The Relationship Between the Big Five Personality Traits and Complicated Grief: A systematic Review

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Abstract

Complicated grief (CG) is a more intense and prolonged grief state associated with a higher risk of suicidality and impairments in the quality of life. Successfully identifying risk factors behind CG symptoms is imperative for developing effective treatment options and to better understand this condition. The Big Five personality traits, (neuroticism, extraversion, conscientiousness, agreeableness and openness to experience), are potential risk or protective factors in the development of CG symptoms. Currently, there is no comprehensive review charting the nature of this relationship. We pre-registered a systematic review (CRD42022373078) to identify quantitative findings on the relationship between Big Five personality traits and CG symptoms. To do so, we searched PsycInfo, PubMed, and Web of Science and identified 16 studies (3470 participants), with bereaved adult samples, written in English and peer-reviewed, which studied the relationship between Big Five personality traits and CG symptoms. Results showed that the focus of the majority of studies (15) was on the relationship between the trait neuroticism and CG symptoms. Neuroticism appeared to be concurrently positively associated with CG symptoms. However, neuroticism was longitudinally associated with CG symptoms only in uncontrolled studies. Our findings suggest that neuroticism may play a role in the development of CG symptoms, but that alternative explanations cannot be ruled out, and the other four traits have not been sufficiently researched. More research is needed to better understand longitudinal relationships between Big Five personality traits and CG symptoms, and their potential clinical implications.

Keywords: Complicated grief, Big Five personality traits, neuroticism, CG treatment

The Relationship Between the Big Five Personality Traits and Complicated Grief: A Systematic Review

Grief is a universal reaction to death, observed across cultures and populations (Rosenblatt, 2008). However, a minority of people can experience more intense and protracted grief in response to bereavement, a condition sometimes referred to as complicated grief, prolonged grief or traumatic grief (Prigerson et al., 2021). For clarity, we will use only the term complicated grief across this review.

Complicated grief (CG) differs from "normal" grief in its intensity, prolonged duration and its related impairments in various areas of life (Eisma & Stroebe, 2021). CG is associated with a higher risk of suicidality, a general reduction in the quality of life, and negative psychological consequences, such as anxiety, depression and post-traumatic stress (Komischke-Konnerup, 2021; Latham & Prigerson, 2004; Prigerson et al., 2021). Over the past decades, manifestations of CG have been extensively studied, and this has recently resulted in two official diagnoses, termed prolonged grief disorder (PGD) (Prigerson et al., 2021). The diagnoses have been included in the major diagnostic handbooks, the International Classification of Diseases 11th (ICD-11, World Health Organization, 2018) and the Diagnostic and Statistical Manual 5th Text Revision (DSM-5-TR, American Psychiatric Association, 2022). It is estimated that one in ten bereaved individuals is at risk of developing PGD (Lundorff et al.2017) and amongst its listed symptoms we find yearning for the deceased loved one, being preoccupied with the deceased, intense emotional pain and psychosocial impairment, all lasting at least six months (Killikelly & Maercker, 2017; Prigerson et al., 2021).

Currently, there are some efficacious treatment options for CG, but they are in need of further development. In their review, Doering and Eisma (2016) showed that, although antidepressants can sometimes reduce CG symptoms, there is no pharmacological treatment

that specifically targets this condition. Moreover, psychotherapeutic approaches, such as cognitive behavioural therapy (CBT) and CBT for CG, are associated with reductions in CG symptoms (Doering & Eisma, 2016). However, these treatments do not seem to work for everyone. There is currently no consensus over which specific type of treatment is potentially the most effective and in which contexts or for which populations. When developing targeted treatment it is important to truly understand the psychological condition that needs to be addressed. Currently, we still do not know the underlying mechanisms of CG and who exactly is potentially more are risk of developing this condition. In order to understand CG mechanisms, and consequentially being able to develop better treatments options, it is important to investigate potential risk and protective factors that could lead to this condition. Amongst the potential risk factors investigated by other researchers, recurrent themes are sociodemographic and loss-related variables, emotion regulation, attachment styles and personality traits (Eisma & Stroebe, 2021; Newson, 2011; van der Houwen, 2010; Wijngaards-de Meij, 2007). We will focus on the latter in this systematic review.

Broadly speaking, personality traits are assumed to predispose people to certain healthy or unhealthy behaviours (e.g. coping strategies) which results in the development of mental disorders (Duggan et al., 2003). There are many theories about personality, but one of the most prominent is the five factors model (FFM) of personality (McRae & Costa, 1999). The FFM (or Big Five model), suggests that individuals' personality consists of the combination of five main traits: openness to experience, extraversion, conscientiousness, agreeableness, and neuroticism. Openness to experience defines how much someone is open-minded and willing to try new things; extraversion is the tendency to seek other people and be sociable; conscientiousness is the extent to which someone is reliable and responsible; agreeableness reflects the tendency to be cooperative and considerate towards others; lastly, neuroticism indicates a person's tendency to experience stress and negative emotions (Costa

& McCrae,1992). We choose to focus on the FFM because the traits described in this model have been consistently associated with general mental disorders as well as therapeutical outcomes (Kennair et al. 2020; Lamers et al., 2012).

According to a meta-analysis by Malouff et al. (2005), high neuroticism, low conscientiousness, low agreeableness and low extraversion is the typical pattern of personality traits associated with mental disorders. Specifically, neuroticism seems to be consistently studied as a potential personality risk factor for mental disorders. Most mental disorders, anxiety and depression disorders in particular, are characterised by negative affectivity, a tendency to experience negative emotional states (Watson & Clark, 1984). Similarly, people who score high on neuroticism tend to be more sensitive to negative emotionality and stress, on average experience more negative life-events, and tend to be more likely to use poor coping mechanisms resulting in more stress (Lamers et al., 2012; Malouff et al., 2005). On the contrary, extraversion, agreeableness, openness to experience and conscientiousness might constitute protective factors against the development of mental health problems, as they are generally related to positive emotions and emotional or psychological well-being (Lamers et al., 2012). Specifically, people who score high on extraversion tend to experience more positive life events, report higher levels of positive emotions in social situations and tend to engage more in social events to increase positive emotions (Lamers et al., 2012).

