The Effect of Prolonged Grief Symptoms on the Quality of Life: A Longitudinal Study

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Abstract

Recently, the two main classification handbooks within psychology, the Diagnostic and Statistical Manual of Mental Disorders 5 Text Revision (DSM-5-TR) and the International Classification of diseases eleventh edition (ICD-11), included a new form of pathological grief: prolonged grief disorder (PGD). To find evidence for the criterion validity of this new construct, the effect of prolonged grief symptoms on quality of life (QoL) was investigated through a cross-sectional and a longitudinal analysis. A sample of 276 bereaved adults (mean age 54 years, 92% female) filled in a survey at baseline, 6 (n = 142) and 12 (n = 135) months later. The Traumatic Grief Inventory-Self Report Plus was used to measure the independent variables ICD-11 and DSM-5-TR prolonged grief symptoms. The European Health Interview Survey - Quality of Life 8-item index was used to measure the dependent variable QoL. Two simple linear regression analyses demonstrated that T1 ICD-11 and DSM-5-TR prolonged grief symptoms related negatively to T1 QoL, supporting concurrent test-criterion validity. Four hierarchical regression analyses demonstrated that T1 ICD-11 and DSM-5-TR symptoms significantly predict QoL at T2 and T3 whilst controlling for T1 QoL, supporting predictive test-criterion validity. This means that we found evidence for both concurrent and predictive test-criterion validity of the criteria sets of the DSM-5-TR and ICD-11. Future research should assess the criterion validity with other relevant outcome constructs and assess other types of validity.

Keywords: prolonged grief disorder, quality of life, criterion validity, longitudinal design, hierarchical regression

The Effect of Prolonged Grief Symptoms on Quality of Life: A Longitudinal Study

After natural deaths, an estimated of 10% of the adult-bereaved population experiences severe, persistent, and disabling grief and develops a disorder, nowadays termed prolonged grief disorder (PGD) (Lundorff et al., 2017). Two conceptually different definitions of PGD have been published in the International Classification of Diseases eleventh edition (ICD-11: World Health Organization, 2018) and in the Diagnostic and Statistical Manual of Mental Disorders 5 Text Revision (DSM-5-TR: American Psychiatric Association, 2022). Individuals diagnosed with PGD following either handbook experience at least one of the symptoms central to the disorder: intense yearning for the deceased and/or the persistent preoccupation with the deceased. Moreover, both handbooks mention that individuals diagnosed with PGD experience significant impairments in daily life functioning and their symptoms cannot be explained in terms of social, cultural, or religious norms.

Whereas both handbooks showed similarity in the core criteria of PGD, they do differ in a number of other criteria (DSM-5-TR: American Psychiatric Association, 2022; ICD-11: World Health Organization, 2018). Firstly, where the DSM-5-TR allows for diagnosing PGD after 12 months of a loved one's death, the ICD-11 allows for this after six months post-loss. Secondly, in supplement to the core symptoms, there are additional symptoms that show both similarities and differences between both handbooks. To illustrate this, some symptoms are included in one criteria set for PGD, whereas in the other criteria set for PGD those symptoms were excluded. An example is the symptom of the inability of experiencing a positive mood, which is included in the criteria set of ICD-11 for PGD and excluded in the criteria set of the DSM-5-TR for PGD (Eisma, et al., 2022). The difference overall between these two diagnostic handbooks is illustrated in the diagnostic rate of PGD in bereaved individuals, as a study showed a significantly lower diagnostic rate for the same participants rated on the DSM-5-TR compared to the ICD-11 (Haneveld et al., 2022). However, this

difference is predominantly attributed to the time criterion, comparing the 6 months post-loss of the ICD-11 for diagnosing PGD with the 12 months post-loss of the DSM-5-TR for diagnosing PGD.

Not only is there a difference between the content of the ICD-11 and DSM-5-TR conceptualization of PGD, there is also a difference in the conceptualization of prolonged grief in past and current research (Prigerson et al., 2021). Before prolonged grief had been conceptualized, Freud started making the distinction between normal and pathological grief (Prigerson et al., 2021). Later, researchers focused on distinguishing the symptoms of this pathological grief from symptoms of bereaved-related depression and anxiety and proposed the terms Complicated Grief (CG) and Traumatic Grief (TG) (Boelen et al., 2003; Shear et al., 2011; Horowitz et al., 1997). Persistent Complex Bereavement Disorder (PCBD) was implemented in the DSM-5 (American Psychiatric Association, 2013) as a condition for further study and included more and different symptoms compared to the newer versions of PGD in the DSM-5-TR and ICD-11 (Eisma et al., 2022).

To diagnose and recognize symptoms in individuals with a prolonged grief response, several measures have been developed, including the Inventory of Complicated Grief (ICG) (Prigerson et al., 1995). The ICG is the first measure developed to identify whether a person might be dealing with a prolonged grief response to bereavement. Whereas the ICG has often been applied, it does not fully assess the symptoms of the current versions of PGD described in the DSM-5-TR and ICD-11 (Eisma et al., 2022; O'Connor et al., 2020). For that reason, it is unclear if empirical evidence of the validity of past conceptualization of prolonged grief generalize to PGD per ICD-11 and DSM-5-TR (Eisma, 2023). In order to check whether these new criteria sets of ICD-11 and DSM-5-TR reflect prolonged grief, the criterion validity for both concurrent as predictive test-criterion validity will be assessed in this study.

Specifically, within the present project, we will do so by examining their relationship with quality of life (QoL).

Prolonged Grief and Quality of Life

Prolonged grief is related to negative physical and mental health outcomes, and on that account also relates to lower QoL of individuals who suffer from this disorder (Stroebe et al., 2007; Boelen & Prigerson, 2007). While a consensus definition does not yet exist (Gill et al., 1994), there seems to be an agreement among experts that QoL is the subjective perception of an individual on their own life (Mendlowicz & Stein, 2000). It is often perceived as a multidimensional construct including several domains covering subjective experiences of general health, energy, activity, self-esteem, personal relationships, finance, and home (Da Rocha et al., 2012). To illustrate, an individual who mentions to not have enough energy for their daily life activities would consequently rate the domain of energy low. On the domain of personal relationships an individual who as a rich social life, may indicate that they are satisfied with their current relationships.

The notion that prolonged grief symptoms may have an effect on the QoL of bereaved individuals, has been supported by research of Silverman et al. (2000). Participants with high prolonged grief levels scored lower on QoL compared to a group with low prolonged grief levels. However, it should be noted that they exclusively looked at cross-sectional associations and for that reason, the direction of this association is unclear. Boelen and Prigerson (2007) focused on the longitudinal association between prolonged grief levels and found a negative association between prolonged grief and QoL over time, whilst controlling for background variables such as sleeping problems. However, no baseline data was available for QoL and for that it is uncertain if prolonged grief symptoms predict changes in QoL as baseline scores of QoL could not be controlled for. Importantly, it should be noted that for both studies older criteria sets were used that defined past conceptualizations of prolonged

grief symptoms (Boelen & Prigerson, 2007; Silverman et al., 2000). All things considered, it is yet unclear whether there is an actual predictive effect of prolonged grief symptoms on changes in QoL.

Considering the lack of research on the criterion validity of the current version of prolonged grief by ICD-11 and DSM-5-TR criteria sets, our first aim is to reproduce earlier findings about the cross-sectional association between prolonged grief symptoms and QoL while using the newer criteria sets to assess the concurrent test-criterion validity. As earlier research found this association, we hypothesize to find a negative association between ICD-11 and DSM-5-TR prolonged grief symptoms and QoL (Silverman et al., 2000). The second aim of this research is to investigate the predictive effects of current prolonged grief symptoms on QoL of bereaved individuals over time. As mentioned before, previous research noted a longitudinal effect of prolonged grief symptoms on QoL impairments ((Boelen & Prigerson, 2007). However, by not controlling for baseline scores of QoL, the actual predictive effect of prolonged grief symptoms on QoL is still questionable. This research will be pioneering a longitudinal design by controlling for baseline scores of QoL when examining associations between ICD-11 and DSM-5-TR prolonged grief symptoms and QoL. We hypothesize to find an effect of prolonged grief symptoms on the change in QoL over time when controlling for baseline QoL.

