EUROPEAN JOURNAL OF
PSYCHO-
TRAUMATOLOGY
THE OFFICIAL JOURNAL OF THE EUROPEAN SOCIETY FOR TRAUMATIC STRESS STUDIES

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BASIC RESEARCH ARTICLE

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Lay causal beliefs about PTSD and cultural correlates in five countries

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ABSTRACT
Background: To date, cultural clinical research has primarily focused on differences between ethnic groups when investigating causal beliefs about mental disorders. While individual as well as contextual factors are considered important for gaining a better understanding of cultural influences, research on causal beliefs about post-traumatic stress disorder (PTSD) and cultural correlates in laypersons is scarce.
Objective: This study aimed at gaining a better understanding of the association between causal beliefs about PTSD and cultural aspects, as well as other contextual and individual correlates of causal beliefs.
Method: We conducted a cross-sectional, vignette-based online survey with 737 laypersons from Mexico, Ecuador, Germany, Greece, and Russia. Participants completed the revised Illness Perception Questionnaire (IPQ-R) and reported several cultural and sociodemographic (e.g. country of residence, gender, personal values) as well as mental health–related variables (e.g. PTSD symptoms, previous seeking of help). Latent class analysis (LCA) was performed to identify subgroups of individuals expressing similar causal beliefs for PTSD. Multinomial logistic regression was used to analyse covariates of class membership.
Results: LCA resulted in a three-class solution of casual beliefs: a traumatic event–focused class (41.1%); an intrapersonal causes class (40.1%); and a multiple causes class (18.0%). Multinomial logistic regression analysis revealed country of residence, gender, personal value of security, PTSD symptoms, and mental health literacy as significant covariates of class membership.
Conclusions: Integrating a more diverse concept of culture into cultural clinical research can be a valuable addition to group comparisons based on nationality or ethnicity. Cultural clinical research needs to move towards a more integrated approach that accounts for the complexity of culture. Including additional contextual and sociodemographic factors can help to reach a more accurate understanding of the cultural influences on the development of causal beliefs and mental health.

HIGHLIGHTS
• We found three types of causal beliefs about post-traumatic stress disorder.
• Causal beliefs were related to country of residence, gender, mental health, knowledge, and personal values.
• Cultural clinical research should include contextual and sociodemographic characteristics.

Creencias causales comunes sobre el trastorno de estrés postraumático y los correlatos culturales en cinco países

Antecedentes: Hasta la fecha, la investigación clínica cultural se ha centrado principalmente en las diferencias entre grupos étnicos al investigar las creencias causales sobre los trastornos mentales. Si bien los factores individuales y contextuales se consideran importantes para obtener una mejor comprensión de las influencias culturales, la investigación sobre las creencias causales sobre el trastorno de estrés postraumático (TEPT) y los correlatos culturales en las personas legas es escasa.
Objetivo: Este estudio tuvo como objetivo obtener una mejor comprensión de la asociación entre las creencias causales sobre el TEPT y los aspectos culturales, así como otros correlatos contextuales e individuales de las creencias causales.
Método: Realizamos una encuesta en línea transversal basada en viñetas con 737 legos de México, Ecuador, Alemania, Grecia y Rusia. Los participantes completaron el cuestionario de percepción de la enfermedad revisado (IPQ-R en su sigla en inglés) y reportaron varias variables culturales y sociodemográficas (e.g. país de residencia, género, valores personales) así como variables relacionadas con la salud mental (e.g. síntomas de TEPT, búsqueda previa de ayuda). Se realizó un análisis de clases latentes (LCA en su sigla en inglés) para identificar subgrupos de individuos que expresan creencias causales similares sobre el TEPT. Se utilizó la regresión logística multinomial para analizar las covariables de pertenencia a una clase.
Resultados: El LCA resultó en una solución de tres clases de creencias causales: una clase centrada en un evento traumático (41,1%); una clase de causas intrapersonales (40,1%); y una clase de causas múltiples (18,0%). El análisis de regresión logística multinomial reveló el país de residencia, el género, el valour personal de la seguridad, los síntomas del TEPT y el conocimiento en salud mental como covariables importantes de la pertenencia a una clase.

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Conclusiones: La integración de un concepto de cultura más diverso en la investigación clínica cultural puede ser una valiosa adición a las comparaciones de grupos basadas en la nacionalidad o la etnia. La investigación clínica cultural debe avanzar hacia un enfoque más integrado que dé cuenta de la complejidad de la cultura. La inclusión de factores contextuales y sociodemográficos adicionales puede ayudar a alcanzar una comprensión más precisa de las influencias culturales en el desarrollo de las creencias causales y la salud mental.

五个国家中关于 PTSD 和文化关联的因果信念

背景: 迄今为止, 在考查有关精神障碍因果信念时, 文化临床研究主要关注种族之间的差异。虽然个人和背景因素被认为对于更好地了解文化影响很重要, 但关于非专业人士中创伤后应激障碍 (PTSD) 和文化关联的因果信念的研究很少。
目的: 本研究旨在更好地了解关于 PTSD 因果信念与文化方面之间的关联, 以及因果信念的其他背景和个体相关性。
方法: 我们对来自墨西哥, 厄瓜多尔, 德国, 希腊和俄罗斯的 737 名非专业人士进行了一项基于小插曲的横断面在线调查。参与者完成了修订版疾病感知问卷 (IPQ-R) 并报告了几个文化和社会人口统计学 (例如居住国, 性别, 个人价值观) 以及与心理健康相关变量 (例如, PTSD 症状, 以前寻求帮助) 。进行潜在类别分析 (LCA) 以识别对 PTSD 表达相似因果信念的个体亚组。多项逻辑回归用于分析类别所属的协变量。
结果: LCA 导致了三类因果信念的解:聚焦创伤事件类 (41.1%); 个人内因类 (40.1%); 和多原因类 (18.0%) 。多项逻辑回归分析显示居住国, 性别, 个人安全价值, PTSD 症状和心理健康素养是类别所属的重要协变量。
结论: 将更多样化的文化概念整合到文化临床研究中可以成为基于国籍或种族的群体比较的宝贵补充。文化临床研究需要转向更综合的方法以解决文化的复杂性。包括额外的背景和社会人口因素有助于更准确了解文化对因果信念和心理健康发展的影响。

1. Introduction

When people experience mental disorders, or observe them in others, they tend to search for explanations. Those affected by, or encountering others affected by, mental health symptoms hold so-called causal beliefs about them, which are part of a wider range of beliefs that can also include ideas about labels, timeline, prognosis, and treatment (Dinos, Ascoli, Owiti, & Bhui, 2017; Rüdell, Bhui, & Priebe, 2009). Laypersons' causal beliefs can differ considerably from medical or psychosocial clinicians' models of diseases. In contrast to scientific models, these beliefs are also dynamic strategies for dealing with illnesses that are shaped by social and cultural context, or personal experiences, and evolve over time (Kirmayer & Bhugra, 2009).