The Big Five personality traits are also associated with treatment outcomes for general mental disorders, especially mood disorders. Effective treatment of anxiety disorders is correlated with a reduction in neuroticism and increases in extraversion and openness to experiences (Kennair et al., 2020). Treatments that specifically target neuroticism can focus for example on reducing stress reactivity and stress sensitivity amongst other things (Armstrong & Rimes, 2016). To do so, therapists can employ mindfulness strategies (e.g. home diaries) to make their clients more aware of their bodily sensations and more in control

of how they react to stress (Armstrong & Rimes, 2016). In addition, cognitive behavioural interventions targeting general personality characteristics showed that reductions in neuroticism and increases in extraversion predicted decreased depression and anxiety symptoms, as well as decreased functional impairments (Carl et al., 2014). These findings suggest that Big Five personality traits may be risk or protective factors involved in treatment outcomes for general mental disorders. Investigating the Big Five personality traits as risk or protective factors for CG symptoms has the potential to help identifying individuals who are more vulnerable to developing CG symptoms. Consequentially, studying risk and protective factors can potentially help in developing targeted treatments for CG symptoms.

Importantly for current purposes, there is some tentative evidence that personality traits might play a role also in the development and maintenance of CG. However, findings appear mixed. For example, Goetter et al. (2019) found that individuals with CG symptoms, versus individuals without CG symptoms, had elevated levels of neuroticism and lower levels of extraversion, agreeableness and conscientiousness. Boelen and Klugkist (2011) showed that higher levels of neuroticism correlated positively with CG symptoms severity, but they did not investigate other personality traits. Eisma et al. (2015), on the other hand, found no support for longitudinal effects of neuroticism on CG symptoms, whilst controlling for baseline symptoms. The latter finding suggests that neuroticism may not affect CG symptoms change in bereaved adults. These contrasting findings suggest that it would be useful to further clarify the concurrent and longitudinal associations of the Big Five traits with CG symptoms.

Despite the potential theoretical and clinical importance of the Big Five personality traits in CG symptoms and mixed findings, there is no review that has systematically charted the nature of these relationships. In this review, we will gather and summarise previous findings on the relationships between Big Five personality traits and CG symptoms. Our aim

is to offer an unbiased and comprehensive review of empirical findings on these associations in quantitative studies with samples of adult bereaved individuals. By summarising previous findings within a single review, we hope to highlight gaps in previous evidence and offer better insight on the relationship between Big Five personality traits and CG, ultimately, providing clues for improving CG treatments in the clinical practice.

Methods

Preregistration

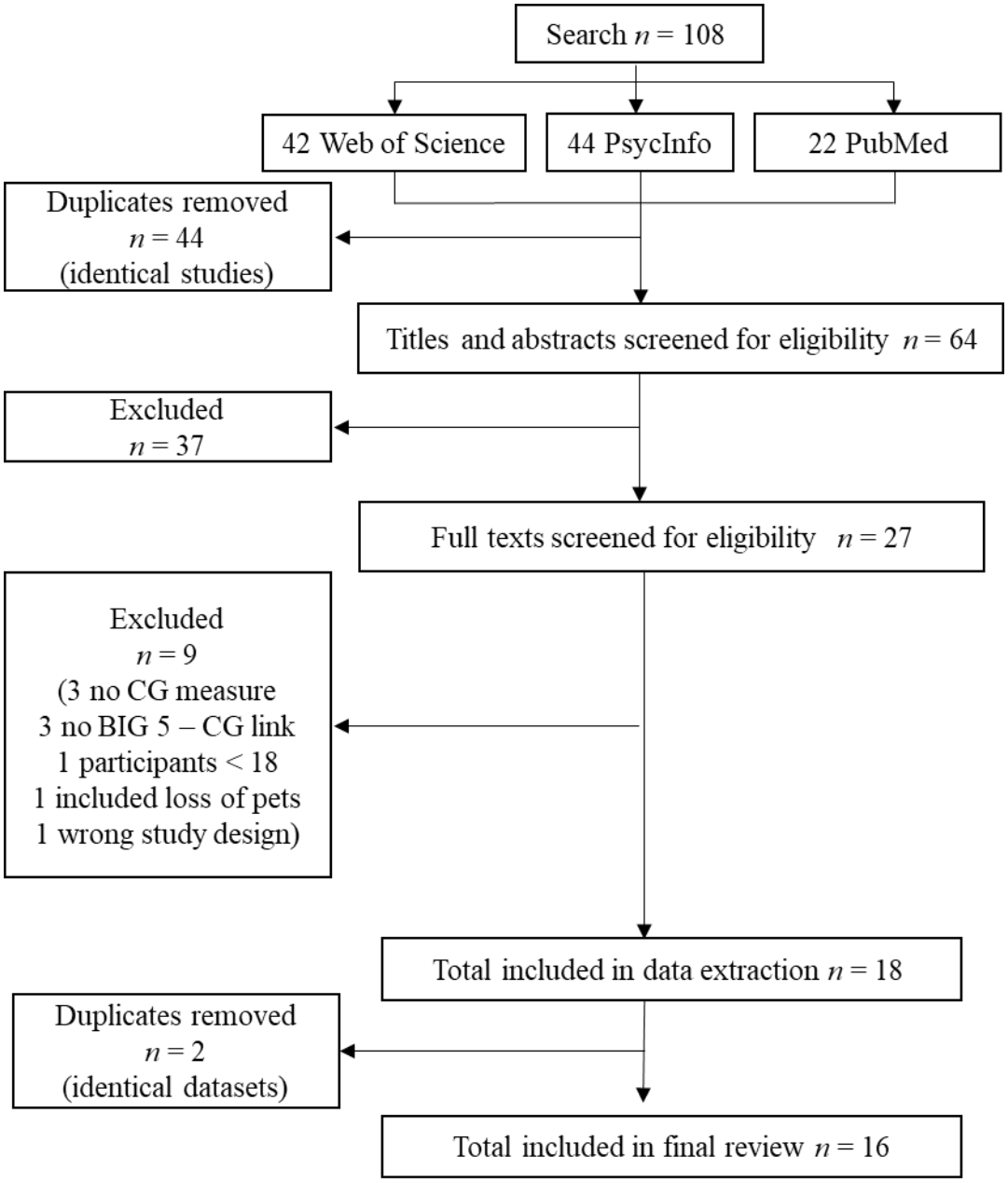
This systematic review was pre-registered at PROSPERO, an international database for prospective systematic reviews, under the registration number CRD42022373078. The review was written in accordance with PRISMA guidelines (Page et al., 2020). A checklist can be found in Appendix A.

