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Health locus of control in a pandemic situation: cross-cultural differences between European and Asian respondents

BACKGROUND
The present cross-cultural study examined the health locus of control construct during the COVID-19 pandemic. The scientific purpose of the study was to determine whether, during the pandemic situation, cultural and sex differences influence the health locus of control construct and change the internal health locus of control (IHLC), powerful others health locus of control (PHLC), and chance health locus of control (CHLC).

PARTICIPANTS AND PROCEDURE
A total of 2617 recipients aged 18-70 years from Asia (China, India, and Indonesia), and Europe (Bulgaria, Germany, and Hungary) completed a questionnaire about their health. The participants completed an online version of the Multidimensional Health Locus of Control Scale – Form A.

RESULTS
The survey shows that in a pandemic life-threatening situation, most individuals strive to rely on IHLC and/or PHLC, and fewer of them tend to rely on CHLC. However, there are differences ($p < .001$) between the two cultural samples: the representatives of Asian collectivistic culture are more dominated by PHLC, compared to the representatives of the European individualistic culture. When the comparison is between individuals from different cultures, sex differentiation affects the health locus of control, and as a result, significant differences in relation to IHLC, PHLC, and CHLC levels ($p < .05$) appear.

CONCLUSIONS
In conclusion, the study indicates that cultural differences influence both the IHLC and PHLC levels, and that Asian participants are dominated by PHLC more than European respondents. Asian females are more likely to seek support from powerful others (PHLC) compared to European women, who perceive themselves as more independent. Asian male participants are prepared to rely on powerful others (doctors or medical institutions), while European male respondents are prone to rely on themselves mainly (IHLC). The results show that sex differences do not significantly affect the health locus of control within the same cultural group.

KEY WORDS
Europe; cross-cultural; Asia; COVID-19; health

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BACKGROUND

Humanity is currently experiencing a turning point in its development. It can rightly be argued that the world has entered a new paradigm of its existence in 2020. A fundamental point of analysis in this new paradigm is the inevitable changes in mass consciousness, the psyche, and the behavior of people caused by the COVID-19 pandemic.

This suddenly erupted extreme situation, accompanied by anxiety and stress, proved to be an even greater disease factor than the virus itself, as it caused severe damage to the mental health of individuals. For example, a number of researchers report that quarantining people leads to an increase in stress and suicide rates (Bueno-Notivol et al., 2021; Manchia et al., 2022; Tanaka & Okamoto, 2021), while others find that restrictive measures and the pandemic itself are causing drastic increases in suicidal thoughts in humans (Gelezelyte et al., 2021; O'Connor et al., 2021).

The influence of the pandemic situation as a disease factor was particularly strong on adolescents, as they were forced to cut off contact with their peers and study online for months. Many authors report that the pandemic and accompanying restrictive measures, such as wearing masks, restricting contact, lockdown, quarantine, etc., are the cause of increasing depression and suicidal thoughts among students (Brailovskaia et al., 2021; Charles et al., 2021; Fuse-Nagase et al., 2021). The reporting of these results gives us reason to believe that we have made the right choice to start the current study at the very beginning of 2020. The research goal of this psychological study was to "capture" the initial picture of the critical pandemic situation humanity is entering.

The cross-cultural study was carried out in the period of April to June 2020, in three European (Bulgaria, Germany, and Hungary) and three Asian (China, India, and Indonesia) countries all affected by the pandemic. Several constructs such as stress, health locus of control, hopelessness, perfectionism, workaholism, self-esteem, and coping strategies were included. The focus of this paper is on the health locus of control since its role is considered important in the pandemic and will be discussed in the following sections.

CONCEPT OF HEALTH LOCUS OF CONTROL – A BRIEF LOOK

The concept of the locus of control (LOC) was developed within social learning theory (Rotter, 1966, 1982; Rotter & Hochreich, 1975). Subsequently, numerous studies have shown that the internality-externality dimension is an important personality construct that plays a significant role in behavior regulation (April et al., 2012; Deutchman, 1985; Lefcourt & Dyal, 1984; Roddenberry & Renk, 2010; Salmani Nodoushan, 2012).

The internality-externality dimension is, at the same time, an important personality health-related construct that determines whether some people believe they can control the outcomes in their own lives, whereas others believe that the event's control happens separately from and outside them. A specific and important aspect of the personality construct general locus of control (GLOC) is called health locus of control (HLOC), which largely mediates the individual's perception of their own health and determines to some extent their health-related behavior (Wallston & Wallston, 1982).

This important function of GLOC is a reason for the creation of specialized research tools, which are used to measure the locus of control in relation to individual health expectations (Ferraro et al., 1987; Lewis et al., 1990; Saltzer, 1982; Wallston et al., 1976, 1978; Whitman et al., 1987; Wood & Letak, 1982). These research methods have different variations and measure health locus of control not only in relation to health in general but also to health in a medical setting (locus of control for a specific disease or locus of control in terminally ill patients).

Based on the results obtained by the Multidimensional Health Locus of Control (MHLC) scales (Wallston et al., 1978), three major dimensions were identified. The first is called internal health locus of control (IHLC) and refers to the individuals' belief that their health is dependent upon their own behavior. The second dimension is called powerful others health locus of control (PHLC) and refers to the belief that individuals' health is dependent upon the behaviors of powerful others (medical doctors). According to the third dimension, called chance health locus of control (CHLC), individuals tend to believe that luck or chance factors determine health outcomes.

There are many research studies that yield information on the important functions of health locus of control in the regulation of individual health behavior (Brincks et al., 2010; Burker et al., 2005; Jacobs-Lawson et al., 2011; Johansson et al., 2001; Knott et al., 2003; Norman et al., 1998). However, these studies have been conducted in a normal environment and provide answers about the nature and characteristics of health locus of control in a standard, non-pandemic situation.

PURPOSE OF THE STUDY AND HYPOTHESES

It is essential to study health locus of control in an extreme pandemic situation because in such a situation the attention of individuals is focused primarily on their own health and the health of their loved ones. The specific objective of the current study is whether under conditions of the COVID-19 pandemic individuals' health locus of control varies between two different cultures – Asian and European. Our expec-

tations are to learn whether, in a pandemic, cultural differences affect the extent to which people believe that they control their own health (IHLC), whether they perceive it to be under the control of medical doctors and governments (PHLC), or whether they believe it is out of control and depends on chance and luck (CHLC). In connection with the study objectives, it is proposed that:

Hypothesis 1: In the extreme pandemic situation, whereby the external stimulus (COVID-19) is perceived as a life-threatening agent, the individuals' behavior in the entire sample will be dominated by IHLC or PHLC.

Hypothesis 2: In the COVID-19 pandemic, the cultural differences affect the configuration of health locus of control (HLC) in such a way that significant differences ($p < .05$) are observed between Asians and European samples, in relation to IHLC, PHLC, and CHLC levels.

Hypothesis 3: In the COVID-19 pandemic, along with the cultural context, sex also influences the configuration of HLC, and in this way contributes to the significant differences ($p < .05$) between Asian and European male and female respondents, in relation to levels of IHLC, PHLC, and CHLC.

PARTICIPANTS AND PROCEDURE

PARTICIPANTS

The participants in the study were representatives of two broad cultures – European and Asian. The total sample includes 2617 subjects aged between 18 and 80 ($M = 37.98$, $SD = 15.20$), 1412 of which were drawn from Asia (45.9% identified as female, 49.6% as male respondents, and 4.5% preferred not to answer), and 1205 were representatives of European samples (64.6% identified as female, 34.5% as male respondents, and 0.9% preferred not to answer). The average age of participants from Asia was 32 years ($M = 31.50$, $SD = 12.77$). The average age of participants from Europe was 45 years ($M = 44.96$, $SD = 14.51$).

The selection of the countries to be included in the study took into account several important criteria, typical for the representatives of both cultures.

In Europe: The study included participants from Bulgaria ($n = 405$), Germany ($n = 400$), and Hungary ($n = 400$). The culture of these countries is influenced by the European Christian tradition and represents different geographical regions – Eastern European, Western European, and Central European.

In Asia: The study included participants from three countries – China ($n = 500$), India ($n = 500$), and Indonesia ($n = 412$). The culture of these Asian countries is influenced by different religious systems – mainly Buddhism, Hinduism, Islam, Taoism, Confucianism, and Catholicism.

MATERIALS AND PROCEDURE

The study was conducted online from April to June 2020. Most respondents were asked to fill out an Internet-based version of the questionnaire, and just a small portion of them (100 subjects) was tested with a paper-and-pencil version.

To perform the research tasks and to indicate the validity of the hypotheses, we used the Multidimensional Health Locus of Control Scale – Form A (Wallston et al., 1976, 1978). There are numerous studies on health locus of control performed with the Multidimensional Locus of Control Scale (Athale et al., 2010; Cooper & Fraboni, 1990; De Las Cuevas et al., 2015; Kassianos et al., 2016; Luszczynska & Schwarzer, 2005; Ross et al., 2015). Wallston (2005) states, in connection with this research history, that the MHLC scales have been used successfully in hundreds of studies. Overall, the results are moderately reliable (i.e. they have Cronbach α in the .60-.75 range and test-retest stability coefficients ranging from .60 to .70). In the present sample, the MHLC reliability is moderate, with Cronbach's α ranging from .67 to .77.

To check the results for the aforementioned hypotheses, the following statistical methods were employed: descriptive statistics and independent samples *t*-test.

RESULTS

The study results clearly show a new picture related to the manifestation of the health locus of control phenomenon during the extreme pandemic situation. According to hypothesis 1, it is reasonable to expect, in this situation, the external stimulus (COVID-19) to be perceived as a life-threatening agent and, as a result, the dominant locus of control to be either internal and/or attributed to powerful others.

For the entire sample ($N = 2581$), the highest mean value was observed in IHLC ($M = 25.45$, $SD = 5.54$), and this indicates the tendency that respondents prefer to rely on their own efforts to protect their health during the pandemic. Some respondents also expressed agreement that they should rely on the assistance and cooperation of "powerful others," e.g. doctors – PHLC ($M = 22.14$, $SD = 6.14$). The mean value for CHLC was 19.70 ($SD = 5.82$). The binary comparison of the mean values using the paired-samples *t*-test showed that there were statistically significant differences in the levels of the three variables ($p < .001$). These results for the total sample lend support to the more powerful effects of IHLC when compared to PHLC.

The purpose of hypothesis 2 was to examine possible cultural differences in health locus of control under the conditions of a pandemic. An independent samples *t*-test was used, to compare the means of the

MHLC subscales in relation to respondents from European and Asian cultures. The results indicated that the scores were significantly higher on the subscale of IHLC for respondents from Asia than for participants from Europe: $t(2553) = 5.93$, $p < .001$, $d = .23$ (Table 1). The effect size was small and indicated that only 2% of the variance in IHLC is explained by cultural differences. Levene's test indicates unequal variances [$F(1, 2553) = 35.21$, $p < .001$], so degrees of freedom were adjusted from 2553 to 2579.

However, the scores were significantly higher on the subscale of PHLC for the respondents from Asia compared to respondents from Europe, $t(2581) = 15.05$, $p < .001$, $d = .59$. In this case, the effect size was medium and indicated that 6% of the variance of PHLC was explained by cultural differences. Levene's test indicated unequal variances [$F(1, 2581) = 226.61$, $p < .001$], so degrees of freedom were adjusted from 2581 to 2585.

Furthermore, the scores were significantly higher on the subscale of CHLC for the respondents from Asia compared to respondents from Europe, $t(2505) = 9.66$, $p < .001$, $d = .38$. The effect size was small and indicated that 4% of the variance of CHLC was explained by cultural differences. Levene's test indicated unequal variances [$F(1, 3063) = 93.26$, $p < .001$], and degrees of freedom are adjusted from 2505 to 2583 (Table 1).

According to hypothesis 3, in the COVID-19 pandemic situation, along with the cultural context, sex also influences the configuration of HLC, and as a result, significant differences ($p < .05$) will be observed between Asian and European male and female respondents in relation to levels of IHLC, PHLC, and CHLC.

To test this hypothesis, an independent samples *t*-test was performed in order to compare the means of the three MHLC subscales for the European and Asian cultures. In both groups of subjects (Table 2), the highest mean values were present on the internal health locus of control subscale, followed by the powerful others health locus of control subscale. The lowest values are observed on the chance locus of control subscale.

An independent samples *t*-test indicates that scores were significantly higher on the subscale of IHLC for female respondents from Asia, compared to female respondents from Europe $t(1194) = 5.03$, $p < .001$, $d = .28$. The effect size was small and indicated that only 3% of the variance of IHLC was explained by the cultural differences. Levene's test indicated unequal variances [$F(1, 1194) = 25.15$, $p < .001$], so degrees of freedom were adjusted from 1411 to 1194. The scores were significantly higher on the subscale of PHLC for female respondents from Asia, compared to female respondents from Europe $t(1273) = 10.25$, $p < .001$, $d = .56$. In this case, however, the effect size was medium and indicated that 6% of the variance of PHLC was explained by cultural differences. Levene's test indicated unequal variances

Table 1

Means and standard deviations for IHLC, PHLC, and CHLC depending on culture

Cultures	IHLC			PHLC			CHLC		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Asia	1379	26.04	6.07	1389	23.74	6.17	1390	20.71	5.65
Europe	1202	24.77	4.77	1198	20.28	5.54	1195	18.52	5.80

Note. IHLC – internal health locus of control; PHLC – powerful others health locus of control; CHLC – chance health locus of control.

Table 2

Means and standard deviations for the IHLC, PHLC, and CHLC depending on the sex differences in Europe and Asia

Cultures/sex	IHLC			PHLC			CHLC		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Asian/women	636	26.35	5.99	638	23.42	6.10	638	21.04	5.37
European/women	777	24.88	4.73	772	20.26	5.32	771	18.23	5.80
Asian/men	685	25.95	5.99	689	24.13	6.18	689	20.47	5.79
European/men	415	24.55	4.81	415	20.30	5.94	413	19.06	5.75

Note. IHLC – internal health locus of control; PHLC – powerful others health locus of control; CHLC – chance health locus of control.

[$F(1, 1273) = 105.94$, $p < .001$], so degrees of freedom were adjusted from 1273 to 1408.

The scores were significantly higher on the subscale of CHLC for female respondents from Asia, compared to female respondents from Europe $t(1390) = 9.44$, $p < .001$, $d = .50$. In this case, the effect size was medium and indicated that 5% of the variance of CHLC was explained by cultural differences. Levene's test indicated unequal variances [$F(1, 1390) = 89.20$, $p < .001$], so degrees of freedom were adjusted from 1390 to 1407 (Table 2).

Hypothesis 3 also refers to the differences in HLC between the male respondents of different cultural samples – European and Asian. To test this hypothesis an independent samples *t*-test was conducted to compare the means of the three MHLC subscales. The results, reported in Table 2, show that the order of the MHLC subscales remains the same. For respondents in both groups, the highest means are observed in relation to the internal health locus of control subscale, followed by the powerful others health locus of control subscale. The lowest means are on the chance health locus of control subscale.

The scores were significantly higher on the subscale of IHLC for male respondents from Asia, compared to male respondents from Europe $t(1013) = 4.28$, $p < .001$, $d = .26$. The effect size was small and indicated that 3% of the variance in relation to IHLC was explained by the cultural differences. Levene's test indicated unequal variances [$F(1, 1015) = 18.31$, $p < .001$], so degrees of freedom were adjusted from 1015 to 1198. Furthermore, the scores were significantly higher on the subscale of PHLC for male respondents from Asia, compared to male respondents from Europe $t(1102) = 10.12$, $p < .001$, $d = .63$. The effect size was medium and indicated that 6% of PHLC variance was explained by cultural differences. Finally, the scores were significantly higher on the subscale of CHLC for the male respondents from Asia, compared to the male respondents from Europe, $t(1100) = 3.94$, $p < .001$, $d = .24$. The effect size was small and indicated that 2% of the variance in IHLC was explained by cultural differences (Table 2).

The results reported in Table 2 make it possible to compare men and women from the same cultural group. An independent samples *t*-test indicated that there was no significant difference in the scores on the subscale of IHLC between the European male respondents and European female participants, $t(1190) = 1.14$, $p = .267$. Also, there was no significant difference in the scores on the subscale of PHLC between the European male respondents and European female respondents $t(771) = 1.29$, $p = .213$. The scores were significant on CHLC comparing European male respondents to European female respondents, $t(1182) = 2.35$, $p = .019$, $d = .14$. However, the effect size was small and indicated that only 1% of the variance in CHLC was explained by the cultural differences (Table 2). The results concerning Asian male and female participants are also presented in Table 2. They show whether sex differentiation has a significant influence on HLC in relation to the Asian respondents.

An independent samples *t*-test indicates that there was no significant difference in the scores on the IHLC subscale between the Asian male respondents and Asian female respondents $t(1319) = 1.19$, $p = .246$. The scores were significantly different on the subscale of PHLC, yielding higher means for the Asian male respondents compared to Asian female respondents, $t(1325) = 2.11$, $p = .040$, $d = .12$. However, there was no significant difference in the mean scores on CHLC between the Asian male respondents and Asian female participants $t(1325) = 1.86$, $p = .060$.

DISCUSSION

The health behavior of individuals during a pandemic is generally related to the way they perceive the health danger. The perception of danger as being of high or low threat depends on a number of internal (experience, personal characteristics, current health, attitudes, etc.) and external (cultural context, social environment, media influence, financial security, etc.) factors. Since the outbreak of the COVID-19 pandemic, many studies have emerged showing that the perception of virus infection danger and the health behavior of individuals are mediated by factors such as coping stress strategies (Greenglass et al., 2021), resilience to stressful events (Yıldırım & Güler, 2021), level of authoritarianism (Arikan, 2022), optimism or pessimism domination (Schou-Bredal et al., 2021), etc.

In the present study, we consider the health locus of control as a determinant of individual health behavior during the COVID-19 pandemic situation, and, at the same time, we postulate that functions of this personality construct depend on factors such as cultural context and sex. As the results mentioned in the previous section show, considerable changes in the health locus of control construct occur during the pandemic. However, the survey reveals that changes in European respondents are not the same as changes in Asian survey participants. To explain the differences between these groups, theoretical models offered by cross-cultural studies are employed (Berry, 1969; Markus & Kitayama, 1991; Matsumoto, 1989; Witkin & Berry, 1975).

In fact, cultural explanatory models were also applied to the political processes, people's experiences, perception of danger and risk, organizational management, and leadership. It was expected that in the 21st century, along with the rise in globalization, the influence of cultural tradition would decrease. However, the scientific interest in this research field has grown

even more (Berry et al., 2011; Kemmelmeier et al., 2003; Krumov & Larsen, 2013; Matsumoto & Yoo, 2006).

Because of the large amount of literature, the current study employed as analytical tools the terminology and theoretical constructs of Hofstede. The analysis will be centered mainly on the first four dimensions of Hofstede's cultural theory: power distance (PDI), uncertainty avoidance (UAI), masculinity-femininity (MAS), and individualism-collectivism (IDV) (Hofstede, 1991, 2001, 2006; Hofstede & McCrae, 2004; Hofstede et al., 1990).

As expected, according to hypothesis 1, in an extreme pandemic situation, the health locus of control will depend on the perceived characteristics of the stimulus (the threat to health). At the beginning of the COVID-19 pandemic, the virus was presented by media and government agencies basically as a strong life-threatening agent, against which the world was powerless because there was no vaccine to counteract it.

The results show (Table 1) that during the first three months of the pandemic, the total sample perceived the virus mostly as a life-threatening danger. Under these conditions, people will mobilize their internal potential and, at the same time, will seek external support. As the results show, the behavior of individuals was dominated by the self-preservation instinct, causing the predominance of IHLC (M = 25.45) followed by PHLC (M = 22.15). The difference in perception of the pandemic is especially noticeable with respect to PHLC, where the effect size is close to medium. The perceived life-threatening agent elicited two main rescue strategies which an individual could apply, namely: full mobilization of one's own internal resources, and/or association with a strong social agent who could provide help and support. From this perspective, it is quite reasonable to substantiate the hypothesis that in the presence of a life-threatening agent (COVID-19), the health locus of control will be manifested mainly in two types – IHLC and PHLC. The presented results show that the subjects are not likely to rely on contingency or chance in regard to their health, and instead, they tend to take control over the situation.

The data discussed above refer to the research sample as a whole and do not consider cultural differences. Therefore, an important question arises here: what the role of culture is, and whether cultural contexts affect IHLC, PHLC, and CHLC levels differently. Clarifying the reasons for this influence requires giving attention to the concept according to which, from a cultural perspective, societies can be divided into two main types – individualistic and collectivistic (Hui & Triandis, 1986; Kemmelmeier et al., 2003; Singelis et al., 1995; Triandis et al., 1990). Hofstede's individualism vs. collectivism dimension (IDV) is one of the basic characteristics of the society that concerns the degree to which people perceive themselves as integrated into groups. In individualistic societies, people relate poorly to each other, and their attention is directed predominantly to themselves and their families. For collectivistic societies, the opposite is characteristic: people are closely related to the group, they are loyal to it, and rely on mutual support (Hofstede, 1991, 2006). Since European culture is characterized as individualistic, and Asian culture is traditionally perceived as collectivistic, differences between the two cultures are expected to manifest mainly as distinctions in relation to the strength of PHLC. The results presented in Table 1 show that respondents, as representatives of both cultures (Asian and European), are dominated by both IHLC and PHLC. However, there are differences between the two cultural samples in the degree to which these two types of health locus of control predominate. The most important feature is that Asian and European participants differ significantly due to the dominance of PHLC. Based on the results of the t-tests, there are statistically significant differences ($p < .001$) for all three subscales, although the effect size in two (IHLC and CHLC) is small. However, in relation to PHLC, there is a statistically significant difference between the Asian and European respondents, and the effect size (d = .59) is medium. The results show a significant difference ($p < .001$) between the cultural samples, namely: the representatives of Asian culture are more dominated by PHLC, compared to representatives of the European culture. They trust powerful others – medical doctors or government agencies.

This significant difference ($p < .001$, d = .59) between Asian and European samples in relation to PHLC can also be explained within the specifics of the common cultural profile of society (Almond & Verba, 1963; Chilton, 1988; Krumov, 2005; Lane, 1992). The political tradition and the political system actually existing in a certain society influence the individuals' political culture and the magnitude of the so-called Power Distance Index (PDI), introduced by Hofstede. According to Hofstede's concept, people living in societies with high power distance perceive power as distributed unequally (e.g. an unequal, hierarchical distribution of power). They accept being led and controlled by those who have high positions in the management hierarchy, trust them, and are ready to obey them. In societies with low power distance, members tend to believe that power is fairly distributed among the various groups, and that no strict power hierarchy exists. In this case, people do not feel controlled by those who take high power positions. Research supports the view that most Asian societies are characterized by a high distance of power, while a low distance of power is a characteristic of societies in Western Europe and North America (Bochner & Hesketh, 1994; Daniels & Greguras, 2014; Hofstede, 1991, 2001). This is why Asians, unlike Europeans, have much more confidence in doctors and

healthcare institutions responsible for their health. Representatives from Asian cultures are ready to obey powerful others, and this is revealed by the higher level of PHLC.

The explanation of the different levels in PHLC between European and Asian participants also corresponds to Hofstede's concept of the Uncertainty Avoidance Index (UAI). This index measures the extent to which individuals are tolerant of uncertainty, do not seek to avoid it, and do not try to control the unknown future. People living in cultures with a high degree of UAI try to minimize the occurrence of unknown and unusual events and avoid unstructured situations. They are rigid to changes and strive to adhere to traditions and established norms of behavior. The picture in low uncertainty avoidance cultures is exactly the opposite. Here individuals do not strive to avoid unstructured situations; they approach changes creatively, rely on informal rules and norms of behavior, and do not experience high stress and anxiety with regard to the unknown future (Giebels et al., 2017; Hofstede, 2001; Kapp et al., 2011; Minkov & Hofstede, 2012, 2014).

According to hypothesis 3, it was proposed that along with different cultural contexts, sex differentiation also affects levels of IHLC, PHLC, and CHLC, yielding significant differences ($p > .05$) between Asian and European male and female samples. Based on the results shown in Table 2, it can be concluded that in both groups of subjects (men and women), the influence of internal health locus of control predominated. Of particular note is the fact that in relation to Asian female participants, higher means are observed on the other two subscales (PHLC and CHLC). Their health behavior is evidently influenced by IHLC, PHLC, and CHLC, to an almost equal degree.

The results for European female samples show support for the utility of IHLC, with a tendency to reject PHLC and CHLC. When the comparison is between females, as representatives of the two cultural groups, then there are statistically significant differences between the European and Asian women for PHLC and CHLC ($p < .001$).

Based on this comparative analysis, it is proposed that differences between European and Asian female participants in relation to the configuration of HLC are influenced by different cultural contexts. As a result, unlike European women, the two types of locus of control – PHLC and CHLC – appear to be more salient to Asian participants. This difference between them can be explained by the fact that because European female participants belong to an individualistic culture, during a pandemic situation, they are less likely to rely on powerful others or chance. On the other hand, the Asian female respondents, living in a collectivist culture, tend to rely much more on powerful others (the doctor or the health institution) and luck.

The scales developed by Hofstede to measure the indices of different cultures – IDV, UAI, PDI, and MAS – were not used in the current study. However, the results confirm, although indirectly, the cultural differences of the four dimensions suggested by Hofstede. Specifically, it is confirmed when comparing the results from the study of locus of control in European and Asian female participants. The significant differences in the values and the typical effect size between Asian and European women regarding the PHLC ($d = .56$) and the CHLC ($d = .50$) subscales are sufficient grounds to suggest that these results are in part due to the influence of the masculinity vs. femininity dimension. Based on these results, it can be suggested that from the perspective of the MAS dimension (Hofstede, 1991, 2001), the Asian participants live in a culture where masculinity characteristics are more salient. Compared to European female participants, who rely more on themselves for coping in a critical situation, the Asian female participants are more likely to perceive themselves as weak and to rely on luck and trust in the powerful other (the man) who has the resources to save them from the danger (e.g. COVID-19).

We assumed that the trend found for female respondents would also be valid for male participants. The analysis of the data (Table 2) shows that there is a significant difference ($p < .001$) between Asian and European male respondents in relation to IHLC, but the effect size is small. This index ($d = .26$) shows that only 3% of the IHLC result is determined by culture. The analysis concerning PHLC also shows a difference between Asian and European male respondents. In this case, the effect size ($d = .63$) is medium and shows that 6% of the PHLC result is determined by cultural differences. For CHLC, the effect size is small since this index ($d = .24$) shows that only 2% of the variance in the CHLC result is determined by cultural differences. According to the results of the *t*-test, it can be stated that although there are significant differences ($p < .001$) with respect to the MHLC subscales, the effect size for two of them (IHLC and CHLC) is small and insignificant. This result does not apply to PHLC, so in that case, it can be concluded that cultural differences partly influenced the outcome. Unlike the results for the comparison between European and Asian female respondents, where a typical effect size was observed for both subscales (PHLC and CHLC), in the case of European and Asian male respondents, a significant effect was observed only for the PHLC scale. Based on this result, it can be concluded that the male respondents from Asian cultural groups, unlike the European male respondents, during the pandemic were more likely to rely on the authority of powerful others (medical doctors, health institutions).

As seen from the foregoing analysis, during a pandemic, different cultures influence in different ways

female and male respondents in relation to HLC. The results presented in Table 2 show that there are no significant differences ($p > .05$) between the European men and women concerning IHLC and PHLC scores. The only significant difference is for the CHLC subscale, although the effect size is small ($d = .14$).

A similar conclusion could be drawn regarding the Asian culture (see Table 2). After conducting an independent-samples *t*-test, significant differences were found only in relation to the PHLC subscale, but the effect size ($d = .12$) is very small. No significant differences were observed between Asian female and male respondents in relation to the other two subscales. Based on these results, it is possible to conclude that if a pandemic has expanded within the borders of the same culture (in the European or Asian context), sex differentiation does not have a significant influence on HLC.

CONCLUSIONS

The survey shows that in a pandemic life-threatening situation, most individuals strive to rely on IHLC and/or PHLC, and fewer of them tend to rely on the possibility that their health is under the control of chance or luck (CHLC).

The results show that cultural differences influence levels of expression of IHLC and PHLC, but Asian participants are dominated to a larger extent by PHLC compared to European respondents. Unlike the Europeans, who are representatives of an individualistic culture, the Asian respondents are more collectivist and rely on relationships with other people.

The research supported the thesis according to which, together with the cultural context, sex differentiation also impacts the health locus of control. Based on the results, it can be concluded that in an extreme pandemic situation, Asian females are more likely to seek support from powerful others, compared to European women, who perceive themselves as more independent and emancipated. For their part, the male participants from Asian cultural groups are ready to rely on powerful others (doctors or government institutions), while European male respondents are prone to rely on themselves mainly. The results also show that in the pandemic occurring within the same cultural group (in the European or the Asian cultural context only), sex differences do not significantly affect the health locus of control.

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