was not the case for the fear of being contagious (p = .62).

Concerning the feeling of loneliness and isolation, responders perceived to be more physically isolated than alone (Me=2 (i.e., "A little") for both isolation and feeling of loneliness, while M = 2.4 vs. M=1.8, respectively; V = 9349, p < .001; items: "*How lonely do you feel in this period?*" vs. "*And how physically isolated do you feel?*"). This was true for all age ranges (all p < .008), but for participants over 70 years old this difference was not significant (p > .008). Interestingly, the feeling of loneliness (and not isolation) was negatively correlated with age (rs = -.18, p < .001): with the exception of participants over 70 years old, the feeling of loneliness decreased with age (from Me = 2 (i.e., "A little") at 18-30 years old, to Me = 1 (i.e., "Not feeling alone") at 60-70 years old). As compared to men, women experienced stronger feeling of loneliness (Me = 2 (i.e., "A Little") vs. Me = 1 (i.e. "Not feeling alone"), respectively; W = 53341, p = .02) and isolation (Me = 2 (i.e., "A little") for both men and women, while M = 2.5 vs. M = 2.2, respectively; W = 56009, p <.001).

Quality and quantity of social relations, and the sense of being connected

To the item "*Have you perceived an improvement in the quality of your social relations?*", half of the responders perceived no improvement (N = 278, 41%) or a deterioration (N = 56, 8%) of the quality of their social relations, while the other half perceived little (N = 159, 24%), moderate (N = 160, 24%), or large improvement (N = 19, 3%) in their social relations. Improvement in social relations positively correlated with age (rs = .12, p = .002), from Me = 2 (i.e., "not better") at 18-30 years old, to Me = 3 (i.e., "little improvement") at 70-80 years old. The feeling of improvement in social relations did not differ between women and men (p = .43).

Concerning the quantity of social contacts during the lockdown (item: "*Aside from the people living with you and the people you see at work, how much are you in contact with friends and family via phone/texts/the Internet/social networking sites?*"), the majority of responders (91%) reported being from moderately to consistently in touch with other people. The quantity of social contacts moderately correlated with age (rs = -.10, p = .01), but a clear decreasing trend was not revealed by mean of median values per age range. The quantity of social contacts differed between men and women, with women reporting having more contacts than men (Me = 5 (i.e., "A lot in contact") both for women and men, while M = 4.8 and M = 4.5, for women and men, respectively; W = 57283, p < .001). Finally, we report here the results for the items investigating the perception of connectedness. Percentages of responders within each condition are illustrated in Figure 2.

