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Running title: HOW SPANISH PEOPLE FEEL ABOUT COVID-19

Could Attitudes Toward COVID-19 in Spain Render Men More Vulnerable Than Women?

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Abstract

The COVID-19 pandemic affects the whole world. Spain is 3rd in the world and 2nd in Europe with largest number of diagnosed cases. Spanish citizens' attitudes are important in controlling the pandemic. This research assessed key attitudes of the Spanish people toward COVID-19. One study (n =64) was conducted in a shopping centre in Madrid and another (n= 640) online. The results of both studies suggest that women in Spain have a 'more responsible' attitude toward the COVID-19 than men. Young adults (18-25 years) appear to perceive less threatening the epidemic than older adults. Spanish people's personal concern about COVID-19 is less than their perceived social alarm about it. Compliance is the strongest predictor of the approval to stay at home, which is the highest rated preventive measure by the Spanish people. These results might help policy makers in targeting public attitudes which could play an important role in the exponentially rising cases of COVID-19.

Key words: Adults, Coronavirus, Epidemic, Morbidity, Virus

Introduction

The outbreak of the novel coronavirus disease 2019 (COVID-19) on March 11, 2020 was described as a pandemic by the World Health Organization's Director General [1]. Spain is the fourth most affected nation in the world, but it is the second after Italy in Europe with 39,673 confirmed cases and 2,696 deaths on March 25, 2020 [2]. On March 14, the Spanish Government declared a nationwide lockdown ordering people to stay at home [3]. At the time of writing the number of confirmed cases COVID-19 keeps increasing in Spain (56,188 diagnosed and 4,089 deaths [4] and also in Europe with 232,470 confirmed cases and 13,692 deaths [5]. Nearly 25% of all the European cases were confirmed in Spain.

Given that currently there is no treatment for, or vaccine against, the new coronavirus, prevention is not only the best, but the sole alternative, in battling the pandemic [6]. Governments' actions in introducing regulations that limit the contact between people to prevent transmission could be the most realistic solution in halting the spread of the virus [7]. However, people's response to these regulations, reflected in their level of compliance and perception of the seriousness of the problem, is the determinant factor in health authorities' struggle in containing the pandemic. Regular washing of the hand and staying home are paramount preventive measures in fighting COVID-19 [8]. However, despite widely publicized information and knowledge, people do not maximize the available preventive measures as revealed in a large-scale survey during the malaria epidemic in Indonesia [9]. People's knowledge and attitude toward the existing preventive measures in battling COVID-19 is crucial in Spain where the disease spreads at exponential rates, claiming several hundreds of lives daily, at this very moment.

The most effective means of fighting the pandemic is by limiting contact between the people which among several others involves staying at home whenever possible [10]. The new discipline requires major and sudden change in the habitual lifestyle of most individuals in most nations [11]. Considering the Behavioral Immune System (BIS) theory [12] at the time of a pandemic people might generate negative feeling states or emotions such as tension, fear, anxiety as a result of the negative appraisal of the situation and self-protection [13]. On the other hand, people may use denial in an attempt to protect themselves from the sudden and major lifestyle changes required by the surfacing threat. The Risk Denial Theory (RDT) posits that cognition (as means of rationalization) is used for defending risky behaviours by justifying one's actions (risky behaviours) to convince the self, prior to anybody else [14]. Given that the COVID-19 pandemic had a relatively slow onset in Spain with less than 100 cases in early March which was followed by a continuous increase reaching exponential rates at the time of writing [15], it can be conjectured that the RDT might explain people's attitudes in the early phase of the pandemic with a progressive shift that will mirror the BIS theory.

The objective of the current work was twofold. First, we wanted to gauge the attitudes of people going to shopping centre in Madrid the day after the Spanish government declared a lockdown and asked its citizens to stay at home. This period can be considered as a transition into a higher level of threat posed by COVID-19. Among others, people's perception of social alarm, personal concern, and perceived need to stay at home (in line with the government's request) were measures of key interest. Second, we tried to assess the attitudes of a larger and more heterogenous sample across Spain in this crucial moment of the declaration of pandemic by the WHO. To obtain data rapidly, the first aim was achieved by conducting a face-to-face study and the second by using an online survey. We predicted that the lockdown of Spain and the declaration of the pandemic will mirror high concern and conforming attitudes.

Study 1

Methods

Study 1 was performed in a large suburban shopping centre in Madrid, Spain. The first author collected the data in person by adopting systematic randomization, which consisted of asking every third person entering the main entrance of the shopping centre whether she or he would be willing to answer a few questions about the corona virus situation. Response rate was 64%. Participation in the study was anonymous and voluntary, and it was totally in accord with the Declaration of Helsinki for conducting research with human participants [16]. Only volunteers who could affirm that they were aged 18 years or over at the moment of the study were eligible for participation. The whole duration of data collection was about 4 hours.

Consenting participants ($n = 64$) were asked about their age ($M = 38.47$, $SD = 13.21$, range 18 to 72 years), gender (33 men, 31 women), education level (university graduate [$n = 34$], student [$n = 27$], and other/vocational training [$n = 3$]), whether they know: a) someone who is infected with the coronavirus (9 yes, 55 no), and b) someone at high risk (i.e., older person and/or individual with chronic disease; 50 yes, 14 no). Subsequently, the participant was requested to rate her/his 1) *personal concern about the COVID-19*, 2) *perceived social alarm*, 3) *personal knowledge*, 4) *perceived control*, 5) *compliance with safety measures*, and 6) *perceived need to stay home* (which was a measure requested by the Spanish government the day before the study), on a rating scale from 0 (lowest possible) to 10 (highest possible). We employed an 11-point scale because it was demonstrated that it has higher sensitivity and it is also nearer to interval level of scaling and normality than scales with other ranges [17]. The above listed six questions formed the dependent measures in Study 1. The face-to-face survey lasted from 3 to 5 minutes.

