Psychometric properties of the Inventory of Complicated Grief in Mexican community sample during COVID-19 pandemic.

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Abstract

Objective: The aim of the present study was to validate the Inventory of Complicated Grief (ICG) in the adult population, since there is no valid instrument that evaluates this construct in the Mexican population.

Method: This study was based on an Ex Post Facto, instrumental design with a convenience sample. The ICG was applied to 4014 participants (3540, females, 470 males and 4 individuals classified as other) who had experienced a loss of a loved one during the COVID-19 pandemic. Exploratory and confirmatory factor analyses were conducted. The internal reliability of each factor was examined by means of the Cronbach's alpha index (α). Correlation analyses between the ICG, the Center for Epidemiologic Studies Depression Scale, the Satisfaction with life scale and the *Beck's Hopelessness Scale* were performed to assess convergent and divergent validity of the ICG.

Results: The ICG showed a high internal reliability with a Cronbach alpha of 0.92. The confirmatory factor analysis demonstrated that a four-factor model of the ICG (normal grief symptoms, emotional-anxious detachment, intense negative emotions, loss-impairing anxiety) fits the data well. According to bivariate analyses the ICG was correlated with measures of life satisfaction ($r = -.208$, $n = 1984$, $p = .001$), hopelessness ($r = .522$, $n = 1984$, $p = .001$), and depressive symptoms ($r = .641$, $n = 1984$, $p = .001$).

Conclusions: The ICG with a Mexican sample is valid, with good psychometric properties and an appropriate measure of complicated grief for Mexican adults.

Keywords: Loss, Grief, Inventory of Complicated Grief, COVID-19, Psychometric Validation, Mexican Sample.

Clinical impact statement

This study suggests the use of the Complicated Grief Inventory validated in the Mexican adult population during the COVID-19 pandemic, a developing country, where instruments and psychological services are scarce. This validation showed adequate psychometric properties. This inventory can be useful to identify those who require psychological attention due to complicated grief disorder, and thus, through psychological interventions to avoid further complications for the mental and physical health.

Introduction

The COVID-19 epidemic has spread globally disrupting the existence of millions. According to data from the World Health Organization (WHO), 2,787,593 million deaths have been registered worldwide, being the region of the Americas with the highest death toll, around 1,340, 530, up until March 30, 2021 (WHO, 2021). Mexico is one of the countries with most deaths reported due to COVID-19, representing the third place

worldwide, with 202,209 deaths, until March 30 (Johns Hopkins University, 2021). The circumstances surrounding death from / within the COVID-19 pandemic have caused a different traumatic experience from other types of deaths / losses (Kokou-Kpolou et al., 2020).

The grieving process is defined as the natural response to the loss of any person, thing, or value with which an affective bond has been built, and as such, it is a natural and human process, not a disease that must be avoided, or from which a person heals (Grochot, 2018). The role of the grieving process is to elaborate the loss impact and adapt to the new situation that is being experienced (Payas, 2010).

Despite the fact that most people that are in a process of grief recover in a relatively short period of time, there are circumstances that complicate this process, increasing the intensity and time of mourning, presenting a complicated grief (CG) (Morris, Moment & deLima, 2020). According to Prigerson et al. (1995), CG can be identified from the following symptoms: “preoccupation with thoughts of the deceased, searching and yearning for the deceased, disbelief about the death, crying, being stunned by the death, and not accepting the death” (p.66).

Derived from the Coronavirus disease (COVID-19) pandemic, there has been an increase in the prevalence of CG, causing severe and dysfunctional symptoms over an extended period of time, in response to loss of a loved one. Bereaved people due to COVID-19 losses showed higher symptoms of prolonged grief disorder compared to people with natural and unnatural loss (Eisma et al., 2021). The social distancing requirements, the funeral or ceremonies restrictions, and the inability to seek support, are

some of the factors that could increase CG in the current pandemic (Bertuccio & Runion, 2020).

In the current context of the COVID-19 pandemic, the evaluation of the manifestations of complicated grief must be evaluated and carefully considered according to the country's context (Kokou-Kpolou et al., 2020). Currently there are measures to assess grief, however, it is necessary to have instruments that allow us to differentiate a normal grief from those that are pathological or complicated, in order to intervene and facilitate adjustment to the loss of the bereaved (Prigerson et al., 2009).

