The Relationship Between ICD-11 and DSM-5-TR Prolonged Grief Symptoms and Quality of Life

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Abstract

Background. With present pathological grief disorder (PGD) criteria, in the two most utilized diagnostic handbooks (ICD-11 and DSM-5-TR), differing from each other and past criteria in content, there is a possibility that validity evidence for past criteria sets may not generalize to current criteria sets. **Aims.** We aimed to test the concurrent and predictive test-criterion validity of the constructs of ICD-11 and DSM-5-TR PGD. The chosen criterion was Quality of Life (QoL). **Methods**. 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. **Results.** 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. **Implications.** Findings support the recent inclusion of the versions of PGD in diagnostic manuals. It also sheds more light onto the relationship between PGD and QoL in terms of providing evidence for the concurrent and predictive test-criterion validity of present diagnostic criteria on QoL.

Keywords: grief, bereavement, ICD-11, DSM-5-TR, diagnostic criteria, concurrent test-criterion, predictive test-criterion, validity, longitudinal, prolonged grief disorder, quality of life

The Relationship between PGD ICD-11 and DSM-5-TR Criteria on Quality of Life

It is a fact of life that everyone goes through bereavement. However, during the Covid-19 pandemic the prevalence of bereavement soared (Stroebe & Schut, 2021), with an estimated 750.000 more people experiencing bereavement than usual during the course of the pandemic in the UK alone (Booth, 2022). With bereavement having been found to be associated with a host of physical and mental impairments and ailments e.g., suicidal ideation, heart problems, strokes, a subset of the bereaved population may need clinical intervention (Stroebe et al., 2007). Having said that, the increase in bereaved individuals coincided with an overloaded healthcare system leading to an estimated 40 percent of individuals seeking support during the bereavement process not receiving professional care (Booth, 2022). The immediate environment during the pandemic was also not indulgent with a lack of a social support network due to isolation coinciding with the sudden and traumatic loss due to the illness. Funerals, which have been shown to give individuals the opportunity to move on (Burrell & Selman, 2022), were being cancelled. The "harsh" nature of the circumstances was reflected in Eisma and Tamminga´s study (2020) which found more severe grief symptoms in individuals recently bereaved during the pandemic than before it. Sudden deaths and stressful situations have been found to exacerbate grief symptoms and increase the likelihood of pathological forms of grief (Lenferink et al., 2022; Revet et al., 2021). This is especially worrying since the prevalence of pathological grief following natural causes was already estimated to be one in ten bereaved adults pre-Covid (Lundorff et al., 2017). Therefore, the probable increase in cases of severe grief symptoms and pathological grief makes it evermore necessary to increase understanding of these constructs and the impact they have on well-being.

Severe, persistent, and disabling grief has recently been added to diagnostic handbooks (American Psychiatric Association, 2022; World Health Organization, 2019) in the form of prolonged grief disorder (PGD). PGD is presently understood as a maladaptive adjustment to bereavement, which is characterized by severe protracted grief symptoms that exceed sociocultural and religious norms. It causes significant impairments in daily life functioning. Present diagnostic criteria comprise of the two core symptoms - intense yearning and preoccupation with thoughts and/or memories of the deceased person (American Psychiatric Association, 2022; World Health Organization, 2019). Of these core symptoms, at least one needs to be present in addition to at least three of eight additional symptoms (such as identity disruption, intense loneliness) to fulfil DSM-5-TR criteria. While the core criteria remain the same, the ICD-11 specifies manifestations of emotional pain as their accessory symptom cluster, which may be presented in the form of at least one of ten different symptoms. The criteria sets differ in the number of accessory symptoms as well as the symptoms in themselves. This is attested by Eisma and colleagues (2022) finding limited content overlap between these two diagnostic criteria sets. This indicates that diagnostic criteria of the same disorder may not be measuring the same construct across diagnostic systems. Additionally, there is inconsistency in the timing criteria between the ICD-11 and DSM-5-TR, with the DSM-5-TR specifying that diagnosis can apply at least twelve months post-bereavement, while the ICD-11 uses a six-month criterion. These clear differences in criteria originate from a history in which multiple conceptualizations of pathological grief existed.

For example, past pathological grief criteria such as “complicated grief” (Horowitz et al., 1997) or the PGD criteria of 2009 (Prigerson et al., 2009) had much more stringent criteria, requiring more symptoms to be met for diagnosis, which was criticized for being too restrictive (Aoun et al., 2021; Bonnano & Malgaroli, 2020). Timing criteria went through

multiple proposals and this issue has still not been resolved (American Psychiatric Association, 2022; Jacobs et al., 2000; Prigerson et al., 2021a; Stroebe et al., 2000). Symptom criteria have been dropped, added, and adapted over time (American Psychiatric Association, 2022; Jacobs et al., 2000; Prigerson et al., 2021a; Stroebe et al., 2000). These changes in criteria were the result of efforts to arrive at the most valid, clinically relevant criteria (Bonnano & Malgaroli, 2020; Killikelly & Maercker, 2017; Prigerson et al., 2021a). Still, the differences lead to very different looking criteria and different content, with Eisma and colleagues (2022) finding only modest content overlap between previous pathological grief criteria and the current PGD criteria. These dissimilarities in content mean that past research has focused on different constructs in conceptualizing pathological grief, which is why it is important to test the validity of the two new constructs.