The obtained data were grouped on the bases of gender, age (18-25 [n = 15], 26-50 [n = 37], and 51-72[n = 12] years), level of education, and knowledge of 1) infected person, and 2) a person at high risk. Before the data analyses, the normal distribution of the six dependent measures was tested with the Kolmogorov-Smirnov and Shapiro-Wilks tests. All tests results were statistically significant, indicating that the assumption of normality was violated in the data ($p < .005$ for all tests). Consequently, nonparametric tests were used. Within-participants data (i.e., differences between the response categories) were tested with the related-samples Wilcoxon Signed-Ranks test. Group differences in the six dependent measures were tested with the nonparametric Mann-Whitney U test, which is recommended for smaller samples and might be less sensitive to sample size differences between the groups [18]. In case of three groups (i.e. age-groups), the Kruskal-Wallis H test, also known as the analysis of variance on ranks, was used.

Results

First, to obtain a general picture about the attitudes toward the COVID-19 of the people attending a shopping centre the day after the government requested the Spanish population to stay at home, we visually examined the mean responses in the six measures (Figure 1). These findings suggested that the perceived social alarm was greater than the personal concern about the virus, which was also justified by the Wilcoxon Signed Ranks test, which confirmed that the former was statistically significantly higher ($Z = 6.359$, $p < .001$, effect size [r] = .56) than the latter (Figures 2A and 2B). In fact the perception of social alarm was significantly higher than the ratings of the other dependent measures as well: perceived personal control ($Z = 6.144$, $p < .001$, $r = .54$), perceived knowledge about COVID-19 ($Z = 6.208$, $p < .001$, $r = .55$), compliance with safety measures ($Z = 4.984$, $p < .001$, $r = .44$), and the need of staying at home to prevent the spread of COVID-19 ($Z = 3.905$, $p < .001$, $r = .35$; refer to Figure 1.)

Insert Figure 1 and Figures 2A and 2B about here

Next, gender differences were examined. The Mann-Whitney U tests revealed that women reported statistically significantly ($Z = 2.60, p = .009$, effect size (Eta squared [η^2] = .11) greater perceived control ($M = 7.58, SD = 1.36$) than men ($M = 3.42, SD = 1.68$). No other gender differences emerged in the examined variables. Further, no differences were found in any of the measures in conjunction with the level of education and knowledge of an infected person. Individuals knowing someone being at high risk agreed more with staying at home during the pandemic ($M = 8.26, SD = 1.72$) than those who did not know such person ($M = 6.57, SD = 2.59$) and the difference was statistically significant ($Z = 2.39, p = .017, \eta^2 = .09$). Finally, differences in age groups emerged in two variables, namely in *the compliance with safety measures* ($\chi^2(2) = 7.90, p = 0.019$), with a mean rank of 23.93 for young adults (18 - 25 years), 35.65 for adults (26 - 50 years) and 37.25 for ageing adults (50 - 72 years) and *the perceived necessity to stay home* ($\chi^2(2) = 7.08, p = 0.029$), with a mean rank of 23.63 for young adults, 32.89 for adults, and 42.38 for ageing adults. In the former measure, the young adults differed from the two other groups who did not differ from each other, and in the latter measure young adults only differed from ageing adults. Descriptives of these variables, along with the results of the Mann-Whitney pairwise comparisons, are illustrated in Table 1.

Insert Table 1 about here

Given that *staying at home* is a principal means of controlling the quick spread of the pandemic, we examined the extent to which age, gender, knowing someone infected, knowing someone at high risk and all dependent measures could predict the attitude toward the need of staying home with a stepwise linear regression. We found that three variables explained a significant proportion of the variance in the perceived need of staying home ($F(3, 60) = 10.51, p < .001, R^2 = .587, R^2 \text{ adjusted} = .312$). The results revealed that the level of compliance had

the largest contribution to the model (Beta [β]= .417, $t(63) = 3.96$, $p < .001$), next knowing someone at risk ($\beta = -.370$, $t(63) = 3.46$, $p = .001$), and finally knowing someone infected also contributed significantly to the regression equation ($\beta = .280$, $t(63) = 2.61$, $p = .012$).

What did we learn from Study 1?

Study 1 was a pilot work providing tentative data that yielded a good starting point for a quick follow-up with a larger scale cross-sectional inquiry. What we learned from Study 1 is that individuals going out shopping, the day after the government asks them to remain at home, perceive social alarm higher than any other measures that may be related to the slowing down of the epidemic, including concern, control, compliance, knowledge and the need of staying at home. Thus, despite thousands of COVID-19 cases and hundreds of deaths have reported at the time of the study, participants thought (based on their answers) that social alarm is not in proportion with their level of concern. Indeed, the results of this pilot research show that the participants expressed a relatively *low concern* toward the pandemic (shortest horizontal bar on Figure 1). In this measure the respondents' mean score was under 7, not reaching the 2/3 of the possible maximum. As illustrated in Figures 2A and 2B, the area above the median (5) of the Likert scale, depicting the profile of individual responses, is *at least twice as large* in the perception of social alarm than the area reflecting personal concern.