The Inventory of Complicated Grief (ICG) created by Prigerson (1995) and adapted to Spanish by Limonero (2009) has been one of the most widely used scales to evaluate CG, showing adequate levels of reliability and viability (Lifshitz et al., 2020; Han et al., 2016). In addition, it has been found that the ICG is a more sensitive instrument to detect cases of CG and it is better suited to discriminate among severities of CG, compared to other scales (Igarashi et al., 2020).

The ICG has been validated in different countries such as Israel (Lifshitz et al., 2020), Korea (Han et al., 2016), Poland (Ludwikowska-Świeboda, & Lachowska, 2019), Italy (Carmassi et al., 2014), Colombia (Gamba-Collazos & Navia, 2017) and Spain (Limonero et al., 2009).

In the study by Lifshitz et al. (2020), the correlations between the scores of the three factors were significantly positive, indicating important convergent validity. Furthermore, Cronbach's alpha for the 17-item measurement was 0.91. These results strongly support a three-factor structure: emotional distress, longing for the deceased, and socio-emotional detachment. The associations between the three factors showed that

each factor explained a unique variation in CG. Han et al. (2016) validated the ICG among 1,138 Korean adolescents. The internal consistency of the 19-item Korean version of the ICG was good (Cronbach's $\alpha = 0.87$). Ludwikowska-Świeboda, & Lachowska (2019), verified the psychometric properties of the Polish version of the ICG with 278 participants who experienced the loss of a close relative or friend. The statistical analysis carried out showed that the measure was a reliable and valid tool ($\alpha = 0.94$). Carmassi et al. (2014), included 171 grieving participants of whom 64 were clinically diagnosed with CG and 58 healthy controls that were evaluated with the Italian version of the ICG. The total ICG mean score was significantly different between the study groups [$F(3,228) = 94.19, p < 0.001$]. Games-Howell post-hoc comparisons indicated significantly higher scores in CG patients and significantly lower scores in healthy controls. The scale demonstrated a high level of internal consistency ($\alpha = 0.95$). In Latin America, Gamba-Collazos & Navia (2017), carried out the adaptation of the ICG in Colombian population, with a sample of 120 voluntary participants. The authors established that scores greater than 25 corresponded to CG and found that the scale had high levels of internal consistency ($\alpha = 0.94$) and test-retest reliability ($r = 0.80$). The Spanish adaptation (Limonero, et al., 2009) had a Cronbach's Alpha = 0.88 and a correlation of $r = 0.81$ in the test-retest comparison. According to the authors, this inventory has high levels of internal consistency ($\alpha = 0.92$ in clinical population and $\alpha = 0.93$ in university population) and temporal stability in test-retest applications ($r = 0.93$). In any case, studies with a larger sample are required to allow the evaluation of the instrument's properties against different population groups.

Indeed, more research is necessary to better understand the structure of symptoms of the complicated grief process. According to the validation of the ICG carried out by

Limonero et al. (2009), three factors related to CG were observed, unlike the original scale (Prigerson et al., 1995) and the Italian validation (Carmassi et al., 2014) where only a single factor was related to CG. This allows us to understand the multidimensionality of the CG construct (Gamba-Collazos & Navia, 2017; Masferrer et al., 2017). Therefore, it is necessary to continue studying the psychometric properties of the ICG, according to the context in which it is applied, as Masferrer et al. (2017) indicates, clinical instruments tend to behave differently depending on the type of population to which they are applied. Based on the validations that have been conducted on the ICG, the study of both reliability and validity can be identified, through internal consistency and test-retest comparisons, as well as with analyses that allow to ascertain the validity of the convergent and divergent construct through correlations with other scales (Gamba-Collazos & Navia, 2017; Lifshitz et al., 2020; Limonero et al., 2009; Masferrer et al., 2017).

In addition, the construct validity or factorial structure of the ICG has been analyzed. This method is widely used in the discipline of psychology for the validation of measurement scales when structural models are proposed, since these allow the empirical contrast of models that include causal effects between certain variables (Martinez & Caro, 2009). According to Thompson (2004) there are two kinds of factor analysis, the first is the Exploratory Factor Analysis (EFA), used when the researcher is not clear about the nature of the relationship between the measured variables; the second corresponds to the Confirmatory Factor Analysis (CFA) where the causal relationships of the variables are tested, which allows the adjustment of the model.