Taking causal beliefs into consideration in mental health care has proven useful at several stages of counselling and treatment (Dinos et al., 2017; Petrie & Weinman, 2006). Causal beliefs can influence symptom severity (Massad & Hulsey, 2006), whether a person seeks treatment (Sheikh & Furnham, 2000; Spoont, Sayer, & Nelson, 2005), and what kind of treatment is sought (Hinton & Kirmayer, 2013; Slewa-Younan et al., 2020). Particularly in transcultural settings, but also in general, a sensitive approach to causal beliefs is the basis for effective interventions, as patient satisfaction and treatment effectiveness increase when patient and practitioner concur about a model (Benish, Quintana, & Wampold, 2011; Callan & Littlewood, 1998).

2. Causal beliefs in cultural clinical research

Although 'culture' is widely assumed to shape causal beliefs and consequently health disparities, there is a relative lack of empirical investigation of those claims, and research on the pathways through which culture may influence causal beliefs is scarce (Hruschka, 2009; Kagawa-Singer, 2012). For post-traumatic stress disorder (PTSD), in contrast to other mental illnesses, the traumatic event is already included as a cause in the diagnostic criteria. Consequently, in studies across several cultural groups, many participants identified the traumatic event as one potential cause (e.g. May, Rapee, Coello, Momartin, & Aroche, 2014; Slewa-Younan et al., 2017). Further studies on causal beliefs about PTSD have focused mainly on differences between ethnic groups, finding, for instance, higher agreement on spiritual or religious causal beliefs for refugee populations from Sudan or Sub-Saharan Africa in comparison to residents from Germany or Australia, respectively (Grupp, Moro, Nater, Skandrani, & Mewes, 2018; May et al., 2014). This research has given valuable insights into the problems that can arise when Western concepts of mental health are applied to people with a different cultural background. However, many studies are implicitly or explicitly based on the assumption that participants can be grouped into 'Western' and 'non-Western', and that the study's results can be extended to other countries according to this dichotomy. This can be problematic as it does not take into consideration the huge differences that can be found among these broad groups (Maercker, 2019). In response,

contemporary cultural psychiatry has been moving towards a perspective that accounts for the dynamics of individuals' hybrid identities, which are in constant transaction and transformation (Good, Willen, Hannah, Vickery, & Park, 2011). The Lancet Commission on Culture and Health defined culture as 'a set of practices and behaviors defined by customs, habits, language, and geography that groups of individuals share.' They clarify, that 'culture, therefore, does not equate solely with ethnic identity, nor does it merely refer to groups of people who share the same racial heritage' (Napier et al., 2014, p. 1609). Instead, culture can be seen as a living, adapting system that offers contextualization within the geographic, historical, social, and political realities of diverse communities (Kagawa-Singer, 2012). Therefore, to better understand cultural influences in cultural clinical research it is necessary to consider other factors that may interact with culture, including demographic (e.g. age, gender) and geographic (e.g. region or country), and also attitudes, beliefs and values (Chao & Moon, 2005; Heim, Maercker, & Boer, 2019; Hruschka, 2009; Kagawa-Singer, 2012). Though applying a broader concept of culture has proven to be a better predictor for mental distress than origin or ethnic group per se (Bhui & Bhugra, 2001), research is scarce on other factors that might be related to causal beliefs about PTSD. Studies have considered age (Spoont et al., 2005), education (Grupp et al., 2018; Spoont et al., 2005), religion or religiosity (Grupp et al., 2018; May et al., 2014), and economic aspects (Aidoo & Harpham, 2001). However, few studies have used standardized and comparable instruments and even fewer have considered the interrelations between these characteristics.

In this study, we sought to explore whether cultural, contextual, and sociodemographic characteristics are associated with differences in causal beliefs about PTSD. Towards this aim, we chose an etic methodological approach, assuming that, following a violent attack, PTSD symptoms can be seen as a universal human reaction. While an emic perspective may have revealed more detailed and culturally rich information, this approach allowed us to compare the results and identify correlates across the chosen countries. Our first goal was to identify profiles of causal beliefs for PTSD among the general population of five different countries. Our second goal was to identify characteristics associated with latent class membership. In line with previous research, we expected participants' country of residence, religion, age, and education to be significantly associated with class membership. In the exploratory analyses, we controlled for mental health–related factors and sought to identify additional correlates by including characteristics that have proven important for mental health research, such as gender, migration, socioeconomic status, and personal values.

3. Methods

We conducted a cross-sectional, online vignette-based survey using *Unipark* (Questback GmbH, 2018), targeting laypersons in Mexico, Ecuador, Germany, Greece, and Russia from February 2019 to May 2019. For our study we chose only high- or middle-income countries varying in mental health burden and having differing mental health care systems (World Health Organization [WHO], 2017). The research ethics committee of the Department of Education and Psychology at Freie Universität Berlin approved this study (202/2018).

3.1. Participants

To be included, participants had to be 18 years of age or older and currently live in one of the five targeted countries. Internet access and literacy were also required. Potential participants accessed the survey via a link, distributed over internet platforms, social media advertisements and postings, health-related online forums, institutional and university mailing lists, and local organizations. While random sampling was not possible, in order to create a diverse sample, recruitment strategies focused on targeting a wide range of age and interest groups, as well as diverse educational and occupational backgrounds. Participants were informed about the aims of the study, and duration and privacy issues, and gave informed consent. To provide an incentive to participate in the study, and to complete the survey, participants could voluntarily enter a prize drawing after completing the survey.

3.2. Study design

Vignette studies are a well-established method for assessing mental health beliefs (Wei, McGrath, Hayden, & Kutcher, 2015). In this study, participants were presented with a short case vignette describing a fictitious person (Mary/Alex) with PTSD symptoms according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association [APA], 2013; Appendix). Thereafter, participants answered questions concerning their causal beliefs about mental health disorders, which were adapted to refer to the case vignette. The gender of the fictitious person in the vignette was matched to the gender of the participant to aid identification.