Search Strategy

We searched three databases, PubMed, PsycInfo and Web of Science. We used the following string of keywords for CG and Big Five personality traits: "prolonged grief" OR "complicated grief" OR "persistent complex bereavement disorder" OR "pathological grief" OR "traumatic grief" OR "prolonged grief disorder" OR PCBD OR PGD AND "Big Five" OR "Big 5" OR "five factor model" OR FFM OR neuroticism OR "emotional stability" OR extraversion OR extroversion OR agreeableness OR "openness to experience" OR conscientiousness OR intraversion OR introversion. The search, conducted November 17th 2022, resulted in the identification of 108 papers, of which 44 duplicates were removed. The screening of articles was done independently by both reviewers. Conflicts were discussed until an agreement was reached. Thirty-seven of 64 articles were found to be irrelevant after screening titles and abstracts. The remaining 27 studies were reviewed in full, which resulted in a final number of 18 articles included for data extraction. Figure 1 displays the screening process in a flowchart.

Figure 1

PRISMA Flowchart of Literature Search



Inclusion and Exclusion criteria

In order to ensure study quality and allow for easier interpretation of study findings, we included only peer-reviewed articles written in English language reporting on quantitative data. Given the purpose of the review, we included only studies with a sample of bereaved adults who experienced the death of a spouse, family member, or close friend. Studies in which the participants experienced other losses (e.g. the loss of a pet, romantic relationship

breakup) were excluded. To ensure that individual studies would at least show sufficient power to detect very strong correlations (r = .80) (Cohen, 1988), solely studies with a sample size of at least 20 bereaved participants were included (Eisma & Stroebe, 2021). The papers needed to include at least one standardized measure of the Big Five personality traits (e.g., HEXACO Personality Inventory-Revised (HEXACO-PI-R), Ashton et al., 2004; NEO Personality Inventory-Revised (NEO PI-R), Costa & McCrae, 1992). Additionally, the studies had to include one or more standardized measure of CG symptoms. Since the Inventory of Complicated Grief (ICG) (Prigerson et al., 1995), the first validated CG symptom instrument, was published in 1995, studies published before that year were excluded from the review. Lastly, at least one statistical association between the Big Five personality traits and CG symptoms had to be reported in the paper.

Data extraction procedure

We extracted sample characteristics (e.g. sample size, country of origin, gender, mean age), bereavement characteristics (e.g. cause of death, mean time since death, relationship to the deceased), information on the study design (i.e. cross sectional survey or longitudinal survey), characteristics of the Big Five personality trait and CG measures (e.g. name of the instrument, number of items, mean scores, Cronbach's alpha), and statistical associations between the two constructs. Two students conducted the data extraction individually and disagreements were discussed until they were resolved. If needed, a third rater helped make a final decision. Initial interrater-agreement across all extracted data was 95%. The quality of the studies was assessed individually using six relevant items of the Manual for Quality Scoring of Quantitative Studies (Alberta Heritage Foundation for Medical Research; Kmet et al., 2004). Disagreements were discussed between the raters. The selected criteria were: (1) sufficient description subjects characteristics (and comparison group, if applicable), (2) appropriate sample size, (3) analytic methods described, (4) outcomes and means of measures

well defined and reported, (5) results reported in detail, (6) conclusions supported by results relevant for this review. The rest of the items included in the manual were not considered applicable for the included studies and were therefore not included in the quality assessment. We did not conduct a meta-analysis due to the expected high heterogeneity of the sample and study characteristics, as well as statistical analyses in each study. Furthermore, we did not anticipate a sufficient amount of studies for a meta-analysis on the topic of the relationship between most of the Big Five personality traits and CG symptoms. For these reasons, we deemed a qualitative summary to be a more appropriate way to synthesize knowledge.

Results

The final 16 studies included in this review reported on a total of 3470 bereaved individuals. Eight studies were cross-sectional (50%) and eight were longitudinal (50%). Five of the eight longitudinal studies also reported on cross-sectional data.

The main unweighted sample characteristics across all studies are the following: participants were on average 46.56 years old and predominantly female (78%). Only one study did not report the gender of the participants. All studies reported on the relationship to the deceased, with the most reported losses being the loss of a partner (40%), parents (19%) or child (14%). Fourteen studies reported on the cause of death. Causes of death were split into nonviolent causes (78%), such as illness or unexpected medical causes, and violent causes (22%), such as accident, murder and suicide. The mean time since loss was reported in 12 studies and the average time at baseline was 10.71 months, ranging from 10.62 weeks to 9.8 years.

Fourteen studies focused only on the relationship between neuroticism and CG symptoms (88%), with only one study investigating the relationship between all five of the Big Five personality traits and CG symptoms (6%) and one study specifically investigating the relationship between openness to experience and CG symptoms (6%).

