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Health risk perceptions in the era of the new coronavirus: are the Italian people ready for a novel virus? A cross-sectional study on perceived personal and comparative susceptibility for infectious diseases

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ABSTRACT

Objectives: This study aims to evaluate the impact of psychological and sociodemographic variables on perceived personal and comparative susceptibility to diseases caused by a novel, unknown virus.

Study design: Cross-sectional study.

Methods: A total of 438 adults (200 male and 238 female) were interviewed in the waiting rooms of three primary care medicine outpatient clinics. The participants completed three validated questionnaires: the Italian Adjustment of Risk Perception of Infectious Diseases questionnaire, the General Self-Efficacy (GSE) scale, and the Italian Version of Personality Inventory (ITAPI).

Results: Only 5% of the respondents believed it likely that they would contract a disease caused by a novel virus in the following months, even though 5.9% considered this probability higher than that of other people of the same age and gender. Gender (P < .04), age (P = .002), and marital status (P = .002) significantly affected the perceived risk of getting a disease caused by a novel virus. Self-efficacy (P < .001), imagination (P < .001), and empathy (P < .001) were significant predictors of perceived personal susceptibility. Self-efficacy (P = .04) and imagination (P = .04) were predictive of perceived comparative susceptibility.

Conclusions: Adequate psycho-educational interventions are necessary to empower the population in adopting the necessary prevention and containment measures aimed at limiting the spread of novel diseases such as COVID-19 and avoiding disastrous consequences both at the health and economic level.

INTRODUCTION

Risk perception related to health is a subjective judgment that people make about dangers affecting their personal well-being. Such judgments dictate precautionary actions and influence the probability of complying with health-related recommendations. One main component of risk perception is the concept of ‘susceptibility’, which concerns how individuals rate their likelihood of contracting a specific disease. Perceived susceptibility, also called perceived vulnerability, includes two dimensions: personal perceived susceptibility, which is the probability that one will be harmed by a hazard, and comparative perceived susceptibility, which is the perceived probability that one is more susceptible to a given danger compared with other people of the same age and gender.

The successful adoption of preventive behaviors to control the spread of diseases largely depends on perceived susceptibility. Although people are often aware of the importance of adopting adequate behaviors to ensure good health for themselves and for others, several subjective variables, such as self-efficacy, personality, and sociodemographic variables, influence the perception and effective adoption of preventive measures. The contribution of subjective variables in determining risk perception is of extreme importance when planning preventive campaigns or in situations that require adherence to specific behavioral models.
‘Self-efficacy’ refers to the confidence that people have in their personal ability to adopt preventive behavioral measures. It is influenced by culture and affects clinical practice and behavioral change, contributing to predicting practices in health behaviors. ‘Personality’ traits refer to those elements that underlie our individual cognitive, emotional, and behavioral differences. Personality traits can help predict individual responses to diseases, health behaviors, mortality risks, and perceived vulnerability to diseases compared with or in association with several sociodemographic variables, such as age and gender. Moreover, they are prospectively related to health status in adulthood and influence the adoption of preventive behaviors. In this regard, Gagigisiz et al. found that personality traits heavily influenced behavioral responses to the flu during the 2009 pandemic.

The spread of the novel coronavirus, which has caused many deaths in China and around the world, makes the investigation of perceived susceptibility a pertinent concern. Realistic perceptions of disease probability significantly influence the adoption of preventive measures and optimize the possibility of maintaining good health and avoiding the spread of infectious diseases. The novel coronavirus, now called SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), is the causative agent for COVID-19, a new acute respiratory syndrome affecting mostly people in China with some outbreaks in other countries. The new virus, isolated for the first time in Wuhan in China in December 2019, quickly spread to other parts of China, and subsequently throughout Asia, Europe, the Americas, and Africa. COVID-19 has not been previously identified in humans. International health organizations, including the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC), placed great emphasis on understanding its spread. On January 30, 2020, the WHO declared a Public Health Emergency of International Concern (PHEIC); some days after, several countries, including Italy, declared national health emergencies.

