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# Bipolar Disorder Mood and the Association with (Perceived) Stress and Irritability: a Mediation Analysis

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## Abstract

The study aimed to investigate the relationship between actual stress and depressive and manic mood in bipolar patients. It further investigated whether perceived stress and irritability mediate these relationships in line with Beck's Cognitive Behavioral Model. Fifty-nine participants diagnosed with bipolar disorder engaged in the study voluntarily. All participants were newly diagnosed with bipolar disorder, Dutch, and started a specialized treatment for the first time. As part of the BINCO study, participants filled out questionnaires about their symptom severity regarding depressive and manic mood, their actual and perceived stress, and their irritability. Correlational and mediational analyses (using PROCESSv4) did not show significant mediating effects of perceived stress and irritability. Only significant positive correlations were found between actual stress and manic mood, perceived stress and depressive mood, and perceived stress and irritability. Consequently, perceived stress and irritability do not seem to mediate the relationship between actual stress and depressive and manic mood in bipolar patients. The findings were not in line with Beck's Cognitive Behavioral Model. Nevertheless, a higher perceived stress seems to be related to an increased symptom severity of depressive mood and a higher actual stress seems to be related to manic symptom severity.

*Key words:* bipolar disorder, actual stress, perceived stress, irritability, mediation

Bipolar disorder is a highly prevalent chronic disorder with a global prevalence of 1-4% (Loftus et al., 2020). Patients with bipolar disorder experience extreme mood states that become persistent and impair the social and psychological functioning. This can cause a lot of suffering to the individual. Bipolar disorder is the psychiatric illness with the highest suicide rate (Schaffer et al., 2015). Around 23-26% of bipolar disorder patients execute a suicide attempt. Suicide attempts in bipolar disorder patients are appropriately 20-30% more likely than suicide attempts in the normal population (Miller & Black, 2020). More specifically, in an observational study it was observed that patients with a greater symptom severity were more likely to commit a suicidal attempt (Bellivier et al., 2011). Thus, it is important to look at factors which correlated with symptom severity in patients with bipolar disorder.

Bipolar disorder is characterized by episodes of feeling very elevated and full of energy and episodes of feeling persistently down and not having any energy. The mood phases with increased energy are called (hypo-) manic episodes and are characterized by racing thoughts, having a lot of energy and an increased goal-directed behavior. During this state, people also engage in potentially harmful behaviors which they may regret once the

manic or hypomanic phase fades away. Examples for this are unprotected sex or careless driving. Additionally, these patients have depressive episodes in which they experience a loss of interest and pleasure in activities, low mood and energy, and recurrent thoughts of death (5th ed.; *DSM-5;* American Psychiatric Association, 2013). Over a lifetime, about 1% of the population is diagnosed with bipolar I disorder (manic and depressive episodes) and about 1.5% of the population with bipolar II disorder (hypomanic and depressive episodes) (Clemente et al., 2015). To summarize, bipolar disorder is a highly prevalent disorder characterized by depressive and (hypo-) manic episodes.

Bipolar disorder has different etiological factors, one of them being stress (Lex et al., 2017). Stress is very prevalent in the whole population and concerns everyone. Stress can be categorized into actual stress and perceived stress. Actual stress can be assessed objectively by looking at external events or stressors that are believed to be stressful for most people. Examples for stressful events are sexual abuse or losing a close relative. This would be a stressful situation for almost everyone. These stressors would increase the demands of a person. Perceived stress can be assessed subjectively. For example meeting new people is not perceived stressful by everyone. In this case, stress can be increased because someone appraises a situation or an event to be stressful even if it would not be considered stressful objectively (Christensen et al., 2019). Thus, stress can be either objective, called actual stress, or subjective, called perceived stress.

In previous research, it was possible to relate stress to bipolar disorder. A meta-analysis by Lex et al. (2017) combined several studies on stressful life events and bipolar disorder, most of them being retrospective. Stressful life events were defined as events that do not belong to the psychopathology of one`s diagnosis but are events that cannot be controlled by the individual. Within our definitions, this can be classified as actual stress (Christensen et al., 2019). In the meta-analysis by Lex et al. (2017), they were able to find an association between stressful life events and the course of bipolar disorder. They concluded that a severe mood episode was more likely to be preceded by a higher number of stressful life events than when the patients were in a stable mood. Furthermore, Koenders et al. (2014) discovered that negative life events are related to symptom severity of the manic and the depressive episode. Mood was assessed using continuous measures. In addition, Koenders et al. (2014) noted that experiencing several negative life events is associated with more severe symptoms than only experiencing single negative life events. Thus, stressful life events, especially experienced repeatedly, and high actual stress seem to be associated to more severe depressive or manic moods in bipolar disorder.

An older study discovered that higher perceived stress was related to a heightened negative affect in healthy individuals (van Eck et al., 1998). Additionally, higher perceived stress was related to a longer and more severe mood response. In their meta-analysis, Lex et al. (2017) also found that the perceived stress was higher in individuals with bipolar disorder before a mood episode than in patients suffering from an acute physical illness. Pech et al. (2020) compared people newly diagnosed with bipolar disorder to healthy individuals. Their baseline measures showed that bipolar disorder patients displayed high rates of perceived stress than healthy individuals did. In sum, higher perceived stress is associated to increases in mood severity.

Another variable being consistently connected to psychiatric illnesses is irritability. Irritability is an unpleasant feeling for the individual and entails having decreased control over one`s temper (Snaith & Taylore, 1985). A study by Yuen et al. (2016) was able to show a positive relationship between current irritability and the severity of bipolar disorder. In their prospective study, they compared patients diagnosed with bipolar disorder experiencing current irritability and not experiencing current irritability. Their findings showed that patients with current irritability had more depressive mood symptoms and displayed a delayed recovery of the depressive episode than patients without current irritability. Furthermore, Berk et al. (2017) conducted research using data from the Bipolar Comprehensive Outcomes Study which is an observational study over the course of 2 years. They investigated whether irritability had a longitudinal effect on illness severity, mania, and depression. They found out that irritability predicted illness severity because patients with higher levels of irritability displayed more symptoms of mania and depression. Concluding, irritability can be associated to displaying more symptoms of mania and depression within the context of Bipolar Disorder.

Furthermore, actual stress has been related to irritability. A qualitative study conducted by Roberts et al. (2018) discovered that stressful life events are related to irritability. Specifically, they used data from a longitudinal study to assess whether the participants experienced stressful life events and whether these life events were experienced once or whether it was experienced repeatedly. Stressful life events were measured with the Child Life Events measure (Hunter et al., 2003). The questionnaire covers different life events that can be stressful to children like school changes or whether a child experienced violence. Participants were divided into a group that had only little exposure to life events, a group that was consistently exposed to many life events, and a group that experienced many life events initially but became less rapidly. The results showed that participants who experienced stressful life events repeatedly throughout childhood and youth were more likely to have

higher rates of irritability. This study displays a positive relationship between actual stress and irritability. Thus, displaying a chronic trend of stressful life events throughout life is positively related to irritability.

As outlined previously, it has been shown that actual stress can be connected to perceived stress and irritability (Lex et al., 2017; Roberts et al, 2018). In addition, it has been shown that actual stress, perceived stress, and irritability are individually related to depressive and manic moods (Koenders et al., 2014; Lex et al., 2017; Yuen et al., 2016). Nevertheless, there is not much research about whether perceived stress and irritability could be mediators between the relationship of actual stress and depressive and manic mood. A study by Feizi et al. (2012) demonstrated that stressful life events, thus actual stress, and perceived stress are associated. It was hypothesized that if people are more sensitive to a major life event, they perceive this event as more stressful. A study by Lee et al. (2012) discovered that perceived stress mediates the relationship between work-related stress and depression. This suggests that perceived stress can act as a mediator between actual stress and mood severity. Additionally, perceived stress and irritability are positively related to each other in patients diagnosed with bipolar disorder (Faurholt-Jepsen et al., 2019). Thus, perceived stress and irritability may not only function as individual mediators, but they may also interact in a combined or stepwise mediation.