3.3. Instruments

Questionnaires were administered in the respective national languages of the included countries (Spanish, German, Greek, and Russian). Where no translations were available, a three-step approach was used to obtain valid instruments. Firstly, two bilingual mental health professionals translated and back-translated the

questionnaires for each language. Secondly, the two translators discussed discrepancies between the translations and agreed on the best possible translation. Thirdly, all involved translators and the authors (CM, NS, and CKa) discussed potentially ambiguous items to eliminate discrepancies between different languages and ensure participants' interpretation of items would be as similar as possible between the languages used.

3.3.1. Sociodemographic and cultural variables

Participants answered questions regarding country of residence, country of origin, migration, age, gender, years of education, self-identified religious affiliation, and religiosity (Fragebogen zu Lebensbedeutungen und Lebenssinn [LeBe], Schnell & Becker, 2007, subscale explicit religiosity with higher values representing higher agreement on religious attitudes). The subjective socioeconomic status scale was used to assess social status (Adler, Epel, Castellazzo, & Ickovics, 2000), in which participants were asked to position themselves on a drawing of a 10-rung ladder according to their subjective standing in society. Participants' perceived cultural closeness to their country of residence was measured with an adapted version of the Pictorial Representation of Illness and Self Measure (PRISM; Sensky & Büchi, 2016). Participants used a slider ranging from 1 ('not close at all') to 20 ('very close') to indicate how close they felt to the culture of their country of residence.

3.3.2. Personal values

The revised Portrait Value Questionnaire (PVQ-RR; Schwartz, 2017) is devised to capture personal value orientation. Each of the 57 items is a short portrait of a fictitious person's values, for example, 'It is important to her never to violate rules or regulations'. Participants are asked to answer on a six-point Likert scale how much the fictitious person is 'not like me at all' to 'very much like me'. The gender of the person in the portraits was matched to the gender of the participants to improve identification. Validated translations of the PVQ-RR were available, and provided by the author, in all included languages. To reduce complexity, the 10 basic value scores can be aggregated into higher order dimensions (Heim et al., 2019). We followed the suggestion of Maercker et al. (2015) with the aggregated value orientations of 1) traditional value orientation (universalism, benevolence, security, tradition, and conformity) and 2) modern value orientation (achievement, power, self-direction, stimulation, hedonism).

3.3.3. Causal beliefs

The revised Illness Perception Questionnaire (IPQ-R; Moss-Morris et al., 2002) was used to assess causal beliefs. The IPQ-R has been applied to mental health research and has demonstrated good

validity and reliability across illnesses and languages (Moss-Morris et al., 2002). This study used only the subscale on possible causes of the disease with 18 items, which consists of a range of disparate causes that are rated on a 5-point Likert scale ranging from 1 ('strongly disagree') to 5 ('strongly agree'). For further analysis, answers were dichotomized such that answers with values 4 ('agree') and 5 ('strongly agree') were combined into an 'agree'-category, while all other answers were combined into a 'disagree'-category". Instructions were adapted to refer to the vignette and asked 'How strongly do you agree or disagree, that each factor caused Maria's problems?'. Validated translations of the IPQ-R were available, in Spanish, German and Greek.

3.3.4. Traumatic exposure and probable PTSD symptoms

The Primary Care PTSD Screen, which assesses previous potentially traumatic experiences with one item (Prins et al., 2016), was used to measure traumatic exposure. For participants who reported having experienced at least one potentially traumatic event, PTSD symptoms, according to the DSM-5 criteria, were assessed with the 20-item PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013). To determine whether participants experienced PTSD symptoms, we followed the DSM-5 diagnostic rule. As recommend, each item rated as 2 = 'Moderately' or higher was considered an endorsed symptom. Participants that met DSM-5 diagnostic criteria according to this recommendation were considered as probably having PTSD. Internal consistency was very good (α = .95). Validated translations of the PCL-5 were available in German.

3.3.5. Well-being

The World Health Organization-Five Well-Being Index (WHO-5) is a five item, self-report measure of current mental well-being (WHO, 1998) where each item is scored from 5 ('all of the time') to 0 ('none of the time'). By multiplying the sum score by 4, a range from 0 (absence of well-being) to 100 (maximal well-being) is calculated. The WHO-5 shows good construct validity as a unidimensional scale for measuring well-being and adequate validity as a screening tool for depression (Topp, Østergaard, Søndergaard, & Bech, 2015). Validated translations of the WHO-5 were available, and provided by the WHO, in all included languages (Psykiatric Center North Zealand, 2018). Internal consistency was good (α = .87).

3.3.6. Mental health literacy

We used recognition of a mental disorder as an indicator for mental health literacy (Jorm, 2000). To this aim, we determined whether participants recognized PTSD in the vignette by using the answers to the open-ended question (*What, if any, is Mary's problem?*).

We considered PTSD as *recognized* when participants mentioned words such as *traumatized, trauma, traumatic stress, post-traumatic stress or PTSD*, and as not recognized when none of these were mentioned. Two independent raters coded each participant's answer. In cases of disagreement, consensus was reached by discussion.

3.3.7. Previous contact with mental health services

Previous experience with mental health services was considered both in terms of provider and patient experience, with one question for each: 'Have you ever worked in mental health services in your life?' [yes/no]; and 'Have you ever seen a mental health professional (e.g. psychologist, psychiatrist, counselor) to get help for your personal problems?' [yes/no].

3.4. Statistical analyses

Respondents who answered items randomly were excluded prior to analyses, in order to ensure data quality. In order to identify such careless respondents, we determined several indicators following Meade and Craig (2012) by using the '*careless*' package in R4.0.2. For every participant we considered *duration* of participation, *LongString* and the *Psychometric Synonyms Index* as overall measures as well as *intraperson variance* and *Mahalanobis distance* for each separate scale. Participants, who were flagged on one or more indicators were rated independently by two authors (CM, CKa) and excluded from the study, when careless data patterns became apparent. In cases of disagreement, consensus was reached by discussion.

In order to identify subgroups of individuals expressing similar causal beliefs about PTSD, we performed latent class analysis (LCA). LCA is a person-centred approach that can be used to identify latent subpopulations in a population based on a certain subset of variables, and subsequently analyse the relation between subpopulation membership and a variety of covariates (Lanza & Rhoades, 2013; Nylund-Gibson & Choi, 2018). Person-centred approaches have become more popular in the field of behavioural research as they allow for more precise estimations of individual differences in complex processes, but have not yet been used to investigate causal beliefs about mental disorders. However, LCA has proven a suitable methodological approach for similar phenomena such as help seeking profiles, attitudes, or health beliefs (Hays & Gilreath, 2017; Smail et al., 2021).

