Do maternal cognitive abilities moderate the association between experienced stress early in pregnancy and anxiety/depression later in pregnancy?

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Masters Thesis in Psychology
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ÅBO AKADEMI – FACULTY OF ARTS; PSYCHOLOGY AND THEOLOGY

Summary of Master's Thesis

Subject: Psychology	
Author: Emma Vihervaara	
Title: Do maternal cognitive abilities moderate the association between experienced stress early in pregnancy and anxiety/depression later in pregnancy?	
Supervisors: Mira Karrasch (Åbo Akademi), Matti Laine (Åbo Akademi) and Elisabeth Nordenswan (Åbo Akademi/ FinnBrain)	
Abstract:	
Prenatal anxiety and depression are among the most common psychological disorders affecting women today. The association between stress and psychiatric symptoms as well as the influence of cognition on this association has been widely studied in the general population. Previous studies have indicated significant associations between stress and anxiety/depression. Findings suggest that good cognitive abilities serve as a protective factor against developing psychiatric symptoms. Earlier studies focus on the general population, whereas research on pregnant women is scarce. The aim of this study was to examine the association between experienced stress early in pregnancy and anxiety/depression later in pregnancy, as well as the possible role of cognition as a moderator of this association in pregnant women. This study (N = 275) was conducted as a substudy within the FinnBrain Birth Cohort study. Initial correlation analysis showed significant associations between the modified stress-related screening questionnaire "Daily Hassles" early in pregnancy and anxiety/depression self-report questionnaires later in pregnancy. The possible moderation effect was investigated with a regression analysis, showing no effect of cognition on the association between experienced stress and anxiety/depression. The results support the use of stress-related screening questionnaires such as the Daily Hassles questionnaire in addition to psychiatric self-report questionnaires in the beginning of pregnancy, to improve identification of mothers at risk for developing anxiety/depression during pregnancy. The results further suggest that help should be provided to all mothers experiencing high levels of stress, anxiety or depressive symptoms in the beginning of pregnancy, regardless of their cognitive performance level.	
Keywords: stress, cognition, anxiety, depression	
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ÅBO AKADEMI – FAKULTETEN FÖR HUMANIORA, PSYKOLOGI OCH TEOLOGI

Abstrakt för avhandling Pro Gradu

Ämne: Psykologi	
Författare: Emma Vihervaara	
Titel: Inverkar mammans kognitiva funktionsförmåga på förhållandet mellan upplevd stress under den tidiga graviditeten och ångest/depression senare under graviditeten?	
Handledare: Mira Karrasch (Åbo Akademi), Matti Laine (Åbo Akademi) och Elisabeth Nordenswan (Åbo Akademi/ FinnBrain)	
Abstrakt:	
Prenatal ångest och depression hör till de mest allmänna psykiska störningar som drabbar kvinnor idag. Sambandet mellan stress och psykiatriska symtom samt kognitionens inverkan på detta samband har undersökts mycket i den allmänna populationen. Tidigare forskning har hittat samband mellan stress och utvecklingen av ångest och depression. Därtill har resultat i tidigare studier antytt att kognition kan fungera som en skyddande faktor i utvecklingen av psykiatriska symtom. Tidigare forskning har fokuserat på den allmänna populationen medan det finns få studier att tillgå som fokuserat på gravida kvinnor. Syftet med den föreliggande studien var att undersöka sambandet mellan upplevd stress under den tidiga graviditeten och ångest/depression i slutet av graviditeten. Därtill var syftet att undersöka den möjliga modererande effekten av mammans kognition på detta samband. Denna studie (N = 275) genomfördes som en delstudie i FinnBrain födelsekohortstudien. En korrelationsanalys genomfördes som påvisade signifikanta samband mellan det modifierade Daily Hassles frågeformuläret gällande stress i början av graviditeten och självskattningsskalor gällande ångest/depression i slutet av graviditeten. Den möjliga moderatoreffekten undersöktes med hjälp av en regressionsanalys. Resultaten visade ingen effekt av mammornas kognitiva prestationsförmåga på sambandet mellan upplevd stress i början av graviditeten och ångest/depression i slutet av graviditeten. Resultaten stöder användningen av frågeformulär relaterade till stress vid sidan om psykiatriska självskattningsskalor i början av graviditeten, för att effektivera identifieringen av mammor med risk för att utveckla ångest/depression under graviditeten. Resultaten tyder vidare på att stöd borde erbjudas alla mammor som uppvisar upplevd stress, ångest eller depression i början av graviditeten, oberoende av nivån på deras kognitiva prestationsförmåga.	
Nyckelord: stress, kognition, ångest, depression	
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1 Introduction

Maternal anxiety and depression are common during pre- and postnatal periods (Field, 2011). According to longitudinal studies, the rate of maternal depression is higher during pregnancy than during the postpartum period (Bowen et al., 2012). Approximately 10-15% of all pregnant women experience some anxiety or stress during this major transitional phase in their life (Dayan et al, 2006). Prenatal anxiety and depression are among the most common disorders affecting women (Fairbrother et al., 2015; Kartal & Oskay, 2017), and the majority of postpartum depression cases are preceded by depression during pregnancy (Bowen et al., 2012).

Effects of prenatal anxiety and depression have negative implications for both fetal and infant development (DiPietro, 2012), as well as for families and for long-term maternal well-being (Brennan et al., 2000). There is evidence that maternal anxiety and depression during pregnancy can affect the immune function of the fetus, possibly by transfer of maternal cortisol to the fetus. Prenatal immune challenges have been linked to central nervous system dysfunction and consequently related neuropsychiatric disorders such as autism, schizophrenia, Alzheimer's and Parkinson's disease (Knuesel et al., 2014). Prenatal maternal anxiety and depression have been linked to a wide range of symptoms in infants such as low birth weight, preterm birth, and dysregulated neurobiological activity, as well as behavioral, emotional and neurodevelopmental disturbances (Lazinski et al., 2008). These wide-ranging symptoms can persist into childhood, adolescence, and all the way into adulthood (Talge et al., 2007). Along with the child-related symptoms of maternal psychological distress, maternal anxiety and depression are known to compromise maternal sensitivity, synchrony and parent-child interaction (Field, 2011). Enhanced identification of maternal anxiety and depression during pregnancy would improve prevention and intervention efforts and consequently reduce symptoms of anxiety and depression throughout pregnancy. The reduction of anxiety and depressive symptoms during pregnancy could provide long-term benefits for both the mother and child as well as the rest of the family (Glover, 2014).

Korja et al. (2018) concluded in their study on courses of prenatal depressive and anxiety symptoms that it may be that not only the chronicity of maternal distress symptoms, but also affiliated risk factors play an important role when the offspring outcomes are considered. Although prenatal anxiety and depression affect many women and have been shown to influence child development and well-being, little is still known about risk factors early in pregnancy predicting anxiety/depressive symptoms later in pregnancy. Identification of such risk factors would enable interventions supporting maternal psychological well-being to be focused on the most vulnerable mothers. Transition into motherhood is a challenging period involving significant physical and psychological changes (Teixera et al., 2009), making pregnant women more vulnerable to the negative effects of life events (Priya et al., 2018). Studies have indicated significant associations between high levels of experienced stress and anxiety/depression among pregnant women (Van Heyningen et al., 2017). Many background factors, such as history of previous psychological disorders, low socioeconomic status and pregnancy-related somatic risk factors increase the risk for prenatal anxiety or depression (Ibanez et al., 2012). Socioeconomic burden and demands of everyday life have been found to be associated with parental psychiatric symptoms not only during the postnatal period, but also during the prenatal period (Leinonen et al., 2002). Furthermore, depressive symptoms during early pregnancy have been found to predict later depressive symptoms (Rallis et al., 2014). One other factor potentially related to maternal anxiety and depression is maternal cognitive ability (Gale et al., 2012), which is at the focus in the present study.

