

Article

Cross-cultural Research of the Perceived Risk During the COVID-19 Pandemic

Krum Krumov ^{1,*}, Johann F. Schneider ², Jin Liu ³, Alben K. Krumova ¹, Eko Widodo ⁴, Alexander L. Gungov ⁵, Marta Juhasz ⁶, Magdalena Z. Garvanova ⁷, Sanjay Kumar ⁸ and Rita Repaczki ⁶

¹ Department Social Psychology, Sofia University "St. Kliment Ohridski", Sofia (1463), Sofia, Bulgaria

² Department of Psychology, Saarland University, Saarland (66123), Saarbrücken, Germany

³ School of Humanities and Social Sciences, Beijing Institute of Technology, Beijing (100081), Beijing, China

⁴ Faculty of Business Administration and Communication Sciences, Atma Jaya Catholic University of Indonesia, Jakarta (12930), Jakarta, Indonesia

⁵ Dept. of Logic, Ethics and Aesthetics, Sofia University "St. Kliment Ohridski", Sofia (1463), Sofia, Bulgaria

⁶ Dept. Ergonomics & Psychology, Budapest Uni. of Technology & Economics, Budapest (1111), Budapest, Hungary

⁷ Department of Public Communications, ULSIT, Sofia (1463), Sofia, Bulgaria

⁸ Western Coalfields Ltd., Nagpur (440001), Maharashtra, India

* Correspondence: prof.krumov@gmail.com

Received: February 7, 2023; Accepted: March 30, 2023; Published: March 31, 2023

Abstract: One of the essential aspects in analyzing the topic of managing people's risk behavior in extreme situations is related to the issue of risk perception. The subject of this study was to reveal whether certain factors, such as cultural context, gender, age, education, religious beliefs, etc., mediate the perceived risk during the COVID-19 pandemic. The study was conducted online from April to June 2020. The two samples included a total of 2617 participants aged between 18 and 70 years, where 1412 of which were drawn from Asia and 1205 were representatives of Europe. Participants were asked to complete an internet-based version of a short questionnaire that described the COVID-19 pandemic situation, as one of the questions referred to the hazard perception of the infection. Results obtained showed that there was a higher level of perceived risk among members of the Asian culture group in comparison with the European study participants. Furthermore, it was revealed that gender is not a significant factor in the perception of risk in either the European or the Asian cultural group ($p > 0.05$). The results showed that levels of the perceived risk increased with age and that there were significant differences between young and old in threat perception for the European sample ($p < 0.001$). Regarding the Asian sample, it turned out that all age groups perceive the risk of infection almost equally. Several demographic characteristics also emerged as important mediators of risk perception. For example, people with the lowest education, married, religious, and families with children fear the hazard of COVID-19 infection to the greatest extent, compared to people with the highest education, singles, atheists, and families without children, who do not perceive the virus as a high-risk factor.

Keywords: Asia; COVID-19; Cultural Differences; Europe; Hazard Perception; Pandemic; Perceived Risk

1. Introduction

Perceived risk of the virus during the COVID-19 pandemic is a central point in the regulation and self-regulation of individuals' health behaviors. Whether people will perceive the virus as a real danger or treat the threat lightly and irresponsibly depends on whether they will engage in

protective or risky behavior. In fact, risk behavior and risk perception are important scientific fields, well-developed in psychology, sociology, economics, management, and anthropology [1, 2, 3, 4, 5, 6]. This issue emerged with great importance and became the focus of research during the COVID-19 pandemic when several scientists began to study the perceived risk of infection and the risk behavior of people [7, 8, 9, 10, 11, 12].

This statement sounds logically acceptable, however, from a psychological point of view, it is untenable, since, in practice, the behavior depends not only on the objective characteristics of the danger but above all on the way in which people perceive the threatening agent. The result of the risk perception process, i.e., the perceived risk, is precisely the one on which the risk behavior depends. Perceived risk is defined as an individual's subjective assessment of the level of risk associated with a particular hazard (e.g., health threat) and varies according to factors such as past experiences, age, gender, and culture defined as an individual's subjective assessment of the level of risk associated with a particular hazard (e.g., health threat), and it varies according to factors such as past experiences, age, gender, and culture [13]. Ultimately, perceived risk determines an individual's engagement in risk/protective behavior.

Several studies reveal that there are many factors on which risk management and risk behavior depend. For example, according to Chionis and Karanikas [14], the factors influencing risk perception are personality, experience, beliefs, age, gender, level of education, knowledge, culture, and psychological context.

Individuals form their inner vision of risk in a specific social and cultural context and under the influence of many external factors – friends, family, institutions, history, traditions, symbols, ideology, etc. The formation of their attitudes toward risk also depends on whether they live in a high-risk or low-risk environment and on whether their encounter with risk is of high or low intensity. On the other hand, it should also be borne in mind that the way of perceiving risk is mediated by internal personal factors such as knowledge, emotions, and attitudes, which means that the perceived risk ultimately depends on past experiences [15]. During their experiences, people learn what is harmful or beneficial to their well-being and what is safe or dangerous for their survival. In other words, it is the personal experience that teaches an individual when and what to fear or not fear. If the current situation is related to the health and life of the individual, the resulting risky behavior will be non-standard, unaccustomed, and extreme, as it is based on instinctive fear for one's own survival. Fear is defined as a primary emotion that arises from the detection of an imminent threat, involving an immediate alarm reaction that mobilizes the organism by triggering a set of physiological changes. In a word, it is a short-term response to a present, clearly identifiable threat [16].

Being a primary emotion and a short-term response to a clearly identifiable threat, fear is an attribute of any critical life-threatening situation. In this sense, it is an indicator and determinant of risk behavior since the greater the fear of external threats, the higher the degree of perceived risk. However, the risk (risky behavior/perceived risk), in general, is personal, and at the same time, it is a social and cultural construct [17]. That is why fear is a universal regulator of human behavior, which means it is a common element, a common attribute of both external and internal control (self-control).

Internal control is, to some extent, relative because the socio-cultural environment (the context) is a demiurge of personal phenomena, such as attitudes, values, and beliefs, through which

self-control is exercised. This circumstance presupposes the existence of a strange paradox: fear generally is subject to complete purposeful control by external factors, however, on a personality level this is not the case and the control, itself, is relative, although people imagine that they themselves have entire control of their own lives.

When discussing the determinants of perceived risk in a critical situation, risk perception is usually seen as a personal process based on the interaction between available information and the individual's set of attitudes, competencies, and experiences developed over a lifetime. As a result of this interaction, the individual assesses whether the stimulus that has arisen, or the event that has occurred, poses a danger to his/her well-being, and on the bases of this, makes a final decision about his/her own behavior. It should be borne in mind, however, that the danger itself does not directly impact the individual's behavior. Before that, it must be perceived as an arousing fear threat, and in turn, the fear must provoke an awareness of the risky situation, threatening individual well-being. Even though a situation is perceived as threatening and there is a perceived risk, there is no guarantee that the individual will act rationally and will not engage in risky behavior. This means that risk-taking behavior also depends on the functioning of several other psychological phenomena that are beyond the intentional conscious control of the individual. For example, individuals may realize that their action would be risky, but under the pressure of a momentary emotion it is possible for them to engage with it, and vice versa, to avoid it. This also means that emotional responses to risk are often independent of cognitive assessments and that emotions are stronger determinants of people's behavior [18]. For example, people tend to react with fear not only to the visible, familiar characteristics of an external object, but they may perceive as harmful such objects that are unobservable, unknown, and new to them [5].

These automatic reactions of the individual, based on unconscious emotional processes, can be caused by a variety of external stimuli – loud sounds, bright light, huge objects, and words whose connotation is associated with danger. They, however, affect the different social groups in different ways, depending on the experience of individuals, their attitudes, beliefs, etc. This ultimately means that the degree of perceived risk will vary between individuals and social groups. For example, Slovic and his colleagues confirm that the word "chemicals", which is perceived as a danger and provokes a fearful reaction in members of the general public, is not perceived in the same way by scientists and experts. This study of "intuitive vs. scientific toxicology", proving the discrepancy between expert and lay views about chemical risks, is an illustration of the existence of internal determinants (experience, knowledge, conceptions, attitudes, values) that make individuals perceive the same danger differently [19].