Fig. 2. Percentages of responses to the items regarding connectedness as a function of response (a lot less, a bit less, as usual, a bit more, or a lot more connected) and level of connection (connected to family and friends (F), to the people from the town of residence (C), to Europe (E), or to the world (W)).
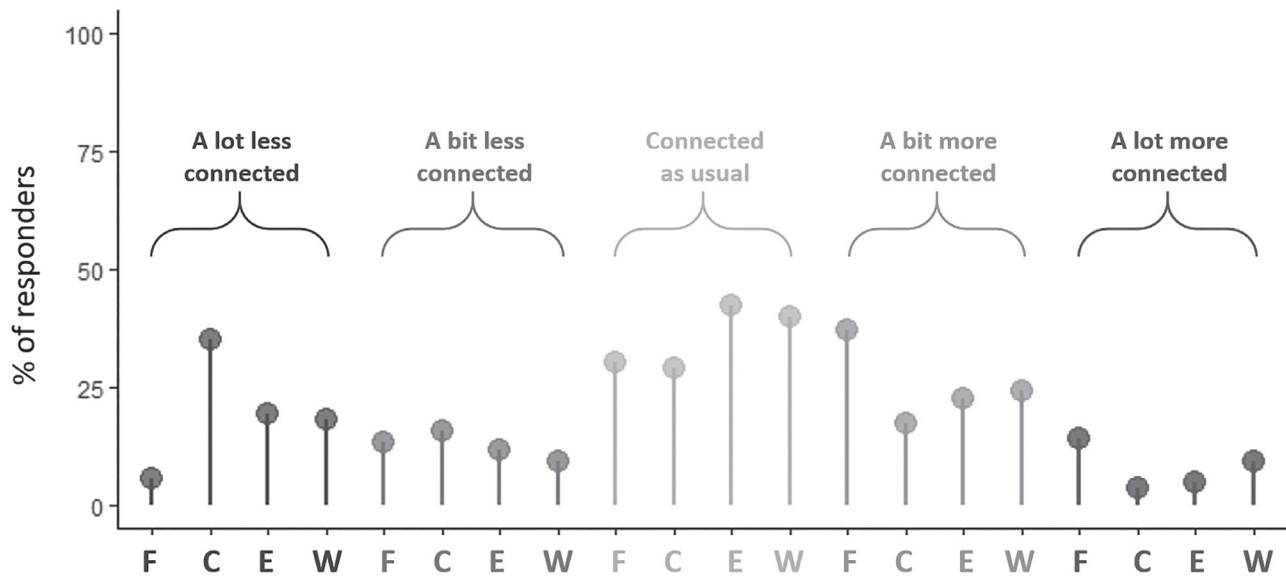
As a group, responders reported the feeling of being particularly connected with their families during lockdown (Me = 4 (i.e. "A bit more connected"), M = 3.4, V = 81350, p < .001; item: "*How connected do you currently feel to your family and your closest friends?*"), less connected with people from their town of residence (Me = 2 (i.e. "A bit less connected"), M = 2.4, V = 20856, p < .001; item: "*How connected do you currently feel to people of the town where you are living at the moment?*"), slightly less connected with people within Europe (Me = 3 (i.e. "Connected as usual"), M = 2.8, V = 27253, p < .001; item: "*How connected do you currently feel to the rest of Europe?*"), while they perceived no variation in the degree of connection with the entire world (Me = 3 (i.e. "Connected as usual"), Me = 3.0 M = 3.0, p = .15; item: "*How connected do you currently feel to the rest of the world?*"). These variables are not described as a function of age or sex in this paragraph, because age and sex have been considered in the next subsections - among other variables - as potential predictors of the feeling of being connected (see the Analyses subsection for a description of the next analyses and related results).

Factors predicting the perception of being connected

Perception of being connected at a personal level. The final model included the following predictors: fear of being infected, fear of being contagious, loneliness, impact of social distancing, relations improvement, and frequency of social contacts. Among these predictors, the fear of being infected, the loneliness, the relations improvement, and the frequency of social contacts revealed significant effects on the perception of being connected to family and close friends (fear of being infected b = .09, SE = .04, t = 2.23, p =.02; loneliness b = -.08, SE =.04, t = 2.28, p =.02; relations improvement b =.43, SE = .03, t = 12.50, p < .001; frequency of social contacts b = .13, SE =.03, t = 3.83, p < .001; *adjusted R2* =.23). Specifically, the more

one experienced the fear of being infected, kept regular social contacts, and felt an improvement in their social relationships, the more one perceived to be connected to family and close friends, while a higher feeling of loneliness was associated with lower connection (Figure 3, first panel from the left).

Perception of being connected to the city. The factors included in the final model were the relation improvement and age (relations improvement b = .20, SE = .04, t = 5.32, p < .001; age b = -.08, SE = .04, t = -1.97, p = .04; *adjusted R2* =.04). Specifically, the more one perceived an improvement in their social relationships, the more one perceived to be connected to the city of living, while a lower connection was associated with age increase (Figure 3, second panel from the left).