Mild difficulties with cognitive functions, such as problems with attention, concentration and working memory are often found in patients with anxiety and depression (Shilyansky et al., 2016). Kataja et al. (2017) found that anxiety and depression during pregnancy was related to lower performance on a task related to visuospatial working memory and operational control. People with high cognitive abilities are expected to have better self- help skills (Ross, 1972) and deal more actively when faced with stress (Cederblad et al., 1995). Luthar (1991) found that cognition can also play a role in internal affective symptomatology when levels of stress increase. A meta-analysis with 8191 participants by Gale et al. (2012) supported

the notion of a significant association between well-being and cognition in general. These results raise the question of whether maternal cognitive capacity could moderate the association between experienced stress in the beginning of pregnancy and anxiety/depression in the end of pregnancy. Parental cognitive functions have rather seldom been assessed in larger-scale studies (Pechtel & Pizzagalli, 2011), perhaps due to limited study resources (Fredrickson et al., 2010). The association between psychiatric symptoms and cognition in the general population has been widely studied, but research focusing on pregnancy is scarce (Kingston & Tough, 2014).

1.1 Aims of the study

The aim of this study is to explore the association between experienced daily stress in the beginning of pregnancy and anxiety/depression in the end of pregnancy. In addition to this, the aim was to examine the possible role of maternal cognitive functions as a moderator of that association. The structure of the study is presented in Figure 1. It was hypothesized that higher levels of experienced stress early in pregnancy would be related to higher anxiety/depressive symptoms later in pregnancy. Furthermore, it was hypothesized that good maternal cognitive functions can act as a protective factor, weakening the association between experienced stress early in pregnancy and anxiety/depression later in pregnancy. Research on this topic is central for early identification of mothers at risk for developing anxiety/depression during pregnancy. Effective identification of these mothers at an early stage in pregnancy would enable interventions targeting these mothers at an early stage of symptomatology.

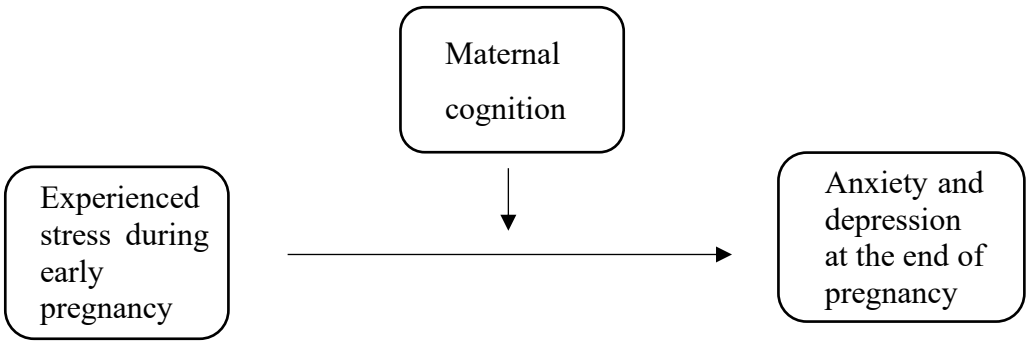

Figure 1.

The structure of the study.

2 Method

2.1 Participants

The sample (*N* = 275) was drawn from the FinnBrain Birth Cohort Study (www.finnbrain.fi), consisting of approximately 4000 participating families. The FinnBrain study started in 2011 at the University of Turku. The sample was recruited through convenience sampling at maternity clinics in Turku, in the nearby municipalities and at the Åland islands at the time of the families' first ultrasonography at gestational week (gwk) 12. In addition to a verified pregnancy, inclusion criteria were sufficient knowledge of Swedish or Finnish. Exclusion criteria were severe malformation revealed during ultrasound or miscarriage before gwk 25. Participation was voluntary and no compensation was provided (Karlsson et al., 2018). Approximately 85-90% of the mothers in the FinnBrain Birth Cohort Study reported low levels of anxiety or depression during pregnancy. Only 1-2 % of the mothers in the FinnBrain Birth Cohort Study sample experienced continuously high levels of anxiety or depressive symptoms throughout the pregnancy (Korja et al., 2018). A focus cohort was established to compare mothers consistently reporting psychological distress symptoms to their matched non-exposed controls. This case control study divided the participants into the highest and lowest 25th percentiles what comes to

psychological symptoms. The present study encompassed 50 mothers from the focus cohort, 104 mothers from the control cohort and 121 mothers from in between these highest and lowest 25th percentiles of psychological symptoms (Karlsson et al., 2018). The mothers included in the present study had filled out the stress-related Daily Hassles questionnaire as well as the psychiatric questionnaires regarding anxiety/depression in the beginning and in the end of pregnancy. In addition to this they had taken part in the neuropsychological measurements at the FinnBrain research facility in Turku.

The background variables of the participants (educational level, age, parity, occupation, and income level, see Table 1) were drawn from the questionnaires filled out at gwk 14. The majority of the mothers in the sample were expecting their first child as well as working during this point of time. Educational level was categorized into three classes: secondary diploma or lower (high school), polytechnic degree, and undergraduate or higher (Karlsson et al., 2018). A large proportion of the participants were highly educated; 74.6% had continued education after high school.

Table 1.

Demographic characteristics of the study sample

		Total sample *N* = 275
Mean Age at labor (range)		30.8 (19-45)
Education (%)	Secondary diploma or lower	25.5
	Polytechnic	29.1
	Undergraduate or higher	45.5
Monthly income after taxes (%)	< 1500	36.0
	1501-2500	52.4
	2501-3500	10.5
	> 3501	1.1
Number of previous births (%)	0	54.2
	1	30.5
	2	12.7
	3	2.2
	4	0.4
Occupation (%)	Working	74.9
	Studying	8.7
	Mother's leave	9.1
	Unemployed	4.0
	Other	2.5

2.2 Procedure

Ethical permission was obtained from the Joint Ethics Committee of the Turku University Hospital and the University of Turku. Written consent was required from each participant before the test sessions at the FinnBrain research facility in Turku.

The neuropsychological measures included in this study were chosen due to their different scope of cognition, adding up to a comprehensive whole. Maternal cognitive functions were measured with a part of the CogState test battery (www.cogstate.com)

and the Verbal Comprehension Index (VCI) from Weschler Adult Intelligence Scale IV (WAIS-IV). Cognitive assessments took place in a quiet room in the FinnBrain Child Development and Parental Functioning Lab in Turku under the supervision of a psychology student. The tasks of the CogState battery were presented on a computer. Practice sessions were provided until the required amount of correct responses was reached or until the practice time was completed. The test battery took approximately 45 minutes to complete and feedback was provided to all participants. WAIS-IV was completed by paper and pen and administered by two psychology students trained and supervised by a senior researcher from the Department of Psychology at the University of Turku. The test battery took approximately 90 minutes to complete (Kataja et al., 2017).

Experienced daily stress was measured at gwk 14 and gwk 34 with the modified ”Daily Hassles” scale (Korpela et al., 2008). Anxiety and depression were also measured at gwk 14 and gwk 34, with the Anxiety Subscale out of the Symptom Checklist Scale - 90 (Derogatis et al., 1973) as well as the Edinburgh Postnatal Depression Scale (Cox et al., 1987). The Daily Hassles questionnaire (DH), Edinburgh Postnatal Depression Scale (EPDS), and the Anxiety Subscale out of the Symptom Checklist Scale- 90 (SCL-90/AS) were sent home to the study participants by mail and could be filled in by hand or electronically.

2.3 Measures

2.3.1 Daily Hassles (DH)

The modified Daily Hassles questionnaire (Korpela et al., 2008), contains assessment of the experienced amount of daily worrying and joy for the last three months, covering relationships, work, money, work around the house, news, and the use of drugs, alcohol or tobacco. The participants were asked to rate their perceived amount of worrying and joy for each of the included areas of life on a scale from zero to three.

The present study included five items out of the worrying part of the questionnaire. The items concerning joy were excluded due to their irrelevance for the present study. The five separate items chosen for the analysis were worrying related to relationships, work, money, work around the house and news. The item concerning addictions was eliminated due to its inapplicability for mothers during pregnancy.