Several statistical criteria were considered in order to identify the optimal number of classes (Nylund, Asparouhov, & Muthén, 2007). For each k-class-solution, a bootstrap likelihood ratio test (BLRT) as well as the Vuong-Lo-Mendell-Rubin LRT (VLMR-LRT) were performed; a significant LRT indicated

that the k-class model was a significantly better fit for the data than the k-1–class model. In addition, Akaike information criterion (AIC), Bayesian information criterion (BIC), and adjusted BIC (aBIC) were evaluated, with lower values indicating a better fit (Geiser, 2012). We considered entropy to determine how accurately the model classified individual cases into latent classes. Higher entropy values indicated better classification, with values greater than .80 indicating *good* and 1 indicating *perfect* classification of individual cases into classes (Nylund-Gibson & Choi, 2018). Lastly, we considered boundaries, parsimony and size, and interpretability of the distinct classes.

To identify cultural covariates of observed class membership, we conducted Pearson χ^2 tests for categorical covariates and one-way analysis of variance (ANOVA), or the Kruskal-Wallis-test, for continuous covariates. When analyses uncovered significant differences between classes, covariates were included in a logistic multinomial regression model. For inclusion in the regression model, all categorical variables were dichotomized and coded in a way that allowed for meaningful interpretation: country of residence was effect coded as deviation from unweighted grand mean, and all other categorical variables were dummy coded with a reference category (Eid, Gollwitzer, & Schmitt, 2017).

As suggested by Vermunt (2010), the three-step approach was used for multinomial logistic regression, which takes the inaccuracy of class assignment into account when assessing latent class covariates in multinominal regressions. Analyses were carried out using R and MPlus 8.4.

For most variables, the proportion of missing values was less than 0.5%. Only the religiosity score and the scale for measuring participants' emotional closeness to their country (PRISM) had higher percentages of missing values (7.5% and 7.2%, respectively). Accordingly, missing values for covariates of class-membership were dealt with using expectation-maximization-based single value imputation, as implemented in SPSS 27, to avoid listwise deletion. Missing values for latent class indicators were dealt with using full information maximum likelihood estimation, as implemented in MPlus.

4. Results

4.1. Sociodemographic characteristics

Of $N = 853$ participants who were shown the vignette, $N = 756$ completed the survey. $N = 19$ persons had to be excluded for giving careless responses. The inter-rater reliability on exclusion as a result of careless response patterns was excellent (κ = .84; Landis & Koch, 1977). The final sample consisted of $N = 737$ participants (492 females, 66.8%), and age ranged from 18 to 78 years (M = 36.2, SD = 13.9). Most participants

resided in Germany at the time of the study ($N = 261$), followed by Greece ($N = 183$), Russia ($N = 134$), Ecuador ($N = 99$), and Mexico ($N = 60$).

More than half of the participants (54.5%) reported having experienced at least one potentially traumatic event. When screened for symptoms of mental health problems, 22% ($n = 165$) of the total sample met the screening criteria for probable PTSD according to the PCL-5. Almost half of the participants reported having visited a mental health professional at least once in their lives, while a minority indicated having working experience in mental health services. Two hundred and forty-six participants (38.2%) were classified as having recognized the problems described in the vignette as related to PTSD. Interrater-reliability was excellent ($κ = .93$; Landis & Koch, 1977). See Table 1 for characteristics of the overall sample by country.

4.2. LCA

To identify the optimal number of latent classes to fit the data, the 1- to 5-class solutions were evaluated and compared according to fit indices, parsimony, and interpretability. We stopped at estimating a six-class solution since the number of boundaries increased and visual inspection indicated that interpretability and separability of classes were low. The VLMR-LRT favoured the two-class model, as it was non-significant when fitting the three-class solution. However, it showed poor interpretability, and since AIC, BIC, and aBIC decreased with a higher number of classes, the two-class model was dismissed. The five-class solution had a lower AIC and aBIC, and higher entropy than the three- and four-class solution; at the same time, it exhibited higher BIC, a significant number of boundaries, and poor interpretability, and was therefore also dismissed. Fit indicators slightly favoured the four-class solution over the three-class solution; however, visual inspection revealed that the four-class solution simply subdivided one of the classes in the three-class solution into two similar profiles. Because of its parsimony, and in consideration of the small differences in fit indicators, the three-class solution was chosen as the final solution. Overall, it demonstrated good interpretability, no boundaries, and a good entropy (0.83). Table 2 presents fit indices for the 1 to 5 class solutions.

Latent class 1 consisted of participants who exclusively identified the traumatic stressor (*stress or worry*)

as responsible for the symptoms described in the vignette (traumatic event focused, $n = 303$, 41.1%). Participants in latent class 2 also identified the traumatic stressor, but also considered individual psychological factors to be likely causes. In addition to *stress or worry*, they showed high rates of agreement in the items *emotional state, personality*, and *mental attitude* (individual psychological, $n = 301$, 40.1%). Participants in latent class 3 were the least specific when identifying possible causes. Beyond traumatic stress and individual psychological factors, they also endorsed a wide range of external, psychosocial risk factors (*accident/injury, family problems, behaviour, overwork, alcohol*) as probable causes for the symptoms described (multicausal beliefs, $n = 133$, 18.0%). In none of the classes, biological risk factors (*hereditary, germ or virus, diet, poor medical care in the past, pollution*), or *chance or bad luck*, were considered to be likely causes. See Figure 1 for details.

4.3. Covariates of class membership

We examined differences among the observed classes by $χ^2$-test, one-way ANOVA, and, where requirements for ANOVA were not met, the Kruskal-Wallis-test. Table 3 shows variable characteristics by class; numbers are given as percentage of category by class (e.g. 33.1% identified as male in the total sample, whereas the percentage of participants that identified as males was 27.7% in the traumatic event–focused class, 31.8% in the individual psychological class, and 48.1% in the multicausal beliefs class, respectively). The three classes differed in terms of country of residence, gender, education, previous occupation in the mental health field, probable PTSD, mental health literacy (recognizing PTSD), and the personal value orientations of self-direction (modern values), and tradition and security (traditional values). See Figure 2 for a graphical representation of class membership by country. All variables with significant differences in the bivariate analyses were included in the multinomial logistic regression analysis.

4.4. Multinomial logistic regression

Table 4 shows covariates of class membership as included in the regression model. Compared to the traumatic event-focused class, the likelihood for membership in the multiple causes class was

Table 1. Sample characteristics and PTSD rates across the five countries.