Vaccines are commonly considered to be the most effective means of mitigating the social and health effects of viral diseases. However, the development of new vaccines takes time. For this reason, the spread of new pathogens typically presages the development of effective vaccines; the only effective response in the interim is prevention. The European Centre for Disease Prevention and Control (ECDC) highlighted that the impact of late detection of an imported case of the novel coronavirus in a European country without the application of appropriate infection prevention and control measures would have been high; therefore, in such a scenario, the risk of secondary transmission in a community setting was estimated to be very high. Unfortunately, this prediction was amply confirmed by the recent outbreak of the COVID-19 epidemic in Italy. Indeed, on February 21, 2020, Patient 1 with COVID-19 was identified in a hospital in Codogno, a county in northern Italy. Starting from the identification of this first ascertained case, the epidemic spread widely throughout northern Italy, forcing the Italian government to adopt very severe virus containment measures with a significant limitation in the social life of Italians. In accordance with the ECDC forecasts, the COVID-19 epidemic was explained by the failure to adopt adequate virus prevention and control measures, which led to the delayed recognition of imported cases of the disease and the start of a chain of secondary transmission of the virus difficult to contain.

In light of these considerations and the current health and social emergency represented by the growing spread of the novel coronavirus, the present study, conducted in the final months of 2019, aimed to investigate perceived susceptibility for a novel, non-defined hypothetical virus. The main goal was to evaluate the impact of psychological and sociodemographic variables on perceived personal and comparative susceptibility to diseases caused by a novel, unknown virus. These findings are particularly relevant in this emergency period related to the new coronavirus, as they increase available information about how people perceive their susceptibility to infectious diseases and aid in the organization of effective preventive campaigns.

**Methods**

**Participants and procedures**

In this study, 438 adults (age ranges 19–69 years; 200 males; 238 females) who were in the waiting rooms of three primary care medicine outpatient clinics in Catania (Italy) filled out a battery of standardized questionnaires under the supervision of three psychologists. All people who visited the clinics during a period of 5 days completed the questionnaire, except for three suffering from serious diseases. A total of 235 participants were in the ambulatory for medical consultation or health-status certification release; the remaining were companions. None of the participants suffered from severe pathologies. This modality of consecutive recruitment, which was used in previous studies, depended on interviewing people who did not have serious illnesses but were potentially aware of the characteristics of common infectious diseases. This research conforms to the Helsinki Declaration, outlining the principles for research involving human subjects, and was approved by the Chair of School and Family Psychology, Department of Educational Sciences, University of Catania (Italy). Participants provided informed consent. The research followed the Ethical Code for Italian Psychologists (L. 18.02.1989, n. 56), Italian data privacy laws (DLGS 196/2003), and the Ethical Code for Psychological Research (March 27, 2015) approved by the Italian Psychologists Association. Data were collected in November 2019.

**Measures**

This cross-sectional study used a battery composed of three measures: the Italian Adjustment of Risk Perception of Infectious Diseases questionnaire, the General Self-Efficacy (GSE) scale, and the Italian Version of Personality Inventory (ITAPI). The Risk Perception of Infectious Diseases questionnaire comprises 85 items. It investigates individual beliefs on several diseases and has been translated into multiple languages and adjusted for different contexts, including the Italian one. In this study, we used the version adapted for the 2009 A/H1N1 pandemic. Participants had to respond to the items of the questionnaire using a four-point Likert-type scale.

The questionnaire measures numerous aspects of risk perception for several diseases (common cold, tuberculosis, 2009 A/H1N1 flu, HIV, avian flu, new viruses, and others) and collects information on gender, age, marital status, size of household, and presence of children under 12 years. The present study investigated the perceived personal and comparative susceptibility only in relation to a novel virus (Cronbach’s alpha .87).

The GSE (Cronbach’s alphas: from .76 to .90 in samples from 23 nations) evaluates self-efficacy. It is a four-point Likert-type scale and consists of 10 items. It supplies a global score from 10 to 40. It has been validated in Italian by Sibilia et al. The ITAPI (short version) measures eight personality traits (‘dynamism,’ ‘susceptibility,’ ‘empathy,’ ‘consciousness,’ ‘imagination,’ ‘defensiveness,’ and ‘introversion’) using 28 items. Several psychological characteristics describe each trait. ‘Dynamism’ (reliability coefficient: Cronbach’s alpha: .86) concerns curiosity, the ease of taking initiatives, and liveliness. Dynamic people are resourceful and innovative. ‘Susceptibility’ (reliability coefficient: Cronbach’s alpha: .86) concerns attitudes toward
Results

Several statistical analyses using the Statistical Package for the Social Sciences (SPSS) version 25.0 (Armonk, NY: IBM Corp.) and Amos package for Structural Equation Modeling (SEM) were conducted. As a preliminary step, we calculated respondents’ perceived susceptibilities of contracting certain infectious diseases (common cold, HIV, tuberculosis, A/H1N1 flu, avian flu in Italy, and a novel virus developed outside Italy). Descriptive statistics, t-test, and ANOVA analyses for perceived personal and comparative susceptibility by age and gender were also calculated.

