

Relationships among COVID-19 causal factors perceived by children, basic psychological needs and social anxiety

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Abstract

Background: The pandemic caused by COVID-19 had a great impact on our society as the lives of children have been affected, as well as their psychological health and social anxiety.

Objective: To examine whether COVID-19 causal factors perceived by children predicted basic psychological needs and social anxiety; and whether basic psychological needs predicted social anxiety.

Methods: A sample of 58 schoolchildren ($M_{age} = 10.18$; $SD = 0.77$; 36 boys, 22 girls) participated in the study and completed a series of self-report measures. The relationship between the study variables was examined using partial least square path modelling (PLS-PM).

Results: Social distancing and protection significantly negatively predicted competence satisfaction. Perceived psychological impact significantly negatively predicted relatedness

satisfaction and significantly positively autonomy frustration and competence frustration. Perceived psychological Impact significantly negatively predicted interaction with the opposite sex. Autonomy satisfaction significantly positively predicted interaction with the opposite sex. Autonomy frustration significantly positively predicted public speaking interaction with teachers, significantly positively interaction with the opposite sex, significantly positively being embarrassed or ridiculed and significantly positively interaction with strangers.

Conclusion: Perceived psychological impact was the causal factor that revealed a higher impact on basic psychological needs. As such, it is important to take measures with children in pandemic situations to minimize this variable. On the other hand, Autonomy frustration revealed a higher impact on social anxiety. Thus, it is necessary to emphasize autonomy in children respecting the restrictions imposed to minimize the impact of social anxiety.

Introduction

The COVID-19 epidemic has caused a large impact on society in distinct health aspects as well as social parameters.^{1,2} As such, it is especially important to determine those causal factors perceived by children regarding the epidemic.³

Several authors have examined those COVID-19 causal factors perceived by the population.^{4,5,6,7} In particular, the COVID-19 causal factors are understood as the factors that the population considers or perceives as causing COVID-19 infection. In this study, it is followed the classification of perceived causal factors divided into²: Social Distancing and Protection (DSP), Perceived Psychological Impact (IPP), Skepticism (ES) and Credibility of Perceived Information (CIP). In particular, Social Distancing and Protection are those elements that the population perceives regarding maintaining a safe distance and the use or not of a mask as a

protective element.⁷ Perceived Psychological Impact is the stress and depression that the pandemic has generated and how the population relates this negative psychological impact as a causal risk factor for contagion.⁷ Skepticism describes the skepticism and risk perception assumed by the population in situations involving restrictions, personal actions or social distancing as contagion risk prevention measures.⁷ Credibility of information describes the insecurity and the credibility of the population towards the content related to COVID-19 transmitted by the government and by the media.⁷ In this study the causal factors related to the epidemic are measured in schoolchildren which may reveal the influence of those causal factors in variables related to wellbeing such as basic psychological needs and social anxiety.

Another factor to take into account that was influenced during the pandemic of COVID-19, is the satisfaction of basic psychological needs.^{8,9} According to Ryan and Deci (2000), Basic Psychological Needs are an intrinsic, universal, and necessary psychological requirement for psychological well-being. Basic psychological needs come from the Theory of Self-Determination¹⁰ and it is divided into the following components: autonomy (e.g., the necessity to decide about one's actions, express ideas and opinions freely), competence (e.g., the necessity to feel ability when performing tasks, the experience of success and develop new skills), and relatedness (e.g., the importance of the close ties in the social relationships made).^{10,11} In addition, another concept that is measured in this work is the deprivation of those aforementioned needs.¹² This deprivation of needs it is known as needs thwarting or frustration and it may turn into the compensation of them which could be manifested by distinct unexpected behaviours.¹³ For instance, a person with the frustration of the competence need may compensate it by pursuing image-oriented outcomes. Thus, the thwarting of the three basic psychological

needs (competence frustration, autonomy frustration and relatedness frustration) will be examined in this work.