This process is in line with Beck's Cognitive Behavioral Model (Beck, 1979). This model suggests that there is a stepwise succession of situation, thoughts, affect, and response. According to that model patients with a psychiatric illness are more likely to interpret situations in a negative way because of a negative thinking pattern about oneself, the world, and the future. If a situation is interpreted more negatively, perceived stress is likely to be higher. Thus, a stressful life event would be interpreted as very negative which would increase the perceived stress. According to the model, this results in a negative affect which can be displayed as irritability. As the perceived stress increases, irritability increases as well. This leads to a specific response. This response can be a psychiatric mood episode, like mania or depression. Thus, a stressful situation triggers negative thinking which results in a negative affect that leads to a respective response.

Behavioral sensitization could play a role in this process as well. Behavioral sensitization explains a process of reversed tolerance. This means that if someone is encountering stressful life events repeatedly, the effects of these life events are increased because of heightened sensitivity to stress (Johnson & Roberts, 1995). The result would be

that if someone displays a chronic trend of stressful life events, the person would display a higher perceived stress and higher levels of irritability. This is in line with findings by Roberts et al. (2018) who showed that a chronic trend of stressful life events is positively related to higher levels of irritability. Therefore, experiencing multiple stressful life events increases the perceived stress of these situations and levels of irritability.

In line with previous research and research that is still missing, this study aims to investigate whether perceived stress and irritability mediate the relationship between actual stress and manic and depressive mood in patients with bipolar disorder. In line with that, this research aims to find out whether there is a direct relationship between actual stress and depressive and manic moods. Lastly, this research aims to investigate whether there is an indirect relationship between actual stress and depressive and manic moods via perceiving high stress and becoming more irritable through that. Thus, it aims to find out whether perceived stress and irritability function as a comprised mediator between actual stress and manic and depressive mood.

**Hypotheses**

Research has shown that there is a positive relationship between stressful life events and depressive and manic moods (Lex et al., 2017; Koenders et al., 2014). Feizi et al. (2012) showed that an event is more stressful if the perception of the event is that it is highly stressful. Additionally, Lex et al. (2017) showed that people diagnosed with bipolar disorder were specifically sensitive to stressful life events. Also, it has been shown that a higher perceived stress is associated to the occurrence of mood episodes (Lex et al., 2017) and to an increased negative affect (van Eck et al., 1998). This suggests that perceived stress mediates the relationship between actual stress and depressive and manic moods. This leads to the first hypothesys that perceived stress acts as a mediator between actual stress and depressive and manic mood (see Figure 1). Specifically this means that there is a direct positive relationship between actual stress and depressive and manic moods and an indirect positive relationship between these variables via perceived stress. It is predicted that people who score high on actual stress will also score high on perceived stress and score high on the measures for symptom severity of depressive and manic mood.

Furthermore, Roberts et al. (2018) showed that if people have more stressful live events, they display more irritability. Additionally, Yuen et al. (2016) and Berk et al. (2017) found out that higher rates of irritability are related to more severe moods in bipolar disorder. This also suggests a mediating role of irritability between actual stress and depressive and

manic moods. This leads to the second hypothesis: it is hypothesized that irritability mediates the relationship between actual stress and depressive and manic mood (see Figure 2). As mentioned previously, a direct positive relationship between actual stress and depressive and manic moods is predicted and a positive indirect relationship between these variables via irritability. It is predicted that participants who have a high score on the questionnaire measuring actual stress, score high on the irritability scale, and score high on the questionnaires measuring symptom severity of manic and depressive mood.

As a third hypothesis, a stepwise model based on Beck's cognitive behavioral model (1979) is proposed (see Figure 3). As already mentioned before, it is hypothesized that actual stress is positively related to perceived stress (Feizi et al., 2012). Furthermore, it is hypothesized that higher perceived stress is related to higher irritability. In Beck's Cognitive Behavioral Model (1979) it is explained that negative thoughts are related to negative affect. This means that perceived stress in the form of negative thoughts is related to irritability. Faurholt-Jepsen et al. (2019) found that perceived stress and irritability are positively related to each other in patients diagnosed with bipolar disorder. This higher irritability is then related to more severe moods in bipolar disorder as already explained (Yuen et al., 2016; Berk et al.; 2017). Thus, a stepwise model in which actual stress increases perceived stress which increases irritability which increases manic and depressive symptom severity is hypothesized.

**Figure 1**

*Hypothesized mediation of perceived stress*

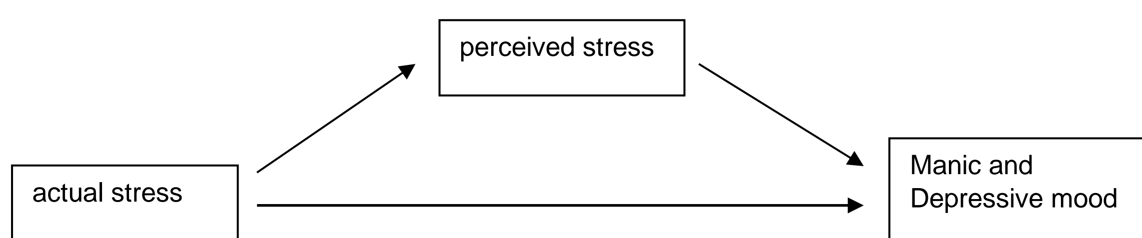



**Figure 2**

*Hypothesized mediation of irritability*

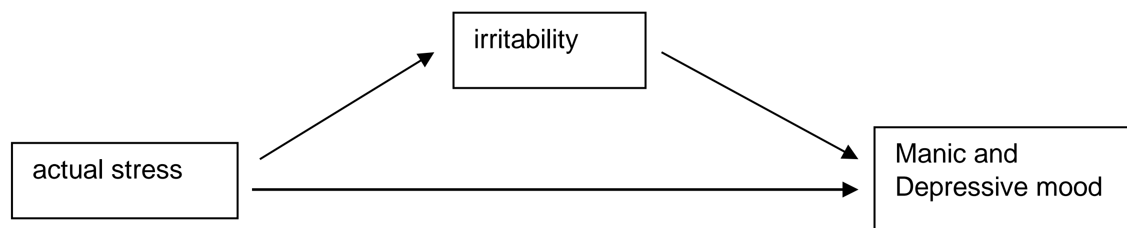
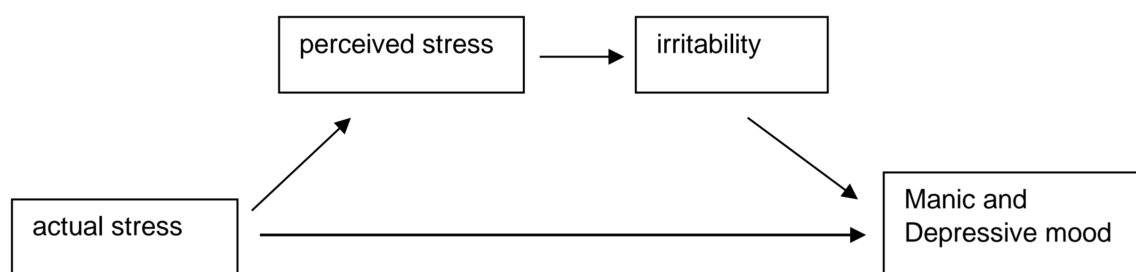



**Figure 3**

*Hypothesized stepwise model*




*Note.* This is the proposed stepwise mediation model in which actual stress affects perceived stress which increases irritability through which manic and depressive moods are more severe. All variables were measured at baseline.