Based on the primary goal of this study, and to better analyze the impact of sociodemographic and psychological variables on perceived susceptibility to a novel virus, we calculated multiple regression analyses. We also developed two structural equation models, which described the relationships between psychological variables and perceived personal and comparative susceptibility. As a preliminary measure, the participants confirmed that they had heard of diseases that were investigated in the questionnaire and were aware that a ‘new virus’ is a virus that is not previously observed in humans.

Perceived personal and comparative susceptibility for a novel virus and other infectious diseases

The analysis of the responses on likelihood to contract infectious diseases, which were investigated in the questionnaire showed that only 5% of the respondents believed it likely that they would contract a disease caused by a novel virus in the following months, even though 5.9% considered this probability higher than that of other people of the same age and gender (Table 1).

Interestingly, participants considered the probability of getting a disease linked to a new virus higher than the possibility of contracting the infectious diseases that were taken into consideration in the questionnaire, except for a common cold. This result is worthy of attention. Although the perception of risk was low, the respondents considered it more dangerous to have an unknown disease than a pathology caused by known infectious diseases, such as the A/H1N1 flu, which was diffused during the 2019/2020 seasonal flu. In this regard, the European Regional Office of the WHO, in its Flu News Europe of February 2020, reported that A/H1N1 pdm (2009) flu is more frequent than the other types and that a large percentage of the severe cases of flu were related to this virus.

With the purpose of investigating the presence of differences in perceived susceptibility to infectious diseases by gender and age, ANOVA and t-test analyses were calculated. Regarding the age variable, the participants were divided into six groups (first group: <20 years old, n = 20; second group: 21–30 years old, n = 81; third group: 31–40 years old, n = 52; fourth group: 41–50 years old, n = 94; fifth group: 51–60 years old, n = 78; sixth group: 61 years old and higher, n = 113). ANOVA analyses showed significant differences by age in perceived personal and comparative susceptibility for all the investigated diseases, except HIV (Table 2), which all respondents considered a highly unlikely disease. Older people had a higher perceived susceptibility for all diseases examined in the questionnaire, except for a common cold. Oddly enough, younger people rated the likelihood of contracting the latter disease higher than older participants did. There were no differences by gender in the perceived susceptibility.