Basic psychological needs may be modified by the causal factors of the epidemic in different senses.^{4,5,6,7} In particular, social distancing may modify the perception of the relationship between people as well as the perception of people's autonomy.¹⁴ On the other hand, Skepticism and the credibility of the information may modify the behaviour patterns of people in complying with the rules and it may have an impact on basic psychological needs.¹⁵ The degree of perceived psychological impact can influence the fulfilment of basic psychological needs, depending on the behaviours people adopt.¹⁶ This means that if the epidemic has significantly altered behaviour patterns, a person will experience greater frustration with their needs compared to cases where the epidemic has only slightly changed people's behaviour patterns.⁸

Another important factor, which has been modified after the epidemic, is the social anxiety disorder or social phobia.¹⁷ From a theoretical point of view, social anxiety is understood as the consistent fear of one or more social situations or public performances in which there is an evaluation/observation to the person. This evaluation may imply a negative outcome that could display embarrassing or humiliating symptoms of anxiety (e.g. facial flushing, trembling, tics, etc.).¹⁸ In particular, previous works showed that COVID-19 increased the social anxiety of children.^{17,19,20} According to basic psychological needs, it makes sense that the frustration of relatedness may enhance the social anxiety experienced by children.^{21,22} In this sense, in the present research work the model of social anxiety was taken.^{23,24} This model divides social anxiety into the following factors: Interaction with the opposite sex (SEX, e.g., anxiety when interacting with the opposite sex), public speaking/interaction with teachers (HABPUB, e.g., fear of public speaking or interacting with teachers), being embarrassed or ridiculed (EVI, e.g., fear

101 of being embarrassed or ridiculed publicly), assertive expression of annoyance or anger (ASERT,
102 e.g., difficulty expressing anger or annoyance assertively), interaction with strangers (DESCON,
103 e.g., anxiety when interacting with unfamiliar people), and acting in public (ACT, e.g.,
104 discomfort performing actions in front of an audience).

105 However, little is known about how the perceived causal factors of COVID-19 increase the
106 social anxiety of children and how basic psychological needs influence social anxiety.
107 Nevertheless, following another related subject, it may be hypothesized that social distancing
108 may decrease social anxiety,²¹ meanwhile, perceived psychological impact may be related to
109 more social anxiety in children.²² The person that experiences social anxiety tends to avoid the
110 situations that he/she fears and if he/she cannot avoid them, he/she tries to escape or endures
111 them with high discomfort.²⁵

112 As a novelty, the present work is intended to examine the perceived causal factors of
113 COVID-19⁷ and their relationship with basic psychological needs and anxiety. Those COVID-19
114 perceived causal factors may modify the wellbeing of children by impacting their social anxiety
115 and basic psychological needs. The examination of those variables may help to reduce the
116 epidemic outcomes and their negative effects in social anxiety and basic psychological needs.
117 As such, the goals of the present study were to examine whether COVID-19 causal factors
118 perceived by children predicted basic psychological needs and social anxiety; and whether basic
119 psychological needs predicted social anxiety. The hypotheses established were: (a) Perceived
120 Psychological Impact may have a positive relation with the frustration of basic psychological
121 needs (competence, autonomy and relatedness) in children; (b) Skepticism may decrease the
122 satisfaction of basic psychological needs (competence satisfaction, autonomy satisfaction and
123 relatedness satisfaction) and may decrease social anxiety in children; (c) Distancing and

Comment [A1]: According to your definition of skepticism in the introduction of the manuscript, increased social anxiety seems more logical.

protection will decrease the basic psychological needs (competence satisfaction, autonomy satisfaction and relatedness satisfaction) and will decrease the experience of social anxiety in children; (d) Credibility of perceived information will promote the existence of higher levels of social anxiety in children.