Method

Procedure and Design

Data collection was part of a larger longitudinal survey on psychosocial adaptation to bereavement conducted between May 2019 and September 2021. The online platform Qualtrics was used to collect the data. Participants were led to this platform by advertisements presented on Google and via a website containing a grief self-test (www.psyned.nl). Both gave a link to the study's website where potential participants could

read information on the study and fill in an online informed consent form. Informed consent was given on a participant information page. Four general themes that were covered were that participation was voluntary, the information was processed in a confidential manner, the research aims, and where to direct possible questions. After giving online informed consent, the participants could start the study. The participants were given a code to ensure anonymity when the data was processed. To be eligible for study participation, people had to be able to read and answer questions in Dutch, had to have experienced the death of a partner, family member, or friend, and be 18 years or older. The Ethical Committee Psychology of the University of Groningen approved the study (registration number: PSY-1819-S-0173).

There were no mandatory breaks while filling out the survey and there was no time limit. Furthermore, the test took around half an hour to finish and was subdivided into several sections. At the end of the first survey (T1), participants were asked if they would be willing to complete two future surveys. Participants who agreed with this were sent an email with a link to the survey 6 (T2) and 12 months (T3) after they completed the first survey.

Participants

Baseline data was collected from 987 bereaved individuals. We excluded 671 people from the data analysis who did not meet the criteria of losing a loved one 12 or more months ago at baseline. Furthermore, 115 people did not give permission to be contacted for completing the second or third questionnaire and some people who did give permission did not complete one or more of the follow-up surveys. Therefore, our final sample consisted of 276 people who completed the QoL questionnaire at T1, 142 in T2, and 135 in T3.

The average age of the participants was approximately 54 years and 92% of the sample reported being female (Table 1 shows baseline sample characteristics). More than half of the participants have completed a college or university education. The majority of the participants had lost a partner, lover and/or spouse (46%), followed by the loss of a parent

(28%), child (13%), brother or sister (9%), or other relationship (4%). Most of the deceased people were male (72%). The median time since loss was 27 months and ranged from 12 months to 5 years or longer. The majority of the participants (45%) indicated that they were between 12 months and 24 months after the loss. Most of the losses were due to a natural cause such as an illness (76%), whereas a minority indicated having experienced a loss due to suicide (16%), an accident (8%), and murder (less than 1%). For most of the participants, the loss was unexpected (55%), while 27% of the participants had expected the loss, and 17% indicated the loss was expected nor unexpected or both.

Measures

We used prolonged grief symptoms as an independent variable and QoL as both an independent and dependent variable. In the T1 survey, participants were asked to fill in a self-constructed questionnaire about socio-demographic characteristics, such as sex, age, and education level. Loss-related characteristics (relationship with the deceased, sex of the deceased, time since loss, cause of death, and expectedness of the loss) were also registered using a self-constructed questionnaire. All answer categories for the categorical variables are listed in Table 1.

We used QoL assessments at T1, T2 and T3 and prolonged grief symptoms assessments at T1. This study has a longitudinal design, but some of the analyses are on cross-sectional data.

Prolonged Grief Symptoms

Prolonged grief symptoms were measured with the Traumatic Grief Inventory - Self Report Plus (TGI-SR+; Lenferink et al., 2022). The TGI-SR+ is the only validated instrument that is able to screen for prolonged grief symptoms according to both the ICD-11 and DSM-5-TR PGD criteria. This makes it the most appropriate instrument available due to this study thematizing the evolving criteria for prolonged grief and its effect on validity. There is

evidence for the concurrent and criterion validity of the TGI-SR+ (Lenferink et al., 2022).

The TGI-SR+ is a 22-item self-report questionnaire using a 5-point Likert scale ranging from 1 (never) to 5 (always). Twelve of these items reflect the ICD-11 criteria while ten reflect the DSM-5-TR criteria. Examples of items for prolonged grief symptoms per DSM-5-TR are: 'I avoided places, objects, or thoughts that reminded me that the person I lost has died' and 'I felt that life is unfulfilling or meaningless without him/her', and per ICD-11: 'I had trouble accepting the loss' and 'I had negative thoughts about myself in relation to the loss (e.g., thoughts about self-blame)'. Item scores are summed to form two overall total severity scores, with one made up of the twelve items for the ICD-11 criteria and the other consisting of the ten items for the DSM-5-TR criteria.

Internal consistencies were previously examined using McDonalds omega, showing values > .70 (TGI-SR+ scores: ω = .97; ICD-11 criteria: ω = .95; DSM-5-TR criteria: ω = .95). The Cronbach's alpha, using this study's data set were .91 (ICD-11 criteria) and .90 (DSM-5-TR criteria) respectively. Together, these indices suggest very strong internal consistency for the TGI-SR+.

Quality of Life

QoL was assessed with the European Health Interview Survey - Quality of Life (EUROHISQOL) (Schmidt et al., 2005). This short version of the WHOQOL-100 has 8 items, and answers are given on a Likert scale ranging from 1 (not at all) to 5 (completely), where a higher score indicates a higher QoL. It measures QoL across four different domains, two items each: psychological, social, physical, and environmental. The World Health Organization names the four domains physical health (e.g., "How would you rate your quality of life?"), psychological health (e.g., "Do you have enough energy for everyday life?"), social relationships (e.g., "How satisfied are you with your personal relationships?"), and environmental health (e.g., "Have you enough money to meet your needs?");Schmidt et al.,

2005).

The EUROHIS-QOL 8-item index has strong associations with conceptually related measures, which supports the convergent validity of the EUROHIS-QOL (Schmidt et al., 2005). It was also able to reliably discriminate between ill and healthy individuals supporting its discriminant validity. Cronbach's alpha for this instrument was .80 (Schmidt et al., 2005), indicating good internal consistency. In this study, a reliability analysis resulted in a Cronbach's alpha of .84.

Statistical Analyses

We calculated the association between prolonged grief symptoms and QoL for both ICD-11 and DSM-5-TR criteria across three time points. We calculated prolonged grief symptom levels at T1 for both ICD-11 and DSM-5-TR criteria based on the TGI-SR+ (for scoring rules: Lenferink et al., 2022). These ICD–11 prolonged grief symptoms and DSM-5-TR prolonged grief symptoms were computed as new variables for T1 (T1 ICD-11 prolonged grief symptoms and T1 DSM-5-TR prolonged grief symptoms). We checked the assumptions of our regression analyses (i.e., normality, linearity, homoscedasticity, outliers, and multicollinearity) before running our main analyses.

We ran a drop-out analysis to assess the differences in sample characteristics of people who dropped out or those who did not. The dropouts were categorized into two categories. The first one was for participants that opted to not continue with the study after baseline measurement (T1), who are called dropout group 1. The second category consisted of participants who opted to continue with the study, but did not complete one or two of the follow-up questionnaires in T2 or T3, who are called dropout group 2.

To check if there were significant differences between people who dropped out of the study and those who did not we used independent sample t-tests in the case of continuous variables (i.e., age, T1 ICD-11 prolonged grief symptoms, T1 DSM-5-TR prolonged grief

symptoms and T1 QoL) and Chi-Square tests for categorical variables (i.e., sex, education level, time since loss, relationship with the deceased, cause of death, expectedness of death). . For those categorical variables that showed a significant effect, we ran additional Chi-square tests to check which categories were distributed differently between groups. If the assumption of expected values (not less than 5 expected observations in every cell) within the cells was violated for the Chi-Square test, we used the Likelihood Ratio instead of the Chi-square test.