### Table 1

|                      | Perceived personal susceptibility | Comparative susceptibility |
|----------------------|----------------------------------|---------------------------|
|                      | Frequencies | Percentages | Frequencies | Percentages |
| **Common cold**      |             |             |             |             |
| No answer            | 1           | .5          | 3           | 1.4         |
| Very unlikely        | 21          | 9.5         | 30          | 13.6        |
| Unlikely             | 27          | 12.2        | 41          | 18.6        |
| Not likely/not       | 85          | 38.5        | 77          | 34.8        |
| Likely               | 87          | 39.4        | 70          | 31.7        |
| **HIV**              |             |             |             |             |
| No answer            | 5           | 2.3         | 7           | 3.2         |
| Very unlikely        | 186         | 84.2        | 178         | 80.5        |
| Unlikely             | 18          | 8.1         | 22          | 10.0        |
| Not likely/not       | 9           | 4.1         | 8           | 3.6         |
| Likely               | 3           | 1.4         | 6           | 2.7         |
| **Avian flu outside Italy** |             |             |             |             |
| No answer            | 4           | 1.8         | 5           | 2.3         |
| Very unlikely        | 129         | 58.4        | 136         | 61.5        |
| Unlikely             | 54          | 24.4        | 51          | 23.1        |
| Not likely/not       | 28          | 12.7        | 23          | 10.4        |
| Likely               | 6           | 2.7         | 6           | 2.7         |
| **Avian flu in Italy** |             |             |             |             |
| No answer            | 5           | 2.3         | 5           | 2.3         |
| Very unlikely        | 130         | 58.8        | 71          | 32.1        |
| Unlikely             | 60          | 27.1        | 94          | 42.5        |
| Not likely/not       | 20          | 9.0         | 42          | 19.0        |
| Likely               | 6           | 2.7         | 9           | 4.1         |
| **Tuberculosis**     |             |             |             |             |
| No answer            | 3           | 1.4         | 5           | 2.3         |
| Very unlikely        | 73          | 33.0        | 122         | 55.2        |
| Unlikely             | 91          | 41.2        | 64          | 29.0        |
| Not likely/not       | 51          | 23.1        | 23          | 10.4        |
| Likely               | 3           | 1.4         | 7           | 3.2         |
| **Influenza A/H1N1** |             |             |             |             |
| No answer            | 3           | 1.4         | 3           | 1.4         |
| Very unlikely        | 58          | 26.2        | 53          | 24.0        |
| Unlikely             | 82          | 37.1        | 83          | 37.6        |
| Not likely/not       | 71          | 32.1        | 69          | 31.2        |
| Likely               | 7           | 3.2         | 13          | 5.9         |
| **New virus**        |             |             |             |             |
| No answer            | 5           | 2.3         | 2           | .9          |
| Very unlikely        | 45          | 20.4        | 46          | 20.8        |
| Unlikely             | 82          | 37.1        | 79          | 35.7        |
| Not likely/not       | 78          | 35.3        | 81          | 36.7        |
| Likely               | 11          | 5.0         | 13          | 5.9         |
Regarding perceived personal susceptibility (F = 2.03, sig: P < .04, Std β = .098), age (t = 3.18, sig: P = .002, Std β = .19), and marital status (t = 3.17, sig: P = .002, Std β = -.18). According to these data, being women, older, and married is associated with a higher perceived risk of getting a disease caused by a novel virus while being men, younger in age, and unmarried is associated with a lower perceived risk.

Table 3 presents the significant results of the regression analyses and shows the contribution of each predictor to the dependent variable. The sociodemographic variables were not predictive of perceived comparative susceptibility.

The regression analyses, using personality traits and self-efficacy as the independent variables and perceived personal and comparative susceptibility as the dependent variables, showed that psychological variables significantly affected perceived personal susceptibility (F = 6.26, sig: P < .001, R square = .08) and comparative susceptibility (F: 2.58; sig: P = .01).

In particular, self-efficacy (t = -4.15, sig: P < .001, Std β = -23), imagination (t = -3.90, sig: P < .001, Std β = 23), and empathy (t = 4.53, sig: P < .001, Std β = 23) were significant predictors of perceived personal susceptibility. Self-efficacy (t = -1.98, sig: P = .04, Std β = -11), and imagination (t = -2.00, sig: P = .04 Std β = -12) were predictive of perceived comparative susceptibility. Table 3 presents the significant results of the regression analyses and shows the contribution of each predictor to the dependent variables.

To better describe the relationships between the psychological variables that influence perceived susceptibility and their relationships, two structural equation models were developed. The models included the three variables that were found to be significant predictors in the regression analyses. The non-significant Chi-square (Chi-square = .001; df = 1; Chi-q/df =.001) and the other FIT model values (RMSEA = .06; SRMR = .07; CFI = .9) indicated a good fit. The results of the SEM analyses are shown in Fig. 1.

**Discussion**

The results of the present study showed the impact of sociodemographic and psychological variables on perceived susceptibility. Interestingly, the influence of subjective factors on risk perception for health is relevant, even if the perceived risk concerns

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**Table 3**

Multiple regression analyses of possible predictors for perceived personal and comparative susceptibility in study group.

| Perceived personal susceptibility | F = 3.400; sig.: P < .005; R square .038 |
|----------------------------------|-----------------------------------------|
| Std β                           | t                                      | Sig    |
| Gender                          | .098                                   | 2.03   | .04 |
| Age                             | .19                                    | 3.18   | .002 |
| Marital status                  | -.18                                   | 3.17   | .002 |

| Perceived personal susceptibility | F = 6.26; sig.: P < .001; R square .08 |
|----------------------------------|-----------------------------------------|
| Std β                           | t                                      | Sig    |
| Self-efficacy                   | -.23                                   | -4.15  | <.001 |
| Imagination                     | .22                                    | -3.90  | <.001 |
| Empathy                         | .24                                    | 4.53   | <.001 |

| Perceived comparative susceptibility | F = 2.58; sig: P = .02; R square = .11 |
|-------------------------------------|-----------------------------------------|
| Std β                               | t                                      | Sig    |
| Self-efficacy                      | -.11                                   | -1.98  | .04 |
| Imagination                        | -.12                                   | -2.00  | .04 |

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**Note:** * sig: P < .05; **sig: P < .001.