Materials & Methods

Participants

The study design is cross-sectional, and the sample collection was performed through non-probabilistic and incidental sampling. The sample consisted of 58 schoolchildren ($Mage = 10.18$; $SD = 0.77$; 36 boys and 22 girls) from the Valencian Community in Spain. The children's hours of study were 7.98h per week, 10 suffered a COVID-19 infection (17.24%), 31 had a relative infected by COVID-19 (53.45%), 17 participants and their relatives were not infected by COVID-19 (29.31%), 41 practiced sports and physical activity (70.69%) and 17 were sedentary (29.31%). In particular, 18 were associated athletes (30.51%), 14 competed at regional level (24.14%) and 5 competed at national level (8.62%).

The sample was selected according to the goals of the study as it was intended to examine whether COVID-19 causal factors perceived by children predicted basic psychological needs and social anxiety; and if basic psychological needs predicted social anxiety. The only inclusion criterion was to evaluate schoolchildren because we wanted to examine the effects of the epidemic on the aforementioned variables in schoolchildren.

Instruments

To measure the perception of the population regarding the pandemic causality, it was utilized the "Questionnaire about the causality factors of COVID-19 pandemic" (CPFC-COVID-19).² The questionnaire consists of 20 items with a Likert-type scale ranging from 1. totally disagree,

2. disagree, 3. agree and 4. totally agree. The CPFC-COVID-19 has four dimensions: 1) “Social distancing and protection” with 6 items (DSP; e.g., I think that if I go down the street without a mask, I put no one at risk of contagion); 2) “Perceived psychological impact” (IPP) with 5 items (e.g., I think that stress influences the risk of contagion by COVID-19), 3) “Skepticism” (ES) with 4 items (e.g., I am sure I will not get infected if I go with my group of friends) and 4) “Credibility of the information received” (CIP) with 5 items (e.g., I think that the population is not well informed about the political and social situation related to curbing COVID). As Cronbach alpha increases with a high number of items, it was taken as an internal consistency marker the mean inter-item correlation.^{26,27} Several scholars have selected this measure in which an inter-item correlation higher than .15 is an adequate cut-off point. Thus, in this study the mean inter-item correlation of the distinct factors was: .20 (DSP), .27 (IPP), .50 (ES) and .40 (CIP). Finally, it is important to highlight that the authors have permission to use this instrument from the copyright holders and the instrument has shown appropriate reliability and validity in a previous study.⁷

The Spanish version of the Basic Needs Satisfaction in General Scale (BNSG-S).^{14,28} The original scale is made up of 21 items that measure the satisfaction of competency needs ($r = .16$; six items, e.g., “Most days I feel that I am successful in what I do”), autonomy satisfaction ($r = .20$; seven items, e.g., “I feel that I am free to decide for myself how to live my life”) and relatedness ($r = .34$; eight items, e.g., “I really like the people that I interact with”). In each of the factors, there were three items written in a negative way. The participants had to answer all the items thinking about how they related to their life and indicating how true they were for them on a Likert-type scale from 1 (not true) to 7 (totally true). Finally, it is important to highlight that the

1170 authors have permission to use this instrument from the copyright holders and the instrument has
1171 shown appropriate reliability and validity in previous studies.^{11,28}

1172 The Psychological Needs Thwarting Scale was utilized (EFNP).^{29,30} The original scale is
1173 preceded by the phrase "In exercise..." but in this study to be adapted by life in general it was
1174 changed to: "In my life...". It consists of twelve items that are distributed in four items for each
1175 of the three subscales in which it is composed: a) Frustration of the need for autonomy ($r = .51$;
1176 e.g., "I feel obligated to follow the decisions of others"); b) Frustration of the need for
1177 competence ($r = .48$; e.g., "there are situations in which I feel incapable") and c) Frustration of
1178 the need for relatedness ($r = .25$; e.g., "I feel that other people don't like me"). For each item, the
1179 participants must indicate their response on a 7-point Likert scale ranging from 1= do not agree
1180 at all, 2=very slightly agree, 3= slightly agree, 4 = moderately agree, 5 = agree, 6 =strongly agree
1181 to 7=very strongly agree. Higher scores indicate a higher level of frustration of psychological
1182 needs. Finally, it is important to highlight that the authors have permission to use this instrument
1183 from the copyright holders and the instrument has shown appropriate reliability and validity in
1184 previous studies.^{29,30}