At the time of the study young adults (18 - 25 years) appeared to be less concerned about the compliance with preventive measures and towards the need of staying home than adults and older adults. Furthermore, women seemed to report greater perceived control than men, that might be a major issue considering that more men appear to be affected by COVID-19 than women [21]. Finally, a relatively large proportion of the variance in the perceived need to stay at home was predicted by the compliance with safety measures, knowing someone at high risk, and knowing a person who is already infected by the virus. This

information might be useful in developing measures to enhance compliance with staying home, which is the most effective method in delaying and/or decreasing the epidemic [6].

Study 2

Methods

This study was performed online using the Spanish Google Forms internet platform (<https://www.google.es/intl/es/forms/about>). The call for participation in the study was made on social networks including Facebook, Twitter and LinkedIn. Criteria for participation was that respondents be aged 18 years or over and reside in Spain at the time of the study. Those who completed the online survey by doing so provided passive consent for participation. The study did not collect any personal data through which an individual could be identified, and it was totally voluntary. Data collection lasted for 3 days. During this period 773 responses were obtained. After eliminating the responses from those who were aged under 18 years ($n = 36$) and those responding from other countries ($n = 98$), the final data set comprised 640 eligible responses.

Like in Study 1, participants were asked about their age ($M = 31.99$, $SD = 11.52$, range 18 to 75 years), gender (386 men, 284 women), level of education (university graduate [$n = 331$], student [$n = 152$], and other/vocational training [$n = 157$]), whether they know: a) someone who is infected with the corona virus (92 yes, 452 no, and 94 unsure), and b) someone at high risk (i.e., older person and/or individual with chronic disease; 484 yes, 95 no and 61 unsure). Subsequently, the respondents were asked to rate their 1) *personal concern about the COVID-19*, 2) *perceived social alarm*, 3) *personal knowledge*, 4) *perceived control*, 5) *compliance with safety measures*, 6) *the perceived need to stay home* 7) *proper hand wash*,

8) *keeping 1.5m from other people in public places*, and 9) *using a mask*. The first six questions were identical to those in Study 1, while the last three were added as additional measures. Like in Study 1, all questions were rated on a 11-point rating scale from 0 to 10.

The data were grouped on the bases of gender, age (18-25 [n = 236], 26-50 [n = 356], and 51-75 [n = 49] years), level of education, and knowledge of a) infected person, and b) a person at high risk. While the assumption of normal distribution was not met, as based on the Kolmogorov-Smirnov and Shapiro-Wilks tests, violation of the assumption in large samples is usually considered to be tolerable especially because the employment of nonparametric tests in such samples is discouraged [18]. Therefore, the data obtained in Study 2 were analysed with multivariate analyses of variance (MANOVA). Regression analysis was also performed.

Results

Like in Study 1, to visualize the attitudes toward the COVID-19 of 640 people across Spain, we graphically illustrated the mean responses to nine (9) measures (Figure 3). Then we performed a within-subjects analysis of variance to examine the differences in the rating of the nine dependent measures. This test was statistically significant ($F(8, 5112) = 805.34, p < .001$, effect size (partial Eta squared [η^2_p]) = .558). We were particularly interested in the difference between perceived social alarm and the other measures, which were statistically significant in Study 1. The Bonferroni-corrected pairwise comparisons revealed that the rating of the perceived social alarm was greater than that of six other measures ($p < .001$; see Figure 3), while it did not differ from the perceived need of proper hand washing and it was statistically significantly *lower* than the perceived need to stay at home ($M = 8.22, SD = 1.69$ vs. $M = 8.88, SD = 1.70$). Unlike in Study 1, in the current online study (performed within 5 days after Study 1), the perceived need to stay at home to avoid the spread of the disease has received the highest rating that differed statistically significantly ($p < .001$) from the rating of

all other questions. However, like in Study 1, the reported personal concern ($M = 6.81$, $SD = 2.19$) was still lower than the perceived social alarm ($M = 8.22$, $SD = 1.69$). The individual response profiles are illustrated in Figures 4A and 4B for comparison purposes with those seen in Study 1.

Insert Figure 3 and Figures 4A and 4B about here

We used a multivariate analysis of variance to examine the gender differences in the nine dependent measures. Based on the Pillai-Bartlett trace multivariate statistic, which was suggested to be the least sensitive to unequal sample sizes and heterogeneity of covariances [19] (Tang & Algina, 1993), this first MANOVA resulted in a statistically significant multivariate effect for gender (Pillai's trace = .036, $F[9, 629] = 2.59$, $p = .006$, $\eta^2_p = .036$). The univariate tests revealed that men and women differed statistically significantly in four out of nine measures: personal concern, compliance with safety measures, exercising proper care to wash hands, and in keeping at least 1.5 m distance from others in public places. These results are summarized in Table 2.

Insert Table 2 about here

Another MANOVA, examining the differences between those who knew an infected person and those who did not, was also statistically significant (Pillai's trace = .041, $F[9, 536] = 2.52$, $p = .008$, $\eta^2_p = .041$). The univariate tests showed that the two groups differed in three out of nine dependent measures including: a) personal concern ($F[1, 544] = 4.03$, $p = .045$, $\eta^2_p = .007$), with those people who knew an infected person ($n = 92$) scoring higher ($M = 7.18$, $SD = 2.05$) than those who did not know ($n = 454$) such an individual ($M = 6.67$, $SD = 2.26$)¹, b) knowledge about COVID-19 ($F[1, 544] = 4.56$, $p = .033$, $\eta^2_p = .008$), with those knowing

¹ The degree of freedom is lower because those who were "unsure" were not included in this analysis.

an infected individual scoring higher ($M = 7.32, SD = 1.51$) than those not knowing such an individual ($M = 6.91, SD = 1.67$), and c) keeping the 1.5 m distance from others ($F[1, 544] = 5.61, p = .018, \eta^2_p = .010$) with those who knew an infected person scoring higher again ($M = 7.33, SD = 2.56$) than those who did not know such a person ($M = 6.65, SD = 2.49$).