2.3.2 CogState

The CogState test battery consists of tests measuring so-called fluid intelligence, which is thought to be biologically driven and rather consistent throughout life. This form of intelligence encompasses skills such as executive functioning and memory (Cattell, 1987). The CogState test battery was selected for the longitudinal FinnBrain Birth Cohort Study because it enables running repeated measurements without significant practice effects. CogState has been designed to measure executive functioning, learning, memory, visuomotor functioning, processing speed, attention and social cognition (Maruff et al., 2009). Evidence suggests a cross-cultural equivalence of performance on the tasks included in the battery (Yoshida et al., 2011). CogState represents a time efficient, accurate and reliable testing method for large groups due to its computerization (Pietrzak et al., 2009).

The primary outcome measures recommended by the CogState research manual were used (CogState, 2011), with the exception of the One Back task where the second outcome measure of reaction time was used instead of the primary outcome measure of accuracy. This decision was made to increase inter-individual variation as error rates were low on the primary outcome measure of the task. The seven tasks used in the present study are presented below. All the card tasks in the CogState battery refer to standard 52-card decks.

Continuous Paired Associate Learning Test (CPAL). This test measures the ability to encode associations between locations and figures into memory. Firstly, the participant is taught the hidden locations of two differently shaped and colored figures beneath circles on the screen. After that the participant is taught where the other eight figures are located on the screen. As figures are shown at the center of the screen, the

participant is to find the matching figure by clicking on the circle beneath which it is hidden. The same procedure continues throughout the seven rounds of the test. Incorrect responses result in an error sound. The CPAL is considered to measure executive functions and learning (Harel et al., 2011). The outcome measure was accuracy of performance measured by the amount of correct responses (CogState, 2016). Kataja et al. (2017) reported moderate correlations between CPAL and the WAIS-IV Matrix Reasoning Task, supporting the validity of the test.

Detection Test (DET). This test consists of 35 trials in which the participant is to answer the question "Has the card turned over?" by pressing "yes" as soon as the playing card turns. The participant is instructed to answer as fast and as accurate as possible. Errors are followed by a sound. DET measures psychomotor functioning and reaction time. The outcome measure was response speed in milliseconds (Cogstate, 2016). The construct validity of the test is demonstrated by significant correlations with the Visual Reproduction-Initial Recall from the Wechsler Memory Scale-Revised (Hammers et al., 2012).

Groton Maze Learning Test (GML). The participant is to find a hidden pathway of 28 steps and 11 turns in a 10x10 grid of tiles. The participant moves from the upper left corner to the lower right corner by clicking the tiles, which show green if the choice of the path is correct, or red if the choice of the path is incorrect. The participant has to follow the following rules: do not move backwards, do not touch the same tile twice, do not move diagonally, and return to the last correct tile when an error is made. GML is considered to measure executive functions and visuospatial learning/memory (Pietrzak et al., 2007). The outcome variable was the total number of errors made in attempting to learn the same hidden pathway on five consecutive trials at a single session (CogState, 2016). GML has good convergent validity with traditional neuropsychological tests measuring attention, working memory, and learning as well as error monitoring, such as the WAIS-IV Working Memory Index and the Benton test (Pietrzak et al., 2008; Pietrzak et al., 2009).

Identification Test (IDN). In this task, the participant is to make a yes/no decision to the question "Is the card red?" as fast and as accurate as possible after the card is turned

during 30 trials. An error is indicated by a sound. The IDN measures reaction time, visual attention and vigilance. The outcome variable was reaction time in milliseconds (CogState, 2016). The construct validity of IDN is supported through significant correlations with the Benton Visual Form Discrimination test (Hammers et al., 2012).

International Shopping List Test (ISL). In this test, the participant is instructed to remember a shopping list consisting of 12 items that is read out loud to them by the test leader. Afterwards the participant is asked to recall the items. This procedure is repeated three times with the same list. ISL is considered to measure verbal memory. The outcome variable was the total number of correct responses (CogState, 2016). The validity of ISL is supported through studies showing strong correlations with the Hopkins Verbal Learning Test Revised (Pietrzak et al., 2009). ISL has been found not to correlate with the verbal tasks from the Weschler Adult intelligence Scale IV, indicating its independence from acquired language abilities (Kataja et al., 2017).

One Back Task (OBK). The participant is to make a yes/no decision to the question "Is the previous card the same?" as fast and accurately as possible during 31 trials. A sound is given to indicate errors. OBK measures attention and working memory. The outcome variable is reaction time in milliseconds (CogState, 2011). The validity of OBK is supported by significant correlations with the Digit Symbol Test from the WAIS-R (Hammers et al., 2012).

One Card Learning Test (OCL). Here the participant is to make a yes/no answer to the question "Have you seen this card before?" as fast and as accurate as possible. A sound is given after each error. The task uses six different randomly selected cards that are repeated and ended after 42 trials. OCL measures attention and visual recognition memory. The outcome variable is reaction time in milliseconds. (CogState, 2011). The construct validity of OCL is supported by significant correlations with Digit Span Backward from the WAIS-R (Hammers et al., 2012).

2.3.3 Wechsler Adult Intelligence Scale IV- Verbal Comprehension Index (WAIS-IV VCI)

The WAIS-IV is a widely used intelligence measure for adults because of its high reliability and vast norming and standardization procedures. The test battery is comprised of 10 core subtests providing four index scores. These are the Verbal Comprehension index, the Perceptual Reasoning index, the Working Memory index and the Processing Speed index. The Verbal Comprehension Index was chosen out of the four existing indexes from WAIS-IV to measure so-called crystallized intelligence, which is thought to develop during life, correlating with education level and verbal experience (Cattell, 1987). The Verbal Comprehension Index is made up of three subtests: Vocabulary, Information and Similarities. The Vocabulary test measures ability to define words, while the Similarities test measures the ability to define similarities between objects. The items of these two tests are scored according to the test manual by points ranging from 0-2. The Information subtest measures general knowledge and the ability to verbalize it. The test items are scored according to the test manual by points ranging from 0-1 (Wechsler, 2012).

2.3.4 Symptom Checklist -90/Anxiety Subscale (SCL-90/AS)

Subjective prenatal anxiety of the mothers was measured using the Anxiety Subscale out of the SCL-90. Out of the altogether 90 items in the Symptom Checklist Scale-90 (SCL-90), ten items concerning anxiety are used in the Anxiety Subscale. The Anxiety Subscale is thought to be a reliable and valid measure of anxiety symptoms in both clinical and research settings. It has demonstrated a good internal consistency with Cronbach's alphas ranging from .83 to .85. The questions of the subscale are rated on a scale from 0 to 4 points. (Derogatis et al., 1973). The maximum score is 40 and the FinnBrain Birth Cohort Study used the total sum score cut-off points of ≥ 10 and ≤ 4 for "cases" and "controls" respectively (Karlsson et al., 2018).

2.3.5 Edinburgh Postnatal Depression Scale (EPDS)

EPDS is a well-studied subjective rating scale used both in prenatal and postnatal subjective evaluation of depression (Gibson et al., 2009), as well as in subjective evaluation of depression in the general public (Becht et al., 2001). It has been developed to identify and estimate the risk for postnatal maternal depression and has demonstrated a good internal consistency with Cronbach's alpha ranging from .82 to .84 (Cox et al., 1996). EPDS consists of 10 questions which are answered on a four-point Likert scale, each of which can be rated between 0-3 points. The maximum score of the questionnaire is 30 points, of which 12 points or higher is regarded as above normal (Cox et al., 1987). The FinnBrain Birth Cohort Study used the total sum score cut-off points of ≥ 12 and ≤ 6 for "cases" and "controls" respectively (Karlsson et al., 2018).

2.4 Data Analysis

The statistical analyses were performed using the IBM SPSS 25 Statistical Program for Social Sciences. The CogState completion and integrity pass rates were calculated prior to the statistical analyses to ensure the reliability of the data in a non-clinical population (CogState, 2011). The large sample size motivated to accept the assumption of normality and the use of parametric tests (see e.g. Field, 2013). The data was checked for outliers, and missing values have been imputed according to mean imputation.