1185 The social anxiety questionnaire (CASO-N24)²⁴ was used in this study. This measure presents
1186 two versions, one aimed at boys and the other at girls, both with 24 items with a Likert-type
1187 response scale from 1 to 4, being 1: not at all, 2: a little, 3: quite a lot, and 4: a lot. The items of
1188 this questionnaire were obtained from a review of the literature on childhood fears and
1189 problematic social situations in children who came for consultation for social phobia. The
1190 questionnaire contemplates 6 factors: Public speaking/Interaction with teachers ($r = .53$);
1191 Interaction with the opposite sex ($r = .63$); Being embarrassed or ridiculed ($r = .37$); Assertive
1192 expression of annoyance or anger ($r = .49$); Interaction with strangers ($r = .54$) and Acting in

public ($r = .33$). Finally, it is important to highlight that the authors have permission to use this instrument from the copyright holders and the instrument has shown appropriate reliability and validity in previous studies.²⁴

Procedure

The study was approved by the ethics committee of Universidad Internacional de La Rioja (UNIR) whose approval code is PI024/2022. The study complied with the ethical standards of the American Psychology Association and with the rules of the Declaration of Helsinki (2013). Before beginning the process of administering the questionnaires, permission was requested from the school centre and the student's parents. A signed in-person informed consent was obtained from all participants' parents.

In the informed consent, the confidentiality and anonymity of the data was ensured. The questionnaires were administered individually through a Google forms link at the computer room in the school hours from February 2022 to April 2022. The administration of the questionnaires was carried out by teachers and research staff to assist with any possible doubts that might arise during the procedure. The length of the survey was around 20 minutes. Once the questionnaires were finished, the data were directly recorded in Google's database.

Data analyses

The statistical software R (4.1.1) was utilized to conduct the distinct statistical analyses. To analyze the relationship across the pandemic causality factors, basic psychological needs satisfaction and frustration, and social anxiety, a Partial Least Square Path Modelling approach was taken (PLS-PM).³¹ PLS-PM is a variance-based structural equation modelling technique which is not constrained by distributional assumptions.^{31,32,33} Thus, it signifies that PLSPM is a good technique to work with little sample sizes. The significance of the parameter estimates is

assessed by constructing 95% bias-corrected percentile confidence interval based on a bootstrap procedure with 100 replications.³² Concerning all the variables (causality factors of COVID-19, basic psychological need satisfaction and needs frustration), two parcels were made³⁴ in each factor. To create the parcels it was used a subset-item-parcel approach in which there were a random aggregate of items. This approach of parceling was taken because it improves the measurement properties of constructs, simplifies model complexity, enhances normality, reduces multicollinearity, and provides stable estimates in PLS-PM, especially when dealing with small sample sizes³⁵.

In addition, different steps were followed to run the distinct analyses. First, the psychometric properties of the variables measured were examined. The indexes measured to ensure sufficient quality were: Standardized factor loadings, composite reliability values (ρ), average variance extracted (AVE) values and eigenvalue analysis of the correlation matrix of each set of manifest variables.^{32,33} Standardized factor loadings higher than .40,³² ρ values greater than .70,³⁶ AVE values equal or greater than .50,³⁷ the first eigenvalue larger than 1 and the second one smaller than 1³³ indicate acceptable reliability of latent and manifest scores. Second, the structural model was tested to examine the connection among the latent variables examined in the study.

232

233 Results

234 *Relationships between the study variables*

235 Figure 1 reflects the relationships between the study variables. It should be noted that the
236 results revealed significant differences between the following variables ($p < .05$): Social
237 distancing and protection (DSP) and Competence (COM); Perceived psychological impact (IPP)
238 and Relationship (RELA), Competence thwarting (TH.COMP) and Interaction with the opposite
239 sex (SEX); Autonomy (AUT) and Interaction with the opposite sex (SEX); and Autonomy

thwarting (TH.AUT) and Public speaking/Interaction with teachers (HABPUB), Interaction with the opposite sex (SEX), Being embarrassed or ridiculed (EVI) and Interaction with strangers (DESCON).