## Clinical relevance

The illness course and prognosis of bipolar disorder worsens with longer and more severe mood episodes (Maj et al., 1992). This becomes especially important if one considers that bipolar disorder has the highest suicide rate among psychiatric illnesses (Schaffer et al., 2015). Miller and Black (2020) concluded that it is important to detect predictors and risk factors of the course of the mood episodes to prevent suicidal behavior. If perceived stress and irritability work as mediators between the relationship of actual stress and depressive and manic mood, one could focus in therapy on these factors to reduce the suicide risk. Implementing coping strategies for misperceptions of stress or handling irritability could then be helpful to mitigate the depressive and manic mood episodes.

# Methods

## Research Design

The current study used data from the ongoing `BINCO` study which examines the effects of immune, endocrine, environmental and psychological factors on the course of bipolar disorder. The BINCO study is a naturalistic longitudinal cohort study in the Netherlands that started in 2017. Assessments took place every half year. This study included baseline measurements. Thus, the current study is a quantitative cross-sectional study.

**Participants**

The participants were Dutch and newly-diagnosed with Bipolar I or Bipolar II disorder being older than eighteen years old. For the first time, the participants started a treatment specialized for bipolar disorder at an outpatient mental health care center in Rotterdam, The Hague, and Leiden. Exclusion criteria for participation in the study were being unable to read, to speak or to understand Dutch, having a diagnosis of bipolar disorder not otherwise specified or cyclothymic disorder. Participants were recruited via convenience sampling. Patients at the outpatient departments in Rotterdam, The Hague, and Leiden were asked to participate in the study.

**Measures**

In the beginning, some general questions assessed the demographic data of the patients, like age, sex, country of origin, and diagnoses. Additionally, inclusion and exclusion criteria were assessed. To measure the severity of manic symptoms the Young Mania Rating Scale (YMRS) (Young et al., 1978) was used (see Appendix A for full questionnaire). The questionnaire consists of 11 items. Each item represents one symptom of a manic episode. The items have to be answered on a five-point Likert scale according to the presence and severity of the symptoms. Answers are coded with 0 (symptom not present), 1, 2, 3, 4 (most severe state of symptom) for items 1, 2, 3, 4, 7, 10, and 11. For the remaining items (items 5, 6, 8, and 9), answers were coded with 0 (symptom not present), 2, 4, 6, 8 (most severe state of symptom). These four items are weighted twice as the other items. This is to compensate for patients who are severely ill and not willing to cooperate. The ratings of each item were added. Scores ranged from 0 to 60. The higher the score, the more severe the manic episode (Young et al., 1978). An example item of the questionnaire is “Elevated Mood” with the answer options “absent” (0), “mildly or possibly increased on questioning” (1), “definite subjective elevation; optimistic, self-confident; cheerful; appropriate to content” (2), “elevated; inappropriate to content; humorous” (3), and “euphoric; inappropriate laughter; singing” (4). The YMRS was found to have a good reliability with Cronbach’s alpha of 0.72

and good validity, displaying agreement between YMRS scores and diagnostic criteria for mania (Mohammadi et al., 2018).

To measure the severity of depressive symptoms, the Quick Inventory of Depressive Symptoms (Q-IDS) (Rush et al., 2003) was administered (see Appendix B for full questionnaire). The inventory consists of 16 items each representing one symptom of a depressive episode. The items have to be answered on a four-point Likert scale with 0 (the symptom is not present), 1, 2, and 3 (symptom is severely present). An example item is "feeling sad" with answer options being "I do not feel sad" (0), "I feel sad less than half the time" (1), "I feel sad more than half the time" (2), "I feel sad nearly all of the time" (3). The highest score of the items 1 until 4, the highest score of items 6 to 9, and the highest score of items 15 or 16 is picked each and added up with the remaining items. Scores range from 0 to 27. The higher the score, the more severe the depressive episode. The Q-IDS has a high reliability with Cronbach's alpha being .86 and a good validity (Rush et al., 2003).

The Brugha Life Events Scale (Brugha & Cragg, 1990) was used to measure actual stress (see Appendix C for full questionnaire). This scale consists of 20 statements each representing a stressful life event that the participant could have encountered. An example item of the scale is "Your parent, child or spouse died". The statements need to be answered with yes or no. For every stressful life event that a participant experienced, two points were assigned. For an event that a participant did not experience, one point was assigned. All experienced stressful life events are counted together to reach the overall score that can range from 20 to 40. The higher the score, the higher the actual stress. Brugha and Cragg (1990) found a high test-retest reliability (Cohen's kappa = .84) and a high validity with a sensitivity of .89 and a specificity of .074.

To measure perceived stress, the perceived stress scale (Cohen et al., 1983) was administered (see Appendix D for full questionnaire). The ten questions concern thoughts and feelings that the participant experienced in the past month. An example question is: "In the last month, how often have you felt that things were going your way?". Answer options are "never" (0), "almost never" (1), "sometimes" (2), "fairly often" (3), and "very often" (4). Questions 4, 5, 7, & 8 are stated positively and have to be reverse coded. After that, all answers are added. Scores range from 0 to 40. A higher score indicates a higher perceived stress level. Roberti et al. (2006) found high reliability (Cronbach's alpha = .89) and high validity for the perceived stress scale.

Irritability was assessed with the Adult Irritability Questionnaire (Craiq et al., 2008) (see Appendix E for full questionnaire). The questionnaire consists of 14 questions about the controllability of one's temper. An example of a question is: "Are you quickly irritated?". Answers can be given on a four-point Likert scale with answer options being "never" (0), "occasionally" (1), "quite often" (2), and "most of the time" (3). The items 3, 5, 6, 9, 11, and 13 are reverse coded. The scores of each question are added up and can range from 0 to 48. A higher score indicates a higher level of irritability. The Adult Irritability Questionnaire has a high reliability (Cronbach's alpha = .86) and a high validity (Craiq et al., 2008).

**Procedure**

The Medical Ethical Committee of the Leiden University Medical Centre approved the research protocol of the BINCO study. The psychiatrist or nurse informed the participants about the study procedure when they signed up for therapy in the outpatient mental health care center in Rotterdam, the Hague or Leiden. After that, participants who were willing to participate in the study signed the consent form agreeing to participate in the study. Within the framework of the BINCO study, participants filled out several questionnaires additional to the ones described above. As this research project is part of a bigger project, only the questionnaires relevant to this study are described and analyzed. Participants of the BINCO study filled out the questionnaire during the face to face meeting in the beginning of the BINCO study. Only the perceived stress scale and irritability scale were filled out by the participants beforehand at home. The questionnaires were administered in Dutch.

**Statistical analysis**

The gathered data from the BINCO study was transferred to SPSS. The data of the participants was treated in an anonymous way. Only individuals who were working with the data in accordance with studies that were accepted by the ethical committee got access to the data. Data that was not relevant to the current study was deleted from the SPSS file. The remaining data got checked for outliers. Firstly, descriptive statistics were assessed with means and standard deviations. Participants who only made appointments but did not start the study at all were deleted from the SPSS file.

To assess the stepwise model, a standardized score comprised of irritability and perceived stress (called: comprised mediator) was computed. Therefore, the total scores of the perceived stress scale and the irritability scale were added.

To demonstrate mediating effects of perceived stress and irritability, three conditions must be met according to Baron and Kennedy (1986). Actual stress needs to be significantly related to perceived stress and to irritability. Perceived stress and irritability each need to be significantly related to depressive mood and manic mood at 6-months follow-up. And actual stress needs to be significantly related to depressive mood and manic mood at 6-months follow-up. Hayes (2018) says that these conditions do not have to be met for a variable to be a mediator. Nevertheless, two procedures were conducted to have more clarity about the mediating effects of perceived stress and irritability.

Firstly, single correlational analyses were done including the variables manic mood, depressive mood, perceived stress, irritability, and actual stress. The variables were measured at baseline. This was done in line with Baron and Kennedy's mediation analysis (1986).