The CogState subtests as well as SCL-90/AS and EPDS were standardized to the data by setting the sample mean in each task to zero with a spread of ± 1 standard deviation. The subtests OBK, IDN, DET, GML and CPAL were transformed so that higher values indicate better performance on all subtests before they were summed up. The summative score of the standardized CogState subtests was used as a continuous variable in the analyses. The data from the WAIS-IV VCI subtests was also summarized into a continuous variable used in the data analyses. The summarized Daily Hassles variable was not standardized because the questions were all on the same scale from the start. The Daily Hassles questionnaire was transformed so that higher

values indicate more experienced daily stress in line with the structure of the SCL-90/AS and EPDS questionnaires. The five included items from the Daily Hassles questionnaire were combined into a continuous variable of experienced daily stress for the analyses.

Pearson product-moment correlations were calculated to study the association between SCL-90/AS and EPDS (r = .55, p < .001). Their intercorrelation motivated the combination of these standardized psychiatric measures into a single variable of "Psychological Distress". The Psychological Distress variable was used as a continuous variable in the data analyses. The correlation between CogState and WAIS-IV VCI was low (r = .22, p = .003), hereby motivating to keep these tests as two separate variables for the moderation analysis. The correlations between the variables of Daily Hassles and Psychological Distress at the beginning of pregnancy (r = .43, p < .001) and in the end of pregnancy (r = .44, p < .001), indicating a shared variance of less than 20%, prompted to keep these measures separate. These correlations are presented in Table 2.

The main association of interest between experienced stress in the beginning of pregnancy, and anxiety/depression in the end of pregnancy, was tested with a bivariate Pearson product-moment correlation analysis between Daily Hassles (gwk 14) and Psychological Distress (gwk 34). A multiple regression analysis, with cognitive performance as a moderator, was used to examine the impact of maternal cognition on this association. The enter method was used, with the variables Education, Age, Daily Hassles and CogState/WAIS-IV VCI entered in different steps to predict the outcome of Psychological Distress.

2.5 Descriptive Statistics

Descriptive statistics (means, standard deviations and ranges) were calculated for Daily Hassles, WAIS-IV VCI, CogState, and the questionnaires of Psychological Distress.

The mothers included in the sample reported daily stress levels between 0-12 out of a maximum of 15. The mean level of experienced daily stress was fairly low (*M* = 5.73, *SD* = 1.99). The mothers' verbal comprehension performance was representative of the general Finnish population (*M* = 101.57, *SD* = 15.54) according to Finnish norms (Wechsler, 2012). The CogState task performances of the present sample fall within the normal range (±1SD) of CogState normative data for the age groups of 18-34 and 35-49 from studies of healthy participants from North and South America, Europe, Australia and Asia. The CogState results were above the normative mean in all tasks except for the Groton Maze Learning Test (CogState, 2014). The mothers in the present study reported low levels of depression (*M* = 4.07, *SD* = 3.68), with a range from 0 to 17 out of a maximum of 30 points on the EPDS. The reported levels of anxiety on the SCL-90/AS were also low (*M* = 2.33, *SD* = 3.08), with a range from 0-18 out of a maximum of 40 points on the scale.

The sample size was larger for the CogState measures (*N* =275) compared to the WAIS-IV VCI measures (*N* =189). This is due to the data being part of the Finnbrain Birth Cohort Study, where only 189 results of the WAIS-IV were needed for the analyses conducted in another earlier study. The sample size of the Daily Hassles questionnaire, which was sent out to the participants in the beginning of pregnancy was 273. The sample size for the psychiatric measures, sent out to the participants at the end of pregnancy, was 257 for SCL and 258 for EPDS. The missing answers are explained by some of the participants failing to return the questionnaires.

3 Results

3.1 Correlation Analysis

Prior to the regression analyses presented below, correlation analyses were conducted to examine the bivariate relationships between WAIS-IV VCI, CogState, Daily Hassles (gwk14/43) and Psychological Distress (gwk14/34). The correlation between Daily Hassles at gwk 14 and Psychological Distress at gwk 34 was of main interest

because of the aim of the study. The CogState task completion rate and integrity pass rate were 100%. Table 2 presents the correlations.

The correlation of main interest between Daily Hassles in the beginning of pregnancy and Psychological Distress at the end of pregnancy was significant ($r = .42$, $p < .001$); higher levels of experienced daily stress in gwk 14 was related to more anxiety and depressive symptoms in gwk 34. Significant intercorrelations were found between all the questions of the Daily Hassles questionnaire and both questionnaires of Psychological Distress. The strongest correlations were found between worrying about relationships and EPDS ($r = .31$, $p < .001$) as well as worrying about money and EPDS ($r = .25$, $p < .001$). The correlations between Daily Hassles and SCL-90/AS were in line with the findings concerning Daily Hassles and EPDS. The strongest correlations were found between SCL-90/AS and worrying about relationships ($r = .25$, $p < .001$) as well as SCL-90/AS and worrying about money ($r = .14$, $p = .03$).

Psychological Distress in the beginning of pregnancy also correlated significantly with Daily Hassles in the end of pregnancy ($r = .37$, $p < .001$); higher levels of anxiety and depressive symptoms in gwk 14 was related to more experienced daily stress in gwk 34. The correlations between Daily Hassles in the beginning and end of pregnancy ($r = .53$, $p < .001$) as well as Psychological Distress in the beginning and end of pregnancy were high ($r = .60$, $p < 0.001$); higher levels of experienced daily stress as well as anxiety/ depressive symptoms in gwk 14 was related to more experienced daily stress and anxiety/depressive symptoms in gwk 34, respectively. WAIS-IV VCI and CogState showed small negative correlations with Psychological Distress in the end of pregnancy ($r = -.07$, $p = .37$; $-.15$, $p = .02$) respectively; higher levels of maternal cognitive performance was related to less anxiety/depressive symptoms in gwk 34, while only the correlations between CogState and Psychological Distress were significant.

Table 2.

Correlation analysis between WAIS-IV VCI, CogState, Daily Hassles gwk 14/34, and Psychological Distress gwk 14/34

	1	2	3	4	5	6
1. WAIS-IV VCI						
2. CogState	**0.22****					
3. DH gwk 14	0.04	-0.09				
4. PD gwk 14	-0.14	**-0.14***	**0.43****			
5. DH gwk 34	0.06	-0.01	**0.53****	**0.37****		
6. PD gwk 34	-0.07	**-0.15***	**0.42****	**0.60****	**0.44****	

*Note. DH= Daily Hassles; PD= Psychological Distress; ** = p < .001, * = p = .02, Greater values on the variables entail more experienced daily stress/psychological distress/better cognitive performance.*

3.2 Moderation Analysis

Because of the indications of small correlations between CogState, WAIS-IV VCI, and Psychological Distress during pregnancy, these associations were further examined through a linear multiple regression. The collinearity diagnostics qualified the use of the data for modelling, as the tolerance values for CogState ranged between .82 - .98 and the VIF values between 1.02 – 1.22. Same applies for the WAIS-IV VCI as the tolerance values ranged between .77 – .99 and the VIF values between 1.01 – 1.30. A three-stage hierarchical multiple regression was conducted with Psychological Distress as the dependent variable. At stage 1, Education and Age of the mothers were entered to control for the influence of these demographic variables. At stage 2, Daily Hassles and the measures of cognition (CogState/WAIS-IV VCI) were entered. At stage 3, the interaction between cognition and Daily Hassles (i.e., the moderation effect) was introduced to the model. The regression statistics are reported separately for CogState in Table 3, as well as for WAIS-IV VCI in Table 4.

Table 3.

