

Intolerance of uncertainty in students during the COVID-19 pandemic: scoping review

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Abstract

The intolerance of uncertainty factor is a construct that implies difficulty for the individual in dealing with unforeseen contexts. The literature indicates that intolerance of uncertainty can have a negative impact on well-being, especially when experiencing an unexpected context, such as the Covid-19 pandemic. From this perspective, this study aimed to perform a synopsis of what has been studied about the intolerance of uncertainty in higher education students during the Covid-19 pandemic through a scoping review. Data was collected in the EMBASE, MEDLINE/PubMed, Web of Science, PsycINFO, and CINAHL databases using descriptors in English. From the application of eligibility criteria performed by two judges, nine studies were selected. The three main research topics of the studies analyzed were the relationship between intolerance of uncertainty and 1. characteristics involving mental health, 2. fear, and 3. academic activities and career aspects. Most studies showed a lack of tolerance for uncertainty as a predictor of negative factors. In addition, it was found that no interventions directed toward the construct were carried out in the studies. The present review highlights the ability to tolerate uncertainty as a relevant component to be evaluated in students and the importance of carrying out psychological interventions aimed at the intolerance of uncertainty in precarious contexts.

Keywords: uncertainty, Covid-19, students, psychology, mental health

INTOLERÂNCIA À INCERTEZA EM ESTUDANTES DURANTE A PANDEMIA DE COVID-19: SCOPING REVIEW

Resumo

Compreende-se que o fator intolerância à incerteza é um construto que implica na dificuldade do indivíduo em lidar com contextos imprevistos. A literatura indica que a intolerância à incerteza pode apresentar impacto negativo ao bem-estar, principalmente, quando se está vivenciando um contexto inesperado, como a pandemia de Covid-19. Nessa perspectiva, o objetivo deste estudo foi realizar uma sinopse sobre o que foi estudado sobre a intolerância à incerteza em estudantes do ensino superior durante o contexto de pandemia de Covid-19 por meio de uma *scoping review*. A coleta foi realizada nas bases de dados EMBASE, MEDLINE/PubMed, Web of Science, PsychInfo e CINAHL com descritores em inglês. A partir da aplicação dos critérios de elegibilidade, realizada por dois juízes, selecionou-se um total de nove estudos. Os três tópicos principais de pesquisa dos estudos analisados foram a relação da intolerância à incerteza com 1. características envolvendo saúde mental, 2. medo, e 3. atividades acadêmicas e aspectos de carreira. A maioria dos estudos evidenciou a falta de tolerância à incerteza como preditor para fatores prejudiciais. Além disso, verificou-se que não foram efetuadas intervenções direcionadas ao construto nos estudos. A presente revisão destaca a habilidade de tolerar a incerteza como um componente relevante de ser avaliado em estudantes e a importância na realização de intervenções psicológicas direcionadas à intolerância à incerteza em contextos precários.

Palavras-chave: incerteza, Covid-19, estudantes, psicologia, saúde mental

INTOLERANCIA A LA INCERTIDUMBRE EN LOS ESTUDIANTES DURANTE LA PANDEMIA DE COVID-19: SCOPING REVIEW

Resumen

Se entiende que el factor intolerancia a la incertidumbre es un constructo que implica la dificultad del individuo para enfrentarse a contextos imprevistos. La literatura indica que la intolerancia a la incertidumbre puede tener un impacto negativo en el bienestar, especialmente cuando se vive un contexto inesperado, como la pandemia de Covid-19. En esta perspectiva, el objetivo de este estudio fue realizar una sinopsis de lo estudiado sobre la intolerancia a la incertidumbre en estudiantes de educación superior durante el contexto de la pandemia del Covid-19 a través de una *scoping review*. La recolección de datos se realizó en las bases de datos EMBASE, MEDLINE/PubMed, Web of Science, PsychInfo y CINAHL con descriptores en inglés. De la aplicación de los criterios de elegibilidad, realizada por dos jueces, fueron seleccionados un total de nueve estudios. Los tres principales temas de investigación de los estudios analizados fueron la relación de la intolerancia a la incertidumbre con 1. características relacionadas con la salud mental, 2. el miedo y 3. actividades académicas y aspectos profesionales. La mayoría de los

estudios mostraron una falta de tolerancia a la incertidumbre como predictor de factores dañinos. Además, se constató que en los estudios no se realizaron intervenciones dirigidas al constructo. La presente revisión destaca la capacidad de tolerar la incertidumbre como componente relevante de ser evaluado en los estudiantes y la importancia de realizar intervenciones psicológicas dirigidas a la intolerancia a la incertidumbre en contextos precarios.