Quality Assessment

Table 1 reports on study quality assessment. Sample characteristics were sufficiently and accurately described in approximately 69% of the studies. Studies did not meet this criterion if they failed to report on one or more of the extracted sample characteristics, such as the cause of death or the relationship to the deceased. Eighty-seven percent of the studies recruited a substantial sample size. Whilst still meeting the inclusion criterion of N > 20, Goetter et al. (2018) and Burke et al. (2019), recruited a relatively small sample size, 81 and 35 respectively, compared to the other studies. This suggests that their studies have potentially lower statistical power than the others. Analytic methods relating to Big Five traits and CG symptoms were sufficiently described and reported in 81% of the studies. The papers that did not meet this criterion, were not sufficiently clear in describing what kind of analysis was used to assess the relationship between the Big Five personality traits and CG symptoms. Only 38% of the studies met the criteria for outcome and assessment, with most of them not reporting mean scores on the measurement instruments for Big Five personality traits and CG symptoms. This was particularly true for neuroticism instruments, presumably due to the fact that it was mainly included as a control variable in most studies. Fifty-six percent of the studies reported coherent and relevant results on the relationship between Big Five personality traits and CG symptoms. This relatively low percentage may reflect that this association was rarely the main focus of the studies. The same can be observed for the conclusions, where only 44% of the articles commenting on the association between Big Five personality traits and CG symptoms in their conclusions.

Table 1

Quality Assessment of Included Studies

Study (authors, date)	Criterion 1: Sample characteristics	Criterion 2: Sample size	Criterion 3: Analytic methods	Criterion 4: Outcome and assessment	Criterion 5: Results	Criterion 6: Conclusions	Total score

Black et al. (2020)	N	Y	Y	Y	Y	N	4
Boelen (2010)	Y	Y	Y	Y	Y	N	5
Boelen (2012)	Y	Y	Y	N	N	N	3
Boelen (2009)	Y	Y	Y	N	Y	N	4
Boelen & Klugkist (2011)	Y	Y	Y	N	N	Y	4
Boelen et al. (2016)	Y	Y	Y	N	Y	Y	5
Boelen & Van den Bout (2010)	Y	Y	N	N	Y	Y	4
Burke et al. (2019)	N	N	Y	N	Y	Y	3
Eisma et al. (2015)	Y	Y	Y	N	Y	N	4
Gegieckaite & Kazlauskas (2020)	Y	Y	Y	Y	Y	Y	6
Goetter et al. (2018)	N	N	Y	Y	N	Y	3
Milman et al. (2019)	N	Y	N	N	N	N	1
Thomsen et al. (2018)	Y	Y	Y	Y	Y	N	5
van der Houwen et al. (2010)	Y	Y	N	N	N	N	2
Vara & Thimm (2020)	Y	Y	Y	Y	N	N	4
Wijngaards-de Meij et al. (2007)	N	Y	Y	N	N	Y	3

Notes: Possible range = 0-6; Y = Yes, N = No; Quality assessment is based on six items of the Manual for Quality Assessment of Quantitative Studies (Kmet et al., 2004). Details of the criteria: Criterion 1 = Sample (and comparison group, if applicable) characteristics sufficiently described; Criterion 2 = Sample size appropriate; Criterion 3 = Analytic method described/justified and appropriate; Criterion 4 = Outcome well defined and robust to measurement, Means of assessment reported; Criterion 5 = Results reported in sufficient detail; Criterion 6 = Conclusion is supported by results and mentions Big Five and CG link

Main findings

A detailed overview of the relationships between the Big Five personality traits and CG symptoms is presented in Table 2 in Appendix B. In the following section, we distinguish between cross-sectional and longitudinal analyses.

Cross-sectional findings

A total of thirteen studies reported cross-sectional associations between the Big Five personality traits and CG symptoms in bereaved individuals (Black et al., 2020; Boelen, 2009, 2010, 2012; Boelen & Klugkist, 2011; Boelen et al., 2016; Boelen & van den Bout, 2010; Burke et al., 2019; Eisma et al., 2015; Gegieckaite & Kazlauskas, 2020; Goetter et al., 2018; van der Houwen et al., 2010; Vara & Thimm, 2020). The majority of these studies focused on the Big Five personality trait neuroticism. Correlational findings showed that neuroticism was consistently positively and significantly correlated with CG symptoms. Correlations ranged from moderate, $r = .39$, to strong, $r = .55$.

In addition to correlational analyses, the relationship between neuroticism and CG symptoms in bereaved individuals was also measured in three studies using concurrent regression analyses (Boelen, 2012; Boelen et al., 2016; Eisma et al., 2015). At baseline, neuroticism was significantly and positively correlated with CG symptoms in all three studies. This remained true when controlling for multiple background variables such as gender, education, and age (Boelen et al., 2016), and was true when neuroticism was entered as a first or last variable in the regression models (Boelen et al., 2016; Eisma et al., 2015). These findings suggest that neuroticism explains unique variance in CG symptoms concurrently.

In a group comparison conducted by Goetter et al. (2018), bereaved individuals with high CG symptoms displayed higher levels of neuroticism than bereaved controls. When including all Big Five personality traits in a multivariate model, neuroticism was the only trait significantly positively associated with CG symptom levels. This study also analysed other

Big Five personality traits and found that bereaved individuals with higher CG symptoms displayed lower levels of conscientiousness (d = 1.02), lower levels of extraversion (d = 1.30) and lower levels of agreeableness (d = 0.55). The effect sizes ranged from medium to large. Regarding openness to experience, there was no significant difference between bereaved individuals with CG symptoms compared to bereaved controls. However, in one study (Black et al., 2020) openness to experience showed a small, negative but significant association with CG symptoms (r = -.14). This means that higher scores of openness to experience were associated with lower CG symptoms.

Longitudinal findings

Regarding longitudinal evidence, five studies reported longitudinal correlations between neuroticism at baseline and CG symptoms at a later point in time, without controlling for baseline symptoms. In most of these studies, neuroticism was significantly and positively correlated with CG symptoms, and these correlations were moderate in strength, r = .36, to r = .43. Similarly, in Boelen et al. (2016), T1 neuroticism was moderately, negatively and significantly related to T2 CG symptoms, when entered first in a regression model (R^2 = .14). This suggests that in uncontrolled studies, neuroticism at baseline is positively associated with CG symptoms at a later point in time.