	Total sample ($N = 737$)	Mexico ($N = 60$)	Ecuador ($N = 99$)	Germany ($N = 261$)	Greece ($N = 183$)	Russia ($N = 134$)
Gender = Male[1], N(%)	243 (33.1)	23 (38.3)	45 (45.5)	76 (29.2)	65 (35.7)	34 (25.4)
Age in years, M(SD)	36.2 (13.91)	31.3 (10.68)	35.0 (12.21)	36.2 (15.08)	37.9 (13.45)	36.8 (14.19)
Probable PTSD = Yes, N(%)	165 (22.4)	18 (30.0)	23 (23.2)	43 (16.5)	39 (21.3)	42 (31.3)

[1]$N = 735$, two participants gave *other* as their gender and were excluded from analysis due to their small category size.
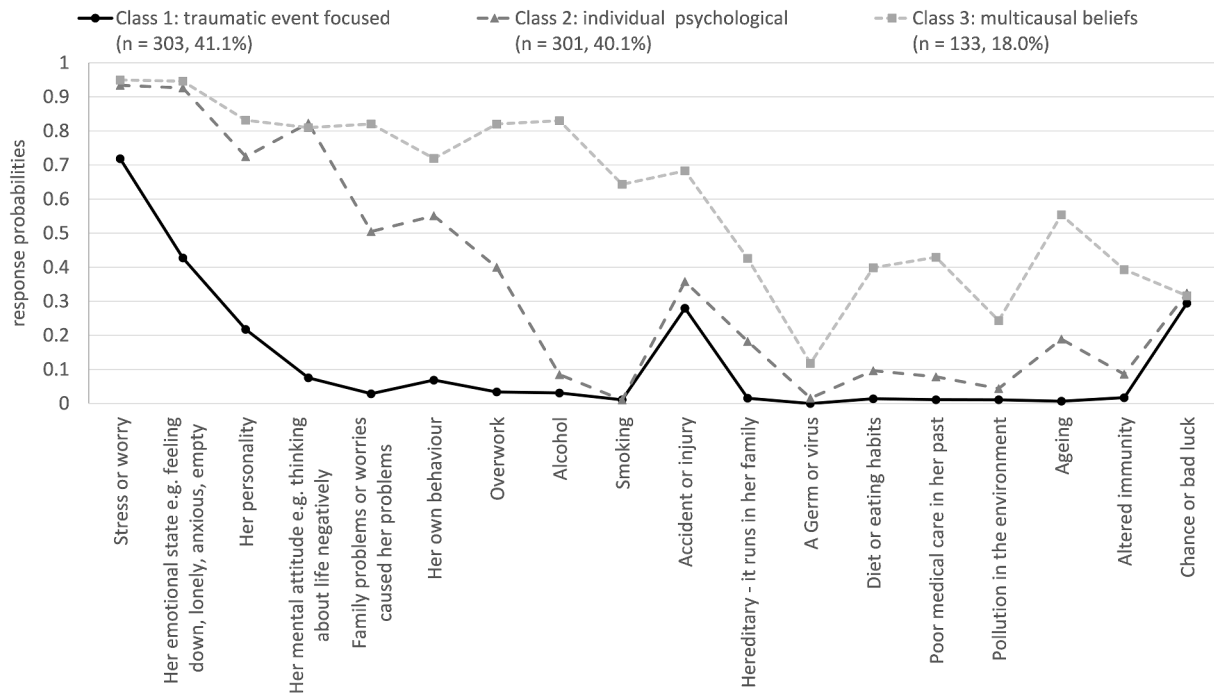
Figure 1. Estimated probabilities for the 3-class-solution.

Table 2. Goodness of fit statistics for 1 to 5 class solutions.

Number of classes	AIC	BIC	aBIC	BLRT	VLMR-LRT	Entropy
1	13.161	13.244	13.187	-	-	
2	11.394	11.564	11.446	<0.001	<0.001	0.863
3	**11.059**	**11.316**	**11.138**	**<0.001**	**n.s.**	**0.831**
4	10.949	11.294	11.056	<0.001	n.s.	0.809
5	10.888	11.320	11.022	<0.001	n.s.	0.822

aBIC, adjusted BIC; AIC, Akaike information criterion; BIC, Bayesian information criterion; BLRT, bootstrap likelihood ratio test; VLMR-LRT, Vuong-Lo-Mendell-Rubin LRT.

significantly higher for participants from Greece or Ecuador, as well as for males and participants with probable PTSD, but lower for participants from Russia.

Compared to the traumatic event-focused class, the likelihood for being part of the individual psychological causes class was significantly higher for participants from Greece, but lower for participants from Russia. Participants who did not recognize PTSD in the vignette, and those who reported lower values on the personal value scale of security, were significantly more likely to be in the individual psychological class compared to the traumatic event–focused class.

Compared to the individual psychological causes class, the likelihood for males to be members of the multiple causes class was significantly higher, for participants with probable PTSD, and for participants who reported higher values on the PVQ-RR scale of security. Years of education, having previously worked in a field related to mental health, and the personal value scales of tradition and self-direction did not emerge as significant covariates in regression analysis.

5. Discussion

Our vignette study explored whether cultural and mental health–related characteristics are associated with causal beliefs for PTSD. To our knowledge, this is the first study applying LCA to causal beliefs about PTSD. This approach allowed us to find types of causal beliefs rather than compare approval to distinct constructs. It also enabled us to apply a multifaceted concept of culture and include a wide variety of covariates.

Three latent classes of causal beliefs about PTSD were identified: a traumatic event–focused class, whose members primarily identified traumatic stress as being responsible for the symptoms described in the vignette; a second individual psychological causes class, whose members also considered individual psychological factors to be likely causes; and a third multiple causes class whose members made the least distinction when identifying possible causes and mentioned a wide range of external psychosocial risk factors in addition to traumatic stress and individual psychological factors.