**Impact of sociodemographic and psychological variables on perceived susceptibility to a novel virus**

Several multiple regression analyses were calculated to investigate the impact of sociodemographic and psychological variables on perceived susceptibility to a novel virus. First, gender, age, marital status, size of the household, and the presence of children under 12 years old were regressed on the perceived personal and comparative susceptibility scores. Second, two regression analyses using personality traits and self-efficacy as the independent variables and perceived personal and comparative susceptibility as the dependent variables were calculated.

The choice to examine the impact of marital status, size of household, and the presence of children under 12 years old depended on the scientific evidence that the size of the household and the presence of children in the family increases the risk of infection for several diseases, such as flu, in which transmission from children to adults in a household is frequent. Results showed that several sociodemographic variables affected the perceived risk of getting a disease caused by a novel virus. Regarding perceived personal susceptibility (F = 3.40, sig: P < .005; R square = .038), the Std β and t values showed the significant contribution to the model of the following predictors: gender (t = 2.03, sig: P < .04, Std β = .098), age (t = 3.18, sig: P = .002, Std β = .19), and marital status (t = 3.17, sig: P = .002, Std β = -.18). According to these data, being women, older, and married is associated with a higher perceived risk of getting a disease caused by a novel virus while being men, younger in age, and unmarried is associated with a lower perceived risk.
From a public health perspective, these data are particularly interesting because when a novel virus with pandemic potential emerges, such as SARS-CoV-2 responsible for the actual COVID-19 outbreak, ‘community mitigation strategies’ can help slow transmission of the virus in communities. The community mitigation strategy is a set of non-pharmaceutical actions primarily focused on implementing actions to protect persons at increased risk of severe illness. These actions involve individuals, communities, businesses, and healthcare organizations to help slow the spread of the virus infection especially before a vaccine or drug becomes available.

In the case of SARS-CoV-2, the more vulnerable persons are the elderly and individuals of any age with underlying medical conditions that may increase the risk of serious COVID-19 disease. Accordingly to the CDC/COVID-19 recommendations appropriate actions are based on the following: (i) emphasizing individual responsibility for implementing recommended personal-level actions; (ii) empowering community organizations (e.g. schools, companies, etc.), to implement recommended actions to protect populations most vulnerable to severe illness; and (iii) focusing on settings that provide critical services to individuals at increased risk of severe illness.

Our study clearly shows that interviewed people considered themselves at a lower risk of catching a familiar virus than a novel one, despite the fact that some of these common infectious diseases, such as the flu, are known throughout the population. These data are at the moment particularly useful for planning and implementing public health control activities against COVID-19 outbreak, because people ought to strictly follow the recommended prevention strategies, such as avoiding exposure by adhering to recommended hygiene procedures (e.g. handwashing, mouth and nose covering when coughing and sneezing, daily cleaning, and disinfecting touched surfaces, etc.), isolation of SARS-CoV-2-infected persons and social distancing.

The older respondents of our sample perceived themselves at higher risk of getting a disease related to a novel virus compared with the younger respondents. These data are particularly important for two main reasons, at least. First of all because, as already underlined, elderly people are at the increased risk of serious COVID-19. Therefore, a high-risk perception could mean that older people are most likely to adopt protective behaviors. On the other hand, children are less likely to become infected or their symptoms are so mild that their infection could escape detection, which has important epidemiological implications.

For this reason, the implementation of behavioral strategies appropriate for the young is necessary to protect the elderly. Self-control strategies for behavioral interventions could help young people in learning the skills necessary to practice and implement behavioral changes, adopt prevention measures or eventually correct mistakes. In particular, young people may require external support persons (e.g. parents, teachers, or behavioral analysts) when learning the established prevention measures for reducing COVID-19 or other communicable diseases transmission in the population through the correct application of personal protective measures. These measures refer to hand and respiratory hygiene, cough etiquette, and use of face masks in the community, as recommended by the ECDC. The external supports should provide modeling of skills for the young to watch, encouraging them to practice, and correcting mistakes. Obviously, adults will model the appropriate behaviors themselves in the same contexts where young people will be expected to exhibit those skills (schools, shopping centers, public parks, etc.). As young people learn how to perform skills and when and where to perform them, they should learn to self-monitor their own behavior in appropriate contexts.

The multiple regression analyses and SEM contributed to better investigating the impact of sociodemographic and psychological variables on perceived risks of health. The findings showed that gender, age, and marital status influenced the perceived personal probability of getting a disease caused by a novel virus. Psychological variables also have a high impact on perceived risk for health. This result is worthy of attention, pending planning effective prevention campaigns that reach a large part of the population. People with different personality characteristics present a different level of risk perception for their health. The levels of empathy, self-efficacy, and imagination significantly influenced perceived susceptibility, presumably contributing to the adoption of preventive behaviors in situations of need. These issues clarify the results of previous studies that found that several personality aspects affect the perception of being at risk and the consequent engaging in health-protective behaviors. Interestingly, ‘self-efficacy’ and ‘imagination’ were found to be the significant predictors of risk perception, as reported in the previous studies about this topic. To confirm these data, the recent literature on the topic showed that these psychological variables have a significant role in promoting effective prevention campaigns. More specifically, preventive self-efficacy, defined as the perception that an individual has of their own ability to adopt specific healthy behaviors, is an important variable in promoting adherence to preventive measures and healthy behaviors such as quitting smoking or exercising more. Furthermore, it has also been shown that empathic messages that stimulate self-efficacy are helpful in promoting disease

![Fig. 1. Structural equation model of empathy, imagination, self-efficacy, and personal and comparative susceptibility.](image-url)
prevention. Indeed, empathy enhances persuasion of health communication campaigns by fostering a better cognitive and emotional understanding of the personal relevance of the risk. Finally, other studies confirmed that imagination can influence the reporting of healthy behaviors.

This study has some limitations. First of all, it is based on data from a single center, and it would be interesting to conduct similar studies in other geographic areas to evaluate any differences in risk perception related to social and cultural differences. Furthermore, we investigated the perceived risk for a hypothetical novel virus, and it would be important to replicate this study in light of the recent outbreak of the COVID-19 epidemic in Italy to verify how much the impact with this new disease may have changed the risk perception of the subjects interviewed.

However, these results are of particular practical interest, given that the recent outbreak of coronavirus in Italy requires that people engage in the proper behavioral measures to mitigate the disease’s spread.

Conclusion

In conclusion, our study shows how subjective factors significantly affect the risk perception for health, even in case of nonspecific pathology, such as a hypothetical disease related to an unknown virus. In this regard, our results suggest taking into account the role of psychological variables, especially empathy, self-efficacy, and imagination, in promoting effective psycho-educational interventions aimed at empowering the population in adopting the necessary prevention and containment measures.

In light of the current COVID-19 outbreak worldwide, it is therefore important to adopt specific programs to enhance the personality characteristics that play an important role in adopting healthy and preventive behaviors to limit the spread of the virus and avoid disastrous consequences both at health and economic level.

Author statements

Ethical approval

This research conforms to the Helsinki Declaration, outlining the principles for research involving human subjects. Participants provided informed consent. The research followed the ethical code for Italian Psychologists (L. 18.02.1989, n. 56), the Ethical Code for Psychological Research (March 27, 2015) approved by the Italian Psychologists Association. The study was approved by the Chair of School and Family Psychology of the Department of Educational Sciences, University of Catania (Italy).

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Competing interests

None declared.

References

1. Brewer NT, Weinstein ND, Cuite CL, Herrington JE. Risk perceptions and their relation to risk behavior. Ann Behav Med 2004;27:125–30.
2. Ikubu Y, Chapman GB, Meyers LA, Li M, Galvani AP. The dynamics of risk perceptions and precautionary behavior in response to 2009 (H1N1) pandemic influenza. BMC Infect Dis 2010;10:296.
3. Jones BH, Salathe M. Early assessment of anxiety and behavioral response to novel swine-origin influenza A(H1N1): Phos One 2009;4:e8032.
4. Rubin GJ, Amlot R, Page L, Wessely S. Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: cross sectional telephone survey. BMJ 2009;339:b2651.
5. Lau JT, Griffiths S, Choi KC, Tsui HY. Avoidance behaviours and negative psychological responses in the general population during the initial stage of the H1N1 pandemic in Hong Kong. BMC Infect Dis 2010;10:139.
6. Perrr R, Klein WM. Risk perceptions and health behavior. Curr Opin Psychol 2015;5:85–9.
7. El-Toukhby S. Parsing susceptibility and severity dimensions of health risk perceptions. J Health Commun 2015;20:499–511.
8. Rogers RW. Cognitive and physiological processes in fear appeals and attitude change: revised theory of protection motivation. New York, NY: Guilford Press; 1983.
9. Jones CL, Jensen JD, Raucher CL, Brown NR, Christen C, Weaver J. The ComediBel Model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. Health Commun 2015;30:566–76.
10. Commodari E. The role of sociodemographic and psychological variables on risk perception of the flu. Sage Open 2017;7(3):215824401778990.
11. Bandura A. Health promotion from the perspective of social cognitive theory. Psychol Health 1998;13:623–49.
12. Cho H, Lee JS. The influence of self-efficacy, subjective norms, and risk perception on behavioral intentions related to the H1N1 flu pandemic: a comparison between Korea and the US. Asian J Soc Psychol 2015;18:311–24.
13. Ruiter RAC, Abraham C, Kok G. Scary warnings and rational precautions: a review of the psychology of fear appeals. Psychol Health 2001;16:613–30.
14. Seyde E, Taal E, Wiegman O. Risk appraisal, outcome and self-efficacy: expectations, cognitive and preventive behaviour related to cancer. Psychol Health 1990;4:49–105.
15. McCrae RR, Costa PT. Validation of the five-factor model of personality across instruments and observers. J Pers Soc Psychol 1987;52:81–90.
16. McCrae RR, Costa Jr PT. Personality trait structure as a human universal. Am Psychol 1999;52:509–16.
17. Costa PT, Terracciano A, McCrae RR. Gender differences in personality traits across cultures: robust and surprising findings. J Pers Soc Psychol 2001;81:322–31.
18. Hill PL, Turiano NA, Hurd MD, Mroczek DK, Roberts BW. Conscientiousness and longevity: an examination of possible mediators. Health Psychol 2011;30:536–41.
19. Chauvin B, Hermand D, Muller E. Risk perception and personality facets. Risk Anal 2007;27:171–85.
20. Jokela M, Bathy GD, Nyberg ST, Virtanen M, Nabi H, Singh-Manoux A, et al. Personality and all-cause mortality: individual-participant meta-analysis of 3,947 deaths in 76,150 adults. Am J Epidemiol 2013;178:667–75.
21. Turiano NA, Chapman BP, Gruenewald TL, Mroczek DK, Personality and the leading behavioral contributors of mortality. Health Psychol 2015;34:51–60.
22. Hampson SE, Andrews JA, Backley M, Lichtenstein E, Lee ME. Personality traits, perceived risk, and risk-reduction behaviors: a further study of smoking and radon. Health Psychol 2006;25:530–6.
23. Gaygizzi U, Gaygizzi E, Ozkan T, Lajunen T. Individual differences in behavioral reactions to H1N1 during a later stage of the epidemic. J Infect Publ Health 2012;5:9–21.
24. Ma K, Chen T, Han MF, Guo W, Ning Q. [Management and clinical thinking of coronavirus disease 2019]. Zhonghua gan zang bing za zhi – Chin J Hepatol 2020;28:1000.
25. Zhang S, Diao MY, Duan L, Lin Z, Chen D. The novel coronavirus (SARS-CoV-2) infections in China: prevention, control and challenges. Intensive Care Med 2020;46:891–3.
26. Han Q, Lin Q, Ni Z, You L. Uncertainties about the transmission routes of 2019 novel coronavirus. Influenza other Respir Viruses 2020;14:470–1.