While the MANOVAs comparing those knowing someone at high risk with those who did not know such an individual and the one considering education level were statistically not significant, the MANOVA comparing the three age groups on the nine dependent measures resulted in a statistically significant multivariate effect (Pillai's trace = .081, $F[18, 1260] = 2.97, p < .001, \eta^2_p = .041$). The univariate tests revealed that the three age groups differed in five out of the nine measures: personal concern, compliance with safety measures, exercising proper care to wash hands, in keeping at least 1.5 m distance from others in public places, and wearing a mask all the time. The univariate tests, along with the descriptive statistics, are summarized in Table 3.

Insert Table 3 about here

A stepwise regression analysis, replicating the one performed in Study 1 and testing the predictors of the crucial measure of controlling the epidemic (i.e. staying at home), resulted in a statistically significant regression equation ($F(4, 635) = 64.82, p < .001, R^2 = .538, R^2$ adjusted = .285). Four measures contributed to the statistically significant model. Personal concern yielded the largest contribution ($\beta = .322, t(639) = 8.97, p < .001$), next compliance with preventive measures ($\beta = .199, t(639) = 4.99, p < .001$), further keeping 1.5 m distance from others ($\beta = .169, t(639) = 4.19, p < .001$), and finally perceived social alarm contributed significantly but inversely to the model ($\beta = -.071, t(639) = -2.11, p = .035$),

Finally, because six questions were identical in Study 1 and Study 2, and since the two samples differed in the means of responding, we compared their responses on the dependent

measures examined in Study 1. The MANOVA² resulted in a statistically significant group effect (Pillai's trace = .085, $F[7, 696] = 9.18, p < .001, \eta^2_p = .085$). The univariate analyses revealed that the differences emerged in *age* ($F[1, 702] = 17.91, p < .001, \eta^2_p = .025$), with the online respondents being younger ($M = 31.99, SD = 11.52$ years) than the shopping centre attendees ($M = 38.47, SD = 13.21$ years), in *perceived social alarm* ($F[1, 702] = 19.59, p < .001, \eta^2_p = .027$), with the online respondents scoring lower ($M = 8.22, SD = 1.69$) than the shopping centre attendees ($M = 9.17, SD = 1.03$), and in the *need to stay at home* during the epidemic ($F[1, 702] = 23.62, p < .001, \eta^2_p = .033$), with the online respondents scoring higher ($M = 8.99, SD = 1.69$) than the respondents from the shopping centre ($M = 7.89, SD = 2.05$).

What did we learn from Study 2?

This larger scale cross-sectional study surveyed volunteer respondents across Spain in contrast to Study 1 which tested a lower number of participants attending a shopping centre in Madrid. Thus, the means of sampling, and very likely the venue of sampling (presuming that most online respondents participated from home), was different between the two surveys. Although there were only a few days difference between the data collection in the two studies, which nevertheless might have affected the answers, the two samples differed in their views on the need to stay at home and in their personal concern about COVID-19. The older sample going out shopping in Madrid on the day after the Spanish government requested people to stay at home perceived greater social alarm associated with the pandemic and lesser need to stay at home than the younger online respondents.

Study 2 as an expansion of Study 1 contained three additional dependent measures, and 10 times more respondents. Like in Study 1, we revealed again that young adults (18 – 25

² Due to the large difference in the size of the two groups, we also performed Mann-Whitney U tests, which yielded identical results.

years) might have the ‘most relaxed’ attitudes towards the pandemic, which is a finding that reflects the factual public information concerning the lowest health threat of COVID-19 to this age group [20]. Partially replicating the findings from Study 1, women differed from men in four out of nine measures including personal concern, compliance with safety measures, exercising proper care to wash hands, and in keeping at least 1.5 m distance from others in public places. In all instances, women scored higher than men (refer to Table 2), which might reflect a more responsible attitude of women toward the dangers associated with the pandemic in contrast to men. While speculative at this time, it cannot be totally ruled out that a greater concern may also be related to some extent to the lower cases of fatalities in women than in men [21]. Finally, a relatively large proportion (28.5%) of the variance in the perceived need to stay at home was predicted by four measures including concern about COVID-19, compliance with safety measures, keeping distance from others and in an inverse direction perceived social alarm. These findings expand those obtained in Study 1 during the course of the face-to-face survey and could be useful in developing and/or implementing measures to reinforce compliance with staying home, which, as noted earlier, is believed to be the most effective method in delaying and/or decreasing the epidemic [6].

We also found in Study 2 that knowing an infected person might be related to slightly higher concern, in at least some of the measures, than not having an infected person in one’s social entourage. People knowing an infected person scored higher on personal concern, knowledge about COVID-19, and in maintaining at least 1.5 m distance from others in public places. Like in Study 1, we found no differences in function of the education level in any of the measures. However unlike in Study 1, where people knowing a person at high risk agreed more to staying home than those who did not such an individual, in Study 2 the knowledge of a person at high risk did not make a difference in responses.

General Discussion

The two studies reported here were performed at the time of transition from lower to higher national threat of COVID-19 and the WHO's declaration of the pandemic. The results show that in this period Spanish people's personal concern about the threat was lower than their perceived social alarm. This finding has emerged from both, the local face-to-face study and the country-wide online survey. The discord between these two measures might suggest that at the crucial time in the etiology of the pandemic Spaniards still had a "make a mountain out of a molehill" [22] attitude toward COVID-19. Such an attitude is consistent with the Risk Denial Theory [13], suggesting that at the time of these studies the fast shift in the course of development of the pandemic was not immediately followed by a shift in people's attitudes. Probably more time is needed for the realization and internalization of the significant threat and for the build-up of emotions like fear and anxiety [12], which eventually triggers high personal concern conforming to the prediction of the BIS theory [11].