Secondly, cross-sectional mediation analyses were executed using the PROCESSv4 program was run. 10000 bootstrap sample means were drawn. From that, bias-corrected confidence intervals were created which evaluate the p-value of the direct and indirect effects (Hayes, 2013). A p-value of $< .05$ was considered significant. The program was run three times. Actual stress was always the independent variable and depressive mood and manic mood the dependent variables. Analyses were done once with perceived stress as mediator, once with irritability, and once with the comprised mediator of perceived stress and irritability.

## Results

### Clinical characteristics

In total, 69 Dutch participants engaged in the BINCO study of which 59 participants completed all questionnaires relevant for the current study. These participants had a mean age of 35 ($SD$ = 11.69). Descriptive statistics (see Table 1) showed that the sample consisted of 21 men, 37 women. 19 patients are diagnosed with bipolar disorder type I and 40 patients are diagnosed with bipolar disorder type II. On average, the onset of the patient`s bipolar disorder was at the age of 20 ($SD$ = 7.391). Symptom severity of the manic episode was rather low ($M$ = 4; $SD$ = 3.95) whereas symptom severity of the depressive episode was in the medium range ($M$ = 9.2; $SD$ = 5.72). Scores of actual stress ($M$ = 29.31; $SD$ = 3.75), perceived stress ($M$ = 31.81; $SD$ = 6.31) and irritability ($M$ = 31.95; $SD$ = 6.55) were in the medium range. Moreover, seven patients are taking one type of psychopharmaceutic (antidepressants, mood stabilizer, benzodiazepine, antipsychotics, psychostimulants or antiepileptics), 20 patients are

taking two types of psychopharmaceutics, 16 patients are taking three medications, and four patients are taking four or more types of psychopharmaceutic. Only 12 patients did not take any psychopharmaceutic medication. Most of the participants have a secondary (33.3 %) or higher education (56.7 %).

**Table 1**

*Descriptive statistics*

| | | n | % |
|---|---|---|---|
| Gender | Men | 21 | 28.8 |
| | Women | 37 | 50.7 |
| Type of BD | Type I | 19 | 26 |
| | Type II | 40 | 54.8 |
| Polypharmacy | 1 medication | 7 | 9.6 |
| | 2 medications | 20 | 27.4 |
| | 3 medications | 16 | 21.9 |
| | 4 medications or more | 4 | 5.5 |
| Level of education | Primary | 6 | 10 |
| | Secondary | 20 | 33.3 |
| | Higher | 34 | 56.7 |

**Associations between variables in the model**

Cross-sectional correlational analyses (see Table 2) showed no significant relationship between actual stress and depressive mood but there is a positive relationship between actual stress and manic mood ($r(56) = .280$, $p = .033$). This indicates that as actual stress increases in a bipolar patient's life, the manic mood is more severe. There was no relationship between actual stress and perceived stress as well as no relationship between actual stress and irritability. The correlational analysis revealed that perceived stress and depressive mood are positively related to each other ($r(54) = .549$, $p < .001$). Thus, as a patient with bipolar disorder experiences a higher level of perceived stress, he/she has a more severe depressive mood. No relationship was found between irritability and depressive mood. Neither perceived stress nor irritability were related to manic mood. Perceived stress and irritability were positively related to each other ($r(53) = .471$, $p < .001$). This means that bipolar patients with

a higher level perceived stress experience a higher level of irritability. Furthermore, a significant positive relationship between the comprised mediator and depressive mood was found ($r(56) = .438$, $p < .001$). This indicates that people who experience more perceived stress and more irritability have higher levels of depressive mood.

The comprised mediator is also highly positively related to perceived stress and to irritability because the comprised mediator is the sum of these two variables. That is why these two relationships are not further mentioned although they are significant.

**Table 2**

*Correlational analyses*

| | | Depressive mood | Manic mood | Perceived stress | Irritability | Actual stress | Comprised mediator |
|---|---|---|---|---|---|---|---|
| Depressive mood | Pearson Correlation | 1 | -.138 | .549** | .232 | .108 | .438** |
| Manic mood | Pearson Correlation | -.138 | 1 | .049 | -.057 | .280* | -.024 |
| Perceived stress | Pearson Correlation | .549** | .049 | 1 | .471** | .053 | .849** |
| Irritability | Pearson Correlation | .232 | -.057 | .471** | 1 | .127 | .866** |
| Actual stress | Pearson Correlation | .108 | .280* | .053 | .127 | 1 | .100 |
| Comprised mediator | Pearson Correlation | .438** | -.024 | .849** | .866** | .100 | 1 |

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

**Mediation model**

The results of the mediation analysis (see Table 3) with PROCESSv4 macro displayed a significant direct effect of actual stress on mania ($\beta = .337$, $t = 2.491$). The effect size demonstrates a medium effect of actual stress on mania. Only .044 of this relationship is explained by perceived stress. This suggests that perceived stress does not mediate the effect of actual stress on mania. Irritability accounts for -.013 of the effect of actual stress on mania.

Thus, irritability does not play a role as mediator of the effect on actual stress on mania as well. The analysis further shows that the comprised mediator does not account for the effect of actual stress on mania (-.006). This suggests that the comprised mediator does not work as a mediator between actual stress and mania.

The mediation analysis yielded a non-significant direct effect of actual stress on depression ($\beta$ = .113, $t$ = .645). This means that there is no relationship between actual stress and depression. Furthermore, only .044 of this effect is explained by perceived stress and only .045 if this effect is explained by irritability. This suggests that neither perceived stress nor irritability function as mediators of the effect of actual stress on depression. Additionally, .065 of this effect is explained by the comprised mediator. This suggests that the comprised mediator does not mediate the effect of actual stress on depression as well.

**Table 3**

*Mediation analyses*

| | Effect | SE | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| Total effect of actual stress on Mania | .339 | .134 | 2.531 | .014 | .070 | .607 |
| Direct effect of actual stress on Mania | .337 | .135 | 2.491 | .016 | .066 | .608 |
| Total effect of actual stress on Depression | .157 | .207 | .756 | .453 | -.259 | .573 |
| Direct effect of actual stress on Depression | .113 | .175 | .645 | .522 | -.239 | .465 |
| | Effect | Boot SE | | | BootLLCI | BootULCI |
| Indirect effect of actual stress on Mania (Perceived stress) | .002 | .021 | | | -.073 | .051 |
| Indirect effect of actual stress on Mania (irritability) | -.013 | .029 | | | -.083 | .037 |
| Indirect effect of actual stress on Depression (perceived stress) | .044 | .128 | | | -.188 | .322 |

| | | | | | |
|---|---|---|---|---|---|
| Indirect effect of actual stress on Depression (irritability) | .045 | .059 | | -.068 | .1762 |
| Indirect effect of actual stress on Mania (comprised mediator) | .006 | .026 | | -.068 | .046 |
| Indirect effect of actual stress on Depression (comprised mediator) | .065 | .109 | | -.134 | .303 |

*Note.* LLCI = lower limit confidence interval; ULCI = upper limit confidence interval

## Discussion

The aim of this study was to investigate the mediating roles of perceived stress and irritability between actual stress and manic and depressive mood in bipolar patients. For that, this study researched whether there is a direct relationship between actual stress and depressive and manic moods. The study researched whether there is an indirect relationship between these variables via perceived stress and irritability. Finally, the research aimed to investigate whether there is an indirect relationship between actual stress and depressive and manic moods via perceiving high stress and becoming more irritable through that.

It was hypothesized that perceived stress and irritability act as mediators between actual stress and depressive and manic mood. The mediation analyses showed that perceived stress and irritability do not act as mediators between actual stress and depressive and manic mood. Furthermore, it was hypothesized that there is a significant direct relationship between actual stress and depressive and manic moods. Correlational and mediation analyses showed that there is a significant direct relationship between actual stress and manic mood but no significant direct relationship between actual stress and depressive mood. Furthermore, a stepwise model was hypothesized; namely that the relationship between actual stress and manic and depressive mood is mediated by how much perceived stress a person experiences and how irritable the person gets through that. The mediation analysis with a comprised mediator score revealed that perceived stress and irritability do not mediate the relationship between actual stress and depressive and manic mood.