One such validity measure would be test-criterion validity, which assesses the extent to which relationships are found between the construct (PGD) and theoretically relevant variables (American Educational Research Association, 2014). A disorder, as per definition, impacts your life in a negative way, as, across diagnostic systems, it is assumed to cause functional impairment. With this current study using subjective self-report measures, we are evaluating perceived functional impairment and seeing if it is predicted by pathological grief scores. By connotating prediction, we are assessing predictive test-criterion validity, which allows us to determine if PGD symptoms can forecast longitudinal changes in perceived adverse life consequences in addition to a general association. The construct used to measure impairments and impact on life and thereby verify test-criterion validity will be Quality of Life (QoL).

There is no consensus-based definition of QoL. However, most researchers agree it is a subjective measure of health in domains that are crucial to the overall perceived standard of life. The World Health Organization (WHO) names the four domains: physical health (e.g.,

"How satisfied are you with your health?"), 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., "How satisfied are you with the conditions of your living place?") (Schmidt et al., 2005). The combination of these four concepts make up QoL. This compendium has been frequently used to evaluate the health consequences of physical diseases and mental disorders (Martin et al., 2019; Mendlowicz & Stein, 2000), thereby providing evidence for the maladaptive nature of a disorder. This can provide insights into treatment as well as describe how successful a treatment has been. The use of QoL has not been limited to establishing effects of treatments and unrelated disorders, but previous iterations of pathological grief were also analysed by using QoL measures as a criterion.

Research on past iterations of pathological grief have shown a clear negative concurrent association between pathological grief symptoms and QoL. Silverman et al. (2000) found pathological grief (versus non-pathological grief) to be associated with lower scores across all domains of QoL. Mason and colleagues (2021) had QoL be previously defined by individuals diagnosed with pathological grief through a semi-structured interview, before assessing similar associations to that of Silverman and colleagues (2000). The participants named similar domains of QoL to that of the WHO (Schmidt et al., 2005), thus providing evidence for the relevance of the definition used in this study. Research using a network approach also observed the aforementioned relationship as well as relationships between individual pathological grief symptoms and specific QoL domains (Macallum & Bryant, 2020). However, these studies were cross-sectional in nature and thereby could only provide evidence for associations and by extension concurrent test-criterion validity of past conceptualizations of pathological grief.

Boelen and Prigerson (2007) found evidence for a longitudinal effect of pathological grief on QoL, when controlling for baseline depression and anxiety symptoms. Their data was measured at three separate time points (T2: six months after initial measurement; T3: fifteen months after initial measurement). While they measured baseline levels for the proposed pathologies, they neglected to do so for QoL making it difficult to assess for changes in QoL predicted by pathological grief. Similar longitudinal associations between pathological grief and the psychological domain of QoL, independent of depression, were found by Tsai et al. (2020). However, they also failed to control for baseline levels of their dependent variable. With past research on the relationship between QoL and pathological grief finding overall negative associations concurrently and longitudinally, the following hypotheses will test if such associations can also be found using present PGD conceptualizations.

We had two main hypotheses. First, that there is a significant negative correlation between ICD-11 PGD symptoms and QoL scores as well as a significant negative correlation between DSM-5-TR PGD symptoms and QoL scores concurrently. The testing of this hypothesis allows us to evaluate if prolonged grief symptoms are associated with perceived functional impairment, thereby assessing concurrent test-criterion validity. In addition to the cross-sectional analysis, we will investigate longitudinal relations between the pathological grief variables and QoL. Contrary to Boelen and Prigerson (2007) we will control for baseline QoL in the longitudinal analyses. This allows us to establish if our second hypothesis, that ICD-11 and DSM-5-TR PGD symptoms significantly predict QoL changes over time, is supported. These hypotheses will enable us to analyse both the covariance and temporal precedence aspects of causality, giving us a deeper insight into the possible relationship between these new pathological grief constructs and 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 pathological 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 and 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, β = -.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 current iterations of pathological grief criteria, found in the ICD-11 and DSM-5-TR, differ from past criteria; in timing criteria, the number of symptoms and the content of symptoms (American Psychiatric Association, 2022; Jacobs et al., 2000; Prigerson et al., 2021a; Stroebe et al., 2000). This raises questions about the validity of the present pathological grief constructs. For example: Does evidence for validity regarding past criteria sets also generalize to the current criteria sets? This study aims to assess this question by evaluating concurrent and predictive test criterion validity of the new PGD symptom sets. This is done by testing the relationship between prolonged grief symptoms and a theoretically relevant variable, in this case QoL.

To assess concurrent test-criterion validity, the hypothesis that “ICD-11 and DSM-5-TR symptoms are significantly negatively associated with QoL at baseline” was tested. Past research consistently showed significant negative correlations between pathological grief

symptoms and QoL (Macallum & Bryant, 2020; Mason et al., 2021; Silverman et al., 2000), making QoL a relevant criterion. The results of this study supported the hypothesis through significant moderate negative correlations (Cohen, 1988) being found across both regressions. This implies that the ICD-11 and DSM-5-TR criteria potentially measure a psychopathology of clinical importance, as its symptoms covary with greater quality of life impairments. While the existence of a relationship can be determined through simple cross-sectional design, longitudinal analyses can provide a more complete picture of a relationship.