Palabras clave: incertidumbre, Covid-19, estudiantes, psicología, salud mental

The disease characterized as Coronavirus disease 2019 (Covid-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was declared a pandemic on March 11, 2020, by the World Health Organization (WHO, 2020). The eventualities generated, such as unforeseen changes and fears involving the possibility of contamination of the virus in oneself and others, led to the confrontation of various challenges during this period (Schimmenti et al., 2020).

In addition to wearing a mask and reinforcing the importance of hygiene activities, several countries adopted lockdown and social distancing measures to help prevent new cases of Covid-19 (Kaur et al., 2021). Distancing measures suspended face-to-face activities in various contexts, including canceling events, banning meetings, and closing educational institutions and public spaces (Aquino et al., 2020; Onyeaka et al., 2021). As an alternative to this situation, many educational institutions, such as universities and colleges, adopted distance learning measures (Doğanülkü et al., 2021; Elsharkawy & Abdelaziz, 2021).

Because the pandemic is a reality experienced globally that generated many challenges, intolerance of uncertainty has received attention in studies carried out during this period. Intolerance of uncertainty (IU) is characterized by an individual's inability to deal with uncertain or unpredictable contexts (Carleton, 2016). Given this, IU can impact how the individual assesses and reacts at cognitive, emotional, and behavioral levels when faced with uncertain circumstances (Dugas et al., 2004).

Fear of the unknown is one of the main characteristics of IU, and the lack of effectiveness in dealing with the lack of certainty can contribute to dysfunctional reactions, characteristic of anxiety and depression disorders, such as worry, avoidance, and verification (Carleton, 2012; Carleton, 2016). During the pandemic, given the characteristic of uncertainties and sudden changes that the disease generated in various areas, studies included IU as a risk condition for negative factors associated with mental health (Korkmaz & Güloğlu, 2021; Rettie & Daniels, 2021).

Because the Covid-19 pandemic is an adverse event characterized mainly as the global health crisis of the most significant magnitude in the last century (United Nations Population Fund, 2020), the analysis of IU and its verification in the context of Covid-19 have proven to be relevant, particularly in higher education students. University students are preparing themselves through classes, activities, and internships in the academic context to be subsequently inserted into the job market. However, due to the circumstances and uncertainties generated by the pandemic, such as the closure of universities, the shift to distance learning, and fears about the future consequences of the pandemic in the context of work, there is a high potential for IU to have a harmful impact on fear about Covid-19, on academic activities, on professional preparation, and aspects of mental health (Elsharkawy & Abdelaziz, 2021; Pereira et al., 2021; Wang et al., 2020). Given this, higher education students have been considered a public vulnerable to the uncertainties generated by the pandemic since it is evident that there are specific effects of the period impacting students, that is, influencing them in a unique and harmful way.

Evaluating IU and its psychological and behavioral repercussions and directing care toward this transdiagnostic construct in students can improve evidence that helps the public during stages of change and uncertainty. From this perspective, the main aim of this study was to explore the available evidence and gaps regarding the implications of IU in higher education students during the Covid-19 pandemic through a scoping review of the literature.

Method

The scoping review carried out followed the guidelines of both the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) by Tricco et al. (2018) and the framework for conducting a scoping review of Arksey and O'Malley (2005). The study proposed to investigate and map initial scientific evidence and to support the investigation of possible gaps in the research (Tricco et al., 2018).

A broad research question was developed for this review:

“What does the scientific literature report about IU in higher education students during the Covid-19 pandemic?”.

To categorize the investigation, the following research items were specifically structured: (1) to identify and explore the studied topics and variables associated with IU in students during the pandemic, and (2) to identify and explore possible interventions aimed at helping to control IU in students during the pandemic. The databases chosen for the collection of publications were EMBASE, MEDLINE/PubMed (via the National Library of Medicine), Web of Science – Main Collection (Clarivate Analytics), PsycINFO (APA), and the Cumulative Index to Nursing and Allied Health Literature (CINAHL).

