Are people excessively pessimistic about the risk of coronavirus infection?

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The recent emergence of the SARS-CoV-2 in China has raised the spectre of a novel, potentially catastrophic pandemic in both scientific and lay communities throughout the world. In this particular context, people have been accused of being excessively pessimistic regarding the future consequences of this emerging health threat. However, consistent with previous research in social psychology, a large survey conducted in Europe in the early stage of the COVID-19 epidemic shows that the majority of respondents was actually overly optimistic about the risk of infection.
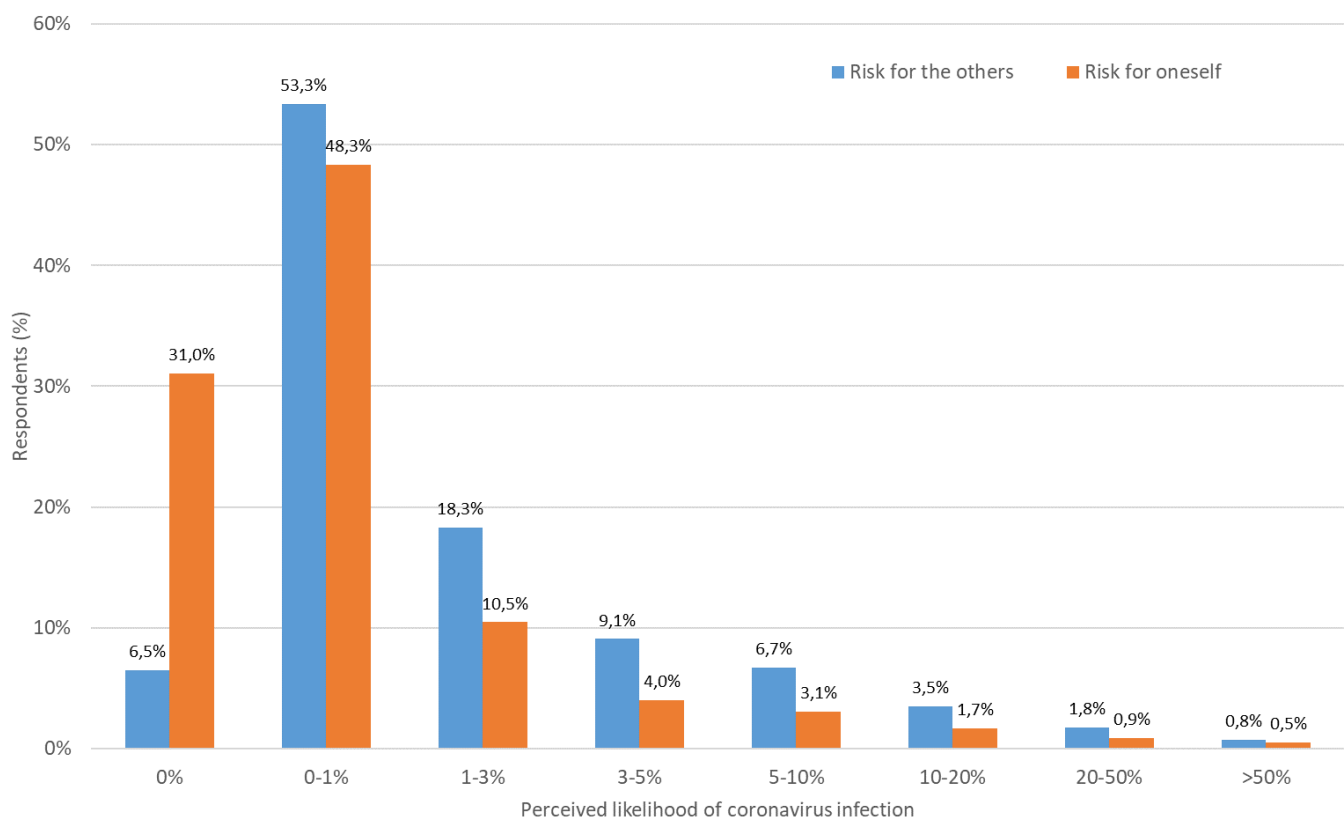
A rational panic?

Human behaviours play a fundamental role in the propagation of many pathogens by either amplifying or attenuating their transmission through person-to-person contact[1]. From an epidemiological perspective, the massive adoption by the population of health protective behaviour, through improved personal hygiene or social distancing measures, is generally effective in reducing or slowing down the transmission of respiratory infectious diseases[2]. However, from a social and economic perspective, avoidance behaviours can also have dramatic side effects when they result in discrimination towards sub-groups of individuals or a shortage of basic necessities such as food or pharmaceutical products[3]. In the early stage of the COVID-19 epidemic, the question as to whether the emergence of the coronavirus in China triggered a panic reaction, i.e. disproportionate public risk perceptions and emotion-driven behaviours with regard to the available epidemiological data, led to somewhat contradictory comments from famous experts. For instance, Dr. Michelle Dusart publicly decried the people's exaggerated fear and hysterical reaction to the risk of the coronavirus infection, while Prof. Didier Raoult and Prof. Nassim Nicholas Taleb, on the other hand, argued that it was rational for people to fear such an emerging health threat. Nevertheless, as mass media have the tendency to highlight aberrant behaviours, and as we know little to date about what people really think about the risk of coronavirus infection, it is not possible to determine whether they are overly optimistic or pessimistic about the future consequences of the COVID-19 epidemic for population health.