The findings of the current study are not fully in line with findings of a previous study by Koenders et al. (2014). They found a significant positive relationship between negative life

events and severity of a manic and depressive episode. In the current study, stressful life events were only significantly positively related to manic mood but not to depressive mood. It is possible that the use of different questionnaires to measure actual stress accounts for these differences. Koenders et al. (2014) measured life events with Paykel's self-report questionnaire (Paykel et al., 1971) which included more items than the Brugha Life Events Scale (Brugha & Cragg, 1990). If more life events are included, the chance of reaching a higher score on actual stress increases. It is possible that the restricted range of the Brugha Life Events Scale (Brugha & Cragg, 1990) decreased the data-evaluation validity of the study. As a conclusion, the range of the questionnaire might have been too restricted to find differences between people who experienced many stressful life events and people who only experienced a few stressful life events (Kazdin, 2021). Moreover, not many people scored very high or very low on this scale. This makes it more difficult to detect a significant relationship between actual stress and other variables (Kazdin, 2021). Additionally, the current findings also showed a tendency towards a positive relationship between actual stress and depressive mood. Accordingly, different questionnaires may yield different results. Data-evaluation validity may have been too low due to a restricted range and too homogenous answering of the Brugha Life Events Scale to detect a significant relationship.

Interestingly, actual stress was neither significantly related to perceived stress nor to irritability. In this study, actual stress, perceived stress, and irritability were measured independently. The questionnaire about actual stress was about stressful life events in a person's lifetime, whereas the perceived stress scale was about the person's perceived stress in the past month and the irritability scale about irritability in the last two weeks. Thus, different time periods are measured. This way, the perceived stress that participants experienced can be independent of the actual stress they reported in the Brugha Life Events Scale. In fact, Ginty and Conklin (2011) demonstrated that perceived stress is a different construct from actual stress. They found that only the perceived stress of life events was related to cardiovascular reactivity. The frequency of life events was not related to cardiovascular reactivity. This is in line with the missing relationship between actual stress and perceived stress. Additionally, that perceived stress is related to cardiovascular reactivity may also explain the relationship between perceived stress and irritability as irritability is about psychomotor reactivity. Thus, our findings are in line with older studies.

Another study was conducted on the relationship between perceived stress, stressful life events and the severity of mood episodes. Sato et al. (2018) found that the psychological distress that is related to stressful life events is associated with the severity of mood episodes.

It is possible that the perceived stress and irritability as measured in the current study are not related to such major stressful life events but rather to daily hassles in a person's everyday life, for example having a stressful period at work. Mcintosh et al. (2009) demonstrated that daily hassles were related to the depressed moods of patients with a major depression whereas major life events were not related to depressed mood. Thus, it is likely that daily hassles and not major life events correlate with mood episodes. Furthermore, it is possible that the level of perceived stress is elicited by the depressive symptoms as these two variables were significantly related to each other. A study by de Rooij et al. (2010) showed that the perceived stress levels were increased in depressive episodes but not the actual stress. In sum, due to negative thinking patterns in a depressed episode, situations can be perceived as more stressful (Spada et al., 2008).

The missing significant relationship between actual stress and irritability is not in line with findings by Roberts et al. (2018). They found that a person with a chronic trend of stressful life events throughout his/her whole life is more likely to have higher rates of irritability. The questionnaire that was used by Roberts et al. (2018) asked specifically for stressful life events in childhood, as for example exposure to violence as a child and the family composition and harmony as a child. In comparison, the Brugha Life Events Scale (Brugha & Cragg, 1990) does not ask for stressful childhood events. Thus, with the Brugha Life Events Scale, it cannot be measured whether there is a chronic trend of stressful life events throughout a person's life, it is more about stressful life events in the recent past. It is possible that the chronicity of experiencing stressful life events is responsible for being more irritable and not experiencing stressful life events in general. McLaughlin et al. (2010) found that stressful life events in adulthood have a higher impact on psychiatric disorders if a person experienced more adversity in childhood. This shows that it is important to take childhood adversities into account as well.

Furthermore, against expectations, perceived stress was not significantly related to manic mood but actual stress was significantly related to manic mood. In return, actual stress was not significantly related to depressive mood but perceived stress was significantly related to depressive mood. This contradicts with findings by Lex et al. (2017). They found that perceived stress was higher before a mood episode in patients with bipolar disorder, regardless of depressive or manic mood episode. Looking at our findings from a theoretical perspective, they make sense. Depressive episodes are related to ruminating (Spasojević & Alloy, 2001) which is also related to perceived stress (Willis & Burnett, 2016). Related to this, Sato et al. (2018) also found that only the severity of a depressive episode, but not the

severity of a manic episode, was related to psychological distress symptoms, meaning as how severe they perceived stressful life events. This is in line with our findings as perceived stress was only related to the severity of the depressive mood. Another study showed that mania is more related to positive ruminating than to negative ruminating (Ghaznavi & Deckersbach, 2012). In sum, perceived stress may be related to depressive mood because of negative rumination but perceived stress is not related to a manic episode in which negative ruminating is not that present.

The current study did not find a significant relationship between irritability and the severity of depressive and manic symptoms. This contradicts findings by Yuen et al. (2016) who found that irritability is positively related to the severity of bipolar disorder. Specifically, they found that current irritability is related to experiencing more depressive mood symptoms than patients who do not experience irritability. Our findings also show a trend towards a positive relationship between irritability and the severity of depressive mood symptoms. Nevertheless, our findings do not show a trend towards a positive relationship between irritability and the severity of manic mood symptoms. Likewise, these results contradict findings by Berk et al. (2017). Their results showed that patients who have higher levels of irritability have more manic and depressive symptoms. Possibly, irritability is not related to manic symptoms but to depressive symptoms as in the study by Yuen et al. (2016). If the power of a study is too low, detecting significant associations becomes difficult (Kazdin, 2021). A tendency towards a positive relationship between irritability and the severity of depressive mood symptoms was found but not a significant relationship. Summed up, power problems may be responsible for lacking significant relational findings, although it is likely that there is at least a positive relationship between irritability and the severity of depressive mood.

**Alternative explanations to the results**

Additionally, it is possible that participants wanted to answer on the irritability questionnaire in a way they thought was socially acceptable. This is called the social desirability bias. This is a likely bias in self-report questionnaires where participants answer in a way that they think will look good to the outside (King & Bruner, 2000). Furthermore, participants could have answered the items in a way to make themselves feel better and protects their self-image. This pattern is called the self-enhancement bias which serves as self-protection (Alicke & Sedikides, 2009). People do not like to be seen as inflexible or as someone who is easily irritated. Most of the participants scored in the middle or low range of

irritability. Likely, people wanted to protect their self-image by not being true to themselves about how irritable they are. Thus, the social desirability bias and the self-enhancement bias may have interfered with answering truthfully.

An alternative explanation to the results is that a lot of patients within the sample took medication. Psychopharmaceutic medication helps either stabilizing the mood meaning holding the mood at an appropriate level (not depressive and not manic) or reducing depressive symptoms. Other psychopharmaceutic medication that the patients took have a calming effect. As most of the sample took medication it is unlikely that this is a confounding factor regarding the internal validity. Nevertheless, it is possible that taking medication reduces the data-evaluation validity (Kazdin, 2021). Looking at the severity of depressive and manic mood symptoms, one can see that the majority of patients score in the area of low or medium symptom severity. Specifically looking at manic symptoms, no one scores in the area of high symptom severity. This makes it statistically difficult to detect a significant relationship or mediating role if most of the patients score in a similar range. Thus, the low variety of symptom severity made it difficult to detect significant findings.