To test our first hypothesis, we used two simple linear regressions to assess the association between T1 ICD-11 prolonged grief symptoms and T1 QoL and the association between T1 DSM-5-TR prolonged grief symptoms and T1 QoL. For our second hypothesis, we ran two separate regression analyses per time-point to examine the extent to which T1 ICD-11 prolonged grief symptoms and T1 DSM-5-TR prolonged grief symptoms predicted QoL outcomes at T2 and T3 (T2 QoL and T3 QoL), whilst controlling for the baseline QoL (T1). So, we ran four hierarchical multiple regression analyses. In the first step of all regression analyses, we included T1 QoL as a control variable. Next, we added either T1 ICD-11 prolonged grief symptoms or T1 DSM-5-TR prolonged grief symptoms as a predictor of QoL at T2 or T3.

Furthermore, we ran an exploratory analysis comparing the effects of ICD-11 and DSM-5-TR prolonged grief symptoms on QoL. The exploratory analysis allows us to assess evidence for the convergent validity of both ICD-11 and DSM-5-TR prolonged grief symptoms, by comparing the longitudinal relationships each of these constructs has with QoL. We compared the confidence intervals of the standardized beta weights of associations between ICD-11 and QoL and DSM-5-TR and QoL across all relevant time periods, whilst controlling for the T1 QoL in longitudinal analyses. The rule of Cumming (2009) states that if the confidence intervals of the standardized beta weights of the variables overlap less than 50% with each other, the difference between the standardized beta weights is significant.

Results

Dropout analysis

A dropout analysis was run to examine whether there were differences in study completers (n = 120; 38%) versus non-completers (n = 196; 62%) for the EUROHIS 8-item index in relationship with different variables. More specifically, 36% (n = 115) of participants opted to not participate for T2 and T3, i.e., dropout group 1, and 26% (n = 81) of participants said they would continue for T2 and T3 but did not finish, i.e., dropout group 2. We are analyzing these two groups by comparing them with their completer counterparts as specified in the paragraphs below. We tested whether T1 ICD-11 prolonged grief symptoms, T1 DSM-5-TR prolonged grief symptoms, T1 QoL, age, time since loss, sex, education, relationship with deceased, cause of death and expectedness of death was associated with dropping out.

In the first part of the dropout analysis, we compared dropout group 1 with those who opted to continue after T1 (n = 201; 64%). No significant differences were found across the two groups in this comparative analysis (Table 2).

In the second portion of the dropout analysis, we compared dropout group 2 with those who opted to continue after T1 and completed T2 and T3 (n = 120; 38%) (Table 3). Using a Chi-square test, a significant effect was found for sex ($\chi 2$ (1, N = 201) = 5.58, p = .02), with women making up 97% of dropout group 2 and 88% of study completers. Cause of death (natural cause, accident, murder, suicide) also had a significant difference in proportions (LR (3, N = 201) = 13.43, p < .01: Table 3) between the two groups compared. Specifically, the group bereaved through suicide was found to have more participants drop out after stating they wanted to continue for T2 and T3 compared with the other subcategories ($\chi 2$ (1, N = 201) = 11.41, p < .001). People bereaved through suicide made up 27% of dropout group 2 and 9% of study completers.

Assumption Checks

Details on the assumption checks can be found in Appendix A at the end of the manuscript. To investigate if the model assumptions for the regression analyses testing the first and second hypothesis were met several figures were made and analyses were executed to check for outliers, normality, homoscedasticity, linearity, and an additional analysis to check for multicollinearity was conducted exclusively for the second hypothesis. For both hypotheses, some outliers were found. To check whether these outliers were influential, Cook's Distance was assessed. The Cook's distance values were not larger than one, therefore the outliers were not influential and thus were retained in the dataset. The assumptions for normality, linearity and homoscedasticity were not violated for the analyses on the two hypotheses. Moreover, there was no multicollinearity of predictors in the regression analyses conducted to answer the second hypothesis.

Hypothesis 1

Cross-sectional analysis

Two simple linear regression analyses were conducted to test the first hypothesis: ICD-11 and DSM-5-TR prolonged grief symptoms are both significantly negatively associated with QoL. T1 ICD-11 prolonged grief symptoms were indeed significantly negatively related to T1 QoL ($F(1, 274) = 120.49$, $\beta = -.55$, $p < .001$). This regression was also conducted for T1 DSM-5-TR prolonged grief symptoms and T1 QoL, again yielding a significant negative relationship ($F(1, 274) = 122.46$, $\beta = -.56$, $p < .001$).

Hypothesis 2

Longitudinal analysis

Four hierarchical regression analyses were run to examine if ICD-11 or DSM-5-TR prolonged grief symptoms predicted QoL at T2 and T3, while controlling for baseline QoL (T1) (hypothesis 2: ICD-11 and DSM-5-TR prolonged grief symptoms significantly predict

changes in QoL over time). In all regression analyses, T1 QoL was entered as a control variable in step 1. In step 2, either T1 ICD-11 prolonged grief symptoms or T1 DSM-5-TR prolonged grief symptom scores were entered as a predictor of QoL at T2 or T3 (Table 4).

In the first regression analysis, we examined the association between T1 ICD-11 prolonged grief symptoms and T2 QoL. The overall model test was significant ($F(2, 139) = 101.85$, $p = .04$). In the first step of the model, T1 QoL predicted 58% of variance in T2 QoL. Adding T1 ICD-11 prolonged grief symptoms additionally explained 1% of variance in T2 QoL.

In the second regression analysis, we examined the association between T1 ICD-11 prolonged grief symptoms and T3 QoL. The overall model test was significant ($F(2 ,132) = 87.80$, $p = .03$). In the first step of the model, T1 QoL predicted 56% of variance in T3 QoL. Adding T1 prolonged grief symptoms additionally explained 2% of variance in T3 QoL.

In the third regression analysis, we examined the association between T1 DSM-5-TR prolonged grief symptoms and T2 QoL. The overall model test was significant ($F(2, 139) = 102.64$, $p = .02$). In the first step of the model, T1 QoL predicted 58% of variance in T2 QoL. Adding T1 DSM-5-TR prolonged grief symptoms additionally explained 2% of variance in T2 QoL.

In the fourth regression analysis, we examined the association between T1 DSM-5-TR prolonged grief symptoms and T3 QoL. The overall model test was significant ($F(2, 132) = 87.20$, $p = .04$). In the first step of the model, T1 QoL predicted 56% of variance in T3 QoL. Adding T1 DSM-5-TR prolonged grief symptoms additionally explained 2% of variance in T3 QoL.

Exploratory analysis

The exploratory analysis consisted of implementing Cumming´s rule to determine if there was a statistically significant difference between the standardized beta coefficients of

the effects of T1 ICD-11 and DSM-5-TR prolonged grief symptoms on EUROHIS for T2 and T3, while controlling for T1 QoL. As seen in Table 4, the confidence intervals overlapped to the degree that significance was not found. The confidence intervals of the standardized beta coefficients of T1 DSM-5-TR prolonged grief symptoms and T1 ICD-11 prolonged grief symptoms on T2 QoL had a 93% overlap and close to 100% overlap on T3 QoL.

Discussion

The main purpose to conduct this study was to assess the criterion validity of the new construct of prolonged grief disorder per ICD-11 and DSM-5-TR. In this study, the cross-sectional association between ICD-11 and DSM-5-TR prolonged grief symptoms and QoL was first investigated. We hypothesized that there is a negative association between prolonged grief symptoms and QoL. The cross-sectional data for T1 confirms this prediction as we found that prolonged grief symptoms for both ICD-11 and DSM-5 criteria were significantly, negatively related to QoL. This result is in line with the results of Silverman et al. (2000), who also found a significant negative effect of prolonged grief symptoms on QoL. Even though Silverman and colleagues have found an effect, it should be noted that this effect was found using an older conceptualization of prolonged grief. Our results thus uniquely illustrate the concurrent test-criterion validity of prolonged grief symptoms per most recent criteria sets of ICD-11 and DSM-5-TR.