To assess predictive test-criterion validity, the hypothesis that "ICD-11 and DSM-5-TR symptoms would significantly predict changes in QoL over time" was tested. To be able to isolate the effects of baseline pathological grief symptoms on future QoL, we controlled for baseline QoL. This study finds evidence for the predictive test-criterion validity of prolonged grief symptoms on QoL, by showing that both types of prolonged grief symptoms significantly predict small changes in QoL at T2 and T3. The relatively small size of this effect may be due to the stringent nature of our analysis, where we added pathological grief symptoms to the model after baseline QoL, meaning that all shared variance was accounted to baseline QoL. The findings of a longitudinal relationship between prolonged grief and QoL corresponds with that of previous research on previous pathological grief proposals (Boelen & Prigerson, 2007; Tsai et al., 2021). However, this is the first study to have controlled for baseline QoL when examining this relationship. The significant effects therefore imply that we established temporal precedence in the relationship between ICD-11 and DSM-5-TR prolonged grief symptoms and quality of life, supporting predictive test-criterion validity

The evidence for the test-criterion validity discussed above, may have clinical implications in both treatment and research. PGD has only recently been added to the two most prominent diagnostic classification systems (ICD-11 and DSM-5-TR) amidst criticism of lacking content overlap with past criteria and each other (Eisma et al., 2022; Haneveld et

al., 2022), making all assessments for validity vital to justify its inclusion in these handbooks. Test-criterion validity has not been previously assessed for present pathological grief criteria with QoL as the criterion. Finding test-criterion validity evidence for ICD-11 and DSM-5-TR PGD symptoms on QoL comparable with past studies on previous iterations of pathological grief (Boelen & Prigerson, 2007; Macallum & Bryant, 2020; Mason et al., 2021; Silverman et al., 2000) helps lessen concerns about the validity of current criteria sets by providing evidence for the two constructs' maladaptive natures. The addition of evidence for temporal precedence to that of covariance suggests the realisation of two of the three causality criteria (Oppewal, 2010) for prolonged grief symptoms on QoL. This makes an even stronger argument for the maladaptive nature of prolonged grief. The compelling evidence for predictive test-criterion validity shows that both conceptualisations of PGD and their criteria have clinical utility in the sense that they can predict the lowering of QoL in the bereaved population, while being arguably less restrictive, more accessible and more sensitive to longitudinal change in symptoms than previous criteria (Aoun et al., 2021; Bonnano & Malgaroli, 2020; Killikelly & Maercker, 2017; Prigerson et al., 2021a).

However, having multiple measures for the same psychopathology can lead to problems. The ICD-11 and DSM-5-TR PGD criteria should measure the same construct, otherwise at least one of them is not measuring what they claim to measure, creating problems for validity. This form of validity is called convergent validity. Prior studies have addressed this question, with Eisma and colleagues (2022) finding lacking content overlap between the two criteria sets. To assess evidence for this, we applied a rule conceptualized by Cumming (2009) to compare the predictive ability of the ICD-11 symptoms and DSM-5-TR symptoms on change in QoL. We found the confidence intervals of their effect sizes on predicting QoL at T2 and T3 to be nearly identical. This provides some evidence for the convergent validity of the two constructs. Still, more research is needed to make conclusions

about convergent validity on other relevant characteristics, before the two criteria sets can be used interchangeably.

There is evidence for concurrent test-criterion validity of ICD-11 PGD symptoms on general mental distress, depressive symptoms and suicidality (Boelen et al., 2018; Comtesse et al., 2020). Boelen and colleagues did not find evidence for predictive test-criterion validity of ICD-11 PGD symptoms on depressive symptoms and PTSD symptoms. However, both Boelen et al. (2018) and Comtesse et al. (2020) did not use validated instruments to measure ICD-11 PGD symptoms, raising validity issues. A review by Prigerson and colleagues (2021b) found significant results in their attempt to assess concurrent and predictive test-criterion validity for DSM-5-TR PGD symptoms on anxiety symptoms, depressive symptoms, suicidality, and PTSD symptoms. But the studies used in the review did not have test-criterion validity assessment in mind when creating their studies, therefore their findings do not directly relate to criterion validity. Additionally, there was no mention of controlling for baseline levels of their dependent variables in their analysis. Our study adds to these findings by providing evidence for both concurrent and predictive test-criterion validity using validated instruments for the present symptom sets on another clinically relevant variable, QoL.

Strengths, limitations and directions for future research

The biggest strength of this particular study is its design. The longitudinal design allows for a deeper insight into the relationship between the constructs PGD and QoL. Due to all relevant measurements (ICD-11 criteria, DSM-5-TR criteria, and EUROHIS-8-item index) being taken across all time periods, we can statistically control for baseline QoL allowing us to establish temporal precedence in this relationship. This is something which had not previously been investigated for these particular variables.

Nevertheless, there are some limitations to keep in mind. Firstly, to fulfil the remaining criteria of causality (Oppewal, 2010), no spuriousness, requires third variables to be controlled through an experimental setting. By collecting data using self-report questionnaires and not manipulating any variables through an experiment, we are not able to fulfil this requirement. Still, satisfying this requirement has been a notorious obstacle in clinical psychology due to obvious ethical implications. An experiment necessitates the manipulation of independent variables and when the variables in mind are bad for the participants, in this case pathological grief symptoms, one needs to ethically induce the state while also consistently alleviating the symptoms afterwards.