Perception of being connected to Europe. The final model included relation improvement, frequency of social contacts, and sex. Among these predictors, the factors relations improvement and sex revealed significant effects on the feeling of being connected to Europe (relations improvement b =.11, SE = .04, t = 2.85, p = .005; sex b = -.24, SE =.08, t = -2.87, p = .004; *adjusted R2* = .03). Specifically, the more one perceived improvement in their social relationships, the more one perceived to be connected to Europe, and the connection was higher in women as compared to men (Figure 3, third panel from the left).

Perception of being connected to the world. The final model included only the predictor sex (sex b = -.19, SE =.08, t = -2.27, p = .02; *adjusted R2* = .01). Specifically, connection was higher in women as compared to men (Figure 3, first panel from the right).

Attitudes towards the future and the sense of connectedness

The number and percentages of responses for the items concerning positive and negative consequences expected of the COVID-19 pandemic can be found in the Supplementary Material. With regard to positive consequences expected, the

Fig. 3. The standardised estimated coefficients predicting the feeling of being connected to family and friends (first panel from the left), to the town of residence (second panel from the left), to Europe (third panel from the left), and to the world (first panel from the right) are plotted. For the variable Sex, negative values indicate higher levels of connection for women as compared to men.
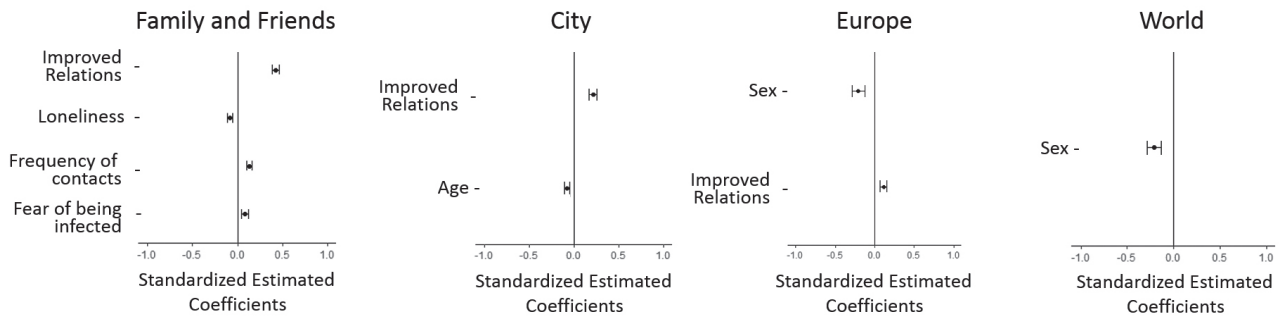
most represented responses concerned pollution reduction (55% of responders), improvement in intimal relations (25%), and increase solidarity within cities (22%) and countries (25%), while 30% of responders expected no positive outcomes from/after the pandemic. With regard to negative consequences expected, the most represented responses concerned the escalation of economic crisis (77%), the fear that the COVID-19 virus could last more months (71%), as well as the fear of being infected (29%), or of suffering from mental illness as a con sequence of pandemic (23%).

By computing for each participant the difference between the percentage of responses on positive choices minus the percentage of responses on negative choices (E-index), we could highlight the fact that on average the responders expected a larger amount of negative as compared to positive outcomes (E-index $M = -13$; *t-test vs. 0*: $t(671) = -15.2$, $p < .001$). The E-index positively correlated with all the variables on connectedness (family: $rs = .14$, $p < .001$; city: $rs = .18$, $p < .001$; Europe $rs = .18$, $p < .001$; world: $rs = .13$, $p = .001$), revealing that the less people perceived to be connected, the more negative consequences were expected from COVID-19 pandemic as compared to positive ones (Figure 4). Importantly, the E-index did not correlate with age ($p = .06$) and was not influenced by sex ($p = .78$, t-test for independent samples).