Despite being a widely used scale in different countries, the ICG has not yet been validated with Mexican population. Thus, the objective of this study was to obtain the

psychometric data of the ICG in a Mexican community sample, since being one of the countries with the highest number of deaths worldwide (Johns Hopkins University, 2021), it would allow estimating the prevalence rates of CG and thus proposing intervention strategies for people who meet the criteria of a CG. Thus, the objective of this study was to obtain the psychometric data of the ICG because there is no valid and reliable version for the Mexican adult population and, likewise, to avoid the methodological error of using translations of instruments developed for other cultures without the proper validation analysis (Sousa & Rojjanasrirat, 2011).

Method

Aims

To adapt and validate the ICG in the Mexican adult population that suffered a loss due to COVID-19 or for any other cause during the COVID-19 pandemic.

Methods and Analysis

This study was based on an Ex Post Facto, instrumental design with Intentional Sample. The study was directed at Mexican participants who had experienced the loss of a loved one during the COVID-19 pandemic and who were invited to access a free online intervention delivered in Spanish, aimed at individuals to prevent complicated grief (Masked). The dissemination of the online intervention was done through digital social networks, articles and journalistic notes, invitations through specialists and civil associations in Mexico, and snowballing sampling from mid-December 2020 to mid-February 2021. Prior to the intervention, individuals had to read the online informed consent, and once approved, continue to complete online-delivered measures on several mental health indicators, including a complicated grief measure. Ethical approval was

obtained from the Autonomous University of Juarez's board of Ethics prior data collection commencement.

For the analysis, the sample was randomly divided into two subsamples in SPSS version 23 to obtain homogenous groups. One of the subsamples was used to conduct EFA, and a second subsample was used to perform a CFA. Firstly, an EFA was carried out to verify the original factor structure of the Inventory of Complicated Grief validated in Spanish population (ICG; Limonero et al., 2009). Secondly, a CFA was conducted to corroborate the factor structure found in our EFA.

Participants

A total of 4015 participants were obtained, but one requested to be removed from the study, therefore a 4015 female (88.2%), male (11.7%) and (.1%) classified as "Other" Mexican participants were recruited from an online psychological intervention for the prevention of complicated grief (Domínguez-Rodríguez et al., 2021) with an age range from 25 to 60 years old, mean age of 36.3 ($SD = 8.5$) years. Most participants (59%) manifest they are "currently working", while others (41%) describe themselves as "currently not working".

Psychological measures

Inventory of Complicated Grief (ICG)

This scale includes 19 items within a five-point Likert-type scale ranging from 0 to 4, where: 0 = "never", 1 = "rarely", 2 = "sometimes", 3 = "often" and 4 = "always". The items evaluate the frequency of the explored symptoms type (emotional, cognitive, or behavioral). For its evaluation, the points of each item are added, and the total scale

scores range between 0 and 76 points. A score above 25 is an indicator of CG. The properties of the adaptation of the scale to Spanish have good results of internal consistency ($\alpha = 0.88$). The version of Limonero et al. (2009), was applied for this study.

Center for Epidemiologic Studies Depression Scale (CES-D)

Depression levels were assessed by means of the CESD-D, a self-report scale that assesses symptoms of depression within the past two weeks. This scale consists of 35 questions and contains four possible answers: rarely or never (less than 1 day), sometime or rarely (1-2 days), occasionally or a good part of the time (3-4 days) and most of the time (5-7 days). This measure has been constantly used in health research and its psychometric properties prove to be a valid scale in Mexican population ($\alpha >.90$), according to González -Forteza et al. (2011).

Satisfaction with Life Scale

This scale consists of 5 items in which participants indicate how much they agree with each question, with an answer option in a Likert-type format ranging from 1 (totally disagree) to 7 (totally agree). The scores range from a minimum of 5 to a maximum of 35, where the highest scores indicate greater satisfaction with life (Vázquez et al., 2013). This scale has been validated in Mexican population, obtaining good results of internal consistency ($\alpha = 0.74$; López-Ortega, et al., 2016).

Beck's Hopelessness Scale.

This scale is composed of 20 items with a dichotomous answer option (false or true). The score ranges from 0 to 20 with higher scores indicating a higher level of hopelessness

(Beck et al., 1974). It is a widely validated and used scale, and for this study the version validated in the Mexican population was applied (Osnaya et al., 2012).