However, a way to get around the lack of control on third variables would be utilizing statistical control. By controlling for baseline QoL we were able to provide strong evidence for predictive test-criterion validity for the relationship between pathological grief symptoms and QoL. Statistically controlling for other possible variables will in time allow for a more isolated view on the relationship between PGD and QoL. An example of this would be Boelen and Prigerson´s study (2007) which looked to find an effect between PGD and QoL over time whilst controlling for depression and anxiety symptom levels.

Secondly, to be able to incorporate people who might potentially meet ICD-11 and DSM-5-TR criteria, we needed select participants from our sample, only including individuals who have been bereaved for twelve months or more. While this is needed to be able to validly use the DSM-5-TR criteria findings as its time criteria specifies these twelve months since loss, the ICD-11 is less stringent only requiring six months since loss. This selection has the effect of lowering the power of our study by reducing our sample size.

Thirdly, another potential variable affected by the strict implementation of the time criteria is baseline QoL. Only including individuals who were assessed at least 12 months

since bereavement means that we have no QoL values before onset of the psychopathology. This could mean that by the time we measured the participants, pathological grief´s effect on QoL could have already occurred. This would be especially problematic due to the sequential nature of our longitudinal analysis, where we added pathological grief symptoms as a predictor after baseline QoL. We could be partialing out the effect we are trying to measure. This could help explain the small effect sizes in the longitudinal analysis in contrast to the strong correlations between pathological grief symptoms and QoL at baseline level in our initial cross-sectional analysis. This argument rests on the assumption that the relationship between pathological grief symptoms and QoL changes over time, which has not been empirically verified. Therefore, we recommend future research to test this hypothesis through a longitudinal analysis with a higher frequency of testing allowing for more sensitivity in temporal changes within this relationship.

Fourthly, females made up 92 percent of the sample. This could be problematic due to there being evidence for gender differences in the outcomes of bereavement (Stroebe, 1998). However, it should be noted that women make up a higher percentage of the bereaved population (Aoun et al., 2015) and this gender unbalance is characteristic of research on grief (Eisma & Stroebe, 2021). Still, this overrepresentation potentially affects the generalizability of this study. Consequently, we suggest future efforts to be allocated to testing for gender differences in the relationship between pathological grief symptoms and QoL.

Lastly, the attrition rate is high in this study, with only 38 percent of the initial sample completing all measurements across all three time periods. To investigate this, a dropout analysis was conducted showing that the subpopulations being bereaved through suicide and being female were overrepresented in dropouts. The subgroup being bereaved through suicide having higher attrition rates could be problematic since traumatic loss has been linked with higher pathological grief symptoms (Holland & Neimeyer, 2011). What somewhat weakens

this argument is that higher levels of pathological grief symptoms themselves were not linked with attrition, making it more likely that this attrition did not have a substantial effect on our data. Additionally, the one participant bereaved through murder dropped out, leading us to have no data on this particular subgroup of bereaved adults.

Despite these limitations, this study has led to an increase in understanding of PGD. It has provided evidence for the existence of a relationship between prolonged grief symptoms, as defined by ICD-11 criteria and DSM-5-TR criteria, and QoL. As well as provided evidence for temporal precedence in this relationship, by finding pathological grief symptoms to be predictive of changes in QoL. The strong similarities in the predictive ability observed between the two PGD criteria on QoL suggest that the differing criteria sets may have similar characteristics. This works towards dissuading the impact of the findings of lacking content overlap by Eisma and colleagues (2022). However, the inconsistent findings between criteria sets of predictive test-criterion validity on other clinically relevant variables (Boelen et al., 2018; Comtesse et al., 2020; Prigerson et al., 2021b) warrants further attention. Nevertheless, with these findings in mind, we recommend the latest criteria to be used. This is due to the beforementioned inherent advantages in clinical utility to past criteria (Aoun et al., 2021; Bonnano & Malgaroli, 2020; Killikelly & Maercker, 2017; Prigerson et al., 2021a), as well as the accumulated evidence of convergent and test-criterion validity found by this study and others (Boelen et al., 2018; Comtesse et al., 2020; Prigerson et al., 2021b).

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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