Furthermore, one multilevel analysis with 3 levels (observations nested within time, nested within individuals, nested within couples), including time and gender as control variables, found that neuroticism related moderately and positively to CG symptoms and explained some variance in CG symptoms (R^2 = .09) (Wijngaards-de Meij et al., 2007).

Furthermore, one study (Boelen, 2012) reported on a multiple longitudinal regression model including T1 background variables, attachment styles, closeness to the deceased, event centrality and baseline symptoms as predictors of T2 CG symptoms. In this model, T1 neuroticism did not significantly predict CG symptoms at T2. Moreover, in two hierarchical

regression models, controlling for baseline symptoms or other variables, T1 neuroticism did not significantly predict T2 and T3 CG symptoms (Burke et al., 2019; Eisma et al., 2015). In addition, van der Houwen et al. (2010), did not find a direct effect of neuroticism on CG symptoms in a multilevel multiple mediation model (repeated measures nested within individuals) including other risk factors (e.g. gender, attachment, etc.). Furthermore, in the same longitudinal study there was no significant interaction of time and neuroticism on CG symptoms. All of these findings indicate that neuroticism does not sufficiently predict increases of CG symptoms over time.

Discussion

Our aim in this review was to provide a comprehensive summary of quantitative findings on the relationships between the Big Five personality traits and CG symptoms. A main finding of this review was that previous research has mainly focused on the relationship between the personality trait neuroticism and CG symptoms, whilst the relationship between the other four traits and CG symptoms has been researched significantly less. A second main finding was that neuroticism was concurrently moderately to strongly positively associated with CG symptoms. However, findings were less straightforward when looking at longitudinal relationships. Longitudinal results showed that when studies did not control for baseline symptoms, neuroticism at baseline was moderately correlated with CG symptoms at a later point in time. On the other hand, longitudinal analyses controlling for baseline symptoms showed no significant relations between neuroticism and CG symptoms over time. These findings suggest that although neuroticism is associated with CG symptoms, this personality trait is not a strong predictor of change in CG symptoms over time. From these results, one may tentatively conclude that neuroticism may play some part in the development of acute grief, but not in the maintenance of these symptoms.

Our findings were only partly in line with previous research. Neuroticism is considered one of the most likely potential personality risk factors for common mental disorders (Malouff et al., 2005; Lamers et al., 2012) and it is often researched more than the other Big Five traits. Indeed, most of the studies included in this review prioritised research on the relationship between neuroticism and CG symptoms over the other four Big Five personality traits. In addition, in the introduction, we explained how targeting personality traits, especially neuroticism, could be beneficial in the treatment of CG symptoms (Barlow et al., 2014; Carl et al., 2014; Kennair et al., 2021). However, our mixed longitudinal findings suggest that neuroticism is not strongly associated with development and changes of CG symptoms over time. Therefore, targeting treatment interventions specifically to changing neuroticism would possibly not be an effective solution to reducing CG symptoms severity. Nonetheless, there could be alternative explanations for our pattern of findings, and we need to be careful in drawing strong conclusions. These will be discussed in the next two paragraphs.

First, one alternative explanation could be that we still do not know what exactly influences the progress of CG symptoms over time. It could indeed be that neuroticism does not play any role in the maintenance of CG symptoms over time, or there could be other factors influencing CG development. For example, personality traits have been found to interact with each other to reduce depressive and anxiety symptoms. Naragon-Gainey and Simms (2017), showed with three-ways interactions between neuroticism, conscientiousness and extraversion on internalizing disorders (e.g. major depressive disorder, anxiety, etc.) that a combination of high levels of extraversion and conscientiousness protected individuals diagnosed with internalizing disorders against neuroticism's negative aspects (e.g. emotional instability). Most of the studies we included in this review only measured participant's levels

of neuroticism. Therefore, we do not know how they scored on the other four personality traits and whether these interacted with neuroticism to predict CG symptoms.

Second, there is currently evidence of the longitudinal predictive value of neuroticism and extraversion over the progress of depression and anxiety (Struijs, 2018). It could still be possible that the Big Five personality traits predict CG symptoms but that there are other unknown variables, confounds, interacting with personality leading to the maintenance of CG symptoms. For example, social support, meta-mood knowledge (the ability to recognize and understand one's own emotions) and resilience, have all been shown to influence the relationship between Big Five personality traits and mental well-being or mental disorders (McHugh & Lawlor, 2012; Pauly et al., 2021; Yildirim & Ballespí, 2022). It is possible that these variables might also play a role in the relationship between Big Five personality traits and CG symptoms.

Whilst research focused mostly on neuroticism, we also found two studies who explored the relationship between the other four Big Five personality traits and CG symptoms. The personality pattern found by Goetter et al. (2018) in individuals with CG, low extraversion, low conscientiousness and low agreeableness, seems to match the one found in general mental disorders (Lamers et al.,2012, & Malouff et al., 2005). On the other hand, findings regarding the relationship between openness to experience and CG symptoms were mixed. In Goetter et al. (2018) there was no significant difference in openness to experience levels between bereaved people with CG and without. However, in Black et al. (2022), participants who scored higher on openness to experience showed less CG symptoms, but this association was weak. The scarcity of papers on these other four personality traits indicates that more research is needed to draw stronger conclusions.

The results of our review need to be considered in light of its strengths and limitations. Turning to strengths first, we pre-registered our review at PROSPERO, the international

prospective registry of systematic reviews. Pre-registration promotes integrity and transparency and reduces the chances of data dredging, as well as reducing the chance of writing a review on the same topic of an already existing one (Stewart et al., 2012). Therefore, pre-registration makes our study more reliable and our findings potentially sounder. In addition, we performed a quality assessment (Kmet et al., 2004) on all the studies included in this review. A quality assessment offers a brief overview of the strengths and weaknesses of all the studies, so that the findings can be more critically observed.