A non-systematic review was conducted in the MEDLINE/PubMed database (via the National Library of Medicine) to determine the descriptors that best covered the proposed theme. The use of the following descriptors for the review was shown to be adequate: “intolerance of uncertainty” to encompass the concept of the study subject and “student,” “students,” “undergraduate,” “undergraduates,” “graduate,” “graduates,” “postgraduate,” “postgraduates” and “higher education” for the population of interest. To cover the context of COVID-19, the following terms were used: “Covid-19,” “SARS-CoV-2,” “coronavirus,” “2019-nCoV,” and “severe acute respiratory syndrome coronavirus-2”. The Boolean terms “AND” and “OR” were considered for combining descriptors in the search process. English descriptors were used because, through the previous non-systematic review, international studies in English stood out as the primary source of research on the subject.

Therefore, in all databases, the following search formulation was used for all fields: (“intolerance of uncertainty”) AND (“student” OR “students” OR “undergraduate” OR “undergraduates” OR “graduate” OR “graduates” OR “postgraduate” OR “postgraduates” OR “higher education”) AND (“Covid-19” OR “SARS-CoV-2” OR “coronavirus” OR “2019-nCoV” OR

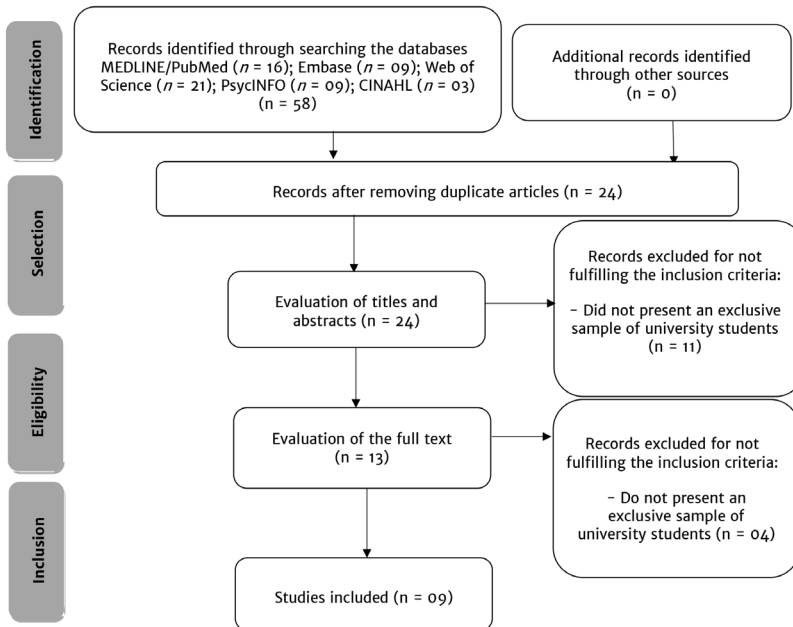
“severe acute respiratory syndrome coronavirus-2”). Studies were selected based on the following exclusion criteria: (1) studies in which the sample of participants was not exclusively higher education students, and (2) studies in which data collection was not carried out exclusively during the Covid-19 pandemic. These criteria were established since the target audience was only students and because the purpose of this review was to analyze only the context of the pandemic; therefore, studies carried out before this period were excluded.

Two independent reviewers carried out the processes involving searching the databases, sorting, and analyzing the complete studies. All databases were verified up to the date of the bibliographic search, carried out on November 23, 2021. The divergences between the reviewers during the stages were discussed, reaching a consensus in all cases. Following the guidelines and practices of the scoping review, the quality terms of the included studies were not analyzed.

Figure 1 shows the flowchart of the steps and results of the screening process. In total, 58 publications were found in the databases. After excluding duplicate studies, 24 were obtained, all with their titles and abstracts analyzed. After eliminating 11 of these studies for not fulfilling the eligibility criteria, 13 were subjected to verification of the full text. After the screening, nine studies were included.

Figure 1

Flowchart of the article selection and inclusion process



Results

As presented in Table 1, the primary information of each study was described. Authors, year of publication, country, design, main characteristics of the sample, period of collection, objective of the study, and main results about the theme of IU were considered.