Moderation analysis of the impact of CogState on the association between Daily Hassles in the beginning of pregnancy and Psychological Distress in the end of pregnancy when controlling for Education and Age

Variable	β	t	sr^2	R	R^2	ΔR^2
Step 1				0.10	0.01	0.01
Education	-0.11	-1.66	0.01			
Age	0.03	0.49	0.00			
Step 2				0.44	0.19	0.18***
Education	-0.09	-1.40	0.01			
Age	0.01	0.07	0.00			
Daily Hassles	0.41	7.13	0.16***			
CogState	-0.08	-1.30	0.01			
Step 3				0.44	0.19	0.00
Education	-0.09	-1.42	0.01			
Age	0.01	0.10	0.00			
Daily Hassles	0.41	7.06	0.16***			
CogState	-0.08	-1.31	0.01			
DH x CogState	0.02	0.30	0.00			

*Note. N =258, DH = Daily Hassles, *** = p < .001*

The hierarchical multiple regression conducted with CogState as the moderator (Table 3) revealed that at stage one, Education and Age did not contribute significantly to the regression model, $F(2,255) = 1.37$, $p = .26$, accounting for only 1.1% of the variation in Psychological Distress. Introducing Daily Hassles and cognition at stage two explained an additional 17.8% of the variation in Psychological Distress, and this change was significant, $F(2,253) = 27.85$, $p < .001$. At stage two of the regression model, Daily Hassles was the only significant predictor of Psychological Distress, uniquely explaining 16.0% of the variation in Psychological Distress. Adding the interaction to the regression model at stage three did not improve the model at all, $\Delta R^2 = 0.00$, $F(1,252) = .091$, $p = .76$. Together the five predictors accounted for 18.9% of the variance in Psychological Distress.

Table 4.

Moderation analysis of the impact of WAIS-IV VCI on the association between Daily Hassles in the beginning of pregnancy and Psychological Distress in the end of pregnancy when controlling for Education and Age

Variable	β	t	sr^2	R	R^2	ΔR^2
Step 1				0.14	0.02	0.02
Education	-0.13	-1.70	0.02			
Age	0.09	1.13	0.01			
Step 2				0.46	0.21	0.19***
Education	-0.12	-1.58	0.01			
Age	0.06	0.84	0.00			
Daily Hassles	0.44	6.45	0.19***			
WAIS-IV VCI	-0.05	-0.62	0.00			
Step 3				0.47	0.22	0.01
Education	-0.13	-1.74	0.01			
Age	0.07	0.99	0.00			
Daily Hassles	0.44	6.50	0.19***			
WAIS-IV VCI	-0.05	-0.66	0.00			
DH x WAIS-IV VCI	0.10	1.54	0.01			

*Note. N =179, DH= Daily Hassles, *** = p < .001*

The hierarchical multiple regression conducted with WAIS-IV VCI as the moderator (Table 4) revealed that at stage one, Education and Age did not contribute significantly to the regression model, $F(2,176) = 1.69$, $p = .19$, accounting for only 1.9% of the variation in Psychological Distress. Introducing Daily Hassles and Cognition at stage two explained an additional 19.1% of the variation in Psychological Distress and this change was significant, $F(2,174) = 20.97$, $p < .001$. At stage two of the model, Daily Hassles was the only significant predictor of Psychological Distress, uniquely explaining 19.1% of the variation in Psychological Distress. Adding the interaction term to the regression model at stage three explained an additional 1.1% of the variation in Psychological Distress, $F(1,173) = 2.37$, $p = .13$. Together the five independent variables accounted for 22.0% of the variance in Psychological Distress.

Altogether, when looking at the predictive value of Daily Hassles on Psychological Distress, 17.6% of the variance in Psychological Distress was explained by variance in Daily Hassles. Figure 2 presents the scatterplot of this association.

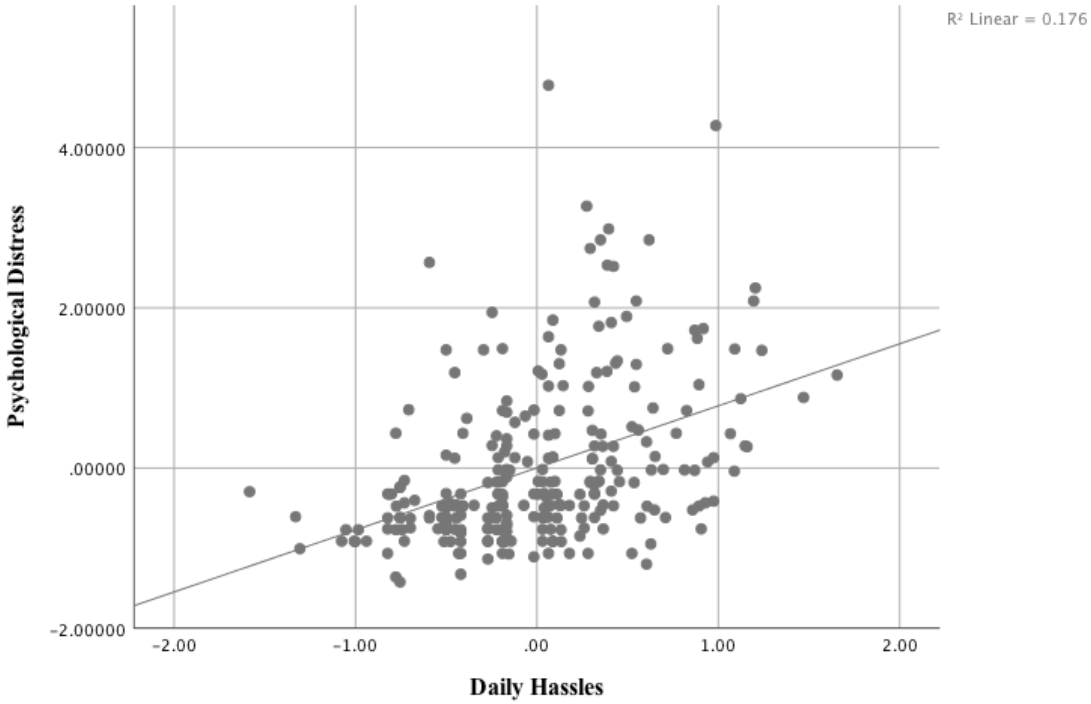

Figure 2.

Illustration of the interaction between Daily Hassles in the beginning of pregnancy and Psychological Distress in the end of pregnancy.

All in all, according to the multiple hierarchical regression analyses, cognitive level as measured by CogState or WAIS-IV VCI does not significantly moderate the association between Daily Hassles and Psychological Distress. Out of the individual predictors, Daily Hassles was the only one reaching statistical significance in any of the regression models.

4 Discussion

The present study set out to examine the impact of maternal cognition on the relationship between daily experiences of stress in the beginning of pregnancy and anxiety/depression at the end of pregnancy. The rationale behind this is that early identification of mothers at risk for developing anxiety and depression at the end of pregnancy would be important to enable early interventions targeted at these mothers. The results of this study showed a significant association between the Daily Hassles questionnaire at early pregnancy and the Psychological Distress variable at late pregnancy. This implies that it is possible to use stress-related self-report questionnaires at early stages of pregnancy to identify mothers who are at risk for developing anxiety/depression later on. At the same time, the possible moderating effect of maternal cognitive level on this association was examined, but no moderating effect was found.

Although the present study failed to find an effect of cognition on the association between experienced daily stress levels and anxiety/depression during pregnancy, the association between the Daily Hassles questionnaire early in pregnancy and the Psychological Distress variable later in pregnancy ($r = .37$, $p < .001$) has important implications. As mentioned in the introduction, prenatal anxiety and depression are amongst the most common disorders affecting women today (Kartal & Oskay, 2017; Fairbrother et al., 2015), accompanied with long-term harming effects on the mother and child as well as the rest of the family (Glover, 2014). In regard of the association found between experienced daily stress during early pregnancy and late pregnancy anxiety and depression, the use of simple screening questionnaires such as the Daily Hassles questionnaire in the beginning of pregnancy should be considered. In line with the aim of this study, this could enhance the identification of mothers in risk of developing anxiety or depression during pregnancy, and thereby prompt early interventions. Early assessments and interventions of maternal mental health problems should be of interest for families, as well as society as a whole.

The association found between experienced daily stress early in pregnancy and anxiety/depression later in pregnancy was supported by the results of the regression

analysis, indicating that the only significant predictor of Psychological Distress in the end of pregnancy was Daily Hassles in the beginning of pregnancy. The correlation analysis further showed that from the beginning of pregnancy to the end of pregnancy, pre-post levels of Daily Hassles ($r = .53$, $p < .001$) as well as Psychological distress ($r = .60$, $p < .001$) were strongly correlated. These correlations state the cross- and interrelatedness of experienced daily stress, anxiety and depression during pregnancy. The latter correlation is supported by the results of the Korja et al., (2018) study, which found that maternal anxiety and depression levels in the beginning and end of pregnancy are highly correlated. These results indicate that anxiety/depressive symptoms are fairly consistant throughout pregnancy and highlight the possibility of identifying mothers at risk for developing psychological distress at the end of pregnancy by using EPDS and SCL-90/AS in the beginning of pregnancy.