For our second hypothesis, we hypothesized to find that prolonged grief symptoms would predict change in QoL over time. We conducted four hierarchical regression analyses examining the effect of T1 ICD-11 prolonged grief symptoms on T2 QoL and T3 QoL, and the effect of T1 DSM-5-TR prolonged grief symptoms on T2 QoL and T3 QoL. Our research findings were consistent with this hypothesis as we found significant results in all four hierarchical regression analyses that measured the change in QoL for T2 and T3. To elucidate, prolonged grief symptoms at baseline significantly predicted lower QoL at later

time points. Our results are consistent with the findings of Boelen and Prigerson (2007), who also found a significant negative association between prolonged grief symptoms and QoL over time, although it should be noted that they did not use baseline QoL and no claims about the temporal precedence can be made in their research. As we did control for baselines scores of T1 QoL, our results show that prolonged grief symptoms at baseline predicts change in QoL over time. In that sense, we have expanded the knowledge on this field by finding suggestive evidence for the direction of the association between prolonged grief symptoms and QoL.

Our study has a high attrition rate as we started this study with 276 participants of which 135 finished the test at the latest time point. It was therefore important to assess whether the characteristics of the group who dropped out were different compared to the group who remained till the end of our study, as this could have an effect on our internal and external validity (Barry, 2005). For that reason, we performed two dropout analyses to check if there were any significant differences between completers and non-completers. Firstly, we used a group of participants who mentioned not wanting to participate in the longitudinal study and compared them to a group who did opt to continue after T1. We did not find significant differences when comparing the two groups in this analysis.

For the second dropout analysis, we compared a group who opted to continue, but ended up not finishing either T2, T3 (non-completers), or both to a group who completed the entire study (completers). Cause of death appeared to have a significant difference when comparing the groups. Specifically, people were more likely to drop out if the cause of death of the lost one was suicide. Moreover, sex also seemed to be significantly different when comparing both groups. In this comparison, proportionally more women dropped out compared to men. This might be explained by the finding of a trajectory study by Lundorff et al. (2020), showing that men improved over time while women appeared to have a relatively

increased grief response. Consequently, this could make it harder for women to continue this study as it may potentially elicit more negative feelings, whereas men already showed decreased grief response and therefore may have it easier finishing the study. However, this is only speculated and in order to attain more information about the actual reasoning behind dropping out, participants could be contacted.

For our exploratory analysis, we compared the longitudinal effects of ICD-11 and DSM-5-TR prolonged grief symptoms on QoL to check for differences in the effect of prolonged grief symptoms defined by both handbooks on QoL. To determine whether there has been a significant difference in the longitudinal associations of ICD-11 prolonged grief symptoms and QoL and DSM-5-TR prolonged grief symptoms and QoL, we compared the confidence intervals of the standardized beta weights of associations between prolonged grief symptoms of ICD-11 and QoL and prolonged grief symptoms of DSM-5-TR and QoL according to the rule of Cumming (2009). We did find not a statistically significant difference for the association of prolonged grief symptoms per ICD-11 and DSM-5-TR with QoL, so we can conclude that both handbooks defining prolonged grief disorder may have a similar effect on QoL.

This study is the pioneer in this field by investigating the effect of prolonged grief symptoms defined by the DSM-5-TR and ICD-11 on QoL over time in. Consequently, we found evidence supporting of the criterion validity of the construct prolonged grief disorder defined by the new criteria sets of ICD-11 and DSM-5-TR. This is important for the clinical utility, as we have evidence of accurately measuring symptoms of prolonged grief symptoms with the criteria sets of ICD-11 and DSM-5-TR. This can help in providing suitable care for people suffering from prolonged grief symptoms by rightfully diagnosing them. Moreover, two of the three criteria for causality in the relationship between prolonged grief symptoms and QoL have been shown: covariance and temporal precedence (Shadish et al., 2002).

However, the limitations of this study should also be considered. First, the sample was a voluntary response sample which consisted mainly of bereaved, higher educated, Dutch females which could threaten the generalizability of our findings. Although these sample characteristics are common in studies on grief (Dennis et al., 2022; Eisma & Stroebe, 2021), we still recommend future research to include more participants from different cultures, more males, and lower educated individuals to be able to assess the external validity of our findings. Another limitation of this study is working with self-report measures, as there is a possibility that participants provide invalid answers, accidently or deliberately. This might be partly solved by having people close to the bereaved individuals rate their behavior as an additional measure and by adding semi-structured interviews by a clinical professional to check for prolonged grief symptoms. A third limitation is that the current study can still not shed light on the exact influence of prolonged grief symptoms on the QoL, as no experimental design has been used. There might be other variables explaining the association found in our study. Even though no experimental design can be used in situations like this due to ethical reasons, in a correlational design these background variables could be controlled for by using statistical control (Becker et al., 2016). To illustrate, a relevant background variable might be sex. When using a regression analysis to check the association between prolonged grief symptoms and QoL, sex can be controlled for. We strongly recommend future research to imply controlling for relevant background variables to further indicate a possible causal relationship.

In addition to the previous named recommendations, we suggest future research to further investigate the validity of PGD defined by the ICD-11 and DSM-5-TR. First, to further assess the criterion validity of PGD defined by ICD-11 and DSM-5-TR, researchers should use other relevant constructs besides QoL. To exemplify, the construct of rumination showed to be positively associated with prolonged grief symptoms and could therefore be

used (Eisma et al., 2020). Along with criterion validity, other types of validity such as construct, convergent and divergent validity should be assessed as it is not clear whether findings of these types of validity studies for past conceptualizations of prolonged grief are similar to the new criteria sets of PGD by ICD-11 and DSM-5-TR (Eisma, 2023). To illustrate, the divergent validity of prolonged grief has been assessed by Boelen and van den Bout (2005) by showing the distinctiveness of the past conceptualization of prolonged grief from depression and anxiety. Attaining more evidence for the validity of the criteria sets of ICD-11 and DSM-5-TR for prolonged grief disorder, could further improve the clinical utility of these sets.

Conclusion

In summary, an effect of prolonged grief symptoms on QoL was found in both cross-sectional and longitudinal analyses. For that reason, our data shows new evidence that support the concurrent and the predictive test-criterion validity of the new prolonged grief criteria sets of ICD-11 and DSM-5-TR. This study can therefore be seen as an opening move towards establishing validity of prolonged grief disorder as defined in ICD-11 and DSM-5-TR. In pursuance of finding more supporting evidence for the validity of the criteria sets for prolonged grief disorder, future research should focus on other relevant outcome variables, such as general rumination, and other types of validity, while being mindful of the limitations of this study.

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Table 1

Demographic and Loss-related Characteristics of the Sample (N=276)

Characteristics	Category	Valid *N*	Percentage	Mean	*SD*	Range
Sex	Male	22	8	-	-	-
	Female	254	92	-	-	-
Educational	Higher Education	152	55	-	-	-
level	Lower Education	124	54	-	-	-
Deceased is	Partner, lover, or spouse	126	46	-	-	-
	Parent	78	28	-	-	-
	Child	35	13	-	-	-
	Sibling	25	9	-	-	-
	Other	12	4	-	-	-
Sex of the	Male	199	72	-	-	-
deceased	Female	75	27	-	-	-
Cause of	Natural cause	209	76	-	-	-
death	Accident	23	8	-	-	-
	Suicide	43	16	-	-	-
	Murder	1	0	-	-	-
Death was:	Expected	75	27	-	-	-
	Unexpected	153	55	-	-	-
	Both or neither	48	17	-	-	-
Age in years	-	-	-	53.67	14.02	18-81
Time loss in months	-	-	-	32.29	17.21	12-61

Table 2

Dropout Analysis: Comparison between Dropout Group 1 and Opting to Continue after T1 on Sample Characteristics, T1 QoL, T1 ICD-11 Prolonged Grief Symptoms and T1 DSM-5-TR Prolonged Grief Symptoms

Variables	*t*	Pearson´s Chi-Square	Likelihood Ratio	Mean (dropout)	Mean (not dropout)
T1 ICD-11 prolonged grief symptoms	.45	-	-	38.94	39.61
T1 DSM-5-TR prolonged grief symptoms	.53	-	-	37.13	37.86
T1 QoL	-1.00	-	-	26.35	25.52
Age	.72	-	-	34.94	36.10
Time since loss	-.30	-	-	32.97	32.36
Sex	-	.56	-	-	-
Education	-	-	7.39	-	-
Relationship with deceased	-	4.25	-	-	-
Cause of death	-	-	1.58	-	-
Expectedness of death	-	5.79	-	-	-

Note. * $p < .05$. ** $p < .01$.