Table 1

Description of studies including: Authors, year, country, design, sample, collection period, objective, and main results about the IU theme

| Authors (year) | Country | Design | Sample and collection period | Objective | Main results regarding the IU theme |
|---------------------------------|--------------------------------|-----------------|--|---|--|
| Scharmer et al. (2020) | United States of America (USA) | Cross-sectional | 295 undergraduate students. Collection carried out between March and April 2020. | To assess the association between eating disorder pathology, risk of compulsive exercise, anxiety about Covid-19, and IU aspects. | Intolerance of uncertainty correlated significantly and positively with compulsive exercise and eating disorder pathology. For compulsive exercise, IU was the strongest predictor. However, it was indicated that the eating disorder and compulsive exercise pathology relationship with COVID-19 anxiety was moderated by IU. |
| Chen and Zeng (2021) | China | Cross-sectional | 550 students from different higher education institutions who were about to graduate and who would enter the job market in 6 months to 1 year. No information about the months of the collection period. | To evaluate the relationship between IU and job anxiety and verify the possibility of moderation by the career planning factor. | Negative and significant correlation between IU and career planning, and a positive and significant correlation between job anxiety and IU. Intolerance of uncertainty was a significant and positive predictor of job anxiety. Furthermore, the relationship between IU and job anxiety was moderated by greater career planning. |
| Doğanülkü et al. (2021) | Turkey | Cross-sectional | 450 students from three state universities located in Turkey. The collection was carried out between October and November 2020. | To assess the association between fear of Covid-19 and procrastination and the possible mediating effect of IU. | Intolerance of uncertainty showed a positive and significant correlation with fear of Covid-19. Furthermore, IU was configured as a relevant mediating factor between fear of Covid-19 and procrastination. |
| Elsharkawy and Abdelaziz (2021) | Saudi Arabia | Cross-sectional | 416 students from Jouf University, located in Saudi Arabia. No information about the months of the collection period. | To analyze the degrees of IU, fear of Covid-19, and the variables that can intervene in these levels. | Positive and significant correlation between IU and fear. Younger individuals, who attended the first academic years, courses in the humanities, and who already had a family member exposed to Covid-19 had higher levels of IU. |

Table 1

Description of studies including: Authors, year, country, design, sample, collection period, objective, and main results about the IU theme

| Authors (year) | Country | Design | Sample and collection period | Objective | Main results regarding the IU theme |
|-------------------------|-------------|-----------------|--|--|--|
| Fedorenko et al. (2021) | USA | Cross-sectional | 608 students enrolled at a university in New Jersey who, at the time of data collection, were living in New Jersey and New York City, considered "hotspot" locations (areas where cases and deaths due to Covid-19 were increasing) in the USA. Collection carried out between April and May 2020. | To evaluate the relationship between fears of contamination by Covid-19 and fears of social distancing and a set of demographics, contextual, and cognitive-affective vulnerabilities. | Intolerance of uncertainty significantly and positively predicted fears regarding Covid-19 contamination. |
| Goksu et al. (2021) | Turkey | Cross-sectional | 1,494 students enrolled in a distance education program during the pandemic. The collection was carried out in April 2020. | To evaluate the associations between variables related to distance education, demographic factors, and psychological factors. | Significant positive correlations between the variables IU, anxiety, stress, and depression. Negative correlation between IU and motivation and distance learning attendance. However, prospective IU presented a direct and positive relationship with motivation, while inhibitory IU presented a negative relationship. |
| Lee and Jung (2021) | South Korea | Cross-sectional | 274 students who were in the transition phase from the college context to the work context during the COVID-19 pandemic. Collection carried out in December 2020 | To analyze relationships between the entrepreneurial mindset, IU, and career adaptability variables. | Positive correlations between prospective IU and entrepreneurial mindset and career adaptability, with these being negative for inhibitory IU. Presentation of the mediation of entrepreneurial mindset between IU and career adaptability. |