Furthermore, it was striking that only perceived stress was significantly related to depressive mood but not actual stress. An alternative explanation to this is the recency effect. The recency effect describes a memory bias in which recent events are remembered better than memories that happened a longer time ago (Baddeley & Hitch, 1993). As the Brugha Life Events Scale (Brugha & Cragg, 1990) measures life events that happened in the past year, it is about recent life events. It is possible that these life events were remembered as more stressful than they objectively were because of the recency of the events. This could explain why the perceived stress was significantly related to the depressive mood but not actual stress.

**Strengths and limitations**

A strength of this study is the great number of bipolar disorder patients that are included in the study. Another strength is that the participants started treatment for the first time with the start of the study. Thus, no treatment effects interfered with the results of the study. Additionally, the study included patients diagnosed with bipolar disorder type I and type II which is why the results are generalizable to both types of bipolar disorder. Another strength is that the sample is followed over time through which the research question can be investigated again considering a prospective model.

A limitation of the research is the incomplete data of the study because it is a study which is still ongoing. As a result, it is a cross-sectional study and causal inferences cannot be done. Another limitation of the study is the use of self-report measures. Patients diagnosed with affective disorders as bipolar disorders display attentional and memory deficits. Filling out self-reports affords attention and not getting distracted. Studies have shown that patients with bipolar disorder struggle with self-reporting an accurate image of their health and capability state (Burdick et al., 2005). The limited attention and insight may have interfered with self-reporting on symptoms and stress levels.

As the participants of the current study displayed rather mild symptom severity in the manic and depressive episode, the study is not generalizable to patients in an acute illness phase. Although patients who did not take psychopharmaceutic participated in the study, they were the minority. Thus, this study is most likely not representable for bipolar patients who never took any type of medication. Furthermore, participants of the current study started with treatment for the first time. It is possible that patients who are sophisticated with therapy recognize stressful life situations and interpret them differently. Moreover, they probably learned helpful coping strategies to handle stress and irritability. Besides, most of the participants had a secondary or higher education which is why the results may look different for bipolar patients with primary education. Thus, the current study may not be generalizable to patients in an acute illness phase, patients who never took any medication, and patients who are well-experienced with therapy.

**Theoretical and practical consequences of the findings**

The study did not find mediating effects of perceived stress and irritability for the relationship between and actual stress and depressive and manic mood. A stepwise mediation of actual stress, perceived stress, irritability, and depressive and manic mood as in Beck's Cognitive Behavioral Model (Beck, 1979) was proposed. As no mediation was found, it should be reconsidered whether Beck's Cognitive Behavioral Model (Beck, 1979) holds in this way in practice. Furthermore, it should be reconsidered under which circumstances it holds. Beck's Cognitive Behavioral Model is about a specific stressful event which is getting interpreted as stressful (perceived stress) and elicits a bodily reaction (irritability). The study did not investigate such specific relations between a specific situation and the reaction in form of perceived stress and irritability to it. Nevertheless, significant positive relationships between perceived stress and depressive mood and actual stress and manic mood were found. Consequently, in therapy sessions, it is important to discuss how someone perceives stress

and restructuring cognitions when someone is in a depressive phase and discussing stressful life situations when someone is in a manic phase.

The findings were not able to support the hypotheses that perceived stress and irritability function as mediators between actual stress and depressive and manic mood in bipolar disorder patients. These findings contradict with theoretical underpinnings of Beck's Cognitive Behavioral Model (Beck, 1979) and various studies. Nevertheless, this study was able to underline the importance of actual stress and perceived stress for the symptom severity of people with bipolar disorder. When the follow-up data for the severity of manic and depressive mood is available, the same mediation model should be run again. This gives a prospective view and it can be observed whether the severity of depressive and manic symptoms changes over time depending on how actual stress and the mediators change over time.

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## Appendix A

### Young Mania Rating Scale (Young et al., 1978)

**YOUNG MANIE SCHAAL**
**(YOUNG MANIA RATING SCALE: YMRS)[1]**
(In te vullen door behandelaar/onderzoeker)

---

Naam: ……………………………………….. Datum: … … - … … - … …

Ingevuld door: ................................................

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**Instructie**:
*Gebruik alle beschikbare klinische informatie om de onderstaande vragen te kunnen beantwoorden, zoals patiëntendossier, psychiatrische voorgeschiedenis, klinische indruk en inbreng van familieleden of andere bronnen. Kies voor elk item de code die het best de patiënt karakteriseert over de afgelopen 48 uur.*

***U kunt een score kiezen die tussen twee gegeven codes in ligt (alleen hele of halve cijfers aangeven) om zo de ernst van de symptomen te nuanceren.***

☐ **1. Verhoogde stemming**

0 = Afwezig.
1 = Licht of mogelijk verhoogd bij navraag.
2 = Beslist subjectief verhoogd: optimistisch, zelfverzekerd; vrolijk; passend bij inhoud.
3 = Verhoogde stemming, niet passend bij inhoud; grappenmakend.
4 = Euforie; ongepast lachen; zingen.

☐ **2. Verhoogde motorische activiteit - energie**

0 = Afwezig.
1 = Subjectief toegenomen.
2 = Geanimeerd; toegenomen gebaren.
3 = Overmatige energie; bij vlagen hyperactief; rusteloos (kan worden gekalmeerd).
4 = Motorische opwinding; voortdurende hyperactiviteit (kan niet worden gekalmeerd).

☐ **3. Seksuele interesse**

0 = Normaal; niet toegenomen.
1 = Licht of mogelijk toegenomen.
2 = Zeker subjectieve verhoging bij navraag.
3 = Vertelt spontaan en uitgebreid over seksuele zaken.
4 = Openlijke seksuele daden (tegenover patiënten, personeel en interviewer).

☐ **4. Slaap**

0 = Meldt geen afname van slaap.
1 = Slaapt tot 1 uur minder dan normaal.
2 = Slaapt meer dan 1 uur minder dan normaal.
3 = Meldt verminderde slaapbehoefte.
4 = Ontkent behoefte aan slaap.

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1 Nederlandse vertaling: Altrecht GGZ. Copyright © 1995

**5. Prikkelbaarheid**

0 = Afwezig.
2 = Subjectief toegenomen.
4 = Bij vlagen prikkelbaar tijdens interview; recente episodes van kwaadheid of overlast op afdeling.
6 = Vaak prikkelbaar gedurende interview; kortaf, bits.
8 = Vijandig, niet coöperatief; interview onmogelijk.

**6. Spraak (tempo en hoeveelheid)**

0 = Geen toename.
2 = Voelt zich spraakzaam.
4 = Bij tijden snel en veel sprekend; bij tijden breedsprakig.
6 = Druk; voortdurend snel en veel sprekend; moeilijk te onderbreken.
8 = Spraakdruk, niet te onderbreken, woordenstroom.

**7. Taal- en denkstoornissen**

0 = Geen taal- en denkstoornissen.
1 = Omstandig; milde afleidbaarheid; snelle gedachten.
2 = Afleidbaar; verliest doel in het denken; verandert vaak van onderwerp; versneld denken.
3 = Gedachtevlucht; van de hak op de tak springen; moeilijk te volgen; rijmend, echolalie.
4 = Incoherent; communicatie onmogelijk.

**8. Inhoud**

0 = Normaal.
2 = Twijfelachtige plannen; nieuwe interesses.
4 = Bijzonder(e) project(en); hyperreligieus.
6 = Grootheids- of paranoïde ideeën; betrekkingsideeën.
8 = Wanen; hallucinaties.

**9. Verstorend - agressief gedrag**

0 = Coöperatief.
2 = Sarcastisch; soms luidruchtig; op scherp staan.
4 = Eisend; dreigementen op afdeling.
6 = Bedreigt interviewer, schreeuwen; interview moeilijk.
8 = Aanvallend; destructief; interview onmogelijk.