The research survey

In late February 2020, prior to the Italian and French outbreak, an international research survey was conducted among large samples of citizens ($N = 4,348$) in four countries of the European Region (France, Italy, United Kingdom, and Switzerland) via a network for influenza surveillance[4]. Here, we examine public perceptions of risk of coronavirus infection by asking the participants to estimate on a discrete percentage scale, the probabilities for themselves and the general national population of getting the disease in the next few months. During the last decades, a great number of psychological studies have shown that risk perceptions are generally subject to an optimistic bias[5,6]. The optimistic bias tend

to affect both the absolute risk judgments (people tend to underestimate the probability of experiencing harmful event), and the comparative risk judgments (most people think they are less likely to experience harmful event than the others). In the case of emerging infectious diseases, it is practically impossible to demonstrate that individual's optimistic or pessimistic expectations about the future are unrealistic, as we cannot know in advance what the final prevalence rates of infection will be in various populations. However, it is possible to rely on opinions made and released to the press by some famous experts in the field of epidemiology of infectious diseases, in order to determine whether the current expectations of the public and experts are congruent. For instance, based on (unpublished) simple epidemiological models using basic assumptions about the transmission rate of SARS-CoV-2, Prof. Marc Lipsitch or Prof. Gabriel Leung roughly estimated that more than 40% of the worldwide population could become infected in the coming year[7].

Fig. 1. Distribution of the perceived risk of SARS-CoV-2 infection (% of respondents)

Evidence of unrealistic optimism

Figure 1 shows the distribution of the perceived risk of SARS-CoV-2 infection for oneself and that for others on a discrete percentage scale. Consistent with previous research in social psychology[8,9], people were found to estimate the coronavirus risk in an optimistically skewed manner. On the one hand, both the perceived risk of infection for oneself, as well as that for others, were substantially lower than expert

rough estimates. Indeed, at the time of the survey, a large majority of participants expected that the coronavirus infection would affect less than 1% of the national population. However, as reliable epidemiological predictions related to COVID-19 are not yet available at this stage, we cannot exclude the hypothesis that mean expectations made by the European populations are actually more pessimistic than optimistic. On the other hand, the comparison between perceived risk of infection for oneself and that for others shows that these two variables are significantly different ($P < 0.001$). Thus, approximately half the participants judged coronavirus infection less likely to happen to them than to other people, demonstrating strong evidence of "unrealistic optimism" in their personal expectations related to the COVID-19 epidemic, whereas only around 5% expressed the opposite comparative risk judgment. Moreover, as presented in Table 1, people showed different levels of optimism across countries and socio-demographic groups, with the French, female and less educated participants exhibiting a greater optimistic bias in their comparative risk judgments ($P < 0.001$).

Table 1. Comparison of unrealistic optimism related to the risk of SARS-CoV-2 infection in various sub-populations: percentages (frequencies), Pearson chi-square, and p-value.

Variables	Optimism rate	Chi-square value	p-value
Sex		24.5	<0.001
Female	53.5% (1391)		
Male	45.6% (731)		
Age group		14.3	<0.001
18-40 years old	45.5% (251)		
40-65 years old	49.1% (1002)		
> 65 years old	53.8% (869)		
Occupation		14.8	<0.001
Employed	47.5% (993)		
Unemployed	52.2% (32)		
Retired	53.6% (934)		
Student	33 (48.5%)		
Level of education		53.3	<0.001
Some high school	62.6% (321)		
High school graduate	55.5% (458)		
Some college and higher	46.9% (1324)		
Size of household		2.2	0.134
1 person	52.9% (413)		
2 persons and more	49.9% (1709)		
Type of household		8.8	0.012
With children	46.6% (484)		
Without children	51.3% (1218)		
Chronic condition		0.0	0.865
No	50.4% (1565)		
Yes	50.7% (557)		
Country		31.3	<0.001
Switzerland	41.5% (165)		
France	52.6% (1788)		
Italy	42% (108)		
United Kingdom	41.2% (61)		
Total	**50.5% (2122)**		

Directions for future research

Overall, these empirical data suggest that most people in Europe were more subject to "unrealistic" optimism than an excessive pessimism concerning the risk of coronavirus infection. Of course, with the rapid spread of the disease in Europe, as well as potential developments in the biomedical sciences (such as the identification of an effective and affordable treatment against SARS-CoV-2), we could not expect to find the same pattern of risk perceptions and epidemiological predictions in the coming weeks[10]. However, the use of similar questions in future international surveys would make it possible to monitor the change in risk perceptions and health behaviours over time. This might provide us a valuable empirical material to understand and predict better the complex interplay between public risk perceptions, emotion-driven protective behaviours and key epidemiological parameters, such as the transmission and fatality rates of COVID-19.

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