Table 1

Description of studies including: Authors, year, country, design, sample, collection period, objective, and main results about the IU theme

| Authors (year) | Country | Design | Sample and collection period | Objective | Main results regarding the IU theme |
|--------------------|---------|-----------------|--|---|---|
| Zhao et al. (2021) | China | Cross-sectional | 3,341 students. Collection carried out between February and March 2020. | To assess whether the relationship between positive information about Covid-19 and anxiety is mediated by risk perception. In addition, to examine whether IU moderates the relationship between positive information about Covid-19 and risk perception. | Intolerance of uncertainty moderated the relationship between positive information about Covid-19 and risk perception. |
| Zhuo et al. (2021) | China | Cross-sectional | 1,017 college students who were returning to classes at universities in Wuhan. The collection was carried out between August and September 2020. | To analyze the relationship between aspects of IU and mental health and investigate whether social support can be a moderating factor in the relationship. | Intolerance of uncertainty positively predicted negative mental health aspects (anxiety, depression, and insomnia). Regarding social support, it was shown that this factor could be categorized as a moderator in the relationship between IU and anxiety and depression |

All the studies were cross-sectional. Most of the articles, eight in total, were published in 2021, with only one in 2020. China had the highest number of studies ($n = 3$), followed by the USA ($n = 2$), Turkey ($n = 2$), Saudi Arabia ($n = 1$), and South Korea ($n = 1$). The sample sizes of participants ranged from 274 to 3,341 students. All studies carried out the collection during the Covid-19 pandemic, and seven of them mentioned that the data collection was carried out during the months of the year 2020, while two did not publish the collection period.

The articles were published in nine different journals: BMC Psychology, Cognitive Behaviour Therapy, Frontiers in Psychiatry, Frontiers in Psychology, International Journal of Eating Disorders, International Journal of Environmental Research and Public Health, Journal of Computer Assisted Learning, Perspectives in Psychiatric Care, and Sustainability. Furthermore, no conflict of interest was reported in any of the studies. This indicates that such studies do not usually depend on funding which could be interpreted as a potential conflict of interest.

Regarding the contexts in which the students found themselves, some studies highlighted specific situations that the participants were experiencing during the data collection. Chen and Zeng (2021) and Lee and Jung (2021) specified that the students were about to graduate; therefore, they were in the transition phase from the higher education context to the labor market context; Zhuo et al. (2021) indicated that the students were returning to classes at universities in Wuhan, China; Fedorenko et al. (2021) reported that students were living in New

Jersey and New York City, places considered hotspots and Göksu et al. (2021) showed that students were enrolled in a distance education program due to the pandemic.

As an IU measurement instrument, all studies used the Intolerance of Uncertainty Scale-12, also known as the Intolerance of Uncertainty Scale-Short Form (IUS-12; Carleton et al., 2007). The instrument can be defined as a “global” IU measure (Thibodeau et al., 2013), and is a reduced scale of the first instrument formulated to assess IU, called the Intolerance of Uncertainty Scale, with 27 items, developed by Freeston et al. (1994). The 12-item self-report scale measures reactions, behaviors, and negative beliefs concerning situations of uncertainty (Carleton et al., 2007).

The instrument assesses how the individual tends to react to undefined contexts, and situations and consists of a 5-point Likert-type scale, where 1 = Does not describe me at all and 5 = Describes me completely. The score can vary from 12 to 60, with higher scores equating to greater degrees of intolerance of the individual. In addition, the instrument presents the division of items between two subfactors that represent prospective IU and inhibitory IU. The first, consisting of 7 items, assesses anxiety or fear regarding future contexts and situations. The second comprises five items and encompasses avoidance behaviors and experiences when faced with uncertain situations (Carleton et al., 2007).

Regarding the topics presented by the studies, they were divided into three different sets according to the theme analyzed by each one and the variables studied and related to IU, namely:

- 1) The relationship between IU and characteristics involved in mental health: studies that analyzed how IU was related to psychological traits and maladaptive behaviors during the pandemic.
- 2) The relationship between IU and fear: studies that addressed the relationship between IU and the emotion of fear during the pandemic.
- 3) The relationship between IU and academic activities and career aspects: studies that evaluated the relationship between distance education characteristics or career characteristics and IU during the pandemic.