Based on the analysis in the preceding lines, two main conclusions could be drawn:

Firstly, the magnitude of fear generated in an extreme (pandemic) situation that threatens the lives and health of individuals is an indicator of the degree of perceived risk.

Secondly, being an indicator of perceived risk, fear as such, its magnitude, characteristics, and control functions depend on internal (innate and acquired) and external factors. However, external factors dominate risk behavior to the greatest extent in extreme situations such as the pandemic.

2. Materials and Methods

2.1. Purpose of the Study and Hypotheses

According to the previous analysis, the risk perception of COVID-19 infection is mediated and depends on different factors, such as age, gender, social experience, cultural context, etc. This is precisely the purpose of the present study: to reveal whether factors such as cultural context, gender, age, and several demographic characteristics, mediate the hazard perception of COVID-19 infection, resulting in varying degrees of individuals' perceived risk.

In accordance with the purpose of the study, the following hypotheses were formulated:

Hypothesis 1. *Various cultural contexts mediate in different ways the hazard perception of COVID-19 infection, as a result of which the degree of perceived risk is higher among representatives of the collectivist culture compared to representatives of the individualistic culture.*

Hypothesis 2. *Sex differentiation mediates hazard perception of COVID-19 infection, and as a result, the degree of perceived risk among women is higher than among men.*

Hypothesis 3. *Age mediates hazard perception of COVID-19 infection, resulting in varying degrees of perceived risk among different age groups.*

Hypothesis 4. *Some demographic characteristics, such as education, financial security, religious orientation, health status, etc., mediate the hazard perception of COVID-19 infection and significantly influence the perceived risk by individuals during the COVID-19 pandemic.*

2.2. Participants

The subjects of the study were representatives of two cultural groups drawn from Europe and Asia. The total number of participants included 2617 subjects, aged between 18 and 70 ($M = 37.98$, $SD = 15.20$), 1412 of which were drawn from Asia (45.9% identified as women, 49.6% as men, and 4.5% preferred not to answer), and 1205 were representatives of Europe (64.6% identified as women, 34.5% as men, and 0.9% preferred not to answer). The number of Asian participants is higher due to the large population in the three Asian countries. Most of the research participants are of active working age. The average age of the participants from Asia was 32 years ($M = 31.50$, $SD = 12.77$). The average age of the participants from Europe was 45 years ($M = 44.96$, $SD = 14.51$).

The distribution of participants in the study is as follows:

Asia: The study included representatives of three countries – China ($N = 500$), India ($N = 500$), and Indonesia ($N = 412$). These are the three Asian countries, influenced by collectivistic values with the largest populations but different religious systems – mainly Buddhism, Hinduism, Islam, Taoism, Confucianism, and Catholicism.

Europe: The study included participants from Bulgaria ($N = 405$), Germany ($N = 400$), and Hungary ($N = 400$). These three countries, in general, are typical representatives of European Christian civilization and culture.

A section with various demographic characteristics is included in the questionnaire. All research participants were required to indicate their age, educational background, work experience, number of children in the family, financial status, qualifications, marital status, religious beliefs, various party affiliations, etc. Data obtained make it possible to examine the influence of demographic factors on perceived risk. Moreover, the data obtained show that the respondents are from diverse social groups, which reflects well enough the different cultural profiles of both samples.

2.3. Materials and Procedure

The study was conducted online from April to June 2020. Participants were asked to complete an internet-based version of a short questionnaire that described the extreme COVID-19 pandemic situation. The original version of the questionnaire is written in English, and for each country, it is translated into Bulgarian, Chinese, German, Hindi, Hungarian, and Indonesian, respectively. This makes it possible for representatives of different social groups to fill out the questionnaire in their native language.

The items were related to the main characteristics of the virus and the pandemic situation, such as the virus origin, functions of the virus, desire for vaccination, precautions against infection, etc. Subjects had to present their answers on a six-point Likert scale. One of the items was related to the fear of a virus contracting and aimed to measure the extent to which the subjects perceived the running pandemic situation as a risk to their health and well-being. The wording of this item is as follows: *I'm not afraid of the hardships of life – I'm only afraid of the disease infection.*

The responses to this question were expected to show that a significant part of the entire sample perceived the virus as a real threat to human health. In addition, the results had to reveal the extents to which separate groups, differentiated according to sex, age, cultural context, and certain specific demographic characteristics, perceive the pandemic situation as risky to their health and well-being. For this purpose, respondents had to answer questions separated into a section, including demographic characteristics, as follows: sex, age, profession, family status, biological or adopted children, number of children in a family, severe childhood illnesses, current employment, financial status, religion, political orientation, etc. To reveal the influence of age on risk perception, according to the concept of Armstrong [20], the subjects were divided into three age groups: *Early Adulthood* – up to 35 years; *Midlife* – from 36 to 50; *Mature Adulthood* – over 50.

The *Research Ethics Approval Procedure* was not applied in this study, as the survey was anonymous, and respondents completed the online questionnaire voluntarily.

To examine the hypotheses, the following statistical methods were employed: descriptive statistics and independent samples T-test, paired-samples T-test, One-Way ANOVA, and post hoc tests.

3. Results

The results of the study showed the ways in which people of different genders, ages, experiences, and cultures perceive the hazard of infection during the COVID-19 pandemic. It is reasonable to expect in this extreme situation, the external stimulus (COVID-19) is perceived as a life-threatening danger, which arouses anxiety and fear in people for their lives. It depends, however, on the degree of the aroused fear, whether an individual will perceive the invisible virus as an extreme life-threatening danger, as a real risk to their life. The presence of a high-level virus fear indicates the presence of a high level of perceived risk, and conversely, the low level or lack of virus fear indicates a low level or lack of perceived risk. COVID-19 hazard information, provoked by external agents (media, state institutions, doctors, etc.), does not directly affect individuals and is not a direct source of their fear as it is mediated by various factors such as age, gender, social experience, etc. This suggests that the degree of induced fear, as a determinant of perceived risk, will be mediated by these factors and will be dependent on them. One important factor that mediates fear and on which perceived risk depends is the cultural context. We assume, according to the formulated Hypothesis 1, cultural contexts mediate the hazard perception of COVID-19 infection,

and the degree of perceived risk is higher among representatives of the collectivist culture compared to representatives of the individualistic one.

The results show (Fig. 1) that in the total sample, the perceived high risk prevails – 53% (n = 855) vs. low risk - 47% (n = 758). The assumption that collectivist cultures, such as Asian, are dominated by a high degree of perceived risk, and individualistic cultures, such as European, are dominated by a low degree of perceived risk has been confirmed. The results show that Europe is dominated by a low level of perceived risk – 57.3% (n = 460) vs. a high level of perceived risk – 42.7% (n = 343). The trend in Asia is exactly the opposite: the high degree of perceived risk dominates – 63.2% (n = 512) vs. the low level of perceived risk – 36.8% (n = 298).

I'm not afraid of the hardships of life – I'm only afraid of the disease infection.