There are several reports suggesting that men are at higher risk of COVID-19 than women [21]. This tendency is sadly reflected by the twice as many male mortalities, in contrast to female mortalities, in Spain [23]. However, there is no clear explanation provided for this phenomenon despite the conjecture that estrogen might have a protective effect in women and that men have a greater number of co-morbidities in COVID-19 cases than women [24]. Our results from Study 1 showed that women report greater perceived control than men. Further, findings from Study 2 reveal that women report greater concern about the pandemic, higher compliance with safety measures, greater care about washing hands, and stricter attitude towards keeping distance from others in public places in contrast to men. These differences in attitudes suggest that women appear to take the threat more seriously or with greater concern, as well as with greater adherence to preventive measures, than men which could be related to the lower incidence of COVID-19 in women compared to men [23].

The *attitude hypothesis* merits special consideration in light of the fact that cross cultural differences in number of cases vary from one culture to another. For example, while in Italy about 15% more cases were noted in men on March 26, 2020 [25] on the same day in South Korea about 22% more COVID-19 cases were registered in women [26]. Consequently, biological differences might not be the sole reason for the generally reported greater prevalence of COVID-19 in men than in women, The here observed differences in the attitudes of the two sexes might suggest that men could be more vulnerable to COVID-19 than women due to their lesser realization of the threat posed by the epidemic, in addition to any other biological or medical differences.

Age group differences also emerged in both studies. Young adults (18-25 years) scored lower on compliance with safety measures and the need to stay at home than the older groups in Study 1. They also scored lower on personal concern, compliance with safety, hand wash, keeping distance and wearing mask from older adults. Briefly, this age group appeared to have the most ‘relaxed’ attitude, which could be expected based on statistics, repeatedly and consistently presented in the media, showing that the risk of complication is significantly lower in this age group than in older adults [27]. Despite the validity of the information, this attitude is dangerous to older adults who are likely to develop greater complications than youngsters [20]. Policy makers and the public media should educate and warn this age group about the dangers of their ‘more relaxed’ attitudes to others.

In Study 1 respondents who knew someone infected agreed more to the need of staying at home than those who did not know such a person, but these findings did not emerge in Study 2, The incongruence between the results of the two studies might be related to the different samples as well as to the fact that in Study 1 only nine people knew somebody affected by the virus. Indeed, the two samples differed in age, perceived social alarm and perceived need to stay at home. The people in Study 1, attending a shopping centre, were

older and perceived greater social alarm around COVID-19 than the online respondents. Their attitude, along with lower rating of the need to stay at home, might reflect the justification of their behaviour at the moment of participation manifested by the fact that they went shopping despite the government's request to stay home.

Staying at home is the best means of avoiding contact with others [6]. In Study 1 the of staying home was rated lower than the perceived social alarm, but this was in the opposite direction in Study 2. Again, the difference between an online and a real-life shopping sample might explain the observed difference. However, the predictors of this measures were also different in the two studies. In Study 1, a higher rating was associated with knowing someone at risk, someone affected by COVID-19 and the level of compliance, which all together explained 31.2% of the variance. The strongest predictor was compliance, which emerged as a significant predictor in Study 2 as well. However, in Study 2 personal concern, keeping 1.5 m distance from other and social alarm (inversely) explained somewhat less variance (28.5%) in the need to stay at home. Taken together these results, it appears that the perceived level of compliance may be strongly related to the approval of the need to stay at home. Therefore, compliance-enhancing strategies may lead to less violation- and better acceptance of the government regulation currently in effect to keep people staying at home. Nonetheless, as seen in these studies, compliance is lower in younger adults and men, which shows that interventions must target these segments of the population as soon as possible.

Limitations

The here reported studies provide a general picture about the COVID-19 pandemic in Spain, which is the 3rd most affected nation in the world at the time of writing. These studies are not without limitation. For example, the sample size in Study 1 was small since out of the nearly 100 people approached only 64 agreed to take part in the study. The respondents could

represent those taking a necessary risk to go shopping at time of lockdown. Their responses in the real-life environment, in which Study 1 was conducted, might contain ‘excuses’ to justify their unconformity with the government’s demand, which is traceable to the Hawthorne effect [28]. The six measures in Study 1 complemented by three others in Study 2 were selected on the basis of most frequently raised media issues rather than a theory. While the novelty of the situation could justify these choices, probably there are several other issues that might have merited attention in the assessment of the public attitudes in Spain at the time of the work. Further, like in their studies with humans, volunteerism is another limitation that could affect the findings. We are not sure how “non-volunteers” would have responded to our questions. Finally, our delimitation to collect data for 3 days only could also be perceived as a limitation; our findings are the momentary reflection of Spaniards’ attitudes at the time of transition from group infection to mass infection.

Main Conclusions

1. Women in Spain appear to project a more responsible attitude toward the COVID-19 pandemic than men.
2. Young adults (aged 18 - 25) perceive the least threatening the epidemic in Spain.
3. Personal concern about COVID-19 is lower than the perceived social alarm.
4. Compliance is the best predictor of the approval of staying at home during the threat.
5. Among several preventive measures staying at home is the most- while wearing a mask is the least-approved.