Results

The sample used in the EFA was composed of 2,030 participants, while the sample used in the CFA was composed of 1,984 individuals. There were no statistically significant differences between the two samples in sociodemographics and in levels on the ICG.

Exploratory factor analysis

The 19 items of the ICG were analyzed using EFA, using the principal axis factors method recommended when data are not normally distributed, as previously checked through Q-Q plots - not shown (Costello & Osborne, 2005). The Kaiser-Meyer-Olkin (KMO) Index was .70 and the Bartlett's sphericity test ($p > .001$) indicated appropriateness of the sample to conduct factor analyses (Tabachnick & Fidell, 2007). If the highest factor loading of an item was lower than .30, the item was eliminated, and if an item had a shared factor loading (factor loadings difference less than .20), the item was removed.

The final scale had 14 items with unique factor loadings ranging from .31 to .74 (see Table 1). Items 7, 12, 13, 15, and 17 did not conform to the resulting four factor structure found through EFA. Table 1 shows factors loadings and communalities for the EFA of the ICG scale. The first factor explained 15.1% of the total variance and it is composed of four items (items 3, 4, 5, and 14) with factor loadings ranging from .38 to .64. According to the theme of these items this factor was labelled "Normal-grief symptoms". The second factor explained 10% of the total variance and it is composed of three items (items 9 - 11) with factor loadings ranging from .53 to .57. According to the theme of these items this factor

was labelled “Emotional-anxious detachment”. The third factor explained 8.3% of the total variance and it is composed of four items (items 6, 17 - 19) with factor loadings ranging from .31 to .62. According to the theme of these items this factor was labelled “Intense negative emotions”. The fourth factor explained 7.6% of the total variance and it is composed of three items (items 1 – 2, and 8) with factor loadings ranging from .34 to .74. According to the theme of these items this factor was labelled “Loss-impairing anxiety”.

Confirmatory Factor Analysis

A sample of 1,984 participants performed the cross-validation and finally, the confirmatory factor structure. This factor structure was verified through structural equation modelling (SEM) using AMOS version 21. Testing whether measures of this construct were consistent with researchers' understanding of complicated grief in a Mexican sample, also known as confirmatory factor analysis (CFA), revealed four factors with the corresponding items in the exploratory factor analysis (see Table 1). The measure of fit between the hypothesized model and the observed covariance matrix, also known as the goodness of fit index (GFI)=.92, the SRMR standardized root mean squared residual fit index (SRMR)=.04, the discrepancy between the data and the hypothesized model measure for model fit, also known as comparative fit index (CFI)=.94, the Tucker- Lewis index a conventional cutoff value under maximum likelihood (TLI)=.92, the root mean square error of approximation (RMSEA)=.08, as stated by Shi, Lee & Maydeu-Olivares (2018) an $RMSEA \leq .06$ could be considered. Both RMSEA and SRMR suggest the model has an acceptable fit. The model of fit indexes concerning the chi-square had the following results: The X^2 with 70 degrees freedom was equal to 14.75 ($p < .001$). Other Indexes

values were: NFI = .94, AGFI = .90. The obtained indexes report an adequate model fit. Item loadings for this model ranged from .57 to .99 (Figure 1)

Internal reliability

The internal reliability of each factor was ascertained by means of the Cronbach's alpha index (α). The CFA Cronbach's alpha values for each of the four factors ranged from .64 to .77 (see Table 2). Most of the values are adequate in cross-validation for both exploratory and confirmatory groups. The reliability for the complete scale was $\alpha = .92$.

Evidence of convergent (and divergent) validity of the validated ICG was corroborated through bivariate analyses resulting in statistically significant correlations with measures of life satisfaction ($r = -.208$, $n = 1984$, $p = .001$), hopelessness ($r = .522$, $n = 1984$, $p = .001$), and depressive symptoms ($r = .641$, $n = 1984$, $p = .001$).

Discussion

The objective of this study was to adapt and validate the Inventory of Complicated Grief with adult Mexican population, one of the most affected countries due to the COVID-19 pandemic that has caused over 200,000 deaths related to this virus. In this sense the scale was validated with the general population searching for psychological treatment due to a recent death of a loved person during the previous six months or more. This scale was already validated in Spanish population by Limonero, et al., (2009), and in Colombia by Gamba-Collazos & Navia (2017), but not in Mexico.