Recent studies suggest that anxiety and depressive symptoms as well as the biological stress response can be reduced during the peripartum period by the use of relaxation techniques, psychoeducation and cognitive-behavioral interventions (Bittner et al., 2014). Treatment studies suggest that cognitive-behavioral therapy, interpersonal therapy (Goodman et al., 2014), and/or medication might improve maternal distress and offspring outcomes (Wisner et al., 2009). Social support, partnership satisfaction, self-esteem and self-efficacy have been related to peripartum anxiety and depression, being thus relevant factors when considering early interventions in women at risk for developing psychological distress (Mendelson et al., 2013). The present study found the strongest correlations between worrying about relationships and money in connection with anxiety and depressive symptoms, highlighting the importance of economic support during pregnancy as well as the support of maternal relationships.

Previous studies have found an association between cognition and psychological distress in the general population (e.g. Gale et al., 2012; Shilyanski et al., 2016), but research focusing on the effect of cognition on psychological distress in pregnant women is scarce (Kingston & Tough, 2014). According to the analyses of the present study, cognitively lower-performing mothers are not more likely to develop more anxiety and depressive symptoms related to daily experiences of stress than cognitively higher-performing mothers. Based on the present results, it is important to

direct help to all mothers experiencing stress in addition to anxiety/depressive symptoms in the beginning of pregnancy, regardless of their cognitive capabilities.

An advantage of the present study is its sample size encompassing of 275 participants, allowing for detection of even smaller associations between variables. The limitations of the study mainly lie in the fact that the data had been gathered in the context of a larger cohort study. Therefore, the measures used were not optimized for the aims of this study in regard to for example repeated measures and balanced samples. The cognitive measurements of the present study were done only once. Hereby, changes in cognitive performance and their potential co-variation with Psychological Distress during pregnancy remain open. The cognitive performance of the mothers prior to pregnancy is also unknown and longitudinal conclusions about the impact of cognition on psychological distress can not be made.

The homogeneity of the sample concerning education level and levels of psychological distress raises questions concerning the generalizability of the results to both clinical populations as well as the general population. The CogState test battery is considered to measure fluid intelligence, which is thought to be biologically driven (Cattell, 1987), and the correlation between CogState and education in this sample was low ($r = .241$, $p < .001$). The education level of the mothers might hereby lack significance on the results. Education was also controlled for in the multiple hierarchical regression analysis. The mothers reported low levels of anxiety symptoms ($M = 2.33$/maximum of 40), symptoms of depression ($M = 4.07$/maximum of 30;), as well as fairly low levels of experienced daily stress ($M = 5.73$/ maximum of 15). However, the sample consisted of mothers reporting high, low and medium amounts of anxiety/depressive symptoms, derived from the original FinnBrain Birth Cohort Study sample, making the participants somewhat diverse in regard of psychological distress.

The reliability and validity of the measurements is important to consider. As was noted in chapter 2.3.2, previous research on CogState has shown adequate reliability (Pietrzak et al., 2009). However, the results of a study by Hammers et al. (2012) indicated weak criterion validity, showing that the battery did not succeed in differentiating between various dementias. Computerized tests have many advantages,

such as the possibility to test large amounts of individuals in a short time, the ability of precise measurements, and easier administration procedures. Computerized test performance is, however, influenced by whether the test is completed in the manner intended by the developer, aspects of the technological devices, as well as personal qualities of the participants (Bauer et al., 2012). The validity of the psychiatric measures is also worth considering due to their subjective format. Self-report questionnaires are effective when gathering information from a big sample, but their reliability is lower than for example the reliability of self-report questionnaires combined with clinical interviewing. It is important to remember the possible difference between experienced and actual stress as well as the possibility of exaggeration or belittling of symptoms when self-reporting.

While the mothers' levels of anxiety and depressive symptoms in the end of pregnancy were not influenced by their cognition in this sample, this should be studied further. Follow-up measurements of cognition and psychological distress are in progress at the FinnBrain Birth Cohort project at the moment, allowing for observation of changes in cognition and psychological well-being in the mothers. In future studies on this topic, samples consisting of heterogenic mothers in regard of education level and psychological distress would be of interest. This would heighten the possibility of generalizing the results to both the clinical and general population.

In summary, the present study found evidence for an association between experienced daily stress in the beginning of pregnancy and psychological distress in the end of pregnancy. Higher levels of experienced daily stress at early pregnancy was associated with higher levels of anxiety/depressive symptoms at late pregnancy. These findings support the use of stress screening questionnaires such as the Daily Hassles questionnaire in addition to psychiatric questionnaires such as EPDS and SCL-90/AS in the beginning of pregnancy, to better identify and help mothers at risk for developing anxiety or depression during pregnancy. Early assessment and interventions are important for decreasing long-term harming effects of prenatal anxiety and depression (Glover, 2014), affecting many women and their families today (Kartal & Oskay, 2017; Fairbrother et al., 2015). The results highlight the importance of economic support in addition to the previously recommended social support

(Mendelson et al., 2013), relaxation techniques, psychoeducation (Bittner et al., 2014), various therapies (Bittner et al., 2014; Goodman et al., 2014) and medication (Wisner et al., 2009). The findings did not support the assumption of high cognitive levels serving as a protective factor against psychological distress in pregnant mothers. Thus, they highlight the importance of directing help to all mothers experiencing high levels of stress, anxiety and/or depressive symptoms in early pregnancy, regardless of their cognitive performance levels. The limitations of the study mainly lie in the fact of the data being a part of a larger study, thus not being optimized for the aims of the present study. Further limitations comprise the generalizability of the sample in regard of its good cognitive performance levels as well as low levels of anxiety and depression. The limitations of computerized testing and self-report questionnaires are also important to consider. An important aspect for future studies is to examine samples that are more heterogenous in regard of cognitive performance- and psychological distress levels.

Swedish summary/ Svensk sammanfattning:

Inverkar mammans kognitiva funktionsförmåga på förhållandet mellan upplevd stress under den tidiga graviditeten och ångest/depression senare under graviditeten?

Introduktion

Prenatal ångest och depression hör till de mest allmänna psykiska störningar som drabbar kvinnor (Kartal & Oskay, 2017; Fairbrother et al., 2015). De har skadliga inverkningar på mammans välmående på lång sikt (Brennan et al., 2000), samt på utvecklingen av barnet i både foster- och spädbarnsstadiet (DiPietro, 2012). Prenatal ångest och depression kan dessutom påverka immunologin hos fostret genom kortisolöverförsel från mamman till barnet. Detta har kopplats till framtida neuropsykiatriska störningar (Knuesel et al., 2014). Utöver detta har prenatal ångest och depression kopplats till bland annat tidigarelagd födsel samt beteendemässiga och emotionella problem hos barnet (Lazinski et al., 2008). Dessa symtom kan fortgå genom utvecklingen till vuxenåldern (Talge et al., 2007) och påverka mammans sensitivitet och interaktionen med barnet (Field, 2011). De flertaliga hälsoeffekter som prenatal ångest och depression kan medföra för mamman och barnet understryker betydelsen av tidig identifiering inom hälsovården av mammor med förhöjd risk för ångest/depression under graviditeten. Denna tidiga identifiering skulle möjliggöra tidigare interventioner för mammor som utvecklar ångest/depression under graviditeten, vilket skulle inverka positivt på hela familjens mående. (Glover, 2014).