Comment [A2]: Delete this paragraph. In lines 263 to 274, these findings are reported.

Descriptive statistics and correlations among the variables

Table 1 shows the descriptive statistics and correlations among the variables. The results revealed low-medium scores in social distancing and protection (DSP), perceived psychological impact (IPP), Skepticism (ES), credibility (CIP), autonomy frustration (THAUT), competence frustration (THCOMP), relatedness frustration (THRELA), public speaking/interaction with teachers (HABPUB), interaction with the opposite sex (SEX), being embarrassed or ridiculed (EVI), assertive expression of annoyance or anger (ASERT), interaction with strangers (DESCON) and acting in public (ACT). On the other hand, high scores were found in autonomy satisfaction, competence satisfaction and relatedness satisfaction. Moreover, correlational analyses showed that there was no multicollinearity between the study variables as correlations ranged from -.54 to .71 and none of the confidence intervals (i.e., $r \pm$ two standard errors) were close to 1.0.

Inner PLS-PM model

Table 2 shows the results of the inner PLS-PM model in which the distinct indexes provided enough markers of the reliability and validity of the model. In particular, the standardized factor loadings ranged between .60 and .96 ($M = .86$; $SD = .11$), the ρ values ranged between .72 and .95 ($M = .86$; $SD = .07$), the AVE values ranged from .60 to .91 ($M = .74$; $SD = .15$) whereas the first eigenvalues ranged from 1.21 to 1.78 ($M = 1.55$; $SD = .18$) and the second eigenvalues ranged from .16 to .83 ($M = .48$; $SD = .20$).

PLS-PM model (relationships between the latent variables)

Table 3 shows the results of the PLS-PM model (i.e., relationships between the latent variables). The results revealed that social distancing and protection significantly negatively predicted competence satisfaction ($\beta = -.13; p < .05$). Besides, perceived psychological impact significantly negatively predicted relatedness satisfaction ($\beta = -.35; p < .05$), significantly positively autonomy frustration ($\beta = .34; p < .05$) and competence frustration ($\beta = .26; p < .05$). In addition, perceived psychological impact significantly negatively predicted interaction with the opposite sex ($\beta = -.36; p < .05$). Moreover, autonomy satisfaction significantly positively predicted interaction with the opposite sex ($\beta = .48; p < .05$). On the other hand, autonomy frustration significantly positively predicted public speaking/interaction with teachers ($\beta = .44; p < .05$), significantly positively interaction with the opposite sex ($\beta = .35; p < .05$), significantly positively being embarrassed or ridiculed ($\beta = .46; p < .05$) and significantly positively interaction with strangers ($\beta = .49; p < .05$).

Comment [A3]: Do you mean the model that is given in Figure 1?
So write "PLS-PM model (Figure 1)".
Why is the relationship between IPP and autonomy frustration not drawn in Figure 1?

Discussion

The goals of the present study were to examine whether COVID-19 causal factors perceived by children predicted basic psychological needs and social anxiety; and if basic psychological needs predicted social anxiety.

Social Distancing, Protection and Competence

Results revealed that social distancing and protection significantly negatively predicted competence satisfaction. These results are in line with the study of Scheid et al., as it states that the mask use and distance measures may influence the perception of competence satisfaction in schoolchildren.³⁸ These results make sense because compliance with mask use and distance measures may hinder how children work at school and the way in which they interact with the

environment and their peers.³⁹ For instance, interacting with children when working on a group task is different when wearing a mask or not. Thus, the experience of working at school and respecting the rules may hinder competence satisfaction as there are several measures to be respected that may worsen competence.