Overall, our findings accord with previous results in the field. First, among all latent classes, a majority of the participants identified traumatic stress as a potential cause, confirming previous results (e.g. May et al., 2014; Slewa-Younan et al., 2017) as well as the validity of the presented vignette. Second, the majority rejected biological causes in all classes, which is also in agreement with previous results from predominantly Western populations (May et al., 2014; Spoont et al., 2005). Interestingly, more than half of the participants expressed agreement about there being more than one explanation. This indicates that
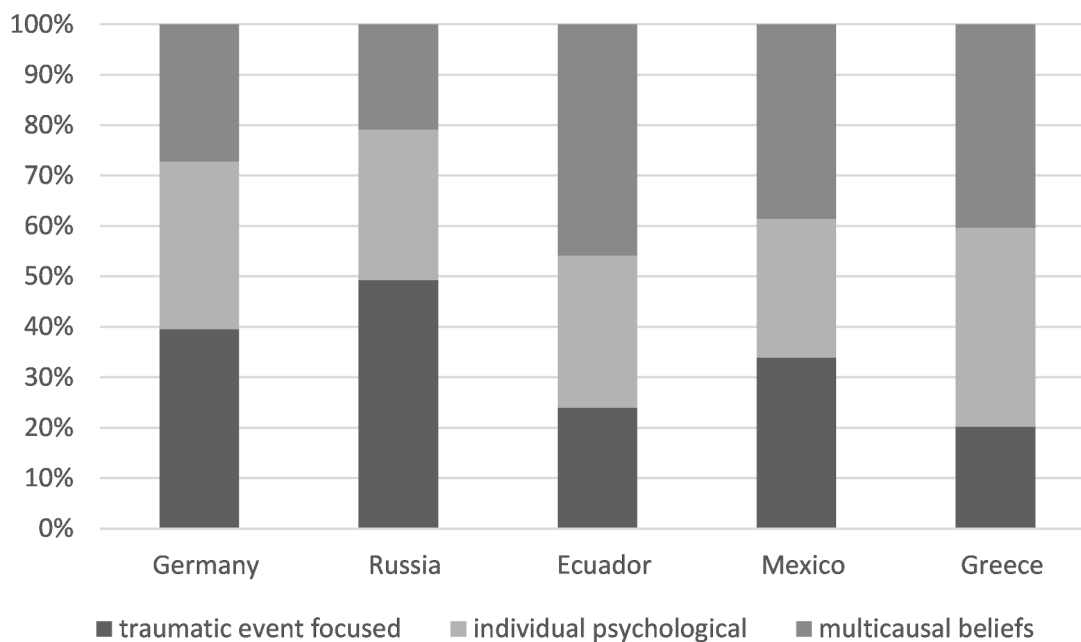
Figure 2. Percentage of class membership by country.

different causal beliefs may in fact not compete with but complement each other, as has been suggested, for example, for psychological and spiritual models in non-Western populations (Furnham & Igboaka, 2007; Grupp et al., 2018).

Additional analysis revealed several cultural factors associated with class membership. First, country of residence and class membership were found to be significantly related. This is in line with previous studies comparing participants by ethnic or national origin and indicates that environmental factors are important for the development of causal beliefs about PTSD. Interestingly, differences in causal beliefs were also found between countries that might be perceived as having much in common because they are geographically close and have a common language, such as Mexico and Ecuador, or because they are part of a political union that cooperates on mental health policies, such as Germany and Greece. This is important, as it indicates that the often-used East–West dichotomy is outdated and has little predictive value and that, on the contrary, grouping countries on selective parameters may even be misleading in this way (Maercker, 2019). Second, gender and class membership were found to be significantly related, with males being more likely to be in the multiple causes class. In previous research, gender has not explicitly been considered a correlate of causal beliefs, but so far has only been included as a covariate (Grupp et al., 2018; Slewa-Younan et al., 2017). Our results indicate that gender should be included as a meaningful correlate when researching causal beliefs, and stress the importance of gender-sensitive approaches in all aspects of PTSD research (Olff, 2017). Third, regarding value orientation, security, which is considered a traditional value, was

associated with class membership. Participants who reported, for example, they would rather avoid dangers or indicated the importance of a country's safety and stability were less likely to be in the individual psychological class in comparison to the traumatic event–focused class and the multiple causes class. In previous research, traditional values have been connected to higher PTSD symptoms in German and Chinese crime victims (Maercker et al., 2009), and trauma victims were more likely to feel socially excluded and blamed for their symptoms in traditional groups (Bennett Herbert & Dunkel-Schetter, 1992). Our results indicate that people endorsing traditional values may be less likely to support individual psychological causal beliefs. Further research is needed to establish a better understanding of the complex interrelations between traditional values, causal beliefs, and PTSD symptoms. For all other cultural characteristics, no significant differences were found between classes. And, for several variables, differences between the classes were found on the bivariate level, but not when controlling for other covariates in the regression analysis. This underlines the importance of using multivariate methods when doing cultural clinical research. Results regarding age and education must be interpreted with care due to the limited representativeness of our sample, as previous studies have found both factors to be connected to certain aspects of causal beliefs (Grupp et al., 2018; Spoont et al., 2005). Particularly with regards to migration, perceived closeness to the country's culture and religion, it is possible that the relations with class membership cancelled one another out, since analyses were performed on the entire sample. A more detailed analysis at the country level may reveal differences in this respect.

Table 3. Variable characteristics for the overall sample and variable characteristics by latent classes for the 3-class solution. Pearson chi-square tests were conducted for categorical predictors (upper table) and one-way analyses of variance or Kruskal-Wallis-test were conducted for continuous predictors (lower table).

	N (% of category in class)				χ²-Test		
	Total sample (N = 737)	Traumatic event focused (N = 303)	Individual psychological (N = 301)	Multicausal beliefs (N = 133)	χ²	df	Cramer's V
Country of Residence					41.89***	8, 737	0.17
Mexico	60 (8.1)	26 (8.6)	21 (7.0)	13 (9.8)			
Ecuador	99 (13.4)	32 (10.6)	40 (13.3)	27 (20.3)			
Germany	261 (35.4)	122 (40.3)	102 (33.9)	37 (27.8)			
Greece	183 (24.8)	48 (15.8)	93 (30.9)	42 (31.6)			
Russia	134 (18.2)	75 (24.8)	45 (15.0)	14 (10.5)			
Working in Mental Health previously = Yes	98 (13.3)	52 (17.2)	32 (10.1)	14 (10.5)	6.67*	2, 737	0.10
Gender = Male[1]	243 (33.1)	84 (27.7)	95 (31.8)	64 (48.1)	17.66***	2, 735	0.16
Religion[2]					0.79	4, 737	0.03
Christian	417 (56.6)	165 (54.5)	175 (58.1)	77 (57.9)			
Other	81 (11.0)	35 (11.5)	32 (10.6)	14 (10.5)			
None	239 (32.4)	103 (34.0)	94 (1.3)	42 (31.6)			
Previous Help Seeking = Yes	356 (48.3)	158 (52.1)	136 (45.2)	62 (46.6)	3.116	2, 737	0.07
Migration = Yes	116 (15.7)	47 (15.5)	51 (16.9)	18 (13.5)	0.83	2, 737	0.03
Partnership = Yes	406 (55.1)	169 (55.8)	175 (58.1)	62 (46.6)	5.05	2, 737	0.08
Probable PTSD = Yes	165 (22.4)	58 (19.1)	64 (21.3)	43 (32.3)	9.62**	2, 737	0.11
Mental health literacy = recognized PTSD	264 (35.8)	131 (49.6)	93 (35.2)	40 (15.2)	12.33***	2, 737	0.13