The first set of studies demonstrated a positive association between IU and negative health factors such as depression, insomnia, and anxiety (Zhuo et al., 2021). In the study by Scharmer et al. (2020), IU was the strongest predictor of compulsive exercise. The authors also highlighted the possibility that high trait anxiety and IU are more relevant factors for the risk of eating disorder pathology and compulsive exercise than Covid-19 anxiety. In individuals with low trait indexes, the most pertinent aspect to increase the risk was Covid-19 anxiety (Scharmer et al., 2020). In addition, the moderation of IU between positive information about Covid-19 and risk perception was verified, indicating the possibility that the effect of positive information for a lower risk perception was lower in students with a high degree of IU (Zhao et al., 2021).

In the second dataset, Doğanülkü et al. (2021) indicated the relevant role of IU mediation, as individuals with high levels of fear of Covid-19 would be more likely to perform procrastination behaviors due to their lower ability to tolerate uncertainty. Elsharkawy and Abdelaziz (2021) showed a positive and significant correlation between IU and fear. In the Fedorenko et al. (2021) study, the IU factor positively predicted fears regarding Covid-19 contamination.

Concerning the third set, IU was shown to be a significant and positive predictor of job anxiety (Chen & Zeng, 2021). Goksu et al. (2021) showed a negative correlation between IU with motivation and frequency of distance learning; however, with the division of prospective and inhibitory IU, prospective IU presented a direct and positive relationship with motivation, and inhibitory IU showed a negative association with motivation. In their results, Lee and Jung (2021) also showed differences between prospective IU and inhibitory IU. The former was positively correlated with an entrepreneurial mindset and career adaptability, while the latter was negatively correlated.

Regarding possible interventions, the reviewed literature did not present strategies for reducing IU. However, some studies highlighted the relevance of protective factors to reduce the negative impact of IU to deal more efficiently with contexts involving uncertainties. According to the study by Chen and Zeng (2021), the relationship between IU and anxiety at work was moderated by career planning; the greater the focus on career organization, the less anxiety experienced in contexts involving uncertainty. Social support was also shown to play an important moderating role, mitigating the relationship between IU and factors such as depression and anxiety (Zhuo et al., 2021). Finally, in the study by Lee and Jung (2021), the mediation of the entrepreneurial mindset between IU and career adaptability demonstrated the potential of this cognitive ability to help students adapt to uncertain circumstances.

Discussion

The scientific literature shows that IU can be a relevant factor in influencing harmful consequences for the well-being of higher education students (Kraemer et al., 2015; Li et al., 2020). However, an event as adverse as the pandemic may have made students more susceptible to possible negative repercussions due to IU. In addition to the concern and anxiety regarding academic preparation for a future professional career, there was also the central issue of the pandemic exerting new changes and unpredictability to which students had to adapt. Through the present study, it was possible to verify the repercussion and relationship of IU with different variables, mainly demonstrating a potential influence of IU on unfavorable characteristics for students during the Covid-19 pandemic.

Uncertainties were presented in several domains, from information about the disease and the possibility of contagion, concerning classes and extracurricular activities to aspects of the students' professional future (Elsharkawy & Abdelaziz, 2021; Schimmenti et al., 2020). The nine publications present the relationship between IU and three main themes. The relationship between IU and different topics can be explained by the fact that IU is a concept with high potential and wide application in the study and understanding of characteristics of psychopathology (Carleton, 2012) and dysfunctional behaviors (Carleton et al., 2016; Thibodeau et al., 2013).

Regarding the first topic, since the pandemic culminated in a high level of uncertainty, the role of IU in predicting negative factors about mental health and dysfunctional behaviors proved significant. This is consistent with the fact that IU is a transdiagnostic dispositional risk

factor, particularly for anxiety and depression (Carleton, 2012; Mahoney & McEvoy, 2012). From adverse events, such as the pandemic, high IU in students demonstrates an aggravating contribution to possible psychological problems and maladaptive behaviors since the property of IU is linked to fears of unforeseen changes.

Concerning the second topic, aggravating factors such as the influence of fear can potentiate adverse effects on students. Fear is a prominent factor in diseases with the potential for contagion, and high degrees of fear can make it impossible to rationalize and make appropriate decisions in response to Covid-19 (Ahorsu et al., 2022). Furthermore, it was indicated that IU could be influential in increasing the perception of the pandemic as threatening (Taha et al., 2014). However, it was also found that the increase in the intensity of fear that the subject feels is a possible factor for the accentuation of IU (Bakioğlu et al., 2021). Due to this association between fear and IU, the two factors can be perceived as possible variables that could cause harm to students during the pandemic, including the development of possible dysfunctional behaviors, such as procrastination.