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Table 1. Descriptive statistics and Mann-Whitney U test results of the pairwise comparisons of two dependent measures for which a statistically significant Kruskal-Wallis test result was found.. Values are by age groups, also showing the effect sizes, Eta squared (η^2).

Measures	Age Groups (a, b, c)	n	Mean (\pm SD) (The maximum score is 10)	Pairs Compared	Z	p (η^2)
Compliance with safety measures	a. 18-25	15	6.73 (1.89)	a-b*	-2.66	.008, 0.11
	b. 26-50	37	7.92 (1.64)	a-c*	-2.18	.029, 0.08
	c. 51-72	12	8.08 (1.56)	b-c	-0.31	.757, 0.01
Perceived necessity to stay at home	a. 18-25	15	6.73 (2.63)	a-b	-1.72,	.085, 0.05
	b. 26-50	37	8.03 (1-74)	a-c*	-2.45	.014, 0.10
	c. 51-72	12	8.92 (1.51)	b-c	-1.66	.097, 0.04

Note: * = Statistically significant.

Table 2. Descriptive statistics (M, SD) and the results of the univariate tests comparing the answers, on a 0 to 10 rating scale, of men and women on nine dependent measures.

Measure	Men <i>n</i> = 356	Women <i>n</i> = 284	<i>F</i>	<i>p</i>	η^2_p
Personal concern about COVID-19	6.58 (2.25)	7.08 (2.08)	8.32	= .004*	.036
Perceived social alarm	8.22 (1.71)	8.23 (1.66)	0.01	= .925	.002
Personal knowledge	6.88 (1.71)	7.02 (1.69)	1.06	= .304	.007
Perceived level of control	7.02 (1.91)	7.20 (2.01)	1.41	= .235	.007
Compliance with safety measures	7.46 (1.91)	8.06 (1.70)	17.36	< .001*	.028
Perceived need to stay home	8.88 (1.70)	9.12 (1.68)	3.15	= .076	.007
Proper care to wash hands	8.25 (1.92)	8.77 (1.59)	13.45	< .001*	.027
Keeping 1.5m from others	6.56 (2.61)	7.16 (2.31)	9.21	= .003*	.042
Using a mask for protection	1.82 (2.88)	1.95 (3.11)	0.29	= .591	.015

NOT: * = Statistically significant

Table 3. Descriptive statistics (M, SD) and the results of the univariate tests comparing the three age groups on nine dependent measures.

Measure	18 - 25 yrs ^a <i>n</i> = 236	26 - 50 yrs ^b <i>n</i> = 356	51 - 75 yrs ^c <i>n</i> = 48	<i>F</i>	<i>p</i>	η^2_p
Personal concern about COVID-19	6.27 (2.20) ^{b,c}	7.10 (2.15)	7.27 (1.97)	11.83	< .001*	.036
Perceived social alarm	8.27 (1.64)	8.22 (1.70)	8.22 (1.69)	0.517	= .597	.002
Personal knowledge	6.75 (1.64)	7.06 (1.67)	6.94 (2.04)	2.40	= .092	.007
Perceived level of control	6.94 (1.99)	7.15 (1.92)	7.56 (1.96)	2.24	= .107	.007
Compliance with safety measures	7.36 (2.08) ^{b,c}	7.89 (1.67)	8.33 (1.49)	9.07	< .001*	.028
Perceived need to stay home	8.81 (1.75)	9.10 (1.68)	9.02 (1.45)	2.11	= .122	.007
Proper care to wash hands	8.14 (2.03) ^{b,c}	8.62 (1.68)	9.15 (1.03)	8.81	< .001*	.027
Keeping 1.5m from others	6.18 (2.75) ^{b,c}	7.14 (2.29)	7.69 (1.99)	14.11	< .001*	.042
Using a mask for protection	1.48 (2.62) ^c	2.03 (3.13)	2.77 (3.28)	4.76	= .009*	.015

NOTE: * = Statistically significant. Superscripts denote the group(s) from which young adults differ statistically significantly ($p < .05$) based on post-hoc Bonferroni corrected tests. These tests yielded statistically no significant differences between adults (26 - 50 years) and ageing adults (51 -75 years) in any of the measures.

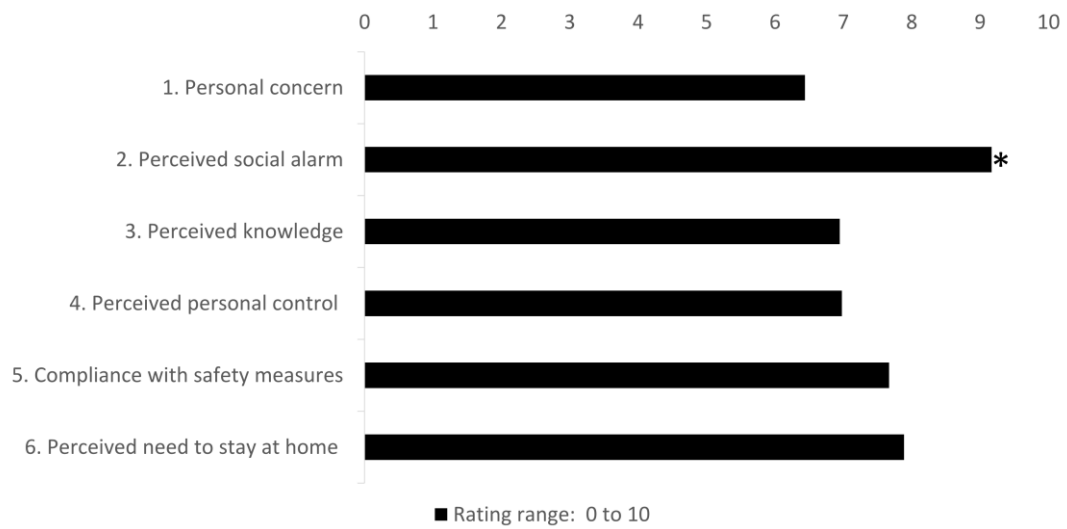


Fig. 1 Mean responses (out of 10 possible) on six measures reflecting attitudes toward the spread of COVID-19 in people ($n = 64$) attending a shopping centre in Madrid the day after the Spanish government requested its citizens to stay at home. The perceived social alarm (2; marked with a star) was rated significantly higher than all the other dependent measures