Table 3

Dropout Analysis: Comparison between Dropout Group 2 and Study Completers on Sample Characteristics, T1 QoL, T1 ICD-11 Prolonged Grief Symptoms and T1 DSM-5-TR Prolonged Grief Symptoms

Variables	*t*	Pearson´s Chi-Square	Likelihood Ratio	Mean (dropout)	Mean (not dropout)
T1 ICD-11 prolonged grief symptoms	-1.07	-	-	40.68	38.9
T1 DSM-5-TR prolonged grief symptoms	-.57	-	-	38.37	37.50
T1 QoL	1.50	-	-	24.74	26.06
Age	1.81	-	-	33.89	37.60
Time since loss	-1.61	-	-	34.74	30.75
Sex	-	5.58*[a]	-	-	-
Education	-	3.12	-	-	-
Relationship with deceased	-	8.80	-	-	-
Cause of death	-	-	13.43**[b]	-	-
Expectedness of death	-	1.03	-	-	-

Note. [a] Sex (females): 97% in dropout group 2, 88% in study completers; [b] Cause of death (suicide): 27% in dropout group 2, 9% in study completers

* $p < .05$. ** $p < .01$.

Table 4

Longitudinal Analyses of T1 ICD-11 Prolonged Grief Symptoms and T1 DSM-5-TR Prolonged Grief Symptoms on T2 QoL and T3 QoL while Controlling for T1 QoL

QoL	Time 2			Time 3			95% Confidence Interval for β Coefficient at T2		95% Confidence Interval for β Coefficient at T3	
	ΔF	ΔR^2	β	ΔF	ΔR^2	β	Lower	Upper	Lower	Upper
Step 1 T1 QoL	194.24	.58	.76	165.62	.56	.75	-	-	-	-
Step 2 T1 ICD-11 prolonged grief symptoms	4.54*	.01	-.14	5.00*	.02	-.15	-.27	-.00[a]	-.30	-.01
Step 1 T1 QoL	194.24	.58	.76	165.62	.56	.75	-	-	-	-
Step 2 T1 DSM-5-TR prolonged grief symptoms	5.20*	.02	-.14	4.47*	.02	-.14	-.27	-.02	-.30	-.01

Note. * $p < .05$.

Appendix A

Assumption Checks

Hypothesis 1

To investigate if the model assumptions for the regression analyses on the first hypothesis were met, several analyses were executed to check for normality of residuals, homoscedasticity, linearity, and outliers. To start off with the outliers, the variables were investigated in Supplemental Figure 1 which showed an outlier for the T1 QoL. To check whether this outlier was influential, Cook's Distance was assessed in Supplemental Table 1 (*Cook's Distance* = .004). Since the value is not larger than one, the outlier is not influential and was kept in the data. As for the assumption of normality, multiple values and figures are assessed. Firstly, the data showed to be symmetrical as the skewness values lie within the range of -0.5 and 0.5. Secondly, the kurtosis values lie within the range of -1 and 1. The significance values of the Shapiro-Wilk test show significant values for both T1 DSM-5-TR prolonged grief symptoms (p = .002) and T1 ICD-11 prolonged grief symptoms (p = .005), which means the population of the data is not normally distributed for these variables. A significant Shapiro-Wilk test is common in larger samples as it is sensitive to sample size. However, the reasonably straight lines in Supplemental Figure 2 suggest a normal distribution. Therefore, the assumption of normality is met (see Supplemental Table 2). Finally, Supplemental Figures 2 and 3 indicate that the assumption for homoscedasticity and linearity were met as the data is spread along the lines equally.

Hypothesis 2

To analyze the model assumptions for the second hypothesis, we checked for outliers, normality, homoscedasticity, linearity, and multicollinearity. The outliers of the variables were investigated in Supplemental Figure 4, this shows an outlier for the T2 QoL and T3 QoL. Cook's Distance was assessed in Supplemental Table 1, since the values are not larger

than one, the outliers are not influential and were kept in the data. For the assumption of normality multiple values and figures are assessed. Firstly, the skewness values lie within the range of -0.5 and 0.5, except for the T2 QoL variable. Secondly, the kurtosis values lie within the range of -1 and 1. The significance values of the Shapiro-Wilk test show significant values for both T1 DSM-5-TR prolonged grief symptoms (p = .002), and T1 ICD-11 prolonged grief symptoms (p = .005), T2 QoL (p = .005), and T3 QoL (p = .013) which means the population of the data is not normally distributed for these variables (see Supplemental Table 2). A violation of the assumption of normality for the Shapiro-Wilk test is common in larger samples. The reasonably straight lines in Supplemental Figure 5 and 6 suggest a normal distribution. The assumption of normality is met. The assumption of homoscedasticity is not violated as there is no pattern shown as seen in Supplemental Figure 7 and 8. Similarly, the residuals showed to be spread along the line equally (Supplemental Figures 5, 6 ,7 ,8). Therefore, the assumption of linearity also appears met. Finally, tests used to check for multicollinearity showed that this was not in concern as the correlations are all below 0.7, the VIF levels were below 10 and scores for Tolerance were higher than 0.1 (see Supplemental Table 3 and 4).

Supplemental Table 1

Cook's Distance Values for T1 QoL, T2 QoL, and T3 QoL with T1 ICD-11 Prolonged Grief Symptoms and T1 DSM-5-TR Prolonged Grief Symptoms

Variables	T1 QoL	T2 QoL	T3 QoL
T1 ICD-11 prolonged grief symptoms	.00	.01	.01
T1 DSM-5-TR prolonged grief symptoms	.00	.01	.01

Supplemental Table 2

Skewness, Kurtosis, and Shapiro-Wilk Values for T1 QoL, T2 QoL, and T3 QoL with T1 ICD-11 Prolonged Grief Symptoms and T1 DSM-5-TR Prolonged Grief Symptoms

Variables	*N*	Skewness		Kurtosis		Shapiro-Wilk	
	Statistic	Statistic	Std. Error	Statistic	Std. Error	Statistic	Sig.
Time_since_loss_1=1 (FILTER)	316	.	.	.	.	.	.
T1 QoL	276	-.10	.15	-.26	.29	.99	.18
T2 QoL	142	-.62	.20	.72	.40	.97	.01
T3 QoL	135	-.48	.21	.39	.41	.98	.01
T1 ICD-11 prolonged grief symptoms	288	-.16	.14	-.67	.29	.99	.01
T1 DSM-5-TR prolonged grief symptoms	288	-.29	.14	-.50	.29	.98	.00
Valid *N* (listwise)	276						

Supplemental Table 3

Pearson's Correlations between Variables T2 QoL and T1 ICD-11 Prolonged Grief Symptoms, T3 QoL and T1 ICD-11 Prolonged Grief Symptoms, T2 QoL and T1 DSM-5-TR Prolonged Grief Symptoms and T3 QoL and T1 DSM-5-TR Prolonged Grief Symptoms

Variables	T2 QoL	T3 QoL
	Correlation	Correlation
T1 ICD-11 prolonged grief symptoms	-.50	-.47
T1 DSM-5-TR prolonged grief symptoms	-.50	-.46