	Mean (SD)				ANOVA/Kruskal-Wallis-Test		
	Total sample (N = 737)	Traumatic event focused (N = 303)	Individual psychological (N = 301)	Multicausal beliefs (N = 133)	F/χ²	df	η²
Age	36.15 (13.90)	36.92 (13.96)	35.17 (13.71)	36.64 (14.17)	3.28	2, 737	0.002
Education	15.78 (4.72)	16.28 (4.79)	15.60 (4.45)	15.06 (5.08)	9.17*	2, 737	0.010
SSS	5.59 (1.48)	5.60 (1.48)	5.62 (1.45)	5.47 (1.53)	0.48	2, 737	0.001
WHO-5 Score	55.15 (21.16)	54.52 (21.50)	54.49 (20.94)	58.11 (20.75)	1.58	2, 737	0.004
Religiousness	2.74 (1.59)	2.76 (1.61)	2.81 (1.57)	2.54 (1.61)	2.27	2, 737	<0.001
PRISM	15.09 (4.46)	14.78 (4.60)	15.10 (4.32)	15.77 (4.41)	4.98	2, 737	0.004
Personal value orientation							
PVQ-RR self direction[3]	0.71 (0.63)	0.80 (0.63)	0.69 (0.62)	0.55 (0.65)	8.03***	2, 737	0.021
PVQ-RR hedonism[3]	0.18 (0.80)	0.09 (0.83)	0.24 (0.78)	0.23 (0.77)	2.88	2, 737	0.008
PVQ-RR power[3]	-1.43 (0.93)	-1.48 (0.98)	-1.39 (0.88)	-1.39 (0.93)	0.81	2, 737	0.002
PVQ-RR conformity[3]	-0.18 (0.72)	-0.19 (0.75)	-0.19 (0.69)	-0.13 (0.70)	0.37	2, 737	0.001
PVQ-RR tradition[3]	-0.71 (0.72)	-0.78 (0.77)	-0.70 (0.69)	-0.59 (0.64)	3.56*	2, 737	0.010
PVQ-RR benevolence[3]	0.74 (0.51)	0.76 (0.54)	0.71 (0.51)	0.75 (0.45)	0.65	2, 737	0.002
PVQ-RR universalism[3]	0.35 (0.60)	0.38 (0.64)	0.36 (0.58)	0.25 (0.56)	2.11	2, 737	0.006
PVQ-RR stimulation[3]	-0.23 (0.88)	-0.27 (0.94)	-0.19 (0.85)	-0.26 (0.83)	1.33	2, 737	<0.001
PVQ-RR achievement[3]	0.07 (0.80)	0.08 (0.86)	0.09 (0.76)	0.00 (0.70)	2.04	2, 737	<0.001
PVQ-RR security[3]	0.30 (0.59)	0.34 (0.65)	0.24 (0.55)	0.36 (0.53)	9.47**	2, 737	0.010

Descriptive statistics were computed based on the imputed dataset.
*p < 0.05; **p < 0.01; ***p < 0.001.
[1]N = 735, two participants gave *other* as their gender and were excluded from analysis due to their small category size. [2]The categories *Buddhist, Hindu, Jewish, Muslim,* and *Other* were summarized as *Other* due to their small category sizes. [3]Values are mean score over all PVQ-RR-scales in correspondence with author recommendations (Schwartz, 2017).
[3]Values are mean centred at individual mean score over all PVQ-RR-scales.
Abbreviations: PRISM, Pictorial Representation of Illness and Self Measure; PVQ-RR, portrait value questionnaire revised; SSS, subjective socioeconomic status; WHO-5, World Health Organization-Five Well-Being Index.

Table 4. Multinomial logistic regression predicting class membership.

	Estimates	SE	OR	95%-CI	*p*-Value
Multicausal beliefs vs. traumatic event focused (reference)					
Living in Mexico[a]	0.06	0.35	1.06	0.53–2.12	.873
Living in Ecuador[a]	**0.56**	**0.27**	**1.75**	**1.04–2.96**	**.037**
Living in Germany[a]	−0.21	0.22	0.81	0.53–1.24	.336
Living in Greece[a]	**0.65**	**0.24**	**1.92**	**1.2–3.06**	**.006**
Living in Russia[a]	**−1.06**	**0.30**	**0.35**	**0.19–0.62**	**<.001**
Male gender[b]	**0.83**	**0.25**	**2.28**	**1.39–3.75**	**.001**
Years of education	−0.04	0.03	0.96	0.91–1.01	.145
Previously worked in MH[c]	−0.32	0.34	0.73	0.37–1.42	.350
MHL: Recognition[d]	−0.43	0.27	0.65	0.38–1.1	.112
Probable PTSD[e]	**0.86**	**0.28**	**2.36**	**1.37–4.07**	**.002**
PVQ-RR: Self-direction[f]	−0.42	0.22	0.66	0.43–1.00	.052
PVQ-RR: Security[f]	0.06	0.22	1.06	0.69–1.62	.799
PVQ-RR: Tradition[f]	0.08	0.18	1.08	0.77–1.53	.648
Individual psychological vs. traumatic event focused (reference)					
Living in Mexico[a]	−0.24	0.34	0.78	0.41–1.51	.466
Living in Ecuador[a]	0.31	0.26	1.36	0.81–2.28	.247
Living in Germany[a]	−0.11	0.18	0.89	0.63–1.27	.525
Living in Greece[a]	**0.67**	**0.21**	**1.96**	**1.30–2.94**	**.001**
Living in Russia[a]	**−0.62**	**0.22**	**0.54**	**0.35–0.82**	**.004**
Male gender[b]	−0.03	0.23	0.97	0.62–1.51	.891
Years of education	−0.03	0.02	0.97	0.93–1.01	.149
Previously worked in MH[c]	−0.48	0.32	0.62	0.33–1.15	.129
MHL: Recognition[d]	**−0.61**	**0.22**	**0.55**	**0.36–0.84**	**.006**
Probable PTSD[e]	0.16	0.25	1.17	0.72–1.91	.523
PVQ-RR: Self-direction[f]	−0.17	0.18	0.84	0.6–1.19	.325
PVQ-RR: Security[f]	**−0.43**	**0.18**	**0.65**	**0.45–0.93**	**.019**
PVQ-RR: Tradition[f]	−0.02	0.16	0.98	0.72–1.33	.904
Multicausal beliefs vs. individual psychological (reference)					
Living in Mexico[a]	0.30	0.39	1.35	0.63–2.90	.439
Living in Ecuador[a]	0.25	0.28	1.29	0.75–2.22	.362
Living in Germany[a]	−0.1	0.24	0.91	0.56–1.46	.685
Living in Greece[a]	−0.02	0.23	0.98	0.62–1.54	.929
Living in Russia[a]	−0.44	0.32	0.65	0.34–1.22	.176
Male gender[b]	**0.86**	**0.26**	**2.35**	**1.40–3.95**	**.001**
Years of education	−0.01	0.03	0.99	0.94–1.05	.776
Previously worked in MH[c]	0.16	0.39	1.17	0.55–2.52	.684
MHL: Recognition[d]	0.18	0.29	1.19	0.67–2.12	.542
Probable PTSD[e]	**0.70**	**0.29**	**2.01**	**1.14–3.57**	**.017**
PVQ-RR: Self-direction[f]	−0.25	0.22	0.78	0.50–1.21	.267
PVQ-RR: Security[f]	**0.49**	**0.22**	**1.63**	**1.06–2.51**	**.027**
PVQ-RR: Tradition[f]	0.10	0.17	1.10	0.79–1.55	.569