Trots att omfattande negativa följder för mammans och barnets hälsa har kopplats till prenatal ångest och depression, finns det få studier att tillgå gällande riskfaktorer för ångest och depression under graviditeten. Identifieringen av riskfaktorer skulle möjliggöra effektiverad vård genom att fokusera stödåtgärder på de mammor som ligger i riskzonen för att utveckla ångest och depression. Graviditeten anses vara en utmanande period, som innefattar betydande fysiska och psykiska förändringar (Teixera et al., 2009), vilket gör gravida kvinnor sårbara inför negativa livshändelser (Priya et al., 2018). Tidigare psykiska störningar, låg socioekonomisk status, och somatiska faktorer förknippade med graviditeten ökar risken för utvecklingen av

ångest eller depression under graviditeten (Ibanez et al., 2012). Det har även dryftats huruvida kognitiva funktioner hos mamman kan ha koppling till utvecklingen av ångest och depression under graviditeten (Gale et al., 2012), vilket var i fokus i denna studie.

Patienter med ångest och depression uppvisar ofta milda kognitiva svårigheter, så som problem med uppmärksamhet, koncentration och arbetsminnet (Shilyansky et al., 2016). Tidigare studier har funnit samband mellan goda kognitiva förmågor, bättre förmågor till självhjälp (Ross, 1972), och aktivare behandlingsstrategier i situationer av stress (Cederblad et al., 1995). En meta-analys med 8191 försökspersoner gav stöd för en koppling mellan välmående och kognition bland människor i allmänhet (Gale et al., 2012). Dessa resultat väcker frågan om huruvida den kognitiva prestationsförmågan hos gravida kvinnor kunde påverka förhållandet mellan upplevd stress i början av graviditeten och ångest/depression i slutet av graviditeten. Relationen mellan psykiatriska symtom och kognition har undersökts flitigt hos den allmänna befolkningen, men forskningen fokuserad på gravida kvinnor är knapp (Kingston & Tough, 2012).

Syfte

Syftet med denna studie var att undersöka förhållandet mellan upplevd stress under den tidiga graviditeten och ångest/depression under slutet av graviditeten. Utöver detta var syftet att undersöka den möjliga inverkan av mammans kognition som moderator på detta förhållande. Hypotesen var att det skulle finnas en koppling mellan upplevd stress i början av graviditeten och ångest-/depressionssymtom i slutet av graviditeten. Vidare förväntades en god kognitiv kapacitet hos mamman fungera som en skyddande faktor genom att försvaga sambandet mellan upplevd stress tidigt under graviditeten och ångest-/depressionssymtom senare under graviditeten. Forskning inom detta ämne möjliggör tidig identifiering av mammor i riskzonen för att utveckla ångest och depression under graviditeten. Effektiv identifiering av dessa mammor skulle möjliggöra tidiga interventioner och därmed kunna minska de negativa effekterna av ångest/depression under graviditeten.

Metod

Samplet i denna studie (*N* =275) kommer från en kohortstudie vid namnet FinnBrain (www.finnbrain.fi) med 4000 familjer från Åbo, närliggande kommuner och Åland. Kohortstudien påbörjades år 2011 och genomförs vid Åbo Universitet. Samplet samlades in genom bekvämlighetsurval vid moderskapskliniker under familjernas första ultraljud under graviditetsvecka 12. Deltagandet var frivilligt och ingen ersättning har erbjudits (Karlsson et al., 2018). Samplet i denna studie bestod av mammor som deltagit i FinnBrain- studiens neuropsykologiska testningar och svarat på studiens frågeformulär gällande ångest- och depression samt självskattningen gällande upplevd daglig stress. Därtill formades samplet så att det inkluderade mammor med de högsta, lägsta och genomsnittliga psykiatriska symtom utav mammorna i det ursprungliga *FinnBrain Birth Cohort* samplet. Enbart 1-2% av mammorna i det ursprungliga samplet upplevde kontinuerligt höga nivåer av ångest-/depressionssymtom under graviditeten (Korja et al., 2018). Majoriteten av mammorna i denna studie väntade sitt första barn och 74.6% hade fortsatt utbildning efter gymnasiet. Medelåldern för mammorna var 30.8 år, i ett åldersspann på 19-45 år.

Denna studie erhöll tillstånd av den sammanslagna etiska granskningsnämnden vid Åbo Universitetssjukhus och Åbo Universitet. De neuropsykologiska måtten inkluderade i denna studie valdes på basis av deras kapacitet att mäta olika kognitiva funktioner. Mammornas kognition mättes med en del av CogState testbatteriet (www.cogstate.com) och Indexet för Verbal Förståelse utifrån Weshler Adult Intelligence Scale IV (WAIS-IV). De kognitiva mätningarna tog plats i ett tyst rum i FinnBrains forskningsutrymmen i Åbo och övervakades av en psykologstuderande. CogState-uppgifterna gjordes på dator och det tog ungefär 45 minuter att genomföra testbatteriet. WAIS-IV gjordes med hjälp av papper och penna och tog ungefär 90 minuter att genomföra. Upplevd stress mättes under graviditetsvecka 14 och 34 med ett modifierat ”*Daily Hassles*” frågeformulär (Korpela et al., 2008). Ångest och depression mättes under graviditetsvecka 14 och 34 med *Edinburgh Postnatal Depression Scale* (EPDS) och en Ångest Underskala från *Symptom Checklist Scale-*

90 (SCL-90/AS). Frågeformulären skickades hem till deltagarna och kunde fyllas i för hand eller elektroniskt.

Upplevd stress under början av graviditeten mättes med ett modifierat *Daily Hassles* frågeformulär (Korpela et al., 2008). Frågeformuläret innefattar självskattad upplevelse av daglig oro och glädje kopplat till förhållanden, arbete, pengar, hemsysslor, nyheter, och beroenden. Försökspersonerna ombads kryssa i deras upplevda nivå av oro och glädje kopplat till de inkluderade livsområdena på en skala från 0-3. Denna studie inkluderade enbart den delen av formuläret som behandlade oro, i enlighet med studiens syfte. Endast fem av livsområdena inkluderades eftersom livsområdet ”beroenden” inte ansågs vara av relevans för gravida kvinnor.

CogState testbatteriet består av deltest avsedda att mäta så kallad flytande intelligens. Den här formen av intelligens anses vara biologiskt betingad och relativt stabil genom livet (Cattell, 1987). CogState testbatteriet lämpar sig för upprepade mätningar utan signifikanta inlärningseffekter. Utöver detta representar testbatteriet ett tidseffektivt, noggrant och reliabelt mätinstrument för stora försöksgrupper tack vare att det utförs på dator (Pietrzak et al., 2009). Utav de tretton ursprungliga deltesten valdes sju stycken för ändamålet av denna studie. Dessa deltest presenteras nedan.

Continuous Paired Associate Learning Test (CPAL). CPAL mäter förmåga att minnas sambandet mellan olika mönster och deras lägen. Försökspersonen får till att börja med se två figurer i olika lokaliseringar på en datorskärm. Därefter visas övriga figurer i tur och ordning och uppgiften blir att hitta den tillhörande figuren genom att trycka på cirkeln där man tror att paret till figuren är gömd. Samma procedur fortsätter under sju omgångar. Uppgiften är utformad för att mäta exekutiv funktion och inlärning (Harel et al., 2011). Resultatvariabeln var antalet korrekta svar (CogState, 2016). Kriterievaliditeten av uppgiften har fått stöd av korrelation med WAIS-IV uppgiften matriser (Kataja et al., 2017).

Detection Test (DET). Den här uppgiften består av 35 försök där försökspersonen ombeds svara på frågan ”Har kortet vänts om?” genom att trycka ”Ja” så fort kortet har vänts. Instruktionen är att svara så snabbt och noggrant som möjligt. DET mäter psykomotorisk funktion och reaktionsförmåga. Resultatvariabeln var reaktionstid i millisekunder. (CogState, 2016). Uppgiftens konstruktvaliditet har fått stöd av

korrelation med *Visual Reproduction Initial Recall* uppgiften från *Weschler Memory Scale-Revised* (Hammers et al., 2012)

Groton Maze Learning Test (GML). I denna uppgift ombeds försökspersonen hitta en gömd rutt bestående av 28 steg och 11 svängar i ett fält bestående av 10x10 plattor. Försökspersonen rör sig framåt genom att klicka på rutorna som visar grönt ifall valet är rätt och rött ifall valet av väg är inkorrekt. Försökspersonen måste följa följande regler: rör dig inte bakåt, vänd inte samma ruta två gånger, rör dig inte diagonalt och återvänd till föregående korrekta ruta då du vänt på en inkorrekt ruta. GML anses mäta exekutiva funktioner (CogState, 2016). Kriterievaliditeten har fått stöd av korrelation med bland annat Benton testet och resultatvariabel är ett så kallat effektivitetsindex som mäts som medeltalet av korrekta rörelser per sekund, det totala antalet fel och det totala antalet regelbrott (Pietrzak et al., 2008).