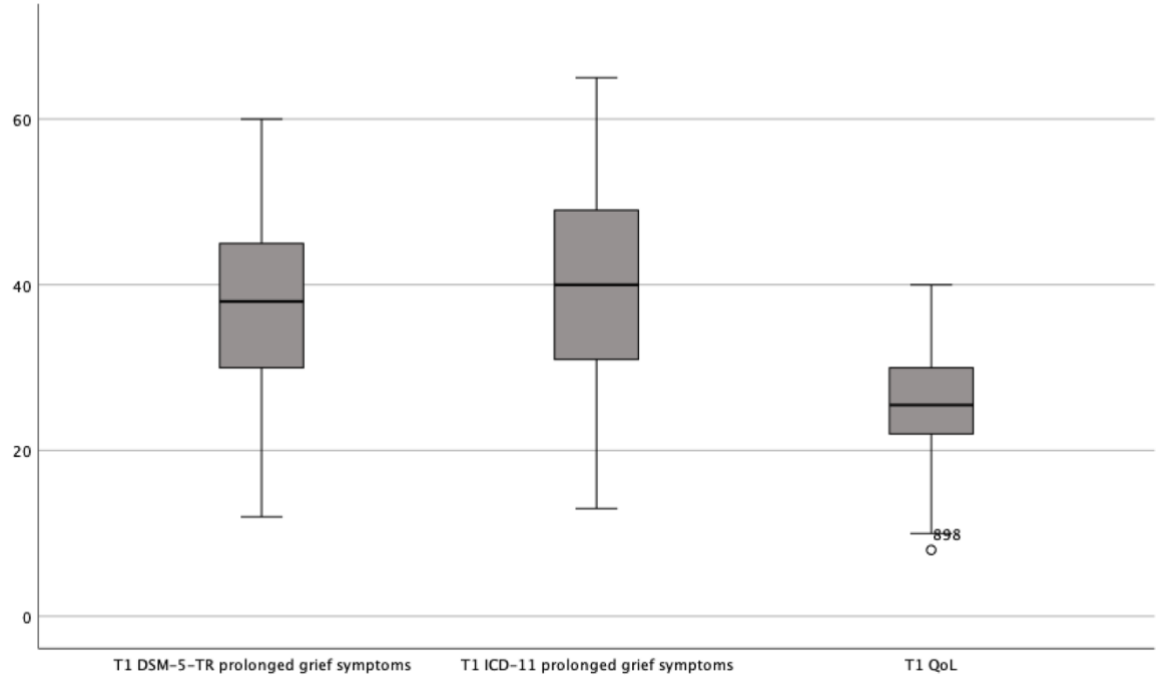
Supplemental Table 4

Tolerance and VIF Scores for the Variables T2 QoL, T3 QoL, T1 ICD-11 Prolonged Grief Symptoms and T1 DSM-5-TR Prolonged Grief Symptoms

Variables	T2 QoL		T3 QoL	
	Tolerance	VIF	Tolerance	VIF
T1 ICD-11 prolonged grief symptoms	.72	1.39	.77	1.30
T1 DSM-5-TR prolonged grief symptoms	.73	1.36	.78	1.28

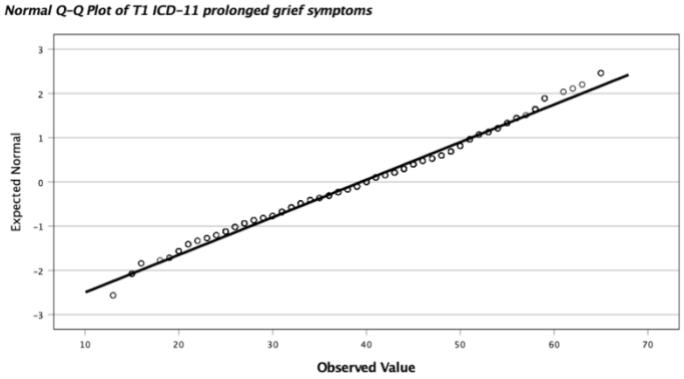
Supplemental Figure 1

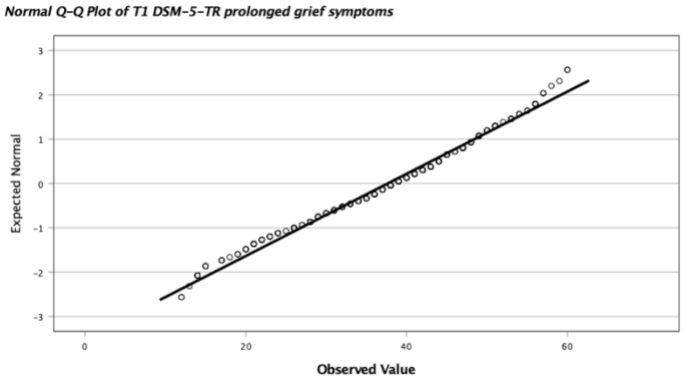
Boxplots for T1 DSM-5-TR Prolonged Grief Symptoms, T1 ICD-11 Prolonged Grief Symptoms, and T1 QoL

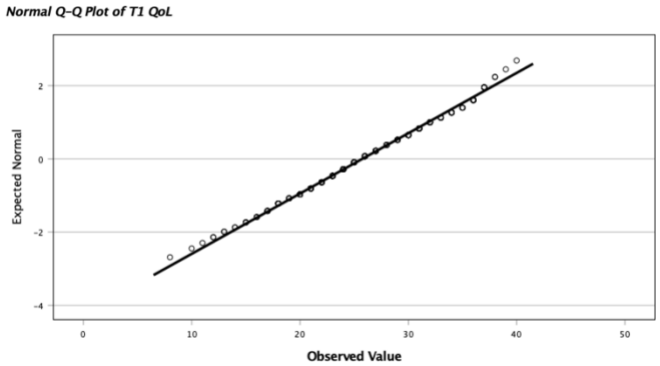


Supplemental Figure 2

Normal QQ-plots for T1 QoL, T1 ICD-11 Prolonged Grief Symptoms, and T1 DSM-5-TR Prolonged Grief Symptoms