The ICG was validated with Mexican adults, both for the EFA, and the CFA yielded a four-factor solution: 1) normal grief symptoms, 2) emotional anxious detachment, 3) intense negative emotions, and 4) loss impairing anxiety. The normal grief symptoms are reflected in the items for the first factor, here labelled as "normal grief symptoms", feelings of

emptiness, nostalgia, sadness, and melancholia, for example: “*I feel like I can't accept the death of my loved one*”. In regard to the first factor, Boelen & Smid (2017) indicate that prolonged grief disorder can be posited after six to 12 months of a loss suffering, and to determine a complex or an uncomplicated grief, a key indicator can be the distress and disability caused by these reactions and their pervasiveness. The results of the present study are in line with Boelen et al. (2010), in that they find reactions and difficulties directly associated with the loss such as longing for the loved one, intrusive ideas about the deceased and their death, sadness or anger at the loss and even denial of the loss. The second factor refers to an “emotional anxious detachment” or distress, this kind of distress is seen in individuals with prolonged grief disorder who show avoidant behaviors associated with detachment, such as, intense worrying and isolating behaviors (Maercker & Lalor, 2012). The third factor, “intense negative behaviors” expresses an intense sensitivity related to loss stimuli, reminders of the loss as they are tossed helplessly onto waves of intense emotion, reveal specific feelings of: anger, bitterness, and envy (Shear, 2012). In regard to the fourth factor, labelled “loss impairing anxiety”, it refers to numbness, daze and upsetting behaviors that follow up a prolonged grief (Shear, et al., 2011). Most people that experience normal bereavement and grief, present a period of sadness, sorrow, melancholia, and nostalgia in a temporary manner, and these feelings ease over time. In this case, most people gradually accept loss, allow themselves to experience reality, adjust their life without the loved one, and are capable of moving forward. For some individuals, feelings become persistent and debilitating and do not improve after time, this is commonly defined as complicated grief.

There are however several limitations of this study. First of all, the age of participants included in the analyses ranged from 25 up to and just under the elderly age mark. Based on the latest theoretical developments, which affirm that adult maturity and the maturational changes that occur in the 21st century, considering the social conditions and demands of the environment (school, family and community), today's adolescents do not comply with the demands of adolescents in past decades in a relevant, continuous and cumulative way that prove that currently an adolescent does not test his cognitive, affective and motivational resources to adapt, independently, to an autonomous social life, until 23 or 25 years of age, which is when they present mostly characteristic behaviors of adults, interpersonal and social behaviors (Twenge & Parke, 2017) typical of the transition to adult independence. Adulthood usually engages the period between approximately 25 and 60 years of age. Caution is however suggested when doing generalizations of findings here to participants younger than 25 years old.

It is relevant to explore the grief process in the younger population due to its impact on their mental health, such as elevated risk of insomnia, fatigue, and moderate to severe depression (Bylund-Grenklo, et al., 2016), that if persistent on adult age, it can affect the appropriate development. Future research could focus on validating measures of complicated grief in the younger population and the elderly.

Another limitation is that although the sample was large, it was mostly composed of women (88.2% versus 11.7% males, respectively). Since the Covid Grief Platform offered free psychological treatment to all the population that had lost someone due to COVID-19 or another reason within the COVID-19 pandemic (masked), the treatment was open for everyone, not gender-based. However, this outcome confirms what has been previously observed, that in general men are more reluctant to search for psychological support

compared to women (Liddon et al., 2018; Seidler et al., 2018). Therefore, efforts to present psychological interventions more appealing to more male participants are needed.

Providing an intervention completely free of charge to the general population while ensuring participant anonymity prevented us from gathering more data on socio demographics. In México, this format of self-applied interventions is not common and therefore persons may be more reluctant to answer if such information / Intervention is not readily available to them.

To the knowledge of the researchers, this is the first validation of the ICG in Mexico. Indeed, with the exception of a complicated grief scale validated in Colombia (Gamba-Collazos & Navia, 2017), in Latin America this is still an understudied area. Mexican mental health professionals require a valid measure to evaluate the COVID-19 impact on grief.