Finally, the third topic identifies that the pandemic caused changes in students' teaching programs, mainly by changing face-to-face teaching to distance learning (Doğanülkü et al., 2021; Elsharkawy & Abdelaziz, 2021) and mobilized changes in the economic and industrial context, harming these sectors significantly (Onyeaka et al., 2021). Based on these unpredictable pandemic circumstances, this review found that IU made an unfavorable contribution to factors involving motivation for online teaching and fear of future jobs. Since high intolerance can impair the effectiveness of responses directed toward problems (Dugas et al., 1997), it is understood that higher education students, who are actively studying and preparing to enter the job market, can react with more significant anxiety about their professional future and be less motivated for distance learning due to the influence of IU.

Concerning the set of studies analyzed, it was found that the majority evaluated IU without analyzing the division between the prospective IU and inhibitory IU subscales. The construct may present differences regarding the subscales since inhibitory IU reflects a tendency to stand still in uncertain situations. At the same time, prospective IU is directed toward active involvement in reducing unpredictability (Birrell et al., 2011). Only two studies showed this separation, in which inhibitory IU was negatively related to motivation for distance learning (Göksu et al., 2021), an entrepreneurial mindset, and career adaptability (Lee & Jung, 2021), while prospective IU was positively related to these variables. From these differences, it can be considered that there are dissimilarities between the IU subfactors and that possible particularities between them were not evaluated in most studies.

Furthermore, although career planning, social support, and an entrepreneurial mindset were presented as relevant elements to better deal with IU, the lack of information on interventions aimed at IU in the studies can be highlighted. As a way of coping with IU, Carleton (2012) articulates that eliminating threats arising from uncertainty, or the uncertainty itself, is an unfeasible task since there is always the possibility of unforeseen events. However, increasing

the ability to tolerate uncertainty is an accessible and realistic way to help the individual (Carleton, 2012). Students with high IU traits were shown to be more vulnerable to dysfunctional behaviors (Scharmer et al., 2020) and more sensitive and pessimistic about uncertainties regarding Covid-19 (Zhao et al., 2021). In this context, it is essential to carry out interventions to increase tolerance to uncertainty among the public.

Final Considerations

The present review showed an association between IU and variables that mainly demonstrate harm to students, ensuring the relevance of verifying the level of intolerance in students during adverse contexts. Intolerance of uncertainty can contribute to excessive worry or fear, adversely influencing students. Identifying how IU relates to other variables can help with demands for mental health services in educational institutions and promote actions that enable students to develop better coping strategies when dealing with possible uncertainties during this period and in other contexts of uncertainty.

However, the results of the studies analyzed in the present review must be evaluated with caution since the limitations of the studies mostly referred to the impossibility of inferring causality from the analyzed results since all were cross-sectional. Furthermore, caution was recommended in generalizing the results to other cultures and interpreting the data, with more research on the subject needed, including the possibility of carrying out longitudinal studies to investigate causal explanations.

Some limitations in this review should also be considered. It is emphasized that, according to the collection period of each study, most occurred at a stage of the pandemic when vaccines against the disease had not yet been developed, and the number of people infected with the disease and deaths from Covid-19 was rising. In addition, considering that the Covid-19 pandemic presented some dissimilarity globally (Pearce et al., 2020) and, as the studies were conducted in diverse countries, time periods and contexts among students, they may present specificities in the results that make generalization difficult. Study bias may also be present as studies in languages other than English and gray literature were omitted.

However, the present review proves to be relevant, as the understanding of IU and its repercussions related to the vulnerability and mental health of students are significant aspects to be evaluated for a better concept of possible actions and psychological interventions that may help students both during the Covid-19 pandemic and in other contexts involving uncertainties (Thombs et al., 2020). It is therefore concluded that the dataset analyzed in this review is relevant for understanding IU in higher education students during the Covid-19 pandemic; however, further research is still needed. It is suggested that further studies on this topic be carried out longitudinally to infer possible causalities between IU and the variables investigated. Furthermore, prospective IU and inhibitory IU should be analyzed separately when there is evidence of possible differences between them. Finally, the importance and need for studies involving interventions aimed at IU and their effectiveness are emphasized.

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