Perceived Psychological Impact and Basic Psychological Needs

Perceived psychological impact significantly negatively predicted relatedness satisfaction, significantly positively autonomy frustration, and competence frustration. This is in line with previous studies in which the distinct outcomes caused by the epidemic have triggered a different influence on basic psychological needs.⁴⁰ In particular, the epidemic has worsened all basic psychological needs in people that were more negative and positive entering the pandemic from a distinct perspective.⁴⁰ This may be explained because each person has suffered the epidemic in a different way.^{8,10} For instance, the effect of the contagion on beliefs, the information received by adults and the ties of the people around the children. Thus, all these factors may modify how people handle the pandemic.

In this sense, perceived psychological impact can negatively influence a person's sense of autonomy, making them feel less able to control their own actions and decisions. For example, people who experience high levels of perceived psychological impact may feel compelled to avoid social situations due to fear of judgment or negative evaluation. This avoidance can be seen as a lack of control over their own lives, which can diminish their sense of autonomy. In another way, perceived psychological impact can undermine the sense of competence, especially in social contexts, where the perception of not meeting social expectations can be debilitating. For instance, studies have shown that a lack of perceived competence in social interactions is closely related to high levels of social anxiety.^{Error! Reference source not found.} These results are in line

Comment [A4]: Delete these sentences. The explanations seem irrelevant to your study findings.

with a previous study that highlights the increased difficulties to interact with others in pandemic times due to the impact on fear and anxiety. Error! Reference source not found.

Perceived Psychological Impact and Social Interaction

In addition, results revealed that perceived psychological impact significantly negatively predicted interaction with the opposite sex. Specifically, can lead to avoiding social interactions to avoid situations that could aggravate these negative feelings. This avoidant behavior is a common characteristic of social anxiety, which has been shown to negatively affect interpersonal relationships.⁴³ Otherwise, the interaction with the other sex may help to reduce those perceived psychological impact experienced in the epidemics, disconnecting and helping to reduce the maladaptive outcomes of the causal factors provoked by the pandemic.⁴⁴ Thus, despite the increase of fear and anxiety which minimize the interaction with others, it is needed to emphasize in children the need to socialize with others respecting the rules as a way to enhance their wellbeing.

Social Interaction, Autonomy and Social Anxiety

According to self-determination theory, higher autonomy satisfaction would be expected to lead to better social outcomes, and conversely, autonomy frustration would be associated with negative outcomes such as social avoidance. However, our findings indicate that social interaction is not significantly affected by autonomy levels, which challenges the typical expectations of self-determination theory. One possible theoretical explanation is that both autonomy satisfaction and frustration may motivate social interactions, albeit for different reasons. Autonomy satisfaction might drive positive relationships due to feelings of competence and security, whereas autonomy frustration might generate interactions in an attempt to

Comment [A5]: During the pandemic, people had shared experiences of stress and anxiety, which may have created a sense of empathy and mutual support and brought people closer together, ultimately reducing anxiety in interacting with the opposite sex. The argument that the perceived psychological impact leads to avoidance of social interactions to prevent social anxiety may not be sufficient alone, and better arguments can be made.

331 compensate for a lack of social control or support. Therefore, both can be present in all relational
332 contexts, as suggested by the cited study.⁴⁴

333 Moreover, autonomy satisfaction and frustration significantly positively predicted interaction
334 with the opposite sex. This finding suggests that interaction with the opposite sex may depend on
335 factors other than autonomy satisfaction or frustration. It is possible that social interactions with
336 the opposite sex may be maintained regardless of autonomy level, due to external motivations
337 such as social norms, interpersonal attraction, or the need for affiliation, such as the frequency of
338 feeling supported by using technologies, seeing friends, creating challenges or carrying out the
339 same activities simultaneously.⁴⁶

340 Besides, autonomy frustration positively predicted public speaking/interaction with teachers
341 and significantly positively interaction with strangers. These results are in line with a previous
342 study that showed a relationship between frustration and making using chats, calls, videocalls,
343 messaging friends, among others.⁴⁶ In particular, when a person experiences frustration in their
344 autonomy, they may feel they do not have control over their decisions. As a consequence, they
345 may develop social anxiety, especially if they struggle to maintain social relationships, in line
346 with the following study.⁴⁷ On the other hand, those who are restricted in their social interaction,
347 for example, due to pandemic isolation, may experience fear and social anxiety due to reduced
348 exposure to frequent social situations⁴⁸. Autonomy satisfaction, on the other hand, is associated
349 with greater social interaction⁴⁹, which can prevent mental illness and reduce social anxiety. In
350 this sense, encouraging autonomy and socialization, especially in educational contexts and
351 during periods of isolation such as a pandemic, is crucial for promoting emotional well-being
352 and prevent disorders such as social anxiety.