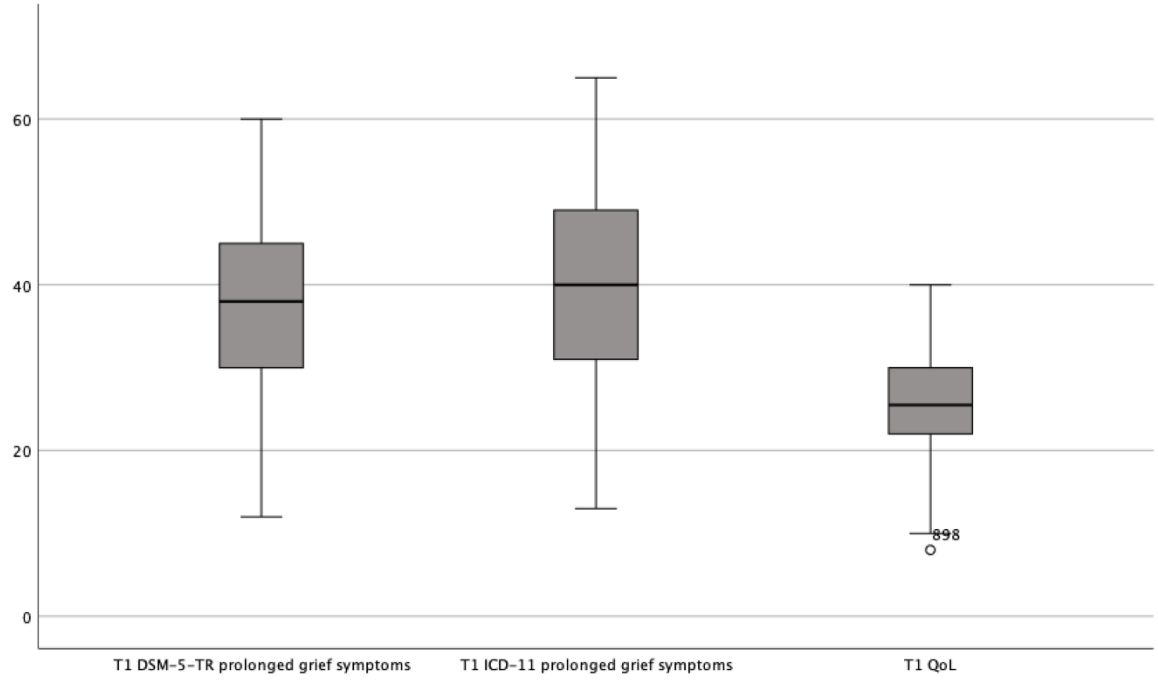
Supplemental Table 4

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

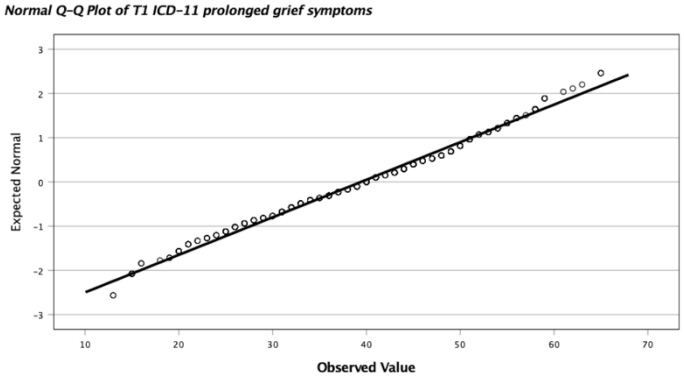
Supplemental Figure 1

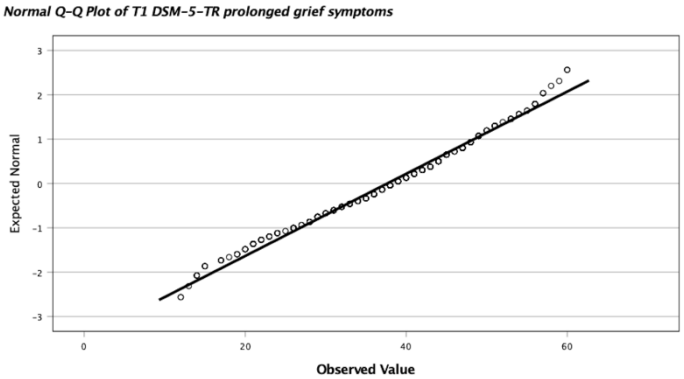
Boxplots for T1 DSM-5-TR Prolonged Grief Symptoms, T1 ICD-11 Prolonged Grief Symptoms, and T1 QoL