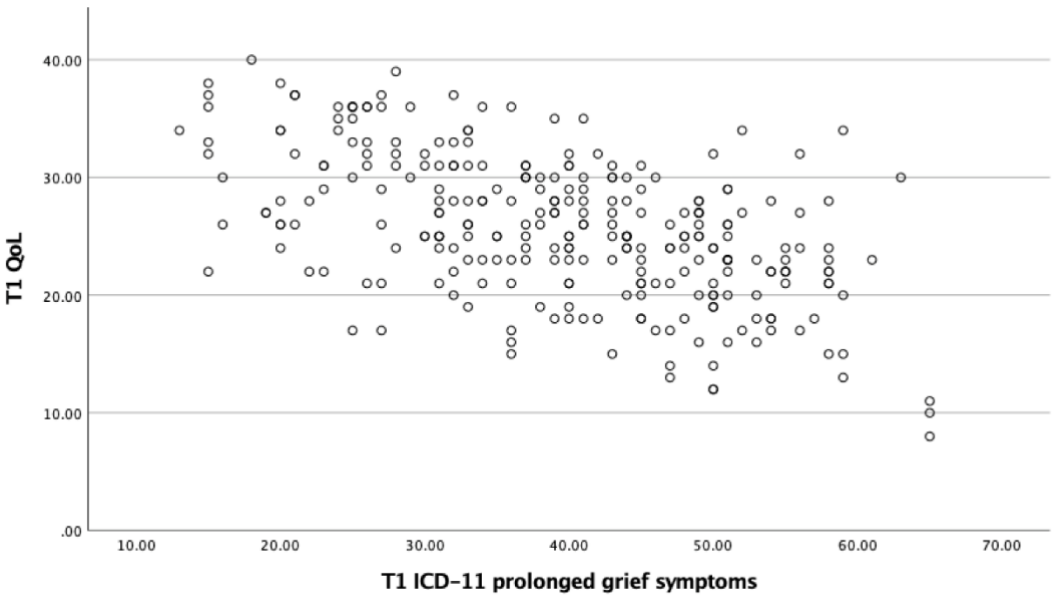


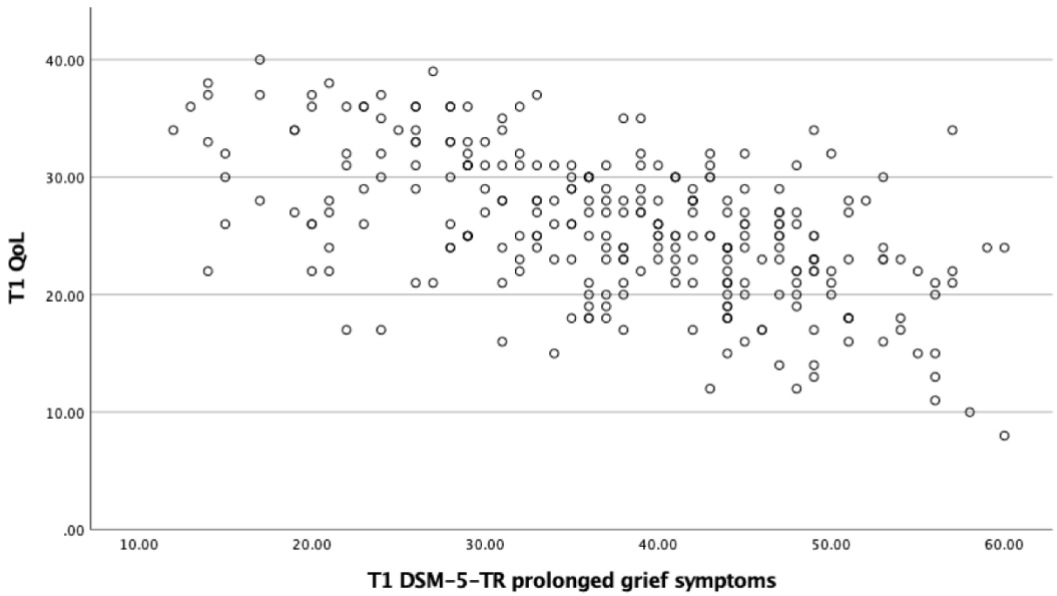




Supplemental Figure 3

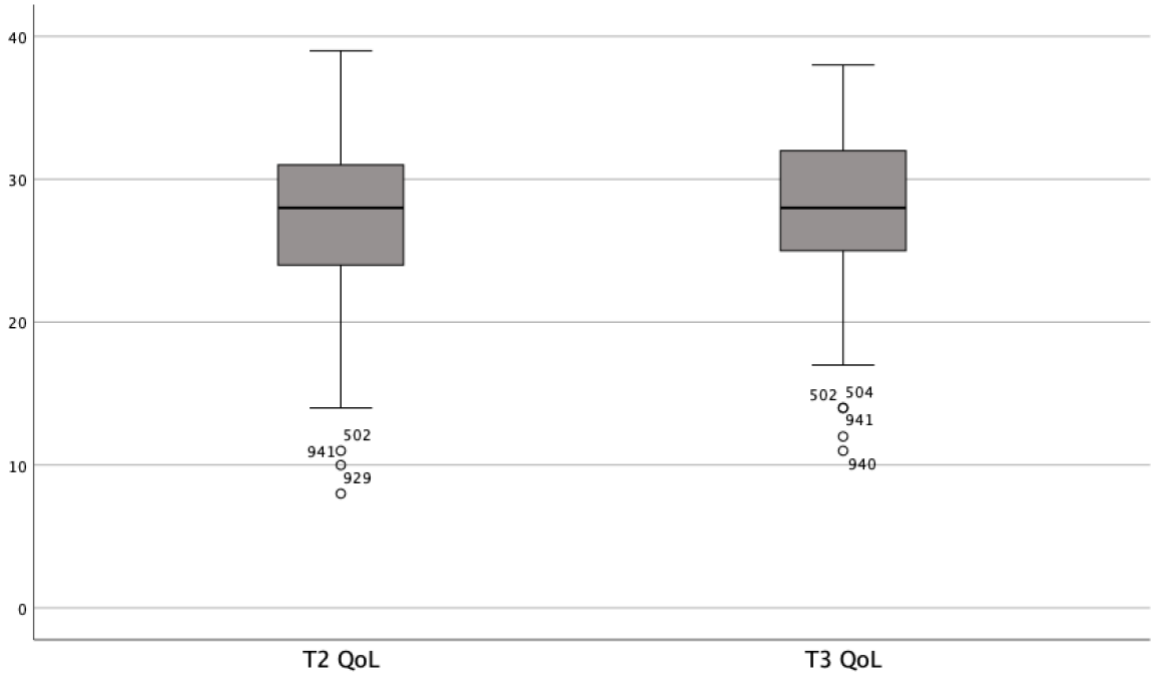
Scatterplots Showing the Relationship between T1 ICD-11 Prolonged Grief Symptoms and T1 QoL, and between T1 DSM-5-TR Prolonged Grief Symptoms and T1 QoL