Comment [A6]: In the text, you have discussed the relationship between satisfaction and frustration of autonomy and interaction with the opposite sex, not anxiety in interaction with the opposite sex. It is logical that autonomy frustration positively predicts anxiety in interaction with the opposite sex. However, in your research, autonomy satisfaction also positively predicts anxiety in interaction with the opposite sex. Did the special conditions during the research period, such as the feeling of insecurity, a sense of inability to control the situation, and the psychological pressures that people suffered during the pandemic, cause such results to occur? Please provide your reasoning for this result.

Comment [A7]: be deleted
It seems unrelated.

Comment [A8]: be deleted

353 Finally, results revealed that autonomy frustration was positively related to being embarrassed
354 or ridiculed. These results make sense from the point of view that when a person is autonomous
355 and has social relationships, the experience of autonomy frustration may also lead to situations
356 where they may feel social anxiety.^{21,23} Likewise, those that are restricted may feel social anxiety
357 because they get fear due to, they are not being exposed to interaction with people.^{21,38} Thus, it
358 seems that autonomy satisfaction or frustration is related to more social interaction, it is
359 important to enhance socialization in schools for the positive effects shown to prevent mental
360 diseases as well as the increased need showed by children in this pandemic context and to
361 prevent social anxiety. Hence, the enhance of socialization will also help to increase wellbeing in
362 epidemic times. It is also worth noting that the literature also indicates that female adolescents
363 show higher levels of social anxiety than male adolescents, so future works could make these
364 comparisons.⁵⁰

Comment [A9]: Report this finding on line 341.

Comment [A10]: be deleted
The content is repetitive and has been written in the previous paragraph.

Comment [A11]: To be written following line 376. Instead of "future works" write "future research".

365 Some of the limitations are that the usage of self-report measures may lead to some bias such
366 as: social desirability, acquiescence and dishonestly.⁴⁶ Nevertheless, the measures taken were the
367 most appropriate to the population selected. On the other hand, the utilization of a specific school
368 may hinder the generalization of the results to other different populations and contexts. As such,
369 the results should be understood in the context in which the study was conducted. Finally, the
370 small sample size analyzed in this study hinders the generalization of the findings obtained and
371 minimizes the power of the conclusions shown. Thus, in future studies, it would be interesting to
372 increase the sample size, adding more schools from different regions and students with diverse
373 sociodemographic characteristics to facilitate the generalization of the findings obtained.
374 Nevertheless, the results obtained are valuable as they show a big picture of the relationship

among COVID-19 causal factors, basic psychological needs and social anxiety, which may help in future epidemics to make decisions to enhance children's well-being.

As practical implications, the kind of information received in the context of epidemics may modify how children experience their basic psychological needs and their social anxiety. This study enhances the usefulness of knowing the causal factors of COVID and how they may impact schoolchildren. Thus, education, psychology and health professionals may take these results to adapt interventions to prevent the negative outcomes of misinformation in children. This means that it is important to teach children in the causal factors to have a real view of what is happening, the measures that should be taken and the risks that implies live with an epidemic context. Otherwise, misinformation may lead to negative outcomes in children that may affect their mental health. Therefore, this study may open a paradigm shift in understanding the outcomes provoked in a pandemic context. In particular, this study outlines the creation of specific measures to teach children about the causal factors and risk that may occur in a pandemic situation to enhance their basic psychological needs and minimize the negative effects of social anxiety.

Comment [A12]: be deleted
It seems unrelated and repetitive.