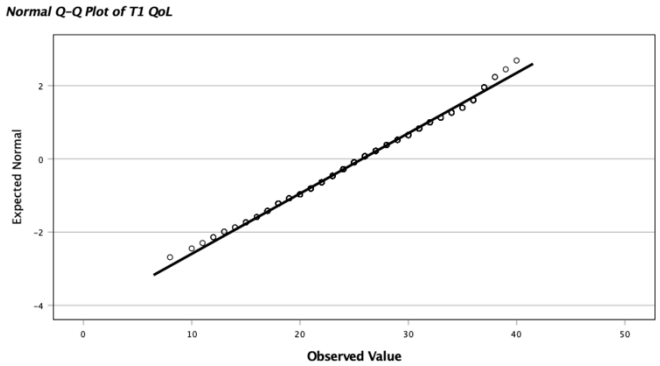


Supplemental Figure 2

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

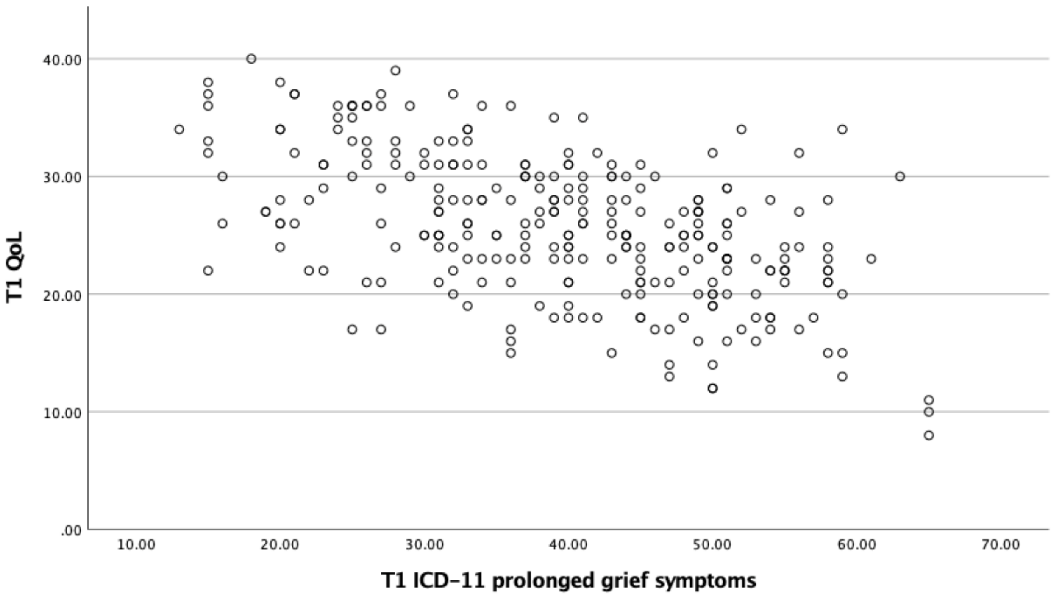


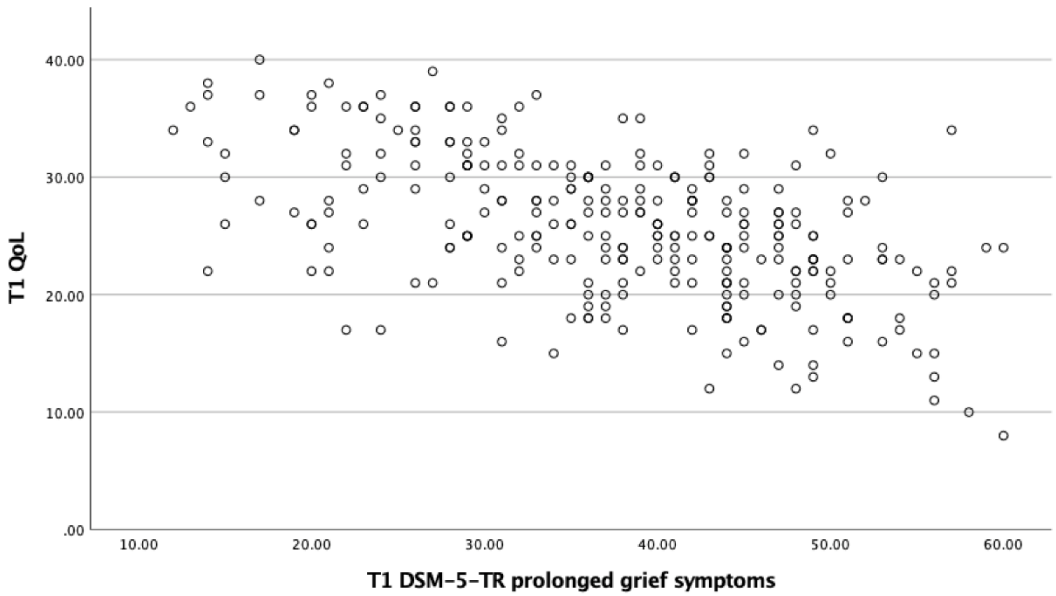




Supplemental Figure 3

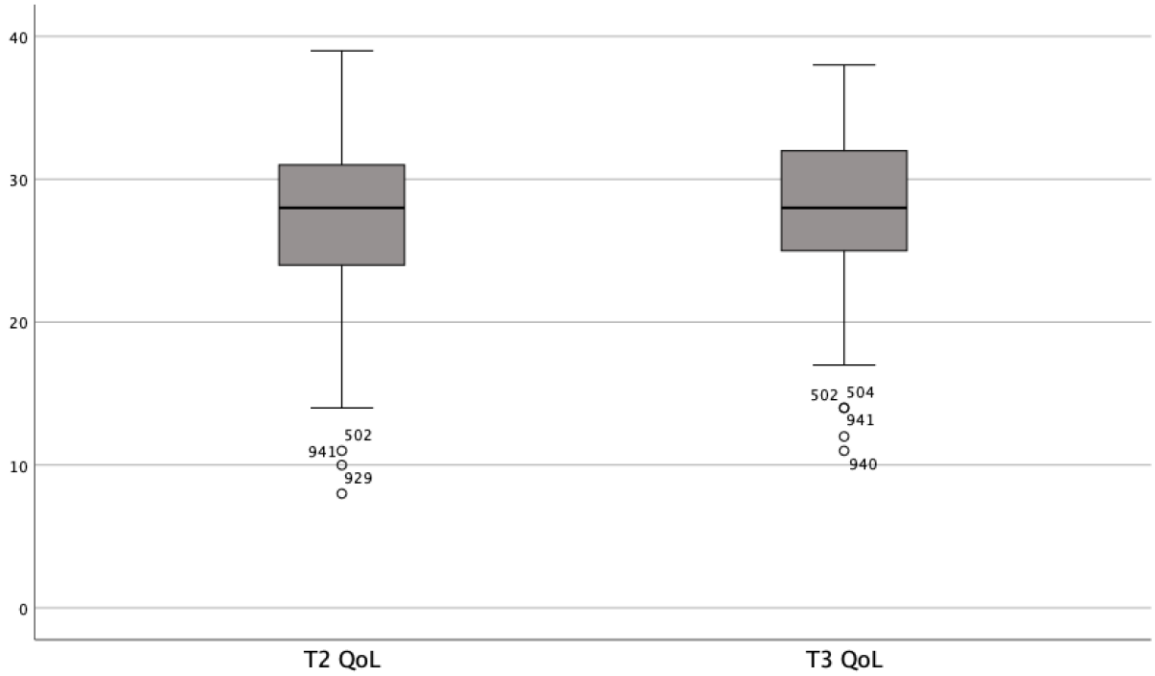
Scatterplots Showing the Relationship between T1 ICD-11 Prolonged Grief Symptoms and T1 QoL, and between T1 DSM-5-TR Prolonged Grief Symptoms and T1 QoL