27. World Health Organization. Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-ncov). 2020 [cited 2020 20 February]; Available from: https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov).
28. European Centre for Disease Prevention and Control. Rapid risk assessment: outbreak of novel coronavirus disease 2019 (COVID-19): increased transmission globally – fifth update. 2020 [cited 2020 2 March]; Available from: https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-outbreak-novel-coronavirus-disease-2019-covid-19-increased.
29. Bordin I, Nicastri E, Scorzolini L, Di Caro A, Capobianchi MR, Castilletti C, et al. Differential diagnosis of illness in patients under investigation for the novel coronavirus (SARS-CoV-2). Italy, February 2020. Euro Surveill 2020;25.
30. Wicks P, Abrams S, Masi D, Hejda-Forde S, Leigh PN, Goldstein LH. Prevalence of depression in a 12-month consecutive sample of patients with ALS. Eur J Neurol 2007;14:993–1001.
31. Brug J, Aro AR, Denema A, de Zwart O, Richards JH, Bishop GD. SARS risk perception, knowledge, precautions, and information sources, The Netherlands. Emerg Infect Dis 2004;10:1486–9.
32. Schwarzer R, Jerusalem M. Generalized self-efficacy scale. In: Weinman J, Wright S, Johnston M, editors. Measures in health psychology: a user’s portfolio Contributions and control beliefs. Windsor, UK: NFER-NELSON; 1995. p. 35–7.
33. Perussi F, Vairo R. ITAPI- S manuale psicometrico. Milan, Italy: Psicotecnica; 1996.
34. de Zwart O, Veldhuizen IK, Elam G, Aro AR, Bishop T, Mroczek DK, et al. Perceived threat, risk perception, and efficacy beliefs related to SARS and other
(emerging) infectious diseases: results of an international survey. Int J Behav Med 2009;16:30–40.
35. de Zwart O, Veldhuijzen IK, Richardus JH, Brug J. Monitoring of risk perceptions and correlates of precautionary behaviour related to human avian influenza during 2006 - 2007 in The Netherlands: results of seven consecutive surveys. BMC Infect Dis 2010;10:114.
36. Sibilia L, Schwarzer R, Jerusalem M. Italian adaptation of the general self-efficacy scale. 1995. Available from: userpage. fu-berlin. de/~health/italian.htm.
37. Viboud C, Boelle PY, Cauchemez S, Lavenu A, Valleron AJ, Flahault A, et al. Risk factors of influenza transmission in households. Br J Gen Pract : J Roy Coll Gen Pract 2004;54:684–9.
38. France AM, Jackson M, Schrag S, Lynch M, Zimmerman C, Biggerstaff M, et al. Household transmission of 2009 influenza A (H1N1) virus after a school-based outbreak in New York City, April-May 2009. J Infect Dis 2010;201:984–92.
39. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19). 2020 [cited 2020 12 March]; Available from: https://www.cdc.gov/coronavirus/2019-ncov/index.html.
40. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. N Engl J Med 2020;382(13):1199–207.
41. European Centre for Disease Prevention and Control. Guidelines for the use of non-pharmaceutical measures to delay and mitigate the impact of 2019-nCoV. Stockholm: ECDC; 2020.
42. Barry LM, Haraway DL. Behavioral self-control strategies for young children. J Early Intensive Behav Interv (JEIBI) 2005;2:79–90.
43. Bogg T, Roberts BW. Conscientiousness and health-related behaviors: a meta-analysis of the leading behavioral contributors to mortality. Psychol Bull 2004;130:887–919.
44. DeNeve KM, Cooper H. The happy personality: a meta-analysis of 137 personality traits and subjective well-being. Psychol Bull 1998;124:197–229.
45. Friedman HS. The multiple linkages of personality and disease. Brain Behav Immun 2008;22:668–75.
46. Steel P, Schmidt J, Shultz J. Refining the relationship between personality and subjective well-being. Psychol Bull 2008;134:138–61.
47. Grow JM, Christopher SA. Breaking the silence surrounding hepatitis C by promoting self-efficacy: hepatitis C public service announcements. Qual Health Res 2008;18:1401–12.
48. Campbell RG, Babrow AS. The role of empathy in responses to persuasive risk communication: overcoming resistance to HIV prevention messages. Health Commun 2004;16:159–82.
49. Loftus EF, Mazzoni GAL. Using imagination and personalized suggestion to change people. Behav Ther 1998;29:691–706.