Turning to limitations next, there are a few to consider. We can distinguish between limitations to the dataset derived from the review and the ones to the methods we used. First, regarding the dataset, 78% of the participants in the samples included in our review were female, and mostly from Western countries, such as the Netherlands and the USA. This means that our conclusions about the relationship between the Big Five personality traits, especially neuroticism, and CG, might be mainly applicable to women from Western countries. Future research should aim to recruit more male participants and gather more data from participants from other cultures.

Second, all studies were correlational in nature. Even if some studies were longitudinal, correlational studies do not allow us to draw conclusions about causation. In order to truly infer whether the Big Five personality traits, neuroticism especially, influence CG symptoms, more research is needed. Future researchers could focus on investigating causal and temporal links between these two variables. Causal links can only be investigated by using experimental study designs, but personality can be hard to manipulate, therefore making experiments difficult to design. On the other hand, investigating temporal links could be done by using well-designed longitudinal studies measuring Big Five personality traits and CG symptoms over time. It is true that we already analysed longitudinal findings for the relationship between neuroticism and CG symptoms. However, we have no longitudinal information about the remaining Big Five

personality traits. We suggest to conduct longitudinal quasi-experiments. Although quasi-experiments do not allow to precisely investigate causality, they can be stronger study designs than correlational studies. Researchers could pre-measure bereaved participants' personality scores and consequently compare participants who scored higher on one trait (e.g. neuroticism) to those who scored lower on the same trait. By assigning them into separate groups and then measuring CG symptoms over time, we could draw stronger conclusions about a temporal relationship between Big Five personality traits and CG symptoms.

Furthermore, regarding limitations to the methods, two of our inclusion criteria were that all the articles had to be written in English language and had to be peer-reviewed. Even though this promoted understandability and yielded a potentially higher study quality, this decision also limited the sources we could include into our analysis. Only selecting English and peer-reviewed articles might have significantly reduced the amount of available literature on the topic. Future research could focus on investigating existing literature on the topic in other languages and compare their results to the ones we gathered in this review.

In addition, we chose a qualitative summary over a quantitative one, meaning that we did not perform a meta-analysis. Meta-analyses have the potential to add quality to a systematic review, as they can statistically combine and analyse results from multiple studies, are more objective, and generally provide more precise and accurate conclusions (Fagard, 1996). As 15 out of 16 articles included a statistical analysis of the relationship between neuroticism and CG symptoms, we suggest to conduct a meta-analysis to analyse the relationship between these two constructs with more accuracy and objectivity.

In conclusion, our review offered a clearer overview of existing research on the relationship between the Big Five personality traits and CG symptoms. We showed that the personality trait neuroticism is associated with CG symptoms, but that this association does not hold in controlled longitudinal studies. Our paper also highlighted the lack of research on

the other four personality traits and CG symptoms. Conscientiousness, agreeableness, openness to experience and extraversion have been largely ignored when investigating potential risk or protective personality factors for CG. Furthermore, our review seems to suggest that targeting neuroticism in the treatment of CG symptoms might not be the most effective strategy for developing successful psychological interventions. However, we also pointed out that more information is needed to confidently exclude the potential relevance of personality traits in the maintenance of CG symptoms over time. Successfully identifying and investigating risk and protective factors in the development and maintenance of CG is crucial for developing efficient treatment options. We hope that our study further highlighted this importance and we believe that more research is needed to understand this condition.

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Appendix A

PRISMA Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4-7
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	7-8
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	8-10
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	8
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	8
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	9-10
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	10-11
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	9-11
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	9-11
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	NA
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	NA
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	NA
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	NA
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	NA
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	NA
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	NA
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	NA

Section and Topic	Item #	Checklist item	Location where item is reported
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	NA
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	NA
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Figure 1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Figure 1, 10-11
Study characteristics	17	Cite each included study and present its characteristics.	Appendix B
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	NA
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	NA
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	NA
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	NA
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	NA
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	NA
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	NA
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	NA
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	16-18
	23b	Discuss any limitations of the evidence included in the review.	19-20
	23c	Discuss any limitations of the review processes used.	19-20
	23d	Discuss implications of the results for practice, policy, and future research.	20-21
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	8
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	8
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	NA
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	NA
Competing interests	26	Declare any competing interests of review authors.	NA
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	NA

Appendix B

Table 2

Summary of main findings on the Big Five and complicated grief symptoms

Study (authors, date)	***N* (total bereaved; non-bereaved controls, T1)**	**Sample characteristics at baseline**	**Study design**	**Big Five measure (items) – construct, alpha, M (T1)**	**CG measure, alpha, M CG (T1)**	**Relevant findings**
Black et al. (2022)	268 bereaved, no non-bereaved	USA, 43% female, *M* age = 33.83 years, range time since loss = 12 to 24 months, cause of death was not reported, participants lost partner (100%)	Cross-sectional online survey	HEXACO Personality Inventory-Revised Openness to Experience Subscale, 16 items α = .85 *M* = 3.55	Inventory of Traumatic Grief, 30 items, α = .96 *M* = 2.85	Openness to experience was significantly negatively related to CG symptoms, r = -.14, p <.05.
Boelen (2010)	134 bereaved, no non-bereaved	Netherlands, 90% female, *M* age = 43.8 years, *M* time since loss = 23.8 months, cause of death was illness (52%), unexpected medical cause (26%), violent loss (10%), other cause (12%), participants lost child (15%), partner (30%), parent (31%), other relative (25%)	Cross-sectional survey	Shortened Eyseneck Personality Questionnaire Neuroticism Subscale, 12 items, α = .87 *M* = 4.93	Inventory of Complicated Grief-Revised, 29 items, α = .94, *M* = 66.91	Neuroticism was significantly positively related to GC symptoms, r = .43, p <.001.
Boelen (2012)	176 bereaved, no non-bereaved	Netherlands, 88% female, *M* age = 45 years, *M* time since loss = 4.8 months, cause of death was illness (49%), unexpected medical cause (29%), violent (11%), other cause (10%), participants lost	Cross-sectional and longitudinal survey	Ten-item Personality Inventory Neuroticism Scale, 2 items, α & *M* not reported	Prolonged Grief Disorder Scale, 11 items, α = .89, *M* = 32	In a model including T1 background variables, attachment styles, closeness to the deceased and event centrality, T1 neuroticism related significantly and positively to T1 GC symptoms, ß = .41, p <.001 In a model including T1 background variables, attachment styles, closeness to the

		child (9%), partner (52%), other relative (39%)				deceased, event centrality and GC symptoms, T1 neuroticism did not significantly predict T2 CG symptoms, *ß* = -.01, *p* >.05.
Boelen (2009)	254 bereaved, no non-bereaved	Netherlands, 89% female, *M* age = 42.2 years, *M* time since loss = 41.9 months, cause of death was illness (52%), violent loss (9%), other cause (39%) participants lost child (18%), partner (33%), parent (31%), sibling (5%) or other relative (9%)	Cross-sectional survey	Neuroticism Scale from the Eyseneck Personality Questionnaire, 12 statements, α = .81 *M* not reported	Inventory of Complicated Grief-Revised 30 items, α = .94, *M* = 70.73	Neuroticism was significantly positively related to CG symptoms, *r* = .52, *p* <.001.
Boelen & Klugkist (2011)	348 bereaved, no non-bereaved	Netherlands, 91% female, *M* age = 42.2 years, *M* time since loss = 24.9 months, cause of death was illness (52%), unexpected medical cause (24%), violent loss (10%), other cause (13%) participants lost child (16%), partner (34%), parent (31%), or other relative (19%)	Cross-sectional survey	Neuroticism Scale from the Eyseneck Personality Questionnaire, 12 statements, α = .81 *M* not reported	Inventory of Complicated Grief-Revised 30 items, α = .91, *M* = 72	There was a significant positive association between neuroticism and prolonged grief symptoms, R^2 = .32.
Boelen et al. (2016)	265 bereaved, no non-bereaved	Netherlands, 71% female, *M* age =55.9 years, *M* time since loss = 4.4 months, cause of death was natural (91%), violent (9%), participants lost child (7%), partner (48%),	Cross-sectional and longitudinal survey	Ten-item Personality Inventory Neuroticism Scale, 2 items, α = .73 *M* not reported	Prolonged Grief Disorder Scale, 11 items α = .92, *M* = 27.1	T1 neuroticism was significantly positively related to T1 CG symptoms, *r* = .50, *p* <.0024 T1 neuroticism was significantly positively related to T2 CG symptoms, *r* = 0.38; *p* < .0024. In a regression model including T1

		other relative (45%)				background variables (gender, age, education, time since loss, relationship to the deceased, cause of death), prospective IU, inhibitory IU, worry and rumination, T1 neuroticism was significantly and positively related to T1 CG symptoms, when entered first in the model, ß = .17, R^2 = .25, p < .001, and when entered last in the model, R^2 = *.01;* In a regression model including T1 background variables (gender, age, education, time since loss, relationship to the deceased, cause of death), prospective IU, inhibitory IU, worry, rumination and CG symptoms, T1 neuroticism significantly and negatively predicted T2 CG symptoms when entered first in the model, ß = -.01, R^2 = .14, p < .001, but did not when entered last in the model, R^2 = .001.
Boelen & van den Bout (2010)	161 bereaved, no non-bereaved	Netherlands, 80% female, *M* age =53.5 years, *M* time since loss = 53.6 months, cause of death was illness (56%), unexpected medical cause (16%) violent (12%) other cause (12%), participants lost child (10%), partner (53%), parent (24%) or other relative (12%)	Cross-sectional survey	Neuroticism Scale from the Eyseneck Personality Questionnaire 12 items α = .79, *M* not reported	Inventory of Complicated Grief-Revised, 30-items, α = .96 *M* = 69.4	Neuroticism was positively correlated with CG symptoms, b = 3.91, p < .001.

Burke et al. (2019)	35 bereaved, no non-bereaved	USA, 77% female, *M* age = 58.64 years, *M* time since loss not reported, cause of death was terminal illness (100%), participants lost partner (34%), parent (31%), sibling (26%), other (9%)	Cross-sectional and longitudinal survey	Neuroticism Subscale of Big Five Inventory 8 items α = .83 *M* not reported	Prolonged Grief Disorder Scale 13 items α = .92, *M* = 8.43	T1 neuroticism was positively correlated with CG symptoms at T2, r = .42, p < .05. T2 neuroticism was positively correlated with CG symptoms at T2, r = .39, p < .05. In a hierarchical regression model including T1 demographic variables (ethnicity and sex), anticipatory grief, relational dependence, social support and meaning making, T1 neuroticism was not significantly related to T2 CG symptoms, when entered at step 3, ß = .07.
Eisma et al. (2015)	242 bereaved, no non-bereaved	Netherlands, 87% female, *M* age = 48.7 years, *M* time since loss = 9.6 months, cause of death was natural causes (89%), violent (6%), other cause (5%), participants lost child (9%), partner (52%), parent (30%), sibling (9%)	Cross-sectional and longitudinal survey	Neuroticism Subscale of the Big Five Inventory 8 items α = .81 *M* not reported	Inventory of Complicated Grief-Revised, Dutch version 29 items, α = .95, *M* = 55.3	T1 neuroticism was positively correlated with T1 CG symptoms, r = .53, p <.01 T1 neuroticism, was positively correlated with T2 CG symptoms, r = .43, p <.01 T1 neuroticism was positively correlated with T3 CG symptoms, r = .37, p <.01. In a hierarchical regression model controlling for T1 symptoms and relevant socio demographic and loss related variables, T1 neuroticism was positively and significantly correlated with T1 CG symptoms, ß = .26, p < .01, R^2 = .30; In the same model, T1 neuroticism did not significantly predict T2 CG symptoms and T3 CG symptoms, R^2s = .00.
Gegieckaite & Kazlauskas (2020)	203 bereaved, no non-bereaved	Lithuania, 85% female, *M* age = 42.13 years, *M* time since loss = 33.11 months, cause of death was natural	Cross-sectional survey	Neuroticism Scale from the Big Five Inventory, 8 items, α = .80 *M* = 3.20	Prolonged Grief Disorder-13 Questionnaire, 13 items,	Neuroticism was positively correlated with CG symptoms, r = .40, p < .01.

		(86%),) violent (6%) other cause (9%), participants lost child (6%), partner (7%), parent (38%), sibling (6%), other family member (35%), friend (7%) or other (1%)			α = .89 *M* = 23.53	
Goetter et al. (2018)	81 bereaved, 51 with CG and 30 bereaved control	USA, 69% female, *M* age = 42.43 years, *M* time since loss was not reported, cause of death was not reported, participants lost partner (36%), parent (33%), sibling (7%), other (22%)	Cross-sectional survey	60-item Self-Report NEO Five-Factor Inventory; 12 items for each traits; α from .70 to .92; Openness: *M* = 29.24; Conscientiousness: *M* = 30.39, Extraversion: *M* = 24.12; Agreeableness: *M* = 32.02; Neuroticism: *M* = 27.78;	19-item Self-Report Inventory of Complicated Grief; α = .95; *M* = 38.76;	In separate t-tests participants with high CG symptoms compared to individuals with low CG symptoms displayed lower levels of conscientiousness, p <.001, d = 1.02, lower levels of extraversion, p <.001, d = 1.30, lower levels of agreeableness, p <.05, d = 0.55 and higher level of neuroticism, p < .001, 1.46. Openness did not significantly differ between groups, p = .87 When entering all the traits simultaneously in a logistic regression analysis predicting group membership, only neuroticism was positively associated with CG symptoms, *B* = 0.15, p < .05.
Milman et al. (2019)	357 bereaved, no non-bereaved	North America and Europe, no baseline characteristics; all following characteristics are from time two: 72% female, *M* age = 44.3 years, *M* time since loss = 6.25 months, cause of death was natural (21%), illness (64%) violent (7%) other	Longitudinal surveys	The Big Five Inventory Neuroticism Subscale, 8 items, α = .89, *M* not reported	Prolonged Grief Disorder-13, 13 items, α = .95, *M* not reported	T1 neuroticism was significantly positively related to T2 CG symptoms, r = .40, p <.01.

		cause (8%), participants lost child (4%), partner (21%), parent (35%), sibling (7%), other relatives (13%), friend (11%) or other (10%)				
Thomsen et al. (2018)	161 bereaved, no non-bereaved	Denmark, 56% female, *M* age = 65.29 years, *M* time since loss = 10.62 weeks, cause of death was illness (100%), participants lost partner (100%)	Longitudinal survey	NEO-Pir Neuroticism Subscale, 12 items α = .86, *M* = 29.49	Prolonged Grief-13 11 items α = .89 *M* = 29.58	T1 neuroticism was significantly positively associated with T1 CG symptoms, *r* = .55, *p* <.01 T1 neuroticism was significantly positively associated with T2 CG symptoms, *r* = .36, *p* <.01.
van der Houwen et al. (2010)	195 bereaved, no non-bereaved	Worldwide, 92% women, *M* age = 41.5 years, *M* time since death = 0.91 years, cause of death was natural cause (67%), violent (11%), other (23%), participants lost child (35%), partner (37%), parent (21%), sibling (7%)	Introduction longitudinal, rest cross-sectional online survey	The Big Five Inventory Neuroticism Subscale, 8-items α = .81 *M* not reported	Criteria for Complicated Grief proposed for the DSM-V 9-items α ranged from = .86 to .91, *M* not reported	In a multilevel longitudinal multiple mediation model including risk factors (gender, attachment avoidance, social support and expectedness), the direct effect of neuroticism on CG symptoms was not significant, *b* = .041, *p* > .05; In the same model, neuroticism had a significant and positive indirect effect on CG symptoms, when mediated by rumination and threatening grief interpretations, *b* = .177, p < .05; There was no interaction of time and neuroticism on CG symptoms, therefore neuroticism did not change CG symptoms over time.
Vara & Thimm (2020)	152 bereaved, no non-bereaved	Norway, 78% female, *M* age = 43.4 years, *M* time since loss = 9.8 years, cause of death was natural (80%), violent (6%)	Cross-sectional survey	NEO-five-factor Inventory-3 Neuroticism Subscale, 12 items α = .91, *M* = 1.71	Inventory of Complicated Grief, 19 items α = .92, *M* = 16.70	Neuroticism was positively and significantly associated with CG symptoms, *r* = .43, *p* <.001.

		other cause (15%), participants lost child (3%), partner (7%), parent (33%), sibling (6%), other relatives (35%), friend (15%) or other (3%)				
Wijngaards-de Meij et al. (2007)	438 bereaved participants, (219 bereaved parent couples)	Netherlands, gender not reported, *M* age = 42.2 years, time since loss = 6 months, cause of death was illness (47%), violent (36%) neonatal death (16%), participants lost child (100%)	Longitudinal surveys	Neuroticism Subscale of the Eyseneck Personality Questionnaire, Revised Short Scale, 12-items α range from = .81 to .84, *M* not reported	Inventory of Complicated Grief, 19 items α ranged from = .9 to .92, *M* not reported	Neuroticism was positively correlated to CG symptoms, $r = .51$, $p < .01$; In a multilevel analysis with time (level 1: 6, 13 and 20 months) nested within individuals (level 2) nested within couples (level 3), including gender and time as control variables, neuroticism related positively to CG symptoms, $p = .05$, $R^2 = .18$ (Model 2). When including neuroticism after adding the variable attachment into the model, neuroticism explained 9% of the variance in CG symptoms, $p < .05$, $R^2 = .09$ (Model 3).