Another strength of this study lies within the size of the sample compared to studies, validating other complicated grief scales. Although some relevant information was not possible to obtain (eg. higher rate of men, civil /relationship status), the data ensures a better representation of the Mexican Population living these situations, where according to the available literature, the measures developed or validated for or during the COVID-19 pandemic are scarce.

Future studies should focus on the development of scales to evaluate the mental health status of the general population, not only for the COVID-19 pandemic, and to promote and integrate proper mental health interventions in low income and developing countries where progress in mental health services has been slow (Rathod, et al., 2017), where such conditions along with several other physical health complications (Ohrnberger, Fichera & Sutton, 2017), may require budget from the public funding.

Conclusion

Results indicate that the Inventory of Complicated Grief with Mexican population is valid, with good psychometric properties and an appropriate measure of complicated grief for Mexican adults. This measure could evaluate the impact of grief on patients, and therefore, aid to structure more appropriate and functional interventions for the general population in order to avoid or reduce the probability of developing more serious disorders, such as complicated grief disorder.

Abbreviations

Center for Epidemiologic Studies Depression Scale (CES-D)

Coronavirus disease (COVID-19)

Complicated Grief (CG)

Confirmatory Factor Analysis (CFA)

Exploratory Factor Analysis (EFA)

Inventory of Complicated Grief (ICG)

Kaiser-Meyer-Olkin (KMO)

World Health Organization (WHO)

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Figure 1.

Standardized Estimates Confirmatory Factor Analysis Diagram

Table 1

Factor loadings and communalities for the exploratory factor analysis of the ICG

Item (Spanish / English)	Factors				Communalities
	1	2	3	4	h^2
1. Pienso tanto en la persona que ha fallecido que me resulta difícil hacer las cosas como las hacía normalmente (I think so much about the person that died, that it's hard for me to do things the way I normally did)	.423			.52 21	.435
2. Los recuerdos de la persona que murió me trastornan (Memories of the person who died upset me)				.74 40	.555
3. Siento que no puedo aceptar la muerte de la persona fallecida (I feel I cannot accept the death of the person who died)	.391				.371
4. Anhelo a la persona que murió (I feel myself longing for the person who died)	.643				.467
5. Me siento atraído por los lugares y las cosas relacionadas con la persona fallecida (I feel drawn to places and things associated with the person who died)	.387				.164

6. No puedo evitar sentirme enfadado con su muerte (I can't help feeling angry about his/her death)		.393	.292
8. Me siento aturdido por lo sucedido (I feel stunned or dazed over what happened)		.340	.346
9. Desde que él/ella murió me resulta difícil confiar en la gente (Ever since he/she died, it is hard for me to trust people)		.538	.322
10. Siento haber perdido la capacidad de preocuparme de la gente o me siento distante de las personas que me preocupaban (Ever since he/she died, I feel as if I have lost the ability to care about other people or I feel distant from people I care about)		.577	.340
11. Me siento solo/a la mayor parte del tiempo desde que él/ella falleció (I feel lonely a great deal of the time ever since he/she died)	.362	.578	.500
14. Siento que la vida está vacía sin la persona que murió (I feel that life is empty without the person who died)	.638		.519

17. Siento que es injusto que yo viva mientras que él/ella ha muerto (I feel that it is unfair that I should live when this person died)	.3 8 4	.212
18. Siento amargura por la muerte de esa persona (I feel bitter over this person's death)	.6 2 2	.438
19. Siento envidia de otras personas que no han perdido a nadie cercano (I feel envious of others who have not lost someone close)	.3 1 7	.116

Table 2.

CFA Cronbach's alpha values for each of the four factors of the ICG

		Normal grief symptoms	Emotional anxious detachment	Intense negative emotions	Loss impairing anxiety
Normal grief symptoms	Pearson's correlation	1	.637**	.678**	.766**
	Sig		0	0	0
	N	1984	1984	1984	1984
Emotional anxious detachment	Pearson's correlation	.637**	1	.663**	.654**
	Sig	0		0	0
	N	1984	1984	1984	1984
Intense negative emotions	Pearson's correlation	.678**	.663**	1	.676**
	Sig	0	0		0
	N	1984	1984	1984	1984

Loss impairing anxiety	Pearson's	.766**	.654**	.676**	1
	correlation				
	Sig	0	0	0	
	N	1984	1984	1984	1984