General Discussion

In this study, we have measured people's sense of connectedness in Italy, France and Spain during the first COVID-19 lockdown. This study was motivated by two main reasons. Our globalized world, including its technological advancements

Fig. 4. The E-index (positive minus negative expectancies arisen from the COVID-19 pandemic) is plotted as a function of the level of perceived connectedness (1=a lot less, 2=a bit less, 3=as usual, 4=a bit more, 5=a lot more connected). Bubble size is in function of the number of responders within each condition. Error bars represent standard error of the mean (SEM).
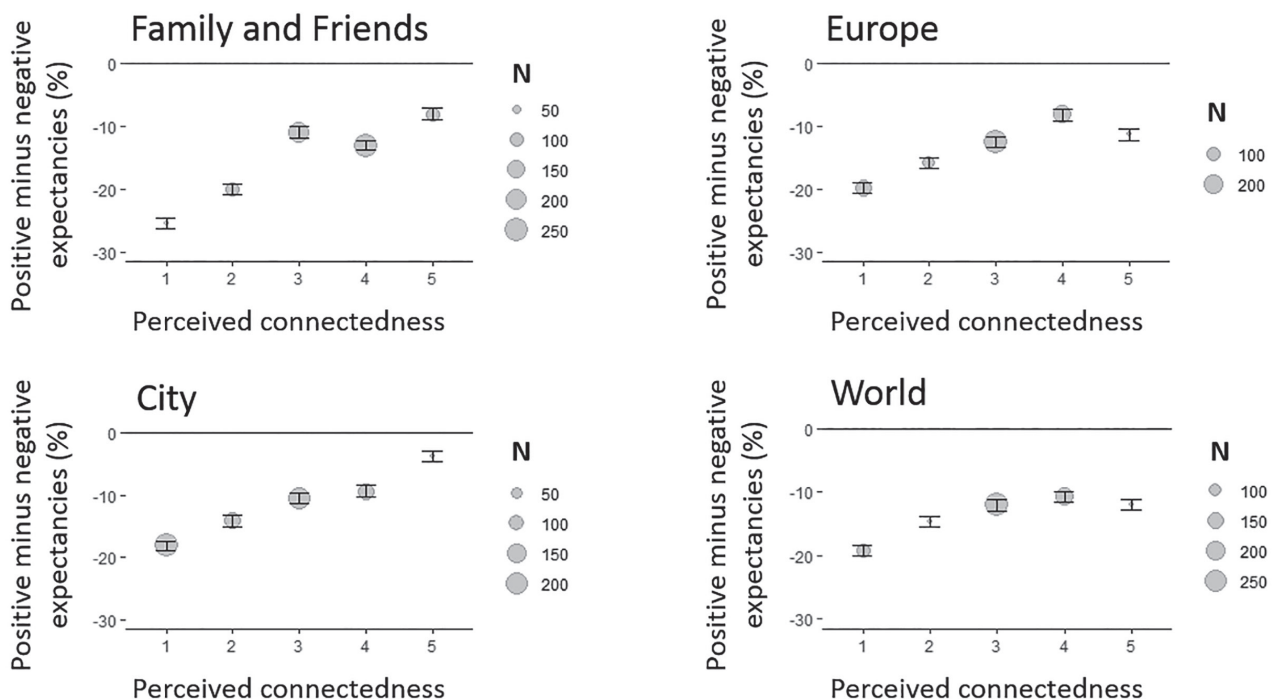
in virtual communication, has been characterizing the COVID-19 pandemic, with no precedent in the history of modern societies. The spread of the virus, and the related social distancing rules, have widely changed social behaviours. Considering these elements, we have measured the sense of being connected in different contexts (both social and spatial), and we have described factors associated with it. Specifically, people judged how much they perceived to be connected at a personal (family and friends), local (inhabitants of the same city), European or global dimension (the world). Our main findings are discussed below.