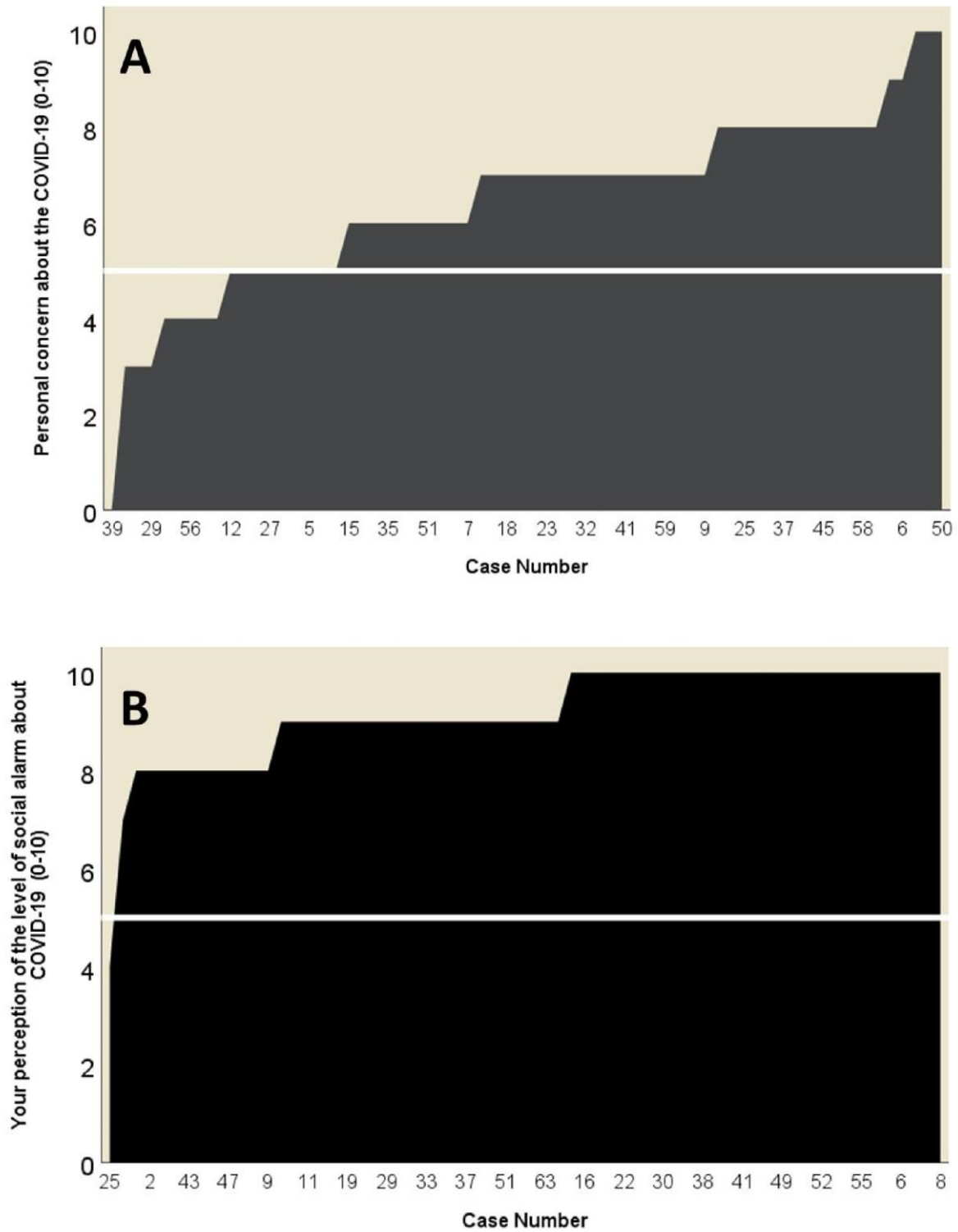


Fig. 2 A. Profile of individual ratings of personal concern about COVID-19; B. Profile of perceived social alarm about COVID-19. In both graphs the white line reflects the middle (0-10 Liker scale's median) level. Face to face study in a shopping centre in Madrid (n = 64)