**10. Uiterlijk**

0 = Gepaste kleding en verzorging.
1 = Enigszins onverzorgd.
2 = Matig verzorgd; tamelijk haveloos; opzichtig gekleed.
3 = Erg slordig; gedeeltelijk gekleed; te veel make-up.
4 = Volledig onverzorgd; bizar uitgedost.

**11. Inzicht**

0 = Aanwezig; erkent ziekte; eens met de noodzaak voor behandeling.
1 = Mogelijk ziek.
2 = Erkent gedragsverandering, maar ontkent ziekte.
3 = Erkent mogelijke gedragsverandering, maar ontkent ziekte.
4 = Ontkent enige gedragsverandering.

**Totaal score:**

# Appendix B

## Quick Inventory of Depressive Symptoms (Rush et al., 2003)

**KORTE ZELFINVULLIJST DEPRESSIEVE SYMPTOMEN**
**(QUICK INVENTORY OF DEPRESSIVE SYMPTOMATOLOGY: QIDS-SR)** [1]
(In te vullen door patiënt)

Naam: ……………………………………..          Datum: … … - … … - … …

***Kruis bij elke vraag het antwoord aan dat de afgelopen zeven dagen het meest op u van toepassing was***

**1-4. Slapen**

**1. In slaap vallen:**
- ☐ 0. Het duurt nooit langer dan 30 minuten om in slaap te vallen.
- ☐ 1. Het duurt tenminste 30 minuten om in slaap te vallen, minder dan de helft van de week.
- ☐ 2. Het duurt tenminste 30 minuten om in slaap te vallen, meer dan de helft van de week.
- ☐ 3. Het duurt meer dan 60 minuten om in slaap te vallen, meer dan de helft van de week.

**2. Slaap gedurende de nacht:**
- ☐ 0. Ik word 's nachts niet wakker.
- ☐ 1. Ik slaap onrustig en licht en word een aantal keren per nacht even wakker.
- ☐ 2. Ik ben tenminste één keer per nacht klaar wakker, maar val weer gemakkelijk in slaap.
- ☐ 3. Ik word vaker dan één keer per nacht wakker en blijf dan 20 minuten of langer wakker, meer dan de helft van de week.

**3. Te vroeg wakker worden:**
- ☐ 0. Meestal word ik niet eerder dan 30 minuten voordat ik op moet staan, wakker.
- ☐ 1. Ik word meer dan 30 minuten voordat ik op moet staan wakker, meer dan de helft van de tijd.
- ☐ 2. Ik word tenminste 1 uur voordat ik op moet staan wakker, meer dan de helft van de tijd.
- ☐ 3. Ik word tenminste 2 uur voordat ik op moet staan wakker, meer dan de helft van de tijd.

**4. Te veel slapen:**
- ☐ 0. Ik slaap niet langer dan 7-8 uur per nacht, zonder overdag een dutje te doen.
- ☐ 1. Ik slaap niet langer dan 10 uur binnen één etmaal (inclusief dutten).
- ☐ 2. Ik slaap niet langer dan 12 uur binnen één etmaal (inclusief dutten).
- ☐ 3. Ik slaap langer dan 12 uur binnen één etmaal (inclusief dutten).

**Score 1-4:** ☐ **(Vul hier in wat de hoogste score (0-3) is op één van de vier slaap vragen hierboven)**

**5. Somber voelen:**
- ☐ 0. Ik ben niet somber.
- ☐ 1. Ik ben minder dan de helft van de tijd somber.
- ☐ 2. Ik ben meer dan de helft van de tijd somber.
- ☐ 3. Ik ben bijna altijd somber.

**6-9. Eetlust en gewicht**

**6. Verminderde eetlust:**
- ☐ 0. Mijn eetlust is niet anders dan gewoonlijk.
- ☐ 1. Ik eet wat minder vaak of kleinere hoeveelheden dan gewoonlijk.
- ☐ 2. Ik eet veel minder dan gewoonlijk en alleen met inspanning.
- ☐ 3. Ik eet nauwelijks binnen een etmaal en alleen met extreme inspanning of op aandringen van anderen.

**7. Toegenomen eetlust:**
- ☐ 0. Mijn eetlust is niet anders dan gewoonlijk.
- ☐ 1. Ik voel vaker dan gewoonlijk de behoefte om te eten.
- ☐ 2. Ik eet regelmatig vaker en grotere hoeveelheden dan gewoonlijk.
- ☐ 3. Ik voel een sterke neiging om tijdens en tussen de maaltijden door te veel te eten.

**8. Gewichtsafname gedurende de afgelopen 2 weken:**
- ☐ 0. Geen gewichtsverandering.
- ☐ 1. Ik heb het gevoel dat ik wat ben afgevallen.
- ☐ 2. Ik ben 1 kg of meer afgevallen.
- ☐ 3. Ik ben 2½ kg of meer afgevallen.

---

[1] Nederlandse vertaling: Altrecht GGZ. Copyright © 2003/2005

***Kruis bij elke vraag het antwoord aan dat de afgelopen zeven dagen het meest op u van toepassing was***

**9. Gewichtstoename gedurende de afgelopen 2 weken:**

☐ 0. Geen gewichtsverandering.
☐ 1. Ik heb het gevoel dat ik wat ben aangekomen.
☐ 2. Ik ben 1 kg of meer aangekomen.
☐ 3. Ik ben 2½ g of meer aangekomen.

**Score 6-9:** ☐ **(Vul hier in wat de hoogste score (0-3) is op één van de vier eetlust-/gewicht vragen hierboven)**

**10. Concentratie/besluitvaardigheid:**

☐ 0. Er is geen verandering in gebruikelijke concentratievermogen of in besluitvaardigheid.
☐ 1. Ik voel mij nu en dan besluiteloos of merk dat ik mijn aandacht er niet bij kan houden.
☐ 2. Ik heb bijna altijd grote moeite om mijn aandacht vast te houden en om beslissingen te nemen.
☐ 3. Ik kan mij niet goed genoeg concentreren om te lezen of kan zelfs niet de kleinste beslissingen nemen.

**11. Zelfbeeld:**

☐ 0. Ik vind mijzelf even waardevol en nuttig als een ander.
☐ 1. Ik maak mijzelf meer verwijten dan gewoonlijk.
☐ 2. Ik heb sterk de indruk dat ik anderen in moeilijkheden breng.
☐ 3. Ik denk voortdurend aan mijn grotere en kleinere tekortkomingen.

**12. Gedachten aan dood en zelfmoord:**

☐ 0. Ik denk niet aan zelfmoord of aan de dood.
☐ 1. k heb het gevoel dat mijn leven leeg is en vraag me af of het nog de moeite waard is.
☐ 2. Ik denk enkele malen per week wel even aan zelfmoord of aan de dood.
☐ 3. Ik denk een aantal keren per dag serieus na over zelfmoord of de dood, óf ik heb zelfmoordplannen gemaakt, óf ik heb al een poging gedaan om mijn leven te beëindigen.

**13. Algemene interesse:**

☐ 0. Geen verandering van mijn normale interesse in andere mensen en activiteiten.
☐ 1. Ik merk dat ik minder geïnteresseerd ben in anderen en in activiteiten.
☐ 2. Ik heb alleen nog interesse in één of twee dingen die ik voorheen deed.
☐ 3. Ik heb vrijwel geen interesse meer in dingen die ik voorheen deed.

**14. Energie:**

☐ 0. Geen verandering in mijn gebruikelijke energie.
☐ 1. Ik word sneller moe dan gewoonlijk.
☐ 2. Ik heb grote moeite met het beginnen aan of volhouden van gebruikelijke dagelijkse activiteiten (bijvoorbeeld boodschappen doen, huiswerk, koken, of naar het werk gaan).
☐ 3. Ik ben niet in staat om mijn normale dagelijkse activiteiten uit te voeren vanwege een gebrek aan energie.