N = 735, two participants gave *other* as their gender and were excluded from regression analysis by listwise deletion due to their small group size. Categorical predictors were effect coded (deviation from unweighted grand mean) or dummy coded.

Positive estimates/ OR >1 indicate that class membership is more likely compared to the reference group. Negative estimates/ OR <1 indicate that class membership is less likely compared to the reference group.

[a]Coding for country of residence: deviation from unweighted grand mean. [b]0: Female; 1: Male. [c]0: Never worked in mental health; 1: Previous work in the field of mental health. [d]0: No PTSD; 1: Screened positive in self-report for probable PTSD (PTSD-Checklist for DMS-5, PCL-5). [e]0: Did not recognize PTSD in vignette; 1: Did recognize PTSD in vignette. [f]PVQ-RR, portrait value questionnaire revised; values are mean centred at individual mean score over all PVQ-RR scales in correspondence with author recommendations (Schwartz, 2017). Abbreviations: CI, confidence interval; MH, mental health; MHL, mental health literacy; OR, odds ratio; PTSD, post-traumatic stress disorder; SE, standard error.

Besides cultural and sociodemographic factors, mental health–related factors were also significantly related to causal beliefs. Participants recognizing PTSD were more likely to be in the traumatic event–focused class, and participants with probable PTSD were more likely to be in the multiple causes class. It is possible that recognizing PTSD in someone else led participants to unidimensional and rather simple explanations, while people who themselves have PTSD symptoms might be more likely to endorse multicausal beliefs, owing to their own experiences when dealing with their illness (e.g. lack of social support, financial problems). However, these results must be interpreted with care as our overall sample exhibited unusually high rates of PTSD endorsement and PTSD rates differed considerably between countries. Overall, these results indicate that considering various cultural dimensions and controlling for mental health–related factors can be valuable additions when researching causal beliefs about mental disorders and cultural differences in general.

5.1. Limitations

The results of this study need to be interpreted in light of its limitations. First, data was collected using convenience sampling through an online survey. As can be seen in the sample characteristics, our participants were relatively young and well educated, and the majority of participants were female. Also, our overall sample exhibited unusually high rates of PTSD endorsement as we used a self-report screening instrument and PTSD rates differed considerably between countries. This should be taken into consideration when

interpreting the results. Second, it must be noted that we chose an etic approach. While this approach allowed direct comparisons, it prevented us to include culturally specific emic aspects in our analysis. All the results of our study are highly dependent on the symptoms described in the vignette. Although the vignette was designed to be as descriptive as possible, it is based on DSM-5 criteria for PTSD, and is thereby already influenced by cultural beliefs and norms. This limitation also extends to our psychometric tools, since not all the questionnaires had validated translations in every language. Though we chose validated versions wherever possible and followed recommendations for translating instruments closely, we cannot ensure, that measures are, in fact, measurement invariant. Third, the vignette method entails some problems, as its generalizability to clinical situations is limited and not all of the described symptoms are specific to a diagnosis of PTSD. Also, the study focused on causal beliefs for PTSD, and we did not examine other aspects of explanatory models, such as stigmatizing attitudes or potential cures. Lastly, our study included a small selection of countries and the results cannot be generalized to other countries.

6. Conclusions and implications

Integrating a more diverse concept of culture into mental health research can be a valuable addition to group comparisons based on nationality or ethnicity, which are still widely used in cultural clinical research. In addition to country of residence, our study revealed that, among laypersons, gender, mental health, knowledge about mental health, and personal values are significant covariates of causal beliefs for PTSD. Of further interest, we found systematic differences in countries that are geographically close or share a language. Research, therefore, needs to move away from transcultural comparisons towards a more integrated approach that attends to the complexity of cultural influences. Focusing on easily visible differences, such as ethnicity, may lead researchers to overestimate the influence of cultural aspects while neglecting other influential factors. Adopting a diverse concept of culture and including other contextual factors in research can help us acquire a more nuanced understanding of cultural influences in the development of causal beliefs and mental health in general. Considering causal beliefs in clinical practice should become an integral part of diagnostic processes and in treatment. Practitioners should be careful not to overestimate the influence of nationality or ethnic group on causal beliefs and pay attention to individual causal beliefs and peoples' tendency to entertain multiple beliefs simultaneously. While cultural aspects clearly may account for differences in causal beliefs, other factors, such as gender, may be just as important.

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Data availability statement

The data that support the findings of this study are available from the corresponding author, CM, on reasonable request. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

Authors contribution

CKa, CM and NS designed the study and were responsible for the data collection. CM analyzed and interpreted the data, and was the major contributor in writing the manuscript. CKa and NS contributed to the interpretation of data and critically revised earlier versions of the manuscript. CKn supervised the study, CKn and ST revised the manuscript. All authors revised the manuscript and have approved the final version.

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Appendix. Vignette

Imagine Mary, a fictitious person. Mary is about your age. For the past two months, she has been sleeping poorly. She often has vivid nightmares that cause her to frequently wake up in the middle of the night feeling very frightened. She is jumpy and easily startled and has lost interest in activities she previously enjoyed. This all began a few months ago, after an incident in which her life was endangered. Mary was out alone when two armed men threatened her with a knife and robbed her. After the incident, Mary felt numb for several days; then the nightmares began in which she still clearly sees the armed men. She is easily startled by unexpected noises. Since the event, Mary has been very afraid to go outside alone and expects danger at all times. She tries not to think about the assault and does not want to talk about it with others.