Identification Test (IDN). I denna uppgift ombeds försökspersonen att svara ”Ja/Nej” på frågan ”Är kortet rött?” så snabbt och noggrant som möjligt efter att kortet vänts. Uppgiften består av 30 försök och mäter reaktionshastighet och visuell uppmärksamhet. Resultatvariabeln är reaktionstid i millisekunder (CogState, 2016). Konstruktvaliditeten har fått stöd av signifikanta korrelationer med *Benton Visual Form Discrimination Test* (Hammers et al., 2012).

International Shopping List Test (ISL). I denna uppgift ombeds försökspersonen att lägga på minnet en uppköpslista bestående av 12 objekt som läses högt för dem av testledaren. Efteråt bes försökspersonen återkalla listan ur minnet. Denna procedur repeteras tre gånger med samma lista. ISL anses mästa verbalt minne. Resultatvariabeln är totala antalet korrekta svar (CogState, 2016) och validiteten har fått stöd genom korrelation med *Hopkins Verbal Learning Test Revised* (Pietrzak et al., 2009).

One Back Task (OBK). Försökspersonen ombeds svara Ja/Nej på frågan ”Är föregående kortet det samma som nuvarande?” så fort och noggrant som möjligt. Uppgiften består av 31 försök och mäter uppmärksamhet och arbetsminne (CogState, 2011). Resultatvariabeln är reaktionshastighet i millisekunder (CogState, 2016) och validiteten har fått stöd av signifikanta korrelationer med *Digit Symbol Test* ur WAIS-R (Hammers et al., 2012).

One Card Learning Test (OCL). I denna uppgift ombeds försökspersonen svara ”Ja/Nej” på frågan ”Har du sett detta kort tidigare?”så fort och noggrant som möjligt.

Uppgiften använder 6 randomiserat urvalda kort som upprepas under 42 försök. OCL mäter uppmärksamhet och igenkänning (CogState, 2011). Resultatvariabeln är reaktionshastighet i millisekunder (CogState, 2016). Validiteten har fått stöd genom signifikanta korrelationer med *Digit Span Backward* från WAIS-R (Hammers et al., 2012).

Utöver CogState valdes det språkliga indexet *Verbal Comprehension Index* (VCI) ur WAIS-IV för att mäta mammornas kognitiva förmågor. WAIS-IV VCI valdes för att mäta så kallad kristalliserad intelligens, som anses formas under utvecklingen och korrelera med utbildningsnivå och verbal erfarenhet (Cattell, 1987). WAIS-IV är ett väl använt testbatteri tack vare dess höga reliabilitetsmått och omfattande standardiseringsprocesser. WAIS-IV VCI innefattar tre deltest; ordförråd, allmänbildning och likheter. Ordförråd-uppgiften mäter förmågan att definiera ord medan likheter-uppgiften mäter förmågan att identifiera likheter mellan två objekt. Svaren i dessa två deltest poängsätts enligt en manual på en skala från 0-2 poäng. Deltestet benämnt allmänbildning mäter allmän kunskap och förmåga att verbalisera den. Deltestet poängsätts enligt manualens anvisningar så att varje svar bedöms på en skala från 0-1 poäng (Wechsler, 2012).

Ångestsymtom hos mammorna mättes med underskalan ”*Anxiety Subscale*” (AS) utav *Symptom Checklist Scale-90* (SCL-90). SCL-90/AS anses vara ett reliabelt mätinstrument av ångest och validiteten anses vara hög i både kliniska- och forskningssammanhang. Underskalan har demonstrerat god intern förenlighet med Cronbach’s alfa värden på en skala från .83 - .85. Utav de 90 frågorna i det ursprungliga frågeformuläret SCL-90 används 10 frågor i AS. Dessa frågor bedöms med 0-4 poäng och det maximala antalet poäng är 40 (Derogatis et al., 1973). FinnBrain studien har använt sig av 10 poäng som gräns för inkludering i case gruppen, innefattandes mammorna med de högsta nivåerna av ångest utav samplet (Karlsson et al., 2018).

Depressionssymtom hos mammorna mättes med frågeformuläret *Edinburgh Postnatal Depression Scale* (EPDS). Frågeformuläret har utvecklats för att identifiera mammor som ligger i riskzonen för att utveckla postnatal depression. EPDS används för

subjektiv självskattning av både prenatala och postnatala depressionssymtom (Gibson et al., 2009), samt bedömning av depression i allmänhet (Becht et al., 2001). Frågeformuläret har demonstrerat god intern förenlighet med Cronbach's alfa värden från .82 - .84 (Cox et al., 1996). EPDS består av 10 frågor som besvaras med hjälp av en Likert skala med 4 punkter där svarsalternativen poängsätts på en skala från 0-3. Resultat som landar på 12 poäng eller mera utav de 30 möjliga anses överstiga det normala (Cox et al., 1987).

De statiska analyserna utfördes med IBM SPSS 25 *Statistical Program for Social Sciences*. Pearsons produktmoment korrelationer användes för att undersöka sambanden mellan SCL-90/AS och EPDS (r = .55, p < .001). Denna analys motiverade kombinerandet av dessa formulär till en variabel vid namnet "*Psychological Distress*". Korrelationen mellan CogState och WAIS-IV VCI var låg (r = .22, p = .003), vilket motiverade fortsatta moderationsanalyser med dessa variabler skilt för sig. Förhållandet mellan *Daily Hassles* i början av graviditeten och "*Psychological Distress*" i slutet av graviditeten undersöktes med en korrelationsanalys. En multipel regressionsanalys med kognition (CogState/WAIS-IV VCI) som moderator användes för att undersöka inverkan av moderlig kognition på detta förhållande. Utbildning, ålder, *Daily Hassles*, och CogState/WAIS-IV VCI lades till i analysen i olika steg för att förutspå nivåerna av depression och ångest i slutet av graviditeten.

Mammorna i samplet uppgav låga nivåer av upplevd daglig stress på en skala från 0-12 utav det maximala antalet 15 (M = 5.73, SD = 1.99). Nivån av verbal förståelse låg inom intervallet av vad som förväntades (M = 101.57, SD = 15.54) i enlighet med finska normer (Wechsler, 2012). Prestationerna på CogState uppgifterna var likaså inom intervallet av vad som anses normalt (±1SD) enligt CogState forskningens normeringar för 18-49 åringar (CogState, 2014). Mammorna uppgav låga nivåer av depressionssymtom (M = 4.07, SD = 3.68), på en skala från 0-17 utav det maximala antalet 30 poäng på EPDS. Ångestnivån hos mammorna var likaså låg (M = 2.33, SD = 3.08), på en skala från 0-18 utav det maximala antalet 40 poäng på SCL-90/AS.

Resultat

Korrelationen av huvudsakligt intresse mellan *Daily Hassles* i början av graviditeten och *Psychological Distress* i slutet av graviditeten var signifikant (r = .42, p < .001); högre nivåer av upplevd stress i början av graviditeten hade ett samband med högre nivåer av ångest/depression i slutet av graviditeten. De starkaste korrelationerna hittades mellan oro över förhållanden och pengar kopplat till både EPDS (r = .25/ .39, p < .001) och SCL-90/AS (r = .19, p < .001/ .18, p = .03). Vidare hittades ett signifikant samband mellan *Psychological Distress* i början av graviditeten och *Daily Hassles* i slutet av graviditeten (r = .37, p > .001). Korrelationen mellan *Daily Hassles* i början och slutet av graviditeten var signifikant (r = .53, p < .001) så som även korrelationen mellan *Psycholocial Distress* i början och slutet av graviditeten (r = .60, p < .001). WAIS-IV VCI och CogState uppvisade svaga negativa korrelationer