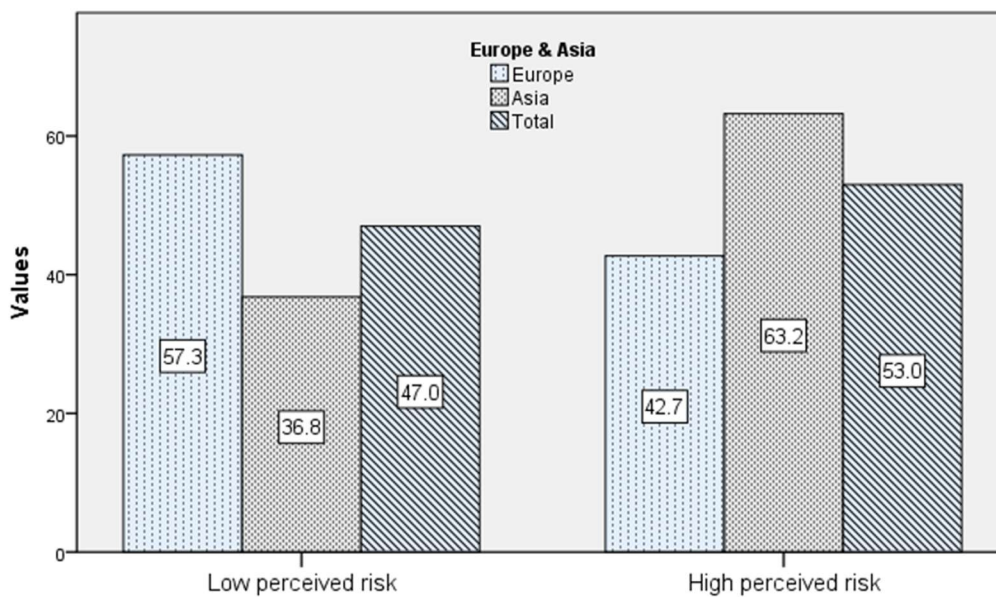


Figure 1. Levels of perceived risk in different cultures.

In order to accurately prove Hypothesis 1, another statistical criterion was applied - the student's t-test for independent samples. The results confirm the assumption that the cultural context is a significant determinant (mediator) of the risk perception process during the COVID-19 pandemic. In this case, the level of perceived risk for the Asian sample is higher – $x = 3.82$, $sd = 1.54$ (n = 1400), than the European sample – $x = 3.27$, $sd = 1.72$ (n = 1204) at $t = -8.52$, $df = 2440$, $p < 0.001$, $d = 0.35$.

One of the assumptions in the present study concerns sex as a mediator of perceived risk. According to Hypothesis 2, sex is a significant determinant (mediator) in the risk perception process during the COVID-19 pandemic, where the degree of perceived risk in women is higher than in men. Although there are theoretical prerequisites for such an assumption, which will be discussed in the next section, this hypothesis was not confirmed. Based on the results of the comparative analysis by sex for the entire sample, it can be concluded that sex is not a significant factor for variability in the level of perceived risk – $t(2431) = 1.01$, $p = 0.312$, which is de facto $p > 0.05$, n.s. Furthermore, sex is not a significant factor in either the European cultural community – $t(1191) = 1.16$, $p = 0.246$, or the

Asian group – $t(1336) = -1.78, p = 0.075$. The two-factor ANOVA also confirmed that the cumulative effect between the variables “sex” and “type of culture” was not statistically significant – $p > 0.05$.

According to the third hypothesis, age is a significant determinant (mediator) of risk perception during the COVID-19 pandemic, as different age groups affect perceived risk to varying degrees. It is logical to assume that different ages affect risk perception differently when people are in a life-threatening situation, especially as the media pressure on the elderly was greatest. As noted in the previous section, respondents were divided into three age groups, according to the concept of Armstrong [20]. He postulates the human life cycle, in general, is divided into twelve stages, and we accepted it as the most appropriate in the case. It is believed, concerning Hypothesis 3, that during the COVID-19 pandemic, the three stages of the human life cycle – *Early Adulthood* (up to 35 years), *Midlife* (from 36 to 50), and *Mature Adulthood* (over 50), impact in different ways the risk perception process.

The results reveal (Fig. 2) that age is a significant factor that introduces statistically significant variability in relation to the level of perceived risk: One-Way ANOVA shows that $F(2,2469) = 13.37, p < 0.001$. The application of Games-Howell as a post-hot test reveals that the emerging group is the third age group – people over 50 years old ($n = 594, x = 3.88, sd = 1.61$), where the level of perceived risk is highest compared to Early Adulthood ($n = 1205, x = 3.52, sd = 1.56$), and Midlife ($n = 673, n = 3.43, sd = 1.70$).

Two-Way ANOVA supports the findings regarding the impact of age on perceived risk levels. At the same time, other dependencies are revealed. The results show that both separate and combined effects of “age” and “type of culture” are statistically significant: age – $F(2,2466) = 24.54, p < 0.001, \eta = 0.14$; type of culture – $F(1,2466) = 87.11, p < 0.001, \eta = 0.18$; age/culture type – $F(2,2466) = 12.30, p < 0.001, \eta = 0.10$.

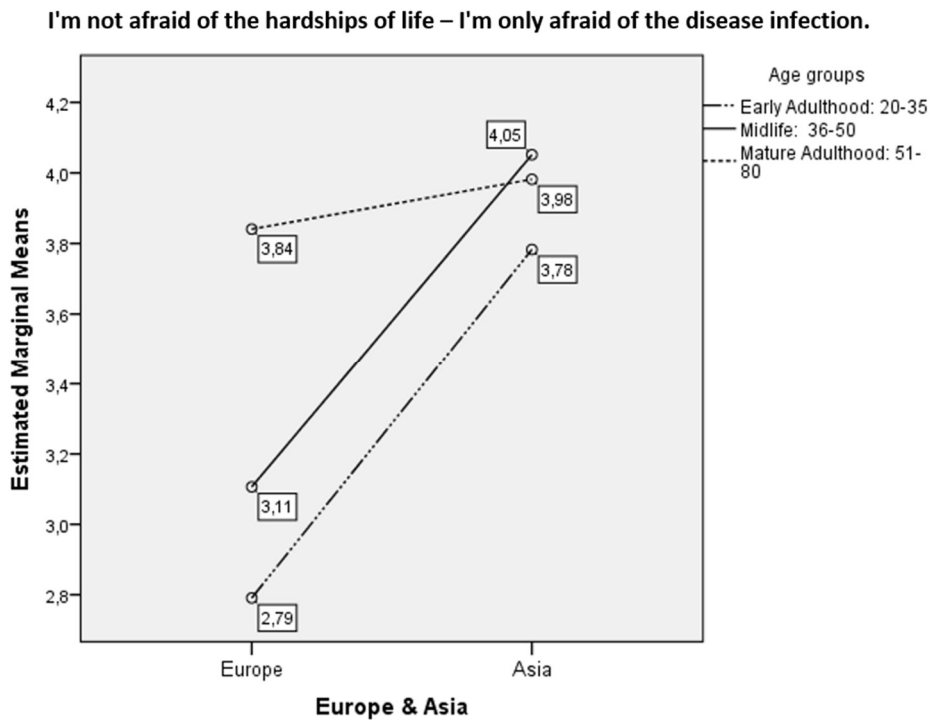


Figure 2. Influence of life cycles on perceived risk levels.

Figure 2 shows that in the European sample, the level of perceived risk increases with age. It is lower among young people, while people over the age of 50 perceive the virus as highly threatening. The opposite trend is visible in the Asian sample: all three age groups perceive the risk almost equally. However, the small differences between them show that representatives of the Midlife group perceive the virus as more dangerous, while younger people perceive the virus as less threatening.

One of the research objectives was to examine whether certain specific demographic characteristics mediate risk perception. Hypothesis 4 suggests that several demographic characteristics, like education, financial security, religious orientation, health status, etc., mediate the process of hazard perception of COVID-19, and in this way influence the perceived risk levels.

We assumed that education was a factor, affecting hazard perception of COVID-19 infection, as a result of which expected respondents with different levels of education (primary education, secondary education, bachelor's degree, master's degree Ph.D., or a higher degree) to indicate different levels of perceived risk. Two-Way ANOVA shows that the cumulative effects of the "culture type" and "education level" are not statistically significant – $F(4,2572) = 1.87$, and $p = 0.114$, n.s., so we used One-Way ANOVA, involving the independent variable "education" and the dependent variable "perceived risk level". The one-factor analysis of variance revealed that education introduces statistically significant variations in the assessment of perceived risk – $F(4,2577) = 6.60$ at $p < 0.001$, $\eta = 0.10$.