First, our results highlight that, despite a situation of distress and isolation due to the first lockdown in three European states, changes have been perceived in the sense of being connected. On average, despite physical distancing and lockdown measures, responders perceived to be more connected to family and friends, as compared to the pre-pandemic period. This finding suggests that the network of personal relations has been positively reinforced during the first period of the current pandemic. Similarly, an Australian survey found that a number of families reported positive effects of social distancing, such as adaptive behaviours considered as valuable tools to deal with stressors induced by the pandemic (Evans et al., 2021). A recent book by Murthy (Murthy 2020: 2) interestingly asks: 'If we could not meet, how could we connect?'. Our study shows that despite isolation, the connection with certain groups was improved. However, in contrast to this, we also found that connectedness with local and European networks appeared instead to have been negatively affected by the pandemic.

Secondly, our results show that the sense of connectedness was related to the quality of social relations and the expectations for the future. Despite the fact that people overall perceived to be less connected with local and European networks, we found that interindividual variability in the sense of connectedness was associated to the quality of the relationships. Specifically, responders who perceived an improvement in their social relations also reported being more connected (or less disconnected) with family and friends, with inhabitants of the same city, and with the rest of Europe. This finding highlights the importance of considering the quality – over the quantity - of social relationships in contrasting the risks related to social disconnection, as suggested by previous studies (Van Tilburg et al. 2020).

Importantly, while the improvement in social relations improved the social sense of connectedness at different levels, higher degrees of connections were associated with fewer worries for the future as compared to expected positive outcomes, no matters the framework of connections (personal, local, European or global). This finding interestingly confirms and extend previous observations on the role of connectedness in generating a positive attitude towards the future, resilience, and capacity to face different critical situations (Nitschke et al., 2020). It is important to consider that the concept of connectedness might be made of different facets (e.g., to be in touch, to matter, to belong; Lee & Robbins, 1995). The responders might have referred to different concepts of connectedness in function of the scale. This might explain why connectedness was predicted by different factors in the four spatial frameworks. Indeed, our results are in line with the study

con ducted by Paolini et al. (2021). The authors investigated the relation between self-identification with different communities (Italians, Europeans, humankind), and other factors such as trust toward social and political actors, interdependent happiness, distress, and individual well-being during the first Italian lockdown. They found that Italians' identification at different levels, in particular with humankind, mediated the effects of trust on happiness, well-being and distress. Future studies will need to clarify the different meanings that the sense of connectedness can assume, and to clarify to which extent the results of this study can be generalized to different contexts.

Taken together, our findings have implications for the management of the pandemic and offer insights for future research on social connectedness. They are in line with evolution-based studies which have demonstrated how social organization and cooperation were essential for the survival of our species (Boyd & Richerson, 2009). Evolution-based explanations have also been provided in social neuroscience, by showing that neurophysiological mechanisms of social connectedness are related to health and well-being (Bzdok, & Dunbar 2020; Cacioppo & Patrick, 2008). Moreover, medical studies provide evidence of the efficacy of social connectedness in preventing pathologies and mortality (Egolf, Lasker, Wolf, & Potvin, 1992). Humanities speak also about the importance of togetherness or we-ness, as characteristics of stable communities and sociality (Szanto, & Moran, 2015).

Importantly, our results highlight the role of the space where sociality takes place. We suggest to consider different spatial scales (from personal and local, to global) in the investigation of social connectedness, in addition to the use of well-established standardized scales measuring close relationships (Berscheid, Snyder, & Omoto, 1989; Nitschke et al., 2020), or the frequency of social interactions (Bailey et al. 2018). The perception of humans as social beings cannot be detached from the space (physical or virtual) in which they are living and interacting. This issue has been widely analysed by phenomenology (Malpas, 2018), and ecological psychology (Menatti & Casado da Rocha, 2016). Nonetheless, it is worth noticing how in our hyper-globalized world, social connections do not depend necessarily on physical ways of keeping in touch; rather, they have different spatial frames, spanning from personal and local dimensions, to a global one. Adopting a *spatial* approach in this research area may shed light on needs and new possibilities of analysing and improving social connectedness.