Conclusions

Perceived psychological impact was the causal factor that revealed a higher impact on basic psychological needs. In addition, autonomy satisfaction was the variable that revealed a higher impact on social anxiety variables. These results shed light on how to treat the causal factors of COVID-19 in children and their implication in other well-being variables (basic psychological needs and social anxiety). This study reveals the connection among the examined variables which may underline the key components to creating a target intervention to mitigate the effects

Comment [A13]: Frustration

Comment [A14]: What is meant by treat?
It seems that you have only examined the effect of the causal factors of COVID-19 on the basic psychological needs and social anxiety of children.

of misinformation about the epidemic causal factors. The main conclusions of the study are evident:

Comment [A15]: Delete these sentences.

- Social distancing and protection negatively predicts competence satisfaction, implying that measures like mask-wearing and social distancing affect how children perceive their abilities and interactions in their environment. For example, how adherence to distancing rules might affect classroom dynamics or group projects can be a possible scenario where social distancing and protection measures directly impact children's activities or interactions.

- Perceived psychological impact affects each of these variables separately: relatedness satisfaction: perceived psychological impact might strain interpersonal relationships among children, perhaps due to increased stress or changes in social dynamics which prevents the satisfaction of relatedness; autonomy frustration: children's sense of autonomy frustration is strengthened during the pandemic, such as restrictions on movement or decision-making; and competence frustration: challenges imposed by the pandemic (like remote learning) hinder children's sense of competence satisfaction.

-Specific suggestions or recommendations: educators could focus on clear communication strategies to mitigate anxiety among students; psychologists might prioritize interventions that enhance children's sense of autonomy satisfaction and competence satisfaction despite pandemic challenges; and Health professionals could collaborate with schools to ensure accurate and supportive messaging reaches children and their families.

Comment [A16]: And relatedness satisfaction

-These recommendations could be implemented in real-world settings, considering practical constraints and opportunities. There is a potential paradigm shift in understanding pandemic impacts on children. This study redefines our understanding of how pandemics, like COVID-19, impact children's psychological well-being. It highlights that measures such as social distancing

and protective protocols negatively affect children's perceived competence, limiting their social and academic interactions. Perceived Psychological Impact emerges as pivotal, influencing basic psychological needs and social anxiety. Perceived psychological impact negatively impacts peer relationships satisfaction but positively correlates with autonomy frustration and competence frustration, revealing how individual stress perceptions shape children's interpersonal dynamics and self-image during pandemics. Autonomy satisfaction is identified as crucial for positive outcomes, predicting increased social engagement and marginal emotional well-being.

- In terms of implications, the study urges tailored interventions recognizing children's diverse responses to pandemics. Specifically, for education professionals, it may be convenient to carry out actions in an interdisciplinary way focused on developing critical thinking, minimizing skepticism in pandemic situations and others that require it. Besides, it is considered pertinent to promote the development and acquisition of basic psychological needs, both from each subject and in coordination with the guidance department. More related to Physical Education, establish physical activity programs to develop resilience and stimulate communication and social interactions among peers. It would also be advisable to hold informative talks for the family, trying to raise awareness about the importance of meeting the basic psychological needs of young people and about the risks derived from social anxiety. Likewise, for psychologists and other health professionals, a measure can be to create and optimize training, communication and counseling channels to meet basic psychological needs and minimize the perceived psychological impact as well as social anxiety. It would also be interesting to reinforce self-concept, self-confidence and self-esteem, thus favoring interaction with classmates and teachers, speaking in public and minimizing the fact of feeling embarrassed or ridiculed. On the other hand it is advisable to develop initiatives such as mindfulness or yoga that help develop self-

Comment [A17]: Children

control and regulate social anxiety. All these measures will be more effective if cooperation and action are achieved between the different agents involved. Ultimately, the study represents a paradigm shift by underscoring the critical role of mental health and socio-emotional development in pandemic preparedness and response. This shift guides policies and interventions that prioritize children's holistic development and mental well-being during health crises.

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