**15-16. Motorische gevoelens**

**15. Gevoel van traagheid:**

☐ 0. Ik denk, spreek en beweeg in mijn normale tempo.
☐ 1. Mijn denken is vertraagd en mijn stem klinkt vlak en saai.
☐ 2. Ik heb meer tijd nodig om te antwoorden op vragen, en mijn denken is zeker vertraagd.
☐ 3. Het kost me zeker veel moeite om te reageren op vragen.

**16. Rusteloos gevoel:**

☐ 0. Ik voel mij niet rusteloos.
☐ 1. Ik ben vaak zenuwachtig, ik wring met mijn handen en ik kan niet rustig op een stoel zitten.
☐ 2. Ik heb de neiging te bewegen en ben nogal rusteloos.
☐ 3. Ik kan vaak niet stilzitten en loop dan te ijsberen.

**Score 15-16:** ☐ **(Vul hier in wat de hoogste score (0-3) is op één van de twee motorische vragen hierboven)**

**Totale score:** ☐

***Dank u voor uw medewerking !***

# Appendix C

## Brugha Life Events Scale (Brugha & Cragg, 1990)

**Brugha Gebeurtenissen**

In de volgende vragenlijst worden 20 gebeurtenissen genoemd. Geeft u alstublieft weer of u deze **sinds het laatste interview** heeft meegemaakt.

| | Nee | Ja |
|---|---|---|
| 1. U was ernstig ziek, ernstig gewond of slachtoffer van geweld<br>1a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 2. Een naast familielid werd ernstig ziek/gewond of slachtoffer van geweld<br>2a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 3. Een naast familielid is hersteld van een ernstige ziekte<br>3a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 4. Een ouder, kind, broer, zus of partner overleed<br>4a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 5. Een goede vriend of (anders dan bij 4 genoemd) naast familielid overleed<br>5a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 6. Uw partner en u gingen uit elkaar<br>6a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 7. U heeft een nieuwe partner gevonden<br>7a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 8. U verbrak een langdurige vriendschap met een goede vriend of familielid<br>8a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 9. U kreeg een ernstig probleem met een goede vriend, familielid of buur<br>9a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 10. U heeft nieuwe vriendschappen gesloten<br>10a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 11. U werd werkloos of zocht vergeefs naar werk<br>11a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 12. U werd ontslagen<br>12a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 13. U bent aan een nieuwe baan begonnen, of heeft belangrijke promotie gemaakt<br>13a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 14. U heeft met succes een opleiding afgerond | 1 | 2 |

| | | |
|---|---|---|
| 14a. Indien ja, wanneer was dat? Maand …… Jaar ……… | | |
| 15. U kwam voor ernstige financiële moeilijkheden te staan<br>15a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 16. Financieel bent u er flink op vooruit gegaan<br>16a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 17. Door overtreding kwam u in aanraking met politie of rechtbank<br>17a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 18. Door diefstal of verlies raakte u geld of iets waardevols kwijt<br>18a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 19. U bent op vakantie geweest<br>19a. Indien ja, wanneer was dat? Maand …… Jaar ……… | 1 | 2 |
| 20. Er zijn u in het afgelopen jaar nog andere belangrijke gebeurtenissen overkomen<br>20a.Indien ja:, namelijk……………………………………………………………<br>…………………………………………………………………………… | 1 | 2 |

20b. Wanneer was dat? Maand …… Jaar ………

# Appendix D

## Perceived stress scale (Cohen et al., 1983)

***Ervaren Stress***

De vragen in deze lijst vragen naar uw gevoelens en gedachten **tijdens de afgelopen maand**. Bij elke vraag kunt u aanduiden *hoe vaak* u op een bepaalde manier gedacht of zich gevoeld hebt. U kunt een cirkeltje plaatsen rond het cijfer dat het beste bij u past.

| | **0= Nooit** | **1= Bijna nooit** | **2= Soms** | **3= Tame lijk vaak** | **4= Zeer vaak** |
|---|---|---|---|---|---|
| 1. Hoe vaak bent u tijdens de afgelopen maand overstuur geweest door iets dat onverwacht gebeurde? | 0 | 1 | 2 | 3 | 4 |
| 2. Hoe vaak hebt u tijdens de afgelopen maand het gevoel gehad dat u niet in staat was de belangrijke dingen in uw leven onder controle te houden? | 0 | 1 | 2 | 3 | 4 |
| 3. Hoe vaak hebt u zich tijdens de afgelopen maand zenuwachtig en gespannen gevoeld? | 0 | 1 | 2 | 3 | 4 |
| 4. Hoe vaak hebt u zich tijdens de afgelopen maand zelfverzekerd gevoeld over uw vermogen om uw persoonlijke problemen aan te pakken? | 0 | 1 | 2 | 3 | 4 |
| 5. Hoe vaak hebt u tijdens de afgelopen maand het gevoel gehad dat de dingen u meezaten? | 0 | 1 | 2 | 3 | 4 |
| 6.Hoe vaak hebt u tijdens de afgelopen maand het gevoel gehad dat u niet opgewassen was tegen al de dingen die u moest doen? | 0 | 1 | 2 | 3 | 4 |
| 7. Hoe vaak bent u tijdens de afgelopen maand in staat geweest om irritaties in uw leven onder controle te houden? | 0 | 1 | 2 | 3 | 4 |
| 8. Hoe vaak hebt u tijdens de afgelopen maand het gevoel gehad dat u de dingen de baas bleef? | 0 | 1 | 2 | 3 | 4 |
| 9. Hoe vaak hebt u zich tijdens de afgelopen maand boos gemaakt om dingen die buiten uw controle om gebeurden? | 0 | 1 | 2 | 3 | 4 |
| 10. Hoe vaak hebt u tijdens de afgelopen maand het gevoel gehad dat de moeilijkheden zich zo hoog opstapelden dat u ze niet te boven kon komen? | 0 | 1 | 2 | 3 | 4 |

# Appendix E

## Adult Irritability Questionnaire (Craiq et al., 2008)

## Prikkelbaarheidschaal (PS)

**Naam:** ..........................................................**Geboortedatum:** ..........................................

**Onderzoekcode:** ..........................................**Onderzoekdatum:** ............................................

De beantwoording van de vragen heeft betrekking op de afgelopen twee weken. Wilt u het juiste antwoord op alle onderstaande vragen omcirkelen?

1. Bent u snel geïrriteerd?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

2. Begint u te mokken als dingen niet op uw manier gaan?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

3. Kunt u zich goed beheersen in het bijzijn van uw familie (of mensen die met u samenwonen)?

3 = helemaal niet
2 = iets
1 = matig
0 = vaak

4. Kunnen kleine dingen tot een woede-uitbarsting leiden?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

5. Kunt u zich goed aanpassen aan een verandering van plannen?

3 = helemaal niet
2 = iets
1 = matig
0 = vaak

6. Als u uw zelfbeheersing verliest, is het voor u dan moeilijk om weer te kalmeren?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak



7. Staat u erop dat dingen gebeuren zoals u het wilt?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

8. Bent u al snel geprikkeld bij kleine problemen?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

9. Kunt u problemen met elkaar bespreken en samen tot een redelijke oplossing komen?

3 = helemaal niet
2 = iets
1 = matig
0 = vaak

10. Leiden onenigheden vaak tot woordenwisselingen?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

11. Kunt u een mening die niet met die van u overeenkomt waarderen?

3 = helemaal niet
2 = iets
1 = matig
0 = vaak

12. Schreeuwt u veel?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

13. Bent u in staat om u te beheersen in aanwezigheid van niet-familieleden?

3 = helemaal niet
2 = iets
1 = matig
0 = vaak

14. Beschouwt u uzelf als prikkelbaar?

0 = helemaal niet
1 = iets
2 = matig
3 = vaak

TOTAAL: