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Protective health behaviors and fear of social isolation during the COVID-19 pandemic: a public opinion perspective

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ABSTRACT

When coronavirus disease (COVID-19) news along with protective health recommendations first came to people’s life, such ambiguous information became a public opinion. Performing protective behaviors can be regarded as an approval of the majority opinion as people have to alter their established health positions and practices. So far, the association between public opinion and protective health behaviors is unclear especially in the pandemic context. This study utilized a survey data collected between 1 and 10 April 2020 in Germany (n = 101), Austria (n = 261), Switzerland (n = 26), and China (n = 267). We compared the protective health behaviors between the Chinese and European participants, as well as examined the associations between the protective health behaviors, peer influence, and fear of social isolation. Protective health behaviors were found similar between Chinese and European participants, although being independent from peer influence and fear of social isolation were related to protective health behaviors in the Chinese sample. Our cross-national findings are consistent with previous studies, suggesting that both official and unofficial health communication show stronger influences in Asian populations. Findings from this study provide advice for public communication strategies to promote protective health behaviors during pandemics.

Introduction

Coronavirus disease (COVID-19) is infectious and respiratory, and its nonpharmaceutical prevention involves changes in interpersonal relationships. In the early stage of the COVID-19 pandemic, which was formally declared on 11 March 2020, public understanding of this disease was largely based on media with clinical knowledge that were unapproachable to general public (Zhao, 2021). Little research thus far has investigated how health information was perceived and followed by as a public opinion during the early stage of the pandemic.

Health information has been theorized as an important ‘cue to action’ in early (Becker & Maiman, 1975) and recent psychosocial models (for a review, see Sutton, 2015). With multiple uncertainties and relevance to the entire society – as opposed to personal relevance and self-efficacy that are usually stressed in psychosocial models – health
information may be more embedded in the contextual information in the society (Vos, 2021). Here, we employ the spiral of silence theory (Noelle-Neumann, 1974) to regard the COVID-19 preventive information as a perceived public opinion. As discussed by Noelle-Neumann (1993), public opinion serves a middle position which is open to and involved with everyone, and able to alter the norms.

At the beginning of the COVID-19 pandemic, while the health authorities like the World Health Organization provided frequent health information to the public, cross-national rules and norm against the disease were far from consistent (Singh et al., 2021). From the newly emerged health information to protective behaviors, one’s adaptation of such public option played a key role. According to the spiral of silence theory, one evaluates the discrepancy between one’s own opinion and the public opinion; once this discrepancy is too large, one would keep silent due to the fear of being isolated (Hayes et al., 2013; Noelle-Neumann, 1974). Consequently, fear of social isolation is a theoretically central concept in the spiral of silence theory and people would conduct appropriately in public lest they become the minority and receive social sanctions (Hayes et al., 2013; Neuwirth et al., 2007). The spiral of silence theory has been applied in the relationship between public opinion and individual health behaviors. For instance, unfavorable public opinions about smoking could facilitate one’s smoking cessation due to the fear of social isolation (Kim & Shanahan, 2003). It is thus assumed that a more hygienic public sentiment during the COVID-19 pandemic would give individuals pressure through fear of social isolation as the public opinion environment motivates preventive health behaviors.

A handful of studies have adopted the spiral of silence theory in the COVID-19 context (e.g., Ahmad Kamboh et al., 2022; Tawai et al., 2021), highlighting the risks of health communication via mass media especially in the online environment that is both homogenous and polarized (Hakobyan, 2020). However, previous research has not empirically tested the constructs related to this theory. Moreover, although the spiral of silence theory could explain the dynamics between the public opinion and people’s perceptions and behaviors, previous research also noticed that some personal traits such as communication style may be overlooked (Neuwirth et al., 2007).

Existing studies suggest that mistrust against official management is common during pandemics (Taylor, 2019) and it would undermine people’s intention to perform health protective behaviors such as vaccination and further treatments (Freeman et al., 2022; Knobel et al., 2022). Such official health information could be further undermined with journalistic narrations (see, Ahmad Kamboh et al., 2022). It is also known that, based on one’s understanding between individual and collective boundaries, community members have different confrontation methods to address the message about public health risks (Douglas, 1984). However, while coordinated and active health communication has been advised (Ratzan et al., 2020), little research has investigated whether individual’s compliance to official health guidelines is related to the fear of being isolated. Such fear is of high relevance to people’s perspective change (e.g., holding a high risk severity of COVID-19) and behavioral change (e.g., performing more protective behaviors such as washing hands) because people would need to make their economic efforts to both fit the majority opinion and avoid being deviated away from the norm (Noelle-Neumann, 1993).

Resistance to peer influence may affect one’s interpretation of health information. So far, this construct has been mainly used for adolescent risk-taking behaviors such as
substance use and self-harm behaviors (Heilbron & Prinstein, 2008; Prinstein et al., 2001). In line with other health behaviors, one’s resistance to peer influence during the COVID-19 pandemic may also promote one’s health protective behaviors. As has been empirically examined (Neuwirth & Frederick, 2004), peer influence is also compatible with the spiral of silence theory, wherein people could lose their assessment ability due to the conflicting opinions in the social milieu (Noelle-Neumann, 1993). Recent research similarly notes that stronger interconnections between smaller social groups could generate a ‘global spiral’ in wider society (Cabrera, Ross, Röchert, Brünker & Stiegitz, 2021). Moreover, underrepresented ethnic groups may be more susceptible to peer influence, according to research among adolescents (Gardner & Steinberg, 2005). It is important to compare whether this ethnic pattern shows consistency in protective behaviors during the pandemic. Furthermore, existing research on peer influence mostly used tests in dilemma or game situations. Risky situations during the pandemic may provide more realistic and ecological values to understand peer influence.

In this study, we used a dataset collected in April 2020, an early stage of the COVID-19 pandemic, among Chinese and European residents. Health protective behaviors (e.g., face mask wearing; Zhao & Knobel, 2021) are more performed by the public in Asian countries than in the West; existing comparisons of the COVID-19 management between Asian countries and the West concluded that cultural, previous management experiences explain the differences in outcomes (Navarro, 2021). However, it is unknown whether the fear of social isolation could explain this discrepancy. Our study primarily focuses on the association between health protective behaviors, fear of being isolated, and resistance to peer influence. Based on the spiral of silence theory, it was hypothesized that people’s adaptation of health advice from the mass media is closely related to their fear of being isolated as well as the resistance to peer influence. It is also hypothesized that the Chinese sample would show more susceptibility than the European sample, as previously identified (Hayes et al., 2013).

**Methods**

**Participants and procedure**

This study is a part of a larger project on COVID-19 health perception (for details, see Zhao & Knobel, 2021). With a convenience sampling approach, an online survey was distributed through social media and email in tertiary educational organizations in Germany, Austria, Switzerland, and China. Data were collected between 1 and 10 April 2020. A total sample of 655 cases were received ($n_{\text{Germany}} = 101$, $n_{\text{Austria}} = 261$, $n_{\text{Switzerland}} = 26$, $n_{\text{China}} = 267$), with a respondent rate of 91.1%. All participation, which was voluntary, was consented to by all participants prior to filling out the survey. The study was approved by the Ethics Committee at the University of Klagenfurt, Austria.

**Measures**

A self-report questionnaire was constructed, first in English and subsequently translated into German and Chinese. The translated versions were then read by native speakers for wording adjustment.
**Demographic variables**

Country of current residence, age, gender, highest education level (primary/secondary/tertiary), underlying pulmonary or cardiovascular diseases status, whether had been confirmed positive with COVID-19, and whether there was anyone around with COVID-19 were measured. The country of current residence was dichotomized as European/Chinese for further comparisons.

**Fear of social isolation**

A five-item scale was used to measure fear of social isolation (Hayes et al., 2013), with a 5-point Likert scale ([1] strongly disagree to [5] strongly agree). This scale showed a high internal consistency (α = 0.81). Higher total scores reflect one’s stronger fear of being socially excluded.

**Preventive health behaviors**

Based on a health guideline by the World Health Organization (2020), 14 items were used to assess one’s efforts and behaviors to prevent the risk of being infected by infectious diseases since the outbreak of the COVID-19 (e.g., I avoid shaking hands). Each item was constructed as a 7-point Likert scale ranging from strongly disagree [1] to strongly agree [7]. A total score of this scale was used given its high internal consistency (α = 0.85). Higher scores reflect more preventive health behaviors one conducts since the COVID-19 outbreak.

**Resistance to peer influence**

As a measure of an individual’s propensity to resist being influenced by peers, the Resistance to Peer Influence (RPI) scale was used (Steinberg & Monahan, 2007). It consists of 10 items, each with two opposing statements (i.e., Some people . . . BUT other people . . .; α = 0.66). The respondent was first to choose which statement is true for themselves, followed by indicating if the statement is sort of true or really true. Each item is scored from 1 to 4, with 1 representing really true on the first statement and 4 representing really true on the second statement. The score on each item is subsequently summarized into a total score, ranging from 1 to 40 (Steinberg & Monahan, 2007). This scale has been used in previously published studies, both on an European sample (α = 0.73; Sumter et al., 2009) and on a Chinese sample (α = 0.55; Chen et al., 2016).

**Analysis**

For all data management and analyses, IBM SPSS 28 was used. The factor structure of the RPI scale was explored via principal component analysis with the varimax rotation. Between-group comparisons were analyzed using χ²-tests for categorical values and F-tests for continuous variables. The predictive effects of the included variables on preventive health behaviors were assessed using multiple regression. Post-hoc power analysis was conducted for the multiple regression before analyses: 108 cases are needed
for a regression model with eight predictors to achieve a small effect size ($f^2 = 15\%$) and a sufficient power (80%). Both Chinese and European sample sizes are larger than 108; thus, were deemed feasible for the analysis.

**Results**

*Psychometric properties and restructure of the RPI*

The Cronbach’s $\alpha$ value of the original 10-item RPI scale was 0.66, slightly below the recommended cutoff of 0.70 (Nunnally, 1978). Examining the inter-item correlations, the sixth item was removed from subsequent analyses as it showed a low correlation with all other items, with an item-total correlation of 0.019. While the Cronbach’s $\alpha$ had changed to 0.69 when the sixth item was excluded, the unidimensional nature of the RPI scale is in question. Indeed, principal component analysis with an orthogonal varimax rotation suggested a three-factor structure. The rotated component matrix is displayed in Table 1.

As shown in Table 1, the internal consistency values of the newly created subscales were still unsatisfactory (ranging from 0.42 to 0.63). Examining the cross-loading items, it was observed that items 3 and 9 also showed high loadings on factor 1; they also possess semantic similarities. When items 3 and 9 were consolidated into factor 1, three subscales emerged: subscale 1 (*Compliance*) includes items 3, 4, 5, 7 and 9 ($\alpha = .69$), with higher scores meaning lower likelihood of changing one’s own behavioral patterns to match their friends; subscale 2 (*Independence*) includes items 2 and 10 ($r = .39, p < .001$), with higher scores indicating one’s tendency of behaving in their own ways rather than follow others; and subscale 3 (*Ingratiation*) includes items 1 and 8 ($r = .14, p < .001$), with higher scores meaning lower tendency to flatter or please others.

**Table 1.** Rotated component matrix with the items in the resistance to peer influence (RPI).

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Refuse to go along with friends even if it makes them unhappy</td>
<td>0.207</td>
<td>0.409</td>
<td><strong>0.450</strong></td>
<td>.370</td>
</tr>
<tr>
<td>(2) More important to be an individual than to fit in with crowd</td>
<td>−0.133</td>
<td>0.764</td>
<td>0.045</td>
<td>.603</td>
</tr>
<tr>
<td>(3) Hard for friends to change their mind</td>
<td>0.399</td>
<td>0.497</td>
<td>0.268</td>
<td>.477</td>
</tr>
<tr>
<td>(4) Will not do something wrong just to stay on friends’ good side</td>
<td><strong>0.558</strong></td>
<td>0.130</td>
<td>0.414</td>
<td>.500</td>
</tr>
<tr>
<td>(5) Will say your true opinions to friends despite risk of ridicule</td>
<td>0.804</td>
<td>0.032</td>
<td>−0.064</td>
<td>.652</td>
</tr>
<tr>
<td>(6) Would not break the law if your friend said you should</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Acts the same way with friends as when alone</td>
<td>0.754</td>
<td>0.063</td>
<td>0.114</td>
<td>.585</td>
</tr>
<tr>
<td>(8) Acts just as risky with friends as when alone</td>
<td>0.021</td>
<td>0.012</td>
<td><strong>0.824</strong></td>
<td>.679</td>
</tr>
<tr>
<td>(9) Won’t say things you don’t believe just to make friends respect</td>
<td>0.469</td>
<td>−0.052</td>
<td><strong>0.550</strong></td>
<td>.525</td>
</tr>
<tr>
<td>you more</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) Better to be an individual even if people will be angry at you</td>
<td>0.206</td>
<td><strong>0.792</strong></td>
<td>−0.063</td>
<td>.673</td>
</tr>
<tr>
<td>for going against the crowd</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cronbach’s $\alpha$  
Eigenvale  
Percentage of variance explained

Note. The sixth item from the original scale was excluded due to its low intercorrelations with other items. The matrix is based on a principal component analysis with orthogonal varimax rotation. The strongest factor loading of each item is marked in bold. The wording of the items is slightly adjusted for better readability.
**Descriptive comparison between the Chinese and European samples**

Table 2 details descriptive findings of the Chinese and European samples and their differences. The Chinese sample were younger and had higher educational levels, with fewer underlying diseases and knew less confirmed COVID-19 cases in their social contexts. No difference on preventive health behaviors was detected between the samples. However, the Chinese sample perceived higher importance to belong to social activities. The European sample reported higher scores on all three subscales of the RPI scale, indicating a stronger resistance to peer influence than the Chinese sample.

**Predictors of preventive health behaviors**

To assess predictors of preventive health behaviors, a multiple regression analysis was performed. As shown in Table 3, the only significant predictor of preventive health behaviors was RPI 2 – Independence (β = .13, p < .001) in the Chinese sample, suggesting that people with a higher individual orientation tended to conduct more preventive health behaviors. Fear of social isolation also showed a near-significant prediction in the Chinese sample (β = .13, p = .058), meaning that those who were more afraid of being isolated performed more health protective behaviors.

**Discussion**

Our study used a cross-national dataset to examine the roles of fear of social isolation and resistance to peer influence in people’s health protective behaviors during the early stage of the COVID-19 pandemic. We only found the fear of social isolation was positively associated with more protective behaviors among the Chinese sample, not the Europeans. This result is in line with a previous study, which shows that fear of social isolation in the Chinese sample has the largest association with public opinion compared with samples from other countries (Hayes et al., 2013).

The unidimensional nature of the Resistance to Peer Influence scale is challenged, and a three-factor structure solution may be more suitable. Our findings partly agree with

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chinese sample</th>
<th>European sample</th>
<th>F/χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size – N</td>
<td>267</td>
<td>388</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
<td>22.46 (9.08)</td>
<td>27.53 (9.68)</td>
<td>43.89 **</td>
</tr>
<tr>
<td>Gender – NMale (%)</td>
<td>219 (82)</td>
<td>313 (81)</td>
<td>0.06</td>
</tr>
<tr>
<td>Educational level (Primary/Secondary/Tertiary)</td>
<td>0/24/243</td>
<td>9/204/175</td>
<td>144.76 **</td>
</tr>
<tr>
<td>Had underlying diseases – N (%)</td>
<td>1 (&lt;0.01)</td>
<td>17 (0.04)</td>
<td>9.59 *</td>
</tr>
<tr>
<td>Tested positive with COVID-19 – N (%)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Had social referents with COVID-19 – N (%)</td>
<td>4 (0.01)</td>
<td>55 (0.14)</td>
<td>31.33 **</td>
</tr>
<tr>
<td>RPI 1 – Compliance</td>
<td>13.47 (2.74)</td>
<td>16.04 (2.99)</td>
<td>119.74 **</td>
</tr>
<tr>
<td>RPI 2 – Independence</td>
<td>5.30 (1.45)</td>
<td>5.97 (1.51)</td>
<td>30.38 **</td>
</tr>
<tr>
<td>RPI 3 – Ingratiation</td>
<td>4.70 (1.26)</td>
<td>5.37 (1.39)</td>
<td>38.26 **</td>
</tr>
<tr>
<td>Fear of social isolation</td>
<td>21.49 (6.96)</td>
<td>15.05 (4.40)</td>
<td>187.09 **</td>
</tr>
<tr>
<td>Preventive health behaviors</td>
<td>84.79 (11.70)</td>
<td>84.70 (10.89)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Note. The group comparisons are based on F-tests for the continuous variables and chi-square tests for the categorical variables. RPI = Resistance to Peer Influence. * p < .05. ** p < .001.
previous research (Gardner & Steinberg, 2005), showing that peer influence may be stronger among adolescents rather than adults. The poor scale property issue was also identified in a previous study among undergraduate students (Chen et al., 2016). It is also clear that the European sample showed higher resistance to peer influence than the Chinese sample, in consistent with previous findings (Gardner & Steinberg, 2005). Since peer influence has been usually applied in adolescent health research, future research may focus on developing an age-appropriate instrument for adults.

Peer influence showed importance in the Chinese sample as higher independence was related to more health protective behaviors. This association is supported by previous preventive programs wherein one’s decision-making process about behaviors usually needs independent and careful considerations (Botvin & Griffin, 2015). The direction of this association also indicates that one’s peer norm may differ from the wider social norm, even in China where individuals reported much higher preventive behaviors (e.g., face mask wearing; Zhao & Knobel, 2021). In contrast, the nonsignificant findings in the European sample may be largely explained by the unestablished norm in the society during the surveying period.

Our findings extend the debates regarding the spiral of silence theory to a pandemic context. Interestingly, a recent research identified the ‘fear of conflicting’ rather than a fear of being isolated within the COVID-19 opinion interactions among Europeans (Mihelj et al., 2022). In addition, the misleading health information by politicians has negatively shaped the public opinion (Navarro, 2021; Rivera et al., 2020). These societal backgrounds partly explain why the fear of social isolation was unrelated to health protective behaviors in the European sample. Cultural differences such as collectivist orientation could explains the discrepancies in fear of social isolation (Hayes et al., 2013). However, the link between fear of social isolation and health protective behaviors may be more related to institutional management and policies against the pandemic. Asian countries like China have more previous experiences with public health emergencies and specific guidance for the public (e.g., face mask use; Feng et al., 2020) had been established at the time of research (Navarro, 2021).

Integrating findings from previous research and present study, Figure 1 illustrates the strategies motivating preventive health behaviors based on the spiral of silence theory.