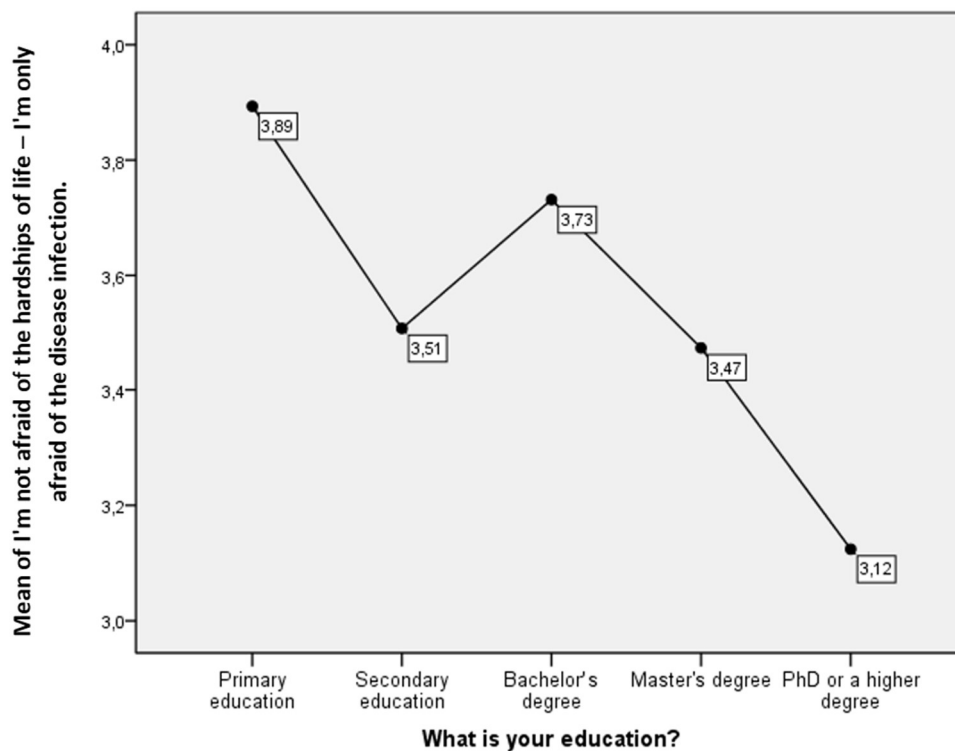


Figure 3. Perceived risk and level of educational qualification.

The Games-Howell post hoc test was used for the intergroup comparison of the means, as the Levene test showed that there was no equality between the variances. The results, in this case, show that there are statistically significant differences between "Primary education", on the one hand, and "PhD or a higher degree" ($p < 0.01$), on the other hand, as well as between "Bachelor's degree", on the

one hand, and "Master's degree" ($p < 0.01$) and "PhD or a "higher degree" ($p < 0.001$), on the other hand. It can be seen in Figure 3 that with increasing stages of educational qualification, the level of the perceived risk of infection with COVID-19 generally decreases, and this was observed particularly when comparing respondents with the lowest and highest levels of education.

We assumed that family/marital status mediated the perception of risk. When using Two-Way ANOVA, the cumulative effects of "culture type" and "marital status" were not statistically significant - $F(3,2566) = 2.24$ at $p = 0.082$, n.s. One-Way ANOVA, however, with the independent variable "family status" and dependent variable "level of perceived risk" reveals that family status has a statistically significant effect on the perceived risk level - $F(3,2570) = 13.67$ for $p < 0.001$, $\eta = 0.13$.

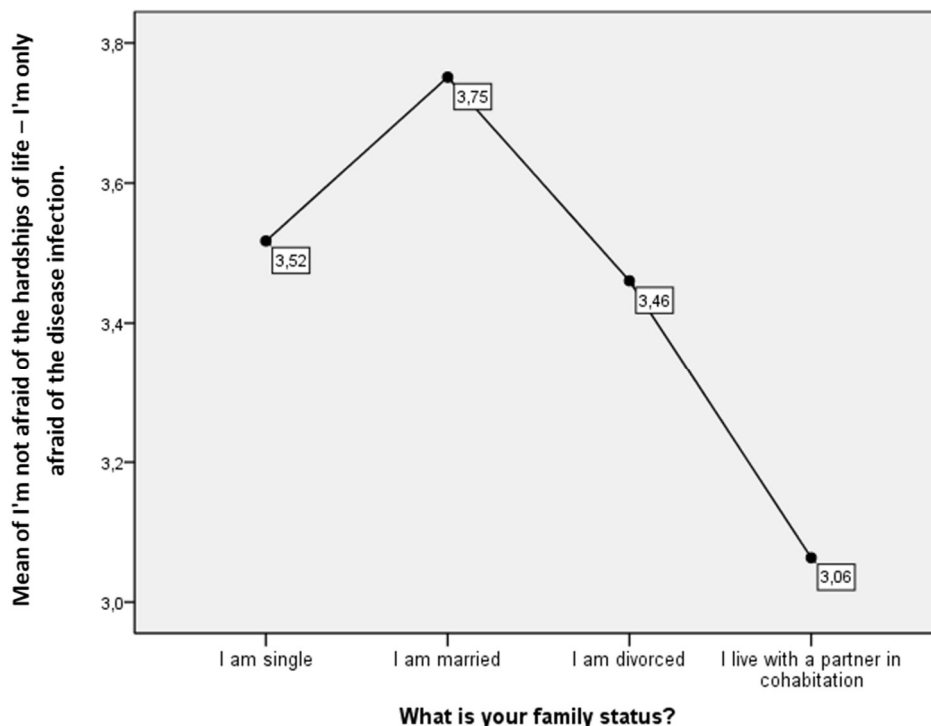


Figure 4. Perceived risk and family status.

The Levene test shows equality of variances, so the post hoc tests use the Scheffe test to estimate the differences in the mean values between the compared groups. The results show (Fig.4) that the group of divorcees does not differ from other groups - $p > 0.05$. The group of married differs from unmarried/single - $p < 0.05$ and those living in cohabitation - $p < 0.001$, and vice versa. In addition, the group of unmarried/single differs from those living in cohabitation, and vice versa - $p < 0.001$.

An important characteristic that mediated the perception of risk is the existence of children in the family. In this regard, respondents had to answer the question: *Do you have any biological or adopted children?* Two-Way ANOVA shows that there are statistically significant individual and cumulative effects of the cultural type, and the presence of children in the family concerning perceived risk: type of culture - $F(1,2572) = 83.02$, $p < 0.001$, $\eta = 0.18$; children in family - $F(1,2572) = 25.64$, $p < 0.001$, $\eta = 0.10$; cumulative effect - $F(1,2572) = 11.78$, $p < 0.001$, $\eta = 0.07$.

Figure 5 shows that having children in the family increases the perceived risk, especially in European cultures. In the Asian sample is observed, a higher level in both groups - families with children, and without children, due to the higher perceived risk in general in this cultural group.

Another demographic characteristic included in the questionnaire refers to respondents' religiosity. Respondents had to indicate the degree of their religiosity, whether they believed in something else or were outspoken atheists.

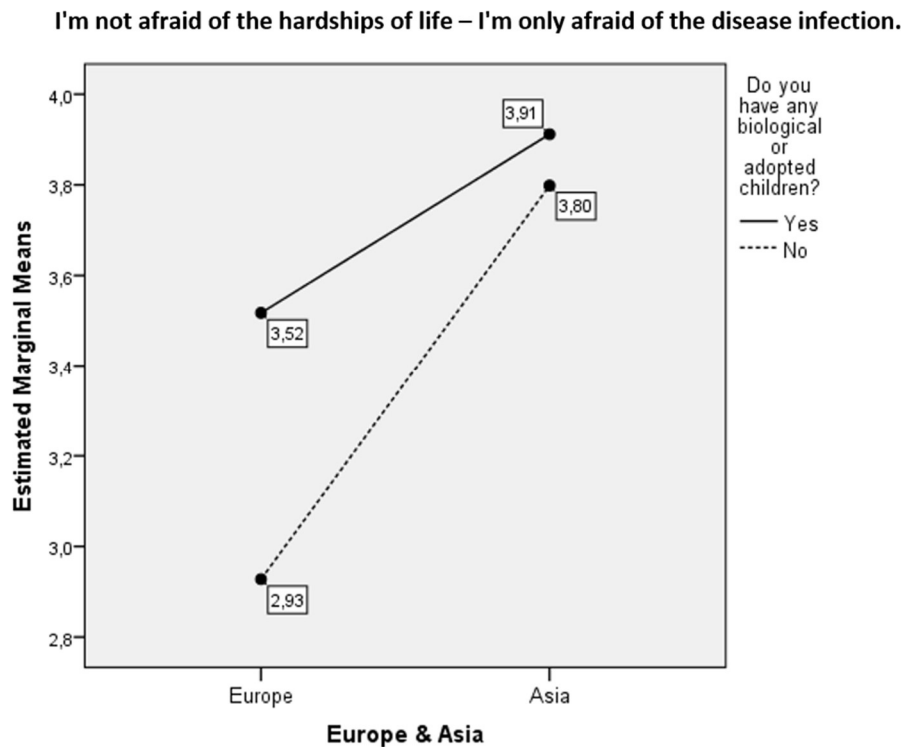


Figure 5. Perceived risk in families with and without children.

Two-Way ANOVA shows that there are statistically significant individual and cumulative factor effects of "culture type" and "degree of religiosity" on "perceived risk". For "culture type" – $F(1,2567) = 77.00$ at $p < 0.001$, $\eta = 0.17$, for "degree of religiosity" – $F(3,2567) = 9.93$ at $p < 0.001$, $\eta = 0.10$ and "culture x religiosity" – $F(3,2567) = 8.54$ at $p < 0.001$, $\eta = 0.10$. The graphical visualization of the results clearly outlines the differences between the studied groups.

As Figure 6 shows, between representatives of Asian culture, there are no statistically significant differences, in relation to the perceived risk, depending on religious beliefs ($p > 0.05$). For Europeans, however, religious beliefs influence perceived risk. There are significant differences ($p < 0.001$) between Europeans with deep and moderate religious feelings, on the one hand, and Europeans who are atheists or believe in something indefinite, on the other hand. The former indicated high values of the perceived risk of infection, but the latter stated that they are not afraid of virus hazards. While deeply and moderately religious Europeans and Asians do not differ in relation to the perceived risk, there are significant differences between those representatives of the two cultures, who are atheists, and who believe in something indefinite ($p < 0.001$). Europeans, who are atheists and believe in something indefinite, have significantly lower levels of perceived risk than Asians, who are members of the same religious groups but perceive the situation as highly risky.

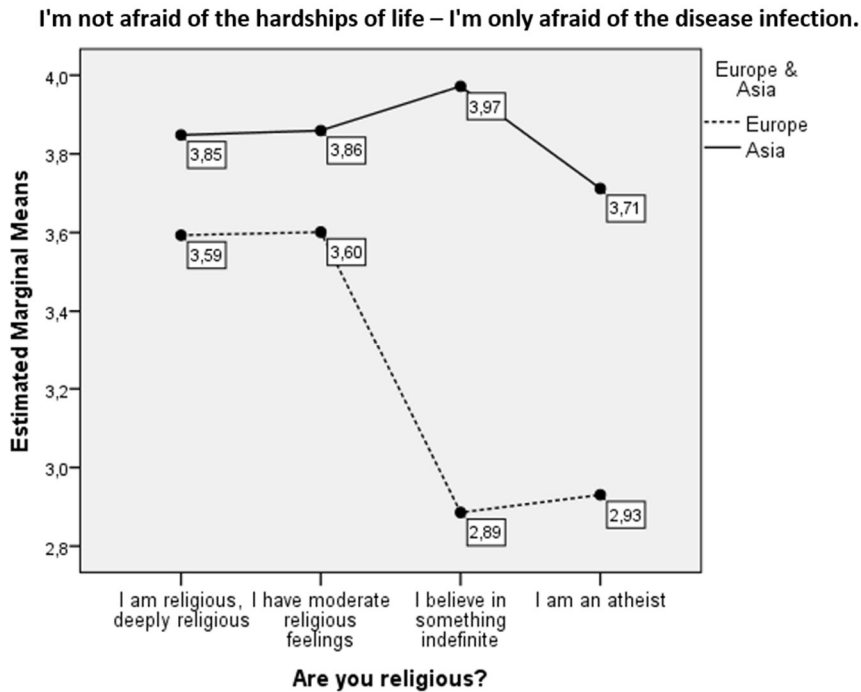


Figure 6. Perceived risk and religiosity of respondents.

4. Discussion

The results of the study showed (Fig.1) that, at the very beginning of the COVID-19 pandemic, in representatives of both cultures, Asian and European, high levels of anxiety and fear of the virus were induced. It, although invisible, was perceived as a real threat, as a risk to the life and health of individuals. Findings show, however, that there are significant differences, between Asian and European representatives, concerning levels of the hazard perception of COVID-19 infection. Since the invisible external threat (COVID-19) is a constant quantity for the entire study population, the conclusion is that differences in degrees of perceived risk are due to the fact the impact of induced fear is mediated in different ways from the two cultures – Asian and European. The results obtained unequivocally confirm Hypothesis 1, according to which the degree of perceived risk is higher among representatives of the collectivistic culture compared to representatives of the individualistic culture. The higher level of perceived risk among representatives of the collectivist culture, compared to representatives of the individualistic one, can be explained by differences in characteristics between the two cultures.

As is known, according to the cultural perspective [21, 22, 23, 24, 25, 26, 27, 28], societies can be divided into two main types - collectivistic and individualistic. Based on this division lies one of the main characteristics of societies, related to the degree to which people perceive themselves as integrated into groups [29, 30]. In collectivist societies, individuals are closely related to the group – they are loyal to the group, accountable for its achievements, and rely on mutual support. In individualistic societies, people are poorly connected to each other, and they are responsible primarily for themselves and their own goals. It is generally assumed that Asian culture is collectivistic and European culture is individualistic, which, therefore, means that different levels of the perceived risk of COVID-19, revealed in the two samples, can be explained by cultural differences between Asian and European participants. Representatives of Asian culture fear not only

for their own lives and the lives of those closest to them, but they also fear for the well-being of the group they are a part of and the society to which they belong. In other words, for them, the degree of perceived risk is significantly higher, as the virus poses an existential threat not only to themselves and their families but also to their groups of membership and to the society they are affiliated with. For representatives of individualistic societies, the degree of perceived risk is primarily due to fear for one's own life and the well-being of one's family. For Europeans, the existential threat seems to be rather personalized, as the ties to other people, to membership groups, and to society at large, are not strong enough.

We hypothesized that along with cultural context, gender differentiation would also be a significant mediator in the risk perception process. According to Hypothesis 2, we assumed, in an extreme pandemic situation, sex differentiation mediates hazard perception of infection, as a result of which the degree of perceived risk among women is higher than among men. The reasons for this assumption are related to the popular belief that the ordinary mind perceives images of women and men differently: a woman is usually perceived as weak, defenseless, and timid, while a man is perceived as strong, fearless, and tough. It was expected that the results of the present study would reveal that, in a critical pandemic situation, females would be more fearful of the virus than males, and, respectively, their level of perceived risk would be significantly higher. However, the results of the comparative analysis for the whole sample showed that gender was not a significant factor in the variability in the level of perceived risk between women and men. Furthermore, it turned out that when comparing men and women as members of the same cultural group, gender also had no significant influence on the degree of perceived risk. The finding that there were no significant differences between both Asian male and female and European male and female participants in the study leads to the conclusion that in Asian and European cultural contexts, during the extreme COVID-19 pandemic situation, the perceived risk of infection is the same for both women and men. The scientific explanation of this fact has to do with the nature of fear as a primary emotion that arises in the presence of a lethal threat. It is the human brain that automatically reacts to all dangers and threats coming from the environment [31]. In the case of the Kovid-19 pandemic, fear of the deadly virus was induced from the outset, activating in women and men alike the survival instinct formed at the physiological level over millennia. Although there are generally some differences in the physiological and psychological profiles of men and women, these do not appear to be significant enough to cause representatives of the two sexes to perceive lethal threats differently.

According to Hypothesis 3, during the Covid19 pandemic, age mediates hazard perception infection, resulting in varying degrees of perceived risk among different age groups. In line with this assumption, we expected that in the three distinct age groups – Early Adulthood (up to 35 years), Midlife (from 36 to 50), and Mature Adulthood (over 50), the levels of induced fear, respectively, the degrees of perceived risk, would be different. The finding for the whole sample is (Fig. 2) that age is a significant factor that influences the risk perception process, whereby the level of perceived risk is highest in the group of people over 50 years old, compared to the Early age groups. These differences between the groups can be explained in two ways - by the information invasion of the media on people, on the one hand, and by the "distance to death" on the other. As is well known, according to medical instructions, the media around the world have described the virus as particularly deadly for people over the age of 60 since the beginning of the pandemic. It is only logical that people in this age group assume that they are the most at risk in the pandemic situation.

“Distance to death” is the second reason why perceived risk is higher in older compared to younger people. While young people have a long-life horizon, the elderly have a short life perspective, and the distance to death is shortened for them. The shorter the time to the natural end of human life, the older people think about death and, as a result, perceive even minimal dangers as high-risk to their lives.

The findings become very exciting when the analysis focuses on combined effects between age groups and types of cultures. The results show that in Europeans, the degree of perceived risk increases dramatically with increasing age, where representatives of the Mature Adulthood group, compared to the other two groups, demonstrate a much higher fear of the virus infection. Although, in general, Asians over 50 also perceived the virus as a major life-threatening danger, there were no significant differences between the three age groups of the Asian sample. All three groups have a high degree of hazard perception of contracting the virus, and in this, they differ dramatically from Europeans. This means that in the two cultures, European and Asian, the age of people mediates and affects in different ways the perceived risk (Fig. 2). The fact that, unlike the Europeans, representatives of the Asian culture of all age groups perceive the pandemic situation as high-risky can be explained by the characteristics of the Asian cultural model. As representatives of the collectivist culture, Asians of the studied age groups feel responsible not only for themselves personally but also for the group of membership and for the society to which they belong. The lack of significant differences in the degree of risk perception between the distinct age groups in the Asian sample means that although the collectivist cultural model is most strongly cultivated in the older generation, this model dominates a significant part of the identity of young Asians.

The results in the previous paragraph suggest that, during the COVID-19 pandemic, certain demographic factors mediated hazard perception of the infection, thereby influencing the perceived risk. One of these factors is education. Study results show, regarding education, that during the COVID-19 pandemic, it emerges as a factor influencing the perception of life-threatening danger. Findings show that different educational levels mediate the hazard perception of COVID-19 infection in different ways and thus influence the degree of perceived risk (Fig.3). It is evident that between individuals with the highest level of education, and those with the lowest level of education, there are statistically significant differences in levels of perceived risk, revealing a trend to increase in induced fear of the virus in the former and a decrease in the latter. Individuals with a bachelor's degree or less perceive the threat of contracting the virus as high risk, while the trend is the opposite for those with a master's degree or doctorate. In this case, however, we could argue that this is only a trend and would not be able to draw precise conclusions regarding the different levels of education, as the educational degrees in the three Asian and three European countries where the study was conducted are not identical. Nevertheless, it could be concluded, in general, that with increasing years of training, levels of the perceived risk of contracting the virus decrease. These findings support the thesis on the relationship between education and risk in an extreme pandemic situation, according to which educational levels are a significant factor in mediating the perceived risk of contagion [32, 33, 34, 15]. Likely, the low educational level of individuals makes them rely predominantly on their primal instincts in extreme situations, which increases levels of fear and anxiety, while accumulated pieces of knowledge and experience of individuals with a high level of education mediate the impact of the threat, and reduces levels of the perceived risk.

Another factor, which mediates the hazard perception of infection and influences the perceived risk during the COVID-19 pandemic, is the family status of individuals. Study results show (Fig.4) that Family status has a statistically significant effect on the individual's level of perceived risk. Among individuals in the married group, the degree of perceived risk is the highest, and this is logical since they fear not only for themselves but also for their families (spouses and children).

The degree of perceived risk among unmarried individuals is also high. Loneliness, in this case, seems to be the main reason for the high fear level of life-threatening danger.

The results show that the degree of perceived risk among divorced individuals is also high. This is probably because individuals have separated from their former spouse and are living in loneliness, or perhaps this is coupled with fear for their children, living with or apart from them. Findings suggest that loneliness and awareness of existing health hazards to children are very important mediators of perceived risk, during extreme situations, like the COVID-19 pandemic. This is categorically proven by the data obtained for the individuals who live with a partner in cohabitation. The results show that during the COVID-19 pandemic, these individuals were the least likely to perceive the situation as threatening or risky. Likely, the low-level induced fear of the virus among them is because these individuals do not live alone and that they do not have children in common to care for.

The finding that individuals who live alone are more afraid of death, in general, is not surprising. However, the important in this case is whether the presence of biological or adopted children is a significant factor mediating perceived risk in an extreme situation. In addition, it is curious whether representatives of both cultures who have children are equally afraid of the virus and perceive to an equal extent the COVID-19 pandemic as risky. The results obtained from the study showed (Fig. 5) that for the entire sample, the presence of biological or adopted children is a significant factor that mediates the perceived risk. Results show that both European and Asian participants who have biological or adopted children in their families fear the virus to a great extent, as a result of which the degree of the perceived risk of COVID-19 infection is very high. Nevertheless, differences between the two cultures emerge. For example, in the Asian sample, both individuals having children, and individuals without children, demonstrated high levels of perceived risk. At the same time, only European participants, who have children, perceive the COVID-19 pandemic as risky, indicating in their responses that they intensely feared contracting the virus. This difference in the results of the two samples can be explained by the different characteristics of the two cultures. Obviously, representatives of the individualistic culture fear primarily for their own children. In contrast, representatives of the collectivist culture feel responsible not only for their own but to a large extent for all children in the society to which they belong. It could be argued, during a pandemic situation, in an individualistic context, there is a personalization of perceived risk, whereas, in a collectivistic context, the life-threatening danger is perceived by individuals not only as a risk to themselves and their loved ones but also as a risk to society.

The fear of mortal illness and death in all cultures is associated with belief in a god or other higher powers on which the existence of the human being depends. Therefore, it was interesting to check the ways of threat perception of the virus in subjects who are *religious and non-religious*. Incidentally, the relationship between people's religiosity, on the one hand, and the fear and anxiety generated by the COVID-19 pandemic, on the other, has been the subject of analysis in a number of studies [35, 36, 37, 38, 39, 40]. The results of the current study show that there are differences in the

perception of the risk of contracting the virus between the groups identified on the basis of religiosity – *deeply religious, moderately religious, believing in something undefined, and atheists* (Fig. 6). In this respect, the individuals in the European sample stand out most dramatically. There are significant differences between representatives of European culture with deep and moderate religious feelings, on the one hand, and atheist Europeans, on the other. The former feel great fear of contracting the virus, while the latter do not perceive the pandemic situation as high-risk at all. The high level of the perceived risk of virus infection, in religious Europeans, can be explained by the fact that they trust in God, think about death, feel responsible for others, and, ultimately, the way they will in the future leave this world, is of great importance for them. At the same time, European atheists are sure that there is no God and do not feel responsible either for how they live or for how they will leave this world.

It is important to note that individuals in both the European and Asian samples, who are profoundly and moderately religious, do not differ from each other in their assessment of the pandemic situation. However, in comparison with other religious groups, they demonstrate higher levels of perceived risk. While religious Europeans and Asians are similar in that they perceive the pandemic situation as high risk, for atheist Europeans and atheist Asians, the picture is precisely the opposite. Europeans, who are atheists or believe in something undefined, do not fear contracting the virus, as has been pointed out, while Asians belonging to the same religious group perceive the pandemic situation as very risky. This difference could be explained by the specificity of Asian culture and its influence on this religious group: Asian atheists, dominated by a collectivist culture, feel responsible not only for their own lives but also for the lives of other members of the society to which they belong, and this is why they perceive the COVID-19 pandemic as high-risky.

5. Conclusions

The present study, conducted in three European, and three Asian countries, revealed that different cultures, as well as certain demographic factors, mediate the hazard perception of the virus infection, resulting in varying levels of perceived risk in individuals during the COVID-19 pandemic. The results showed increased levels of perceived risk in the whole study population. When comparing the two samples, however, it appeared that the level of the perceived risk of virus infection was higher in Asians compared to Europeans, and this supports the thesis for a mediating role of cultural context. In addition, age differences between individuals are also revealed as a significant mediator of risk perception. For Europeans, however, fear of contagion was found to increase with increasing age, while Asians of almost all age groups perceived the virus equally as a high risk to their well-being. Contrary to expectations, it turned out that, unlike age, gender was not a significant mediator in hazard perception of COVID-19 infection. Results also reveal that the ways people perceive the threat of viruses in an extreme pandemic situation depends on certain demographic factors such as education, marital status, presence of own or adopted children, and religiosity. However, the influence of these factors is different in different cultural contexts. The conclusions drawn from the study will contribute to more effective management of people's risk behavior in extreme situations. This is because the way in which risk is perceived should be seen as key to the successful management of people's health behavior during pandemics. It is the perceived risk that determines whether individuals will engage in risk-taking or in risk-avoidance behavior following the precautions imposed by medical institutions. Exploring risk perception in situations of

health uncertainty is, therefore, a method to successfully manage future pandemics and a way to save human lives.

In addition to the current risk perception study, the international research team investigated early in the COVID-19 pandemic also the health locus of control, hopelessness, coping strategies, and other phenomena, which will be the subject of future analyses. The authors hope that the study will contribute to more effective management of human health behavior in future pandemics.

The strengths, weaknesses and future research goals are as follows:

The most important strength of this work is that the research results will help to manage people's risk behavior more effectively in future pandemic situations. The findings that differences in cultures, genders, age, education, religious beliefs, etc., influence the perception of the risk of infection, show that in the future it is necessary to use differentiated approaches in the management of the health behavior of individuals in extreme situations. Another advantage is that the study represents an original snapshot of the beginning of a pandemic in two different cultures that will never start the same way again.

A weakness of the study was the lack of time to create a sufficiently efficient research design to ensure the use of representative (stratified) national samples for each country. This prevented the possibility of making a comparative analysis between the countries, which is why it was made only between the two cultural groups - the Asian and the European.

Contributions: Conceptualization, K.K.; methodology, K.K. and A.K.; software, A.K. and M.G.; formal analysis, K.K., J.S., A.K. A.G. and M.G.; investigation, K.K., J.S., J.L., A.K., E.W., M.J., S. K. and R.R.; resources, K.K., J.S., J.L., A.K., E.W., A.G., M.J., M.G., S.K. and R.R.; data curation, M.G. and A.K.; writing—original draft preparation, K.K.; writing—review and editing, K.K., J.S., J.L., A.K., E.W., A.G., M.J., M.G., S.K. and R.R.; visualization, M.G.; supervision, K.K.

Acknowledgments: The authors thank all anonymous survey participants who voluntarily completed the online questionnaire.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

References

- [1] Boholm, A. *Anthropology and Risk*. Routledge, London, 2015; 190 pp. DOI: <https://doi.org/10.4324/9781315797793>.
- [2] Gigerenzer, G. *Simply rational: Decision making in the real world*. Oxford University Press, 2015. DOI: <https://doi.org/10.1093/acprof:oso/9780199390076.001.0001>.
- [3] Hopkin, P. *Fundamentals of Risk Management: Understanding, Evaluating and Implementing Effective Risk Management*. London: Kogan Pag, 2010; 436 pp. <http://dspace.vnbrims.org:13000/xmlui/bitstream/handle/123456789/4826/Fundamentals%20of%20Risk%20Management%20Understanding%2C%20Evaluating%20and%20Implementing%20Effective%20Risk%20Management.pdf?sequence=1&isAllowed=y>.
- [4] Kahneman, D. *Thinking, Fast and Slow*. Farrar, Straus, and Giroux. New York, 2011. <http://dspace.vnbrims.org:13000/xmlui/bitstream/handle/123456789/2224/Daniel-Kahneman-Thinking-Fas-t-and-Slow-.pdf?sequence=1&isAllowed=y>.
- [5] Slovic, P. Perception of risk. *Science*, 1987, 236, (4799), 280–285. DOI: <https://doi.org/10.1126/science.3563507>. See also: Slovic P. *The Feeling of Risk: New Perspectives on Risk Perception*. Routledge, London, 2010; 456 pp. DOI: <https://doi.org/10.4324/9781849776677>.

- [6] Walaski, P. Risk and Crisis Communications: Methods and Messages. New York : John Wiley & Sons, Incorporated, 2011; 224 pp. <https://www.wiley.com/en-ie/9780470592731>.
- [7] Adachi, M., Murakami, M., Yoneoka, D., Kawashima, T., Hashizume, M., Sakamoto, H., Eguchi, A., Ghaznavi, C., Gilmour, S., Kaneko, S. et al. Factors Associated with the Risk Perception of COVID-19 Infection and Severe Illness: A Cross-Sectional Study in Japan. *SSM Popul. Health*, **2022**, *18*, 101–105. DOI: <https://doi.org/10.1016/j.ssmph.2022.101105>.
- [8] Cipolletta, S., Andregretti, G.R., Mioni, G. Risk Perception towards COVID-19: A Systematic Review and Qualitative Synthesis. *International Journal of Environmental Research and Public Health*, **2022**, *19*, (8), 4649. DOI: <https://doi.org/10.3390/ijerph19084649>.
- [9] Dryhurst, S., Schneider, C.R., Kerr, J., Freeman, A.L.J., Recchia, G., vander Bles, A.M., Spiegelhalter, D., van der Linden, S. Risk perceptions of COVID-19 around the world. *Journal of Risk Research*, **2020**, *23*, (7-8), 994–1006. DOI: <https://doi.org/10.1080/13669877.2020.1758193>.
- [10] Heydari, S.T., Zarei, L., Sadati, A.K., Moradi, N., Akbari, M., Mehralian, G., Lankarani, K.B. The effect of risk communication on preventive and protective Behaviours during the COVID-19 outbreak: Mediating role of risk perception. *BMC Public Health*, **2021**, *21*,(1), 54. PMID: PMC7787415. DOI: <https://doi.org/10.1186/s12889-020-10125-5>.
- [11] Siegrist, M., Luchsinger, L., Bearth, A. The Impact of Trust and Risk Perception on the Acceptance of Measures to Reduce COVID-19 Cases. *Risk Analysis*, **2021**, *41*, 787–800. DOI: <https://doi.org/10.1111/risa.13675>.
- [12] Yang, X.Y., Gong, R. N., Sassine, S., Morsa, M., Tchogna, A. S., Drouin, O., Chadi, N., Jantchou, P. Risk Perception of COVID-19 Infection and Adherence to Preventive Measures among Adolescents and Young Adults. *Children*, **2020**, *7*, (12), 311. DOI: <https://doi.org/10.3390/children7120311>.
- [13] APA. *APA Dictionary of Psychology*. Washington, DC: American Psychological Association. Vandenberg, Gary, R, APA Dictionary of Psychology. Washington, DC: American Psychological Association, 2015. Available online at: <https://dictionary.apa.org/risk-perception> (accessed October 10, 2022).
- [14] Chionis, D., Karanikas, N. Differences in Risk Perception Factors and Behaviours amongst and within Professionals and Trainees in the Aviation Engineering Domain. *Aerospace*, **2018**, *5*, (62), 1–23. DOI: <https://doi.org/10.3390/aerospace5020062>.
- [15] Traczyk, J., Zaleskiewicz, T. Implicit attitudes toward risk: the construction and validation of the measurement method. *Journal of Risk Research*, **2015**, *19*, (5), 632–644. DOI: <https://doi.org/10.1080/13669877.2014.1003957>.
- [16] APA. *APA Dictionary of Psychology*. Washington, DC: American Psychological Association. Vandenberg, Gary, R, APA Dictionary of Psychology. Washington, DC: American Psychological Association, 2015. Available online at: <https://dictionary.apa.org/fear> (accessed October 10, 2022).
- [17] Douglas, M., Wildavsky, A. B. *Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers*. Berkeley, CA: University of California Press, 1982. <https://faculty.washington.edu/mccurdy/SciencePolicy/Douglas%20and%20Wildavsky.pdf>.
- [18] Loewenstein, G. F., Weber, E. U., Hsee, C. K., Welch, N. Risk as feelings. *Psychological Bulletin*, **2001**, *127*, (2), 267–286. DOI: <https://doi.org/10.1037/0033-2909.127.2.267>.
- [19] Slovic, P., Malmfors, T., Krewski, D., Mertz, C. K., Neil, N., Bartlett, S. Intuitive toxicology. II. Expert and lay judgments of chemical risks in Canada. *Risk Analysis*, **1995**, *15*, (6), 661–675. DOI: <https://doi.org/10.1111/j.1539-6924.1995.tb01338.x>.
- [20] Armstrong, T. *The Human Odyssey: Navigating the Twelve Stages of Life*. Ixia Press, 2019. <https://www.institute4learning.com/resources/articles/the-12-stages-of-life/>.
- [21] Gudykunst, W.B., Gao, G., Schmidt, K.L., Nishida, T., Bond, M., Leung, K., Wang, G., Barraclough, R. A. The influence of individualism-collectivism, self-monitoring, and predicted-outcome value on communication in ingroup and outgroup relationships. *Journal of Cross-Cultural Psychology*, **1992**, *23*, 196–213. DOI: <https://doi.org/10.1177/0022022192232005>.
- [22] Lee, H.O., Boster, E.J. Collectivism-individualism in perceptions of speech rate: A cross-cultural comparison. *Journal of Cross-Cultural Psychology*, **1992**, *23*, 377–388. DOI: <https://doi.org/10.1177/0022022192233008>.
- [23] Kimmelmeier, M., Burnstein, E., Krumov, K., Genkova, P., Kanagawa, C., Hirshberg, M. S., Erb, H-P., Wiczorkowska, G., Noels, K. A. Individualism, collectivism and authoritarianism in seven societies.

- Journal of Cross-Cultural Psychology*, **2003**, 34, (3), 304–322. DOI: <https://doi.org/10.1177/0022022103034003005>.
- [24] Krumov, K., Larsen, K. *Cross-cultural psychology: why culture matters*. IAP - Information Age Publishing, PO Box 79049, Charlotte, NC 28271, USA, 2013, 478 pp. <https://www.infoagepub.com/products/Cross-Cultural-Psychology>.
- [25] Matsumoto, D., Weissman, M., Preston, K., Brown, B., Kupperbusch, C. Context-specific measurement of individualism-collectivism on the individual level: The IC Interpersonal Assessment Inventory (ICIAI). *Journal of Cross-Cultural Psychology*, **1997**, 28, 743–767. DOI: <https://doi.org/10.1177/0022022197286006>.
- [26] Singelis, T.M., Triandis, H.C., Bhawuk, D.P.S., Gelfand, M.J. Horizontal and vertical dimensions of individualism and collectivism: a theoretical and measurement refinement. *Cross-cultural Research*, **1995**, 29, 240–275. DOI: <https://doi.org/10.1177/106939719502900302>.
- [27] Triandis, H.C. *New directions in social psychology: Individualism and collectivism*. Boulder, CO: Westview Press, 1995. <https://psycnet.apa.org/record/1995-97791-000>.
- [28] Triandis, H.C., McCusker, C., Hui, C.H. Multimethod probes of individualism and collectivism. *Journal of Personality and Social Psychology*, **1990**, 59, (5), 1006–1020. DOI: <https://doi.org/10.1037/0022-3514.59.5.1006>.
- [29] Hofstede, G. *Cultures and Organizations: Software of the Mind*. London/New York: McGrawHill, 1991. <https://www.worldcat.org/title/cultures-and-organizations-software-of-the-mind/oclc/23015181>.
- [30] Hofstede, G. What did GLOBE really measure? Researchers' minds versus respondents' minds. *Journal of International Business Studies*, **2006**, 37, 882–96. DOI: <https://doi.org/10.1057/PALGRAVE.JIBS.8400233>.
- [31] LeDoux, J. Rethinking the Emotional Brain. *Neuron*, **2012**, 73, (4), 653–676. DOI: <https://doi.org/10.1016/j.neuron.2012.02.004>.
- [32] Rattay, P., Michalski, N., Domanska, O., Kaltwasser, A., De Bock, F., Wieler, L.H., Jordan, S. Differences in risk perception, knowledge and protective behaviour regarding COVID-19 by education level among women and men in Germany. Results from the COVID-19 Snapshot Monitoring (COSMO) study. *PLoS One*, **2021**, 16, (5): e0251694. PMID: 33979413. DOI: <https://doi.org/10.1371/journal.pone.0251694>.
- [33] Pfortner, T. K., Dohle, S., Hower, K.I. Trends in educational disparities in preventive behaviours, risk perception, perceived effectiveness and trust in the first year of the COVID-19 pandemic in Germany. *BMC Public Health*, **2022**, 22, 903. DOI: <https://doi.org/10.1186/s12889-022-13341-3>.
- [34] Soltan, E.M., El-Zoghby, S.M., Salama, H. M. Knowledge, Risk Perception, and Preventive Behaviors Related to COVID-19 Pandemic Among Undergraduate Medical Students in Egypt. *SN Compr. Clin. Med.*, **2020**, 2, 2568–2575. DOI: <https://doi.org/10.1007/s42399-020-00640-2>.
- [35] Bentzen, J. S. In Crisis, We Pray: Religiosity and the COVID-19 Pandemic. *Journal of Economic Behavior and Organization*, **2021**, 192, 541–583. DOI: <https://doi.org/10.1016/j.jebo.2021.10.014>.
- [36] Kranz, D., Niepel, C., Botes, E., Greiff, S. Religiosity predicts unreasonable coping with COVID-19. *Psychology of Religion and Spirituality*, **2020**, Advance online publication. DOI: <https://doi.org/10.1037/rel0000395> // <https://psycnet.apa.org/fulltext/2020-71379-001.pdf>.
- [37] Lee, S.A., Mathis, A.A., Jobe, M.C., Pappalardo, E.A. Clinically significant fear and anxiety of COVID-19: A psychometric examination of the Coronavirus Anxiety Scale. *Psychiatry Research*, **2020**, 290: 113112. PMID: 32460185. DOI: <https://doi.org/10.1016/j.psychres.2020.113112>.
- [38] Pomerleau, J. M., Pargament, K. I., Krause, N., Ironson, G., Hill, P. Religious and spiritual struggles as a mediator of the link between stressful life events and psychological adjustment in a nationwide sample. *Psychology of Religion and Spirituality*, **2020**, 12, (4), 451–459. DOI: <https://doi.org/10.1037/rel0000268>.
- [39] Rigoli, F. The Link Between COVID-19, Anxiety, and Religious Beliefs in the United States and the United Kingdom. *J. Relig. Health*, **2021**, 60, 2196–2208. DOI: <https://doi.org/10.1007/s10943-021-01296-5>.
- [40] Saraei, M., Johnson, K.A. Disappointment with and Uncertainty about God Predict Heightened COVID-19 Anxiety among Persian Muslims. *Religions*, **2023**, 14, (1), 74. DOI: <https://doi.org/10.3390/rel14010074>.



Copyright © 2023 by the authors. This is an open access article distributed under the CC BY-NC 4.0 license (<http://creativecommons.org/licenses/by-nc/4.0/>).