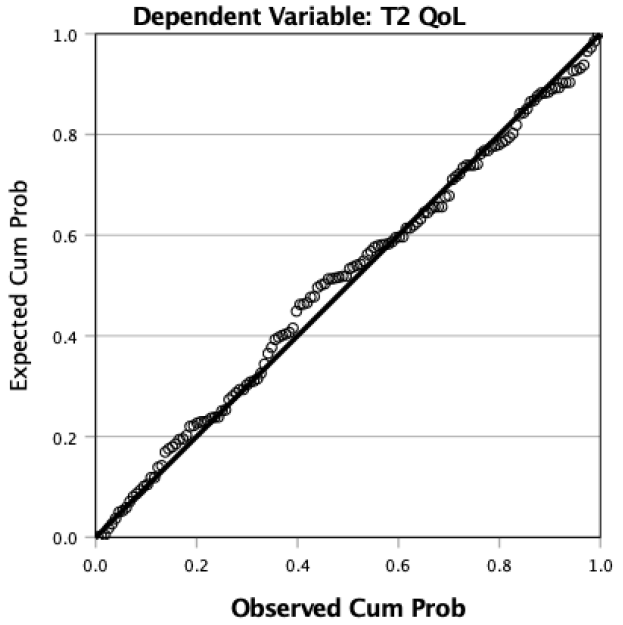
Supplemental Figure 4

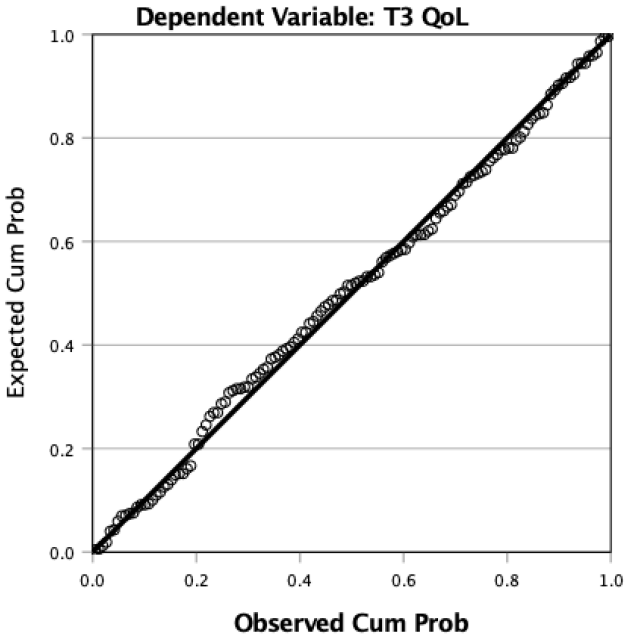
Boxplots for T2 QoL and T3 QoL



Supplemental Figure 5

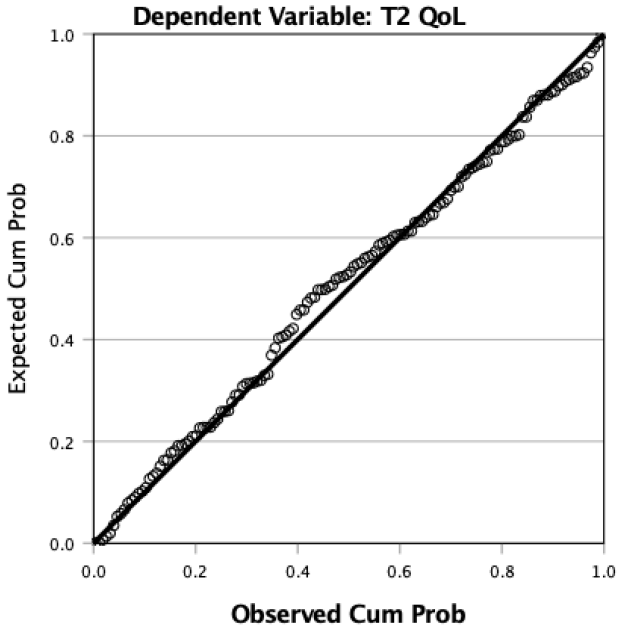
Normal PP-plots for T2 QoL and T3 QoL with T1 ICD-11 Prolonged Grief Symptoms