### Table 3. Multiple regression of preventive health behaviors on the study variables.

<table>
<thead>
<tr>
<th></th>
<th>Chinese sample</th>
<th>European sample</th>
<th>Total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β</td>
<td>95% CI</td>
<td>β</td>
</tr>
<tr>
<td>RPI 2 – Independence</td>
<td>.133* [06.29]</td>
<td>−.108 [−1.65,10]</td>
<td>−.003 [−.68,63]</td>
</tr>
<tr>
<td>Fear of social isolation</td>
<td>.126† [−01.42]</td>
<td>−.081 [−49.10]</td>
<td>.068 [−05.27]</td>
</tr>
<tr>
<td>Age</td>
<td>.066 [−.09,26]</td>
<td>.094 [−.04,24]</td>
<td>.084 [−01,20]</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.034</td>
<td>0.023</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Note. The positive COVID-19 status of one’s own was excluded from the regression analysis since no Chinese participant reported. Having social referents with COVID-19 was as well excluded as only 3 participants in the Chinese sample reported that they knew people around them confirmed with COVID-19. RPI = Resistance to Peer Influence. β = standardized coefficients. Gender: 1 = Female, 2 = Male. *p < .050. †p = .058.
During pandemics, policy makers would utilize mass media and consistent communication to first create a majority opinion (Noelle-Neumann, 1993). Importantly, this health communication should be a reciprocal process. As noted in a recent study about vaccine hesitancy (Yang & Liu, 2021), the government or media decision-makers should also monitor how the public perceive risk of the ongoing pandemic or disease, so as to avoid one-sided information delivery. It is also important to monitor smaller networks in social media as they could influence the majority voice thereby creating conflicting information (Cabrera et al., 2021; Mihelj et al., 2022). After assessment, the public would adjust their willingness to perform behaviors to protect themselves as well as to motivate others to follow the public opinion. Expressing such support would also reinforce the public opinion. However, as identified in health psychological models (e.g., Ajzen, 1991), from individuals’ willingness or intention to their actual behaviors, a set of motivational work could be beneficial. For instance, attitude certainty and self-efficacy could encourage individuals when they make their decisions (Matthes et al., 2010). Conflicting and misleading information such as conspiracy theories may also influence people when they evaluate the discrepancy between their own opinions and public opinion (Knobel et al., 2022). Thus, monitoring and managing such conspiracy theories are needed in the process of shaping a prevailing opinion.

Health communication practitioners could strengthen the risk perceptions at a population level. For example, when people think the public opinion is from a trustworthy authority, it is easier to be adopted (Vos, 2021). Strategies should also be tailored according to the culture (Hayes et al., 2013; Navarro, 2021). The spiral of silence theory may reflect some monolithic characteristics, potentially overlooking the individual-level nuances. Health care clinicians could bridge the gap between willingness and action with individuals or groups. Clinicians should be empathic about the difficulties people face with navigating conflicting information about protective health behaviors, as well as motivate them to adhere to these practices. As an effective method to motivate health behaviors (Miller & Rollnick, 2002), Motivational Interviewing could be useful as it helps people elicit intrinsic reasons to follow the recommendations.

![Logic model for strategies that promote protective health behaviors during a pandemic.](image)

**Figure 1.** Logic model for strategies that promote protective health behaviors during a pandemic.
The main limitation of our study is the self-reported design. As our survey centers on health perceptions, nuanced cultural factors were not examined. Future studies may consider the cultural dimension as it even showed a systematic impact on COVID-19 infection patterns (Muurlink & Taylor-Robinson, 2020). The relatively low coefficients of determination identified in the models suggest there may be more moderators between fear of isolation and health behaviors, consistent with previous research (Glynn et al., 1997). More health and lifestyle items may increase the explanatory ability in the model. Moreover, our study did not use a national sampling strategy, thus, local pandemic measures may be overlooked. However, using a dataset from the early stage of the COVID-19 pandemic, this study importantly highlights individual’s privatization of public opinion. Although both Chinese and European samples showed a similar level of conducting protective health behaviors, being independent from peer influence and fear of social isolation served as two significant associates, suggesting the influences from both official and unofficial sources are important for disease prevention.

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