Few additional findings should be also discussed. One of these concerns loneliness. The COVID-19 pandemic has been characterized by an unprecedented level of contagion and the diffused fear, elements that have endangered the very idea of staying in (physical) contact. This consideration might help to explain why, in our study, among the factors predicting social connectedness, loneliness was negatively associated with connectedness at a personal level. This finding allows to deepen the analysis of the idea of loneliness. Among the main typologies of loneliness – which is neither solitude nor isolation – we may find *intimate loneliness* (or emotional), which usually refers to a lack of a close partner or confident; *relational* (or social) *loneliness,* which is the lack of quality in friendships; *collective loneliness,* which is the feeling of being

alone in a community with respects to shared values, aims and social purposes (see Murthy 2020). During this pandemic, people may have experienced loneliness according to these three typologies and post-pandemic measures should consider these three aspects to reinforce people's well-being.

Interestingly, in our sample, young adults reported having felt lonelier as compared to older adults. Indeed, it has been shown how loneliness is a feeling largely experienced by contemporary young people (Batsleer & Duggan, 2020). This finding is also in line with other studies showing that during this pandemic young people have been identified as a vulnerable group regarding the risk of mental health changes and cognitive functioning issues (Fiorenzato et al. 2021). Factors such as intense exposure to media (which might generate also stress and anxiety), drastic reduction of the physical social interaction, and uncertainty about the future, should be considered to explain why younger people were less able to contrast loneliness during the lockdown.

Another interesting finding of our study concerns the fact that people were more worried to be contagious than to be infected, and this finding was independent of age (until 60 years old). This element, together with the above-mentioned finding about youthful loneliness, is in contrast with the differences between age groups, which seem to have been exacerbated by the current pandemic. Ageism is a phenomenon largely intensified during 2020 and 2021, as elderly people have been considered not only the main target of this virus, but also frail, and helpless. Researchers have urged to avoid 'the use of arbitrary age cut-off' in the management of the pandemic (Ayalon et al., 2020) and to foster the relations between young and old people to overcome ageism. Our study supports this view, showing that caring for others is an intergenerational trait calling for connectedness and solidarity against ageism.

Finally, this study has some limits which should be highlighted. The main limit of the study concerns the use of a questionnaire specifically designed for this purpose. This choice was motivated by the exceptionality of the pandemic: by aiming at investigating the exceptional experiences of pandemic and lockdown from a multidisciplinary perspective, we judged that creating a specific questionnaire would overcome difficulties in comparing the pandemic with previous existent literature on social connection. We know that avoiding the use of pre-existent scales from social or psychological studies strongly limits our conclusions. On the other hand, we believe that our alternative approach to the study of social connections and the observed findings can contribute to the discussion on the effects of pandemic, and open new perspectives for research in different fields, including psychology, sociology, and humanities. Also, the unselected sample and the peculiar pandemic scenario limit the possibility of generalizing the results. Nonetheless, overall, our findings are in line with previous studies on social connectedness and social support over and beyond the COVID 19 period (Jaspal & Breakwell 2021), contributing to increase evidence for the above mentioned proposed theories.

Taken together the results of this study have implication for the relationship between health and well-being, highlighting the importance of considering social relationships to improve well-being. These pandemic years have witnessed debates on medical evidence, treatments and vaccines, but

also unpredictable long-COVID outcomes (Subramanian et al. 2022). Medicine has recently underlined that social connection is a public health issue (Holt-Lunstad 2022). The medical framework on Social Determinants of Health show how social relationships are directly related to health and well-being outcomes (Solar & Irwin 2010; Committee on Educating Health Professionals to Address the Social Determinants of Health, 2016). Scholars also claim that social factors should be considered as having a causal role in health outcomes and not simply a mere correlation (Kelly, Kelly & Russo 2014). Policies on future pandemics may thus consider how preventive measures, such as lockdowns, impact individuals' and communities' social relationships unequally, e.g.: "whether restrictions on social events are equitable across age group, religious/ethnic groupings and social class, and also to ensure that the language promoted by such policies (e.g., households; families) is not exclusionary" (Long et al. 2022: 130). Furthermore, attention should also be paid to the spatial possibilities of social interaction during pandemics. The understanding of the airborne nature of the COVID-19 goes for the promotion of open-air interaction during social-distancing measures (Polianski 2021, Labib et al. 2021), as well as the implementation of architecture interventions in order to promote social exchanges while reducing the circulation of virus in communal spaces (Menatti, Bich & Saborido 2022).

Conclusion

This study sheds light on social distancing, social relationships and connectedness during the first COVID-19 lockdown but has implications for the post-pandemic scenario, as well as for health and well-being in everyday life. COVID-19 has been a disrupting event, with political and social polarities (Farias & Pilati, 2021), as well as negative psychological effects. Despite this, our findings do not necessarily describe a 'COVID-19 fatigue' (Jetten, 2020: 6; Harvey, 2020). Rather, we have found that, despite social distancing and lockdown measures, some people improved their social interactions. This improvement resulted in an amelioration of the sense of connectedness, by helping to contrast worries about the future. In this sense, we have highlighted the capacity of people to *adapt* during the first lockdown, in line with research demonstrating that appealing to responsibility and caring for the others has been fruitful to improve the respect of social distancing rules and the protection of their own/others' health (Jetten et al. 2020; Shigeto, Laxman, Landy & Scheier 2021). The need to connect, to matter, and to belong, has been described as an essential human need (e.g., Lee & Robbins, 1995), and it has been consistently associated with health and well-being (e.g., Egof et al., 1992; Lee & Robbins, 1998; Lee, Draper, & Lee, 2001): this need should be promoted from a local to a global scale, to foster well-being and faith in the future, among individuals, as well as among societies. The need to connect should therefore be taken into account for future public health policies with respects to pandemics and lockdowns.

Notes

[1] For the Italian data we did refer to:

http://www.salute.gov.it/portale/nuovocoronavirus/homeNuovoCoronavirus.jsp

https://opendatadpc.maps.arcgis.com/apps/opsdashboard/index.html#/b0c68bce2cce478eaac82fe38d4138b1

For the French data we did refer to:

https://www.coronavirus-statistiques.com/stats-globale/nombre-de-cas-coronavirus-par-region-par-departement/#dptmmetropolitain

https://www.gouvernement.fr/info-coronavirus/carte-et-donnees

For the Spanish data we did refer to:

https://www.mscbs.gob.es

https://www.mscbs.gob.es/profesionales/saludPublica/ccayes/alertasActual/nCov/situacionActual.htm

[2] During the lockdown the use of masks was strongly suggested, yet its use was not compulsory. The number of masks was also scarce and many governments (e.g. France) decided that the few stocks of masks available would be preferably meant for the health professionals. Only after the lockdown the use of the mask become compulsory. In Spain it was compulsory on public transportation starting the 4th of May 2020, but at the end of May 2020 the obligation was applied to closed spaces and in outdoor spaces where two-meter safe distances could not be respected (https://www.lamoncloa.gob.es/covid-19/Paginas/uso-mascarilla-nueva-normalidad.aspx). In Italy the use of the mask was compulsory starting 26th of April 2020 indoors and outdoors where social distancing was not guaranteed (http://www.salute.gov.it/portale/news/p3_2_1_1_1.jsp?lingua=italiano&menu=notizie&p=dalministero&id=4722). Starting September 2020, the obligation was extended to every indoor space (public and private, also at home if presence of persons who are not cohabitants), outside, on public transportation, in schools, commercial facilities etc. In France, wearing the mask was compulsory in public indoor spaces starting May 10th 2020. In the following months the obligation was progressively extended to open spaces on the basis of regional decisions (https://www.gouvernement.fr/info-coronavirus/les-actions-du-gouvernement). In addition, questions such as the typology of mask, the fabric, the possibility of re-using it or not, have generated an important debate since the start of the pandemic, following the diffusion of the research on the transmission of the virus, such as via droplets or aerosols.

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