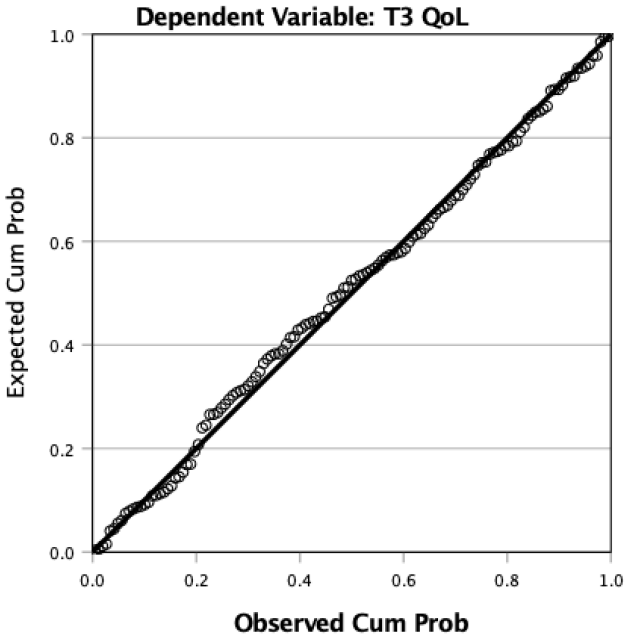




Supplemental Figure 6

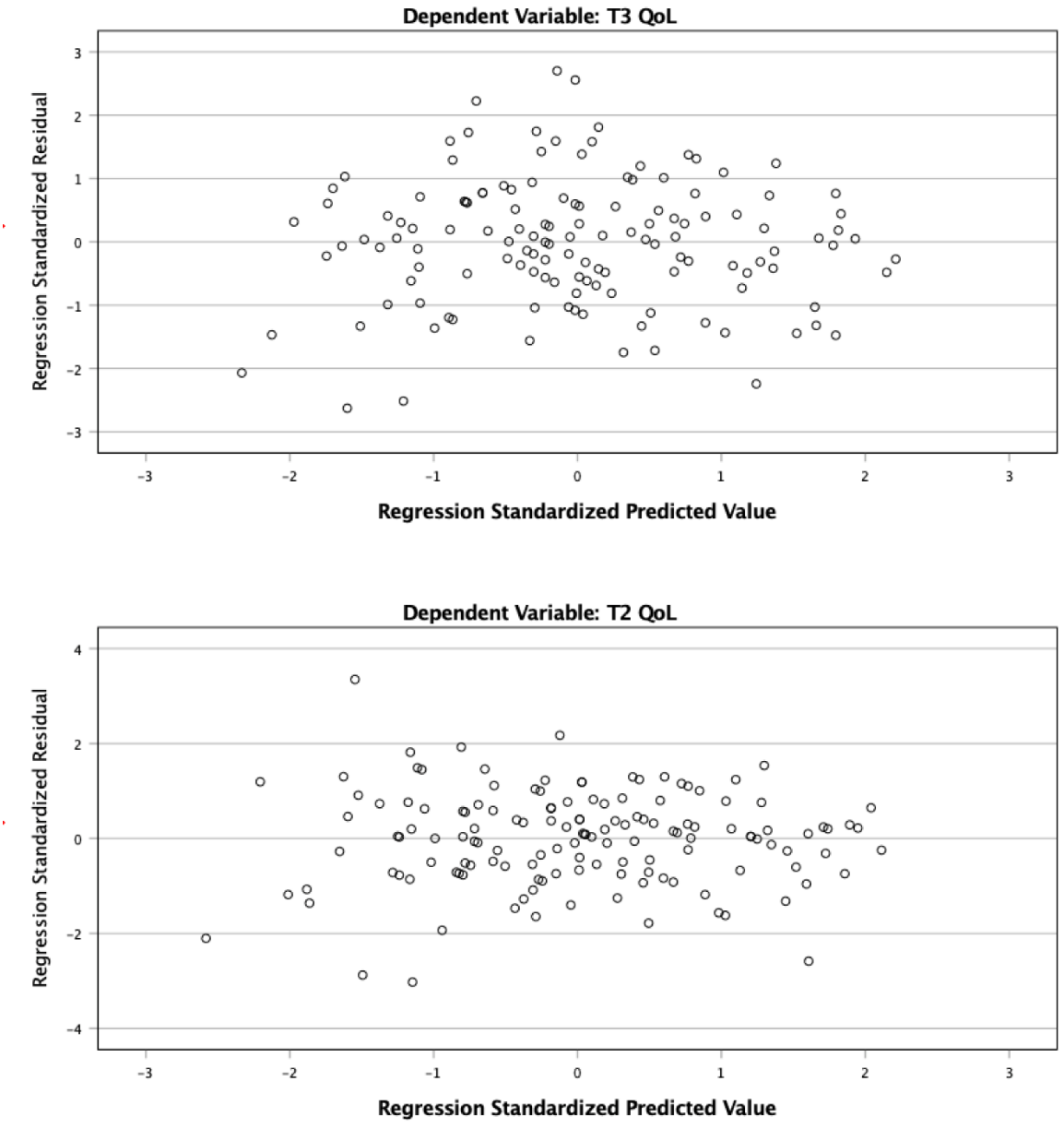
Normal PP-plots for T2 QoL and T3 QoL with T1 DSM-5-TR Prolonged Grief Symptoms





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