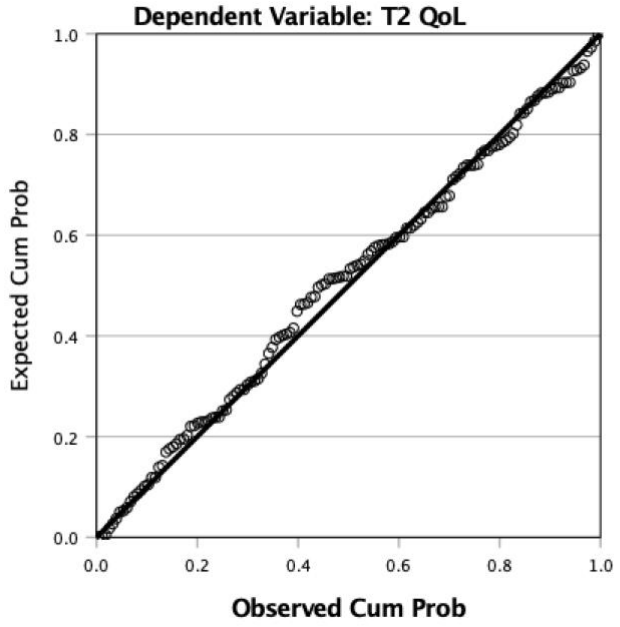
Supplemental Figure 4

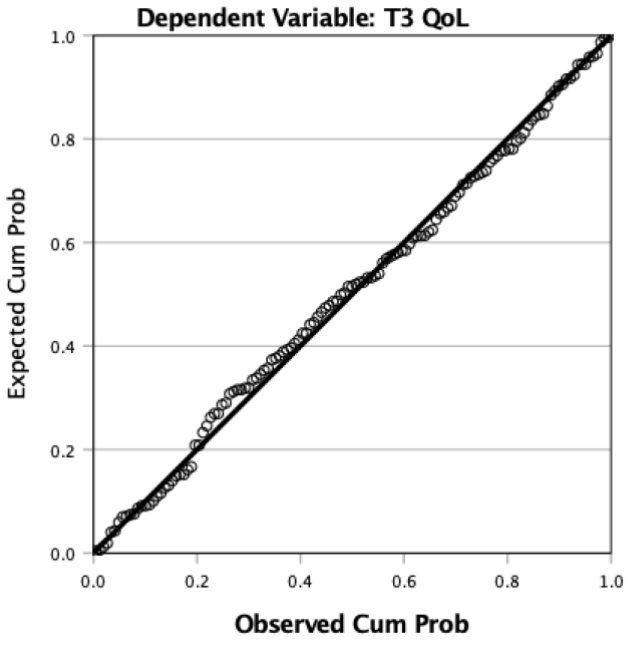
Boxplots for T2 QoL and T3 QoL



Supplemental Figure 5

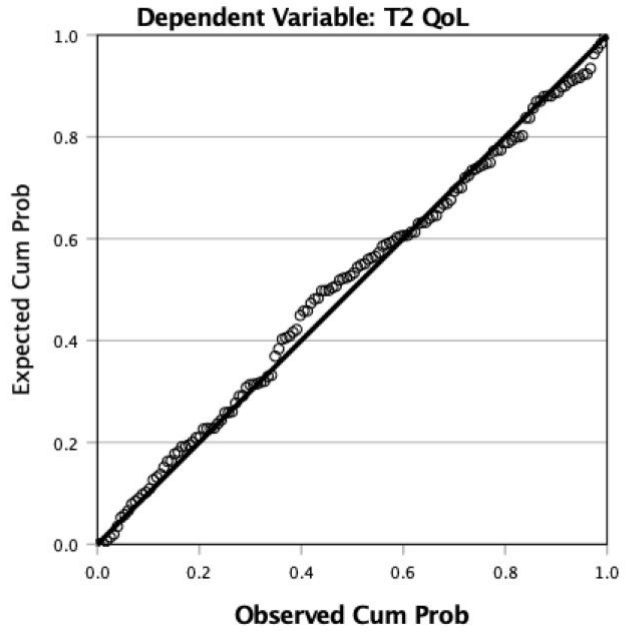
Normal PP-plots for T2 QoL and T3 QoL with T1 ICD-11 Prolonged Grief Symptoms

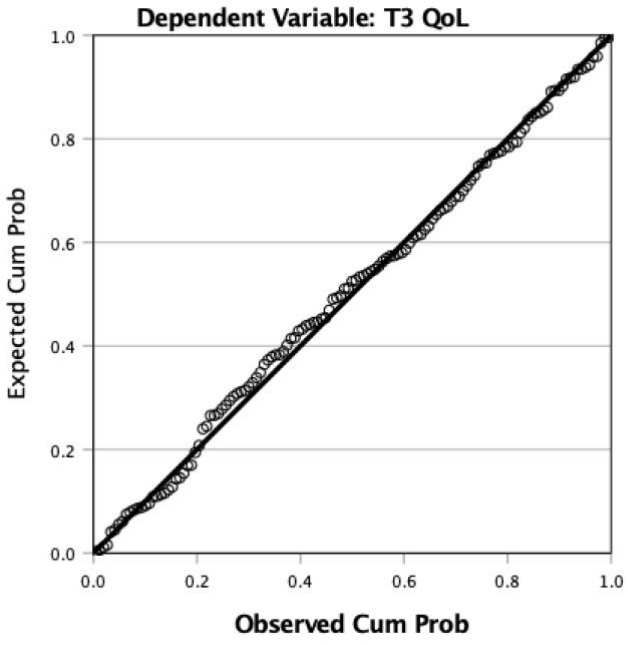




Supplemental Figure 6

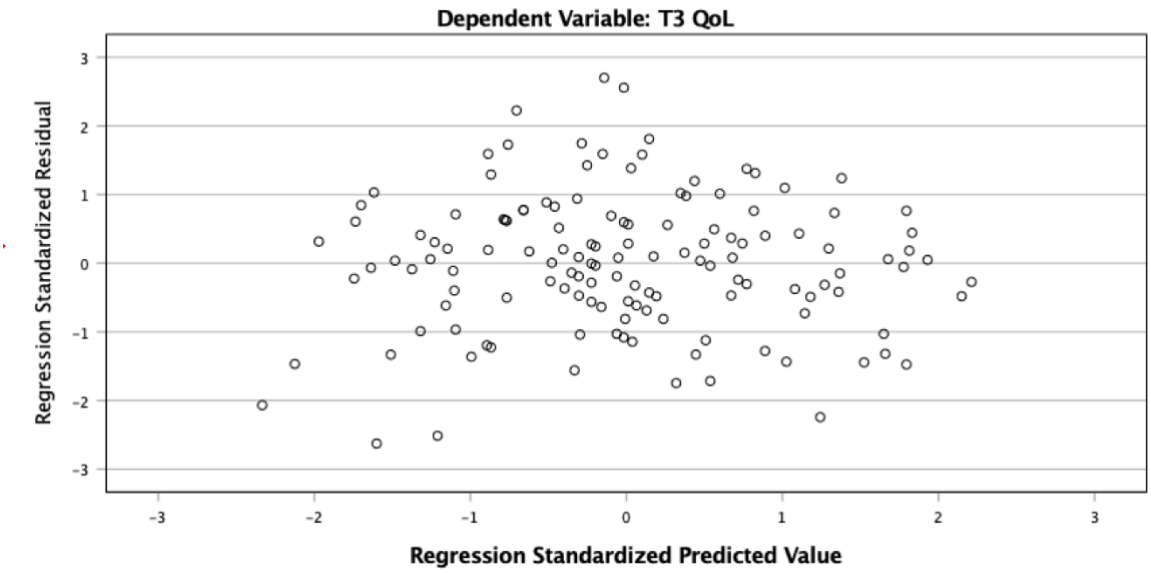
Normal PP-plots for T2 QoL and T3 QoL with T1 DSM-5-TR Prolonged Grief Symptoms

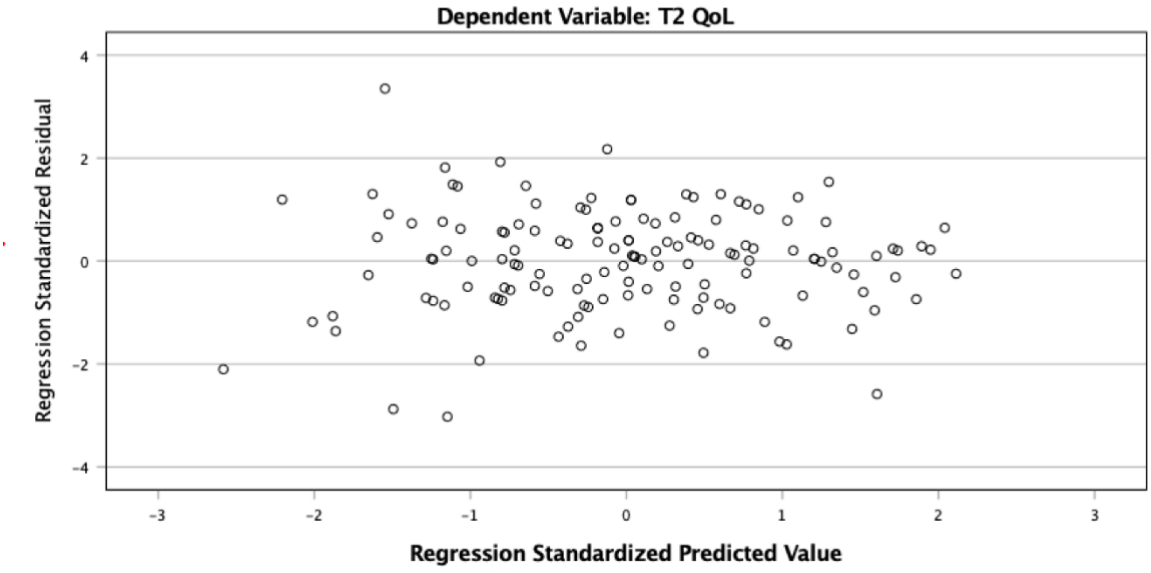




Supplemental Figure 7

Scatterplots of the Standardized Residuals for T2 QoL and T3 QoL with T1 ICD-11 Prolonged Grief Symptoms





Supplemental Figure 8

Scatterplots of the Standardized Residuals for T2 QoL and T3 QoL with T1 DSM-5-TR Prolonged Grief Symptoms