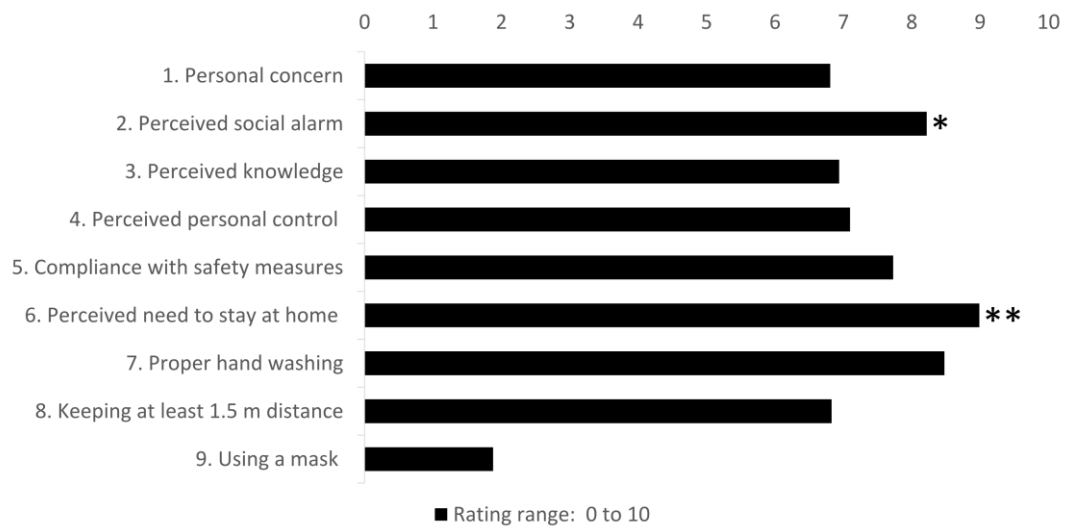


Fig. 3 Mean responses (out of 10) possible on nine issues reflecting attitudes toward the spread of COVID-19 in Spain based on an online survey (n = 640). The social alarm (marked with one star) was rated significantly higher than six other dependent measures, while it did not differ from proper hand washing (7) and it was lower than the perceived need to stay at home (6; marked with two stars). The perceived need to stay at home (6) was rated higher than all the other measures ($p < .001$)

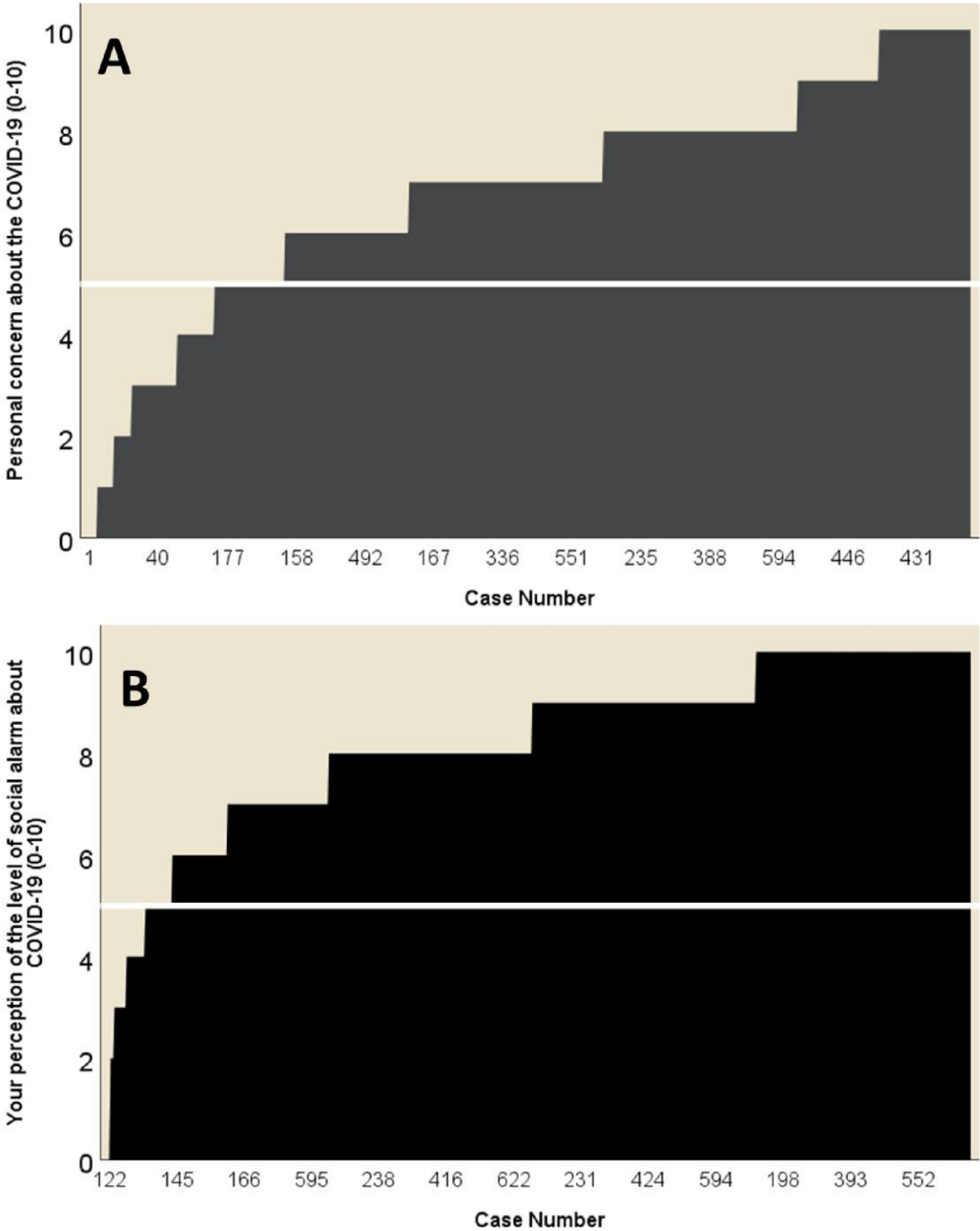


Fig. 4 A. Profile of individual ratings of personal concern about COVID-19; B. Profile of perceived social alarm about COVID-19. In both graphs the white line reflects the middle (0-10 Liker scale’s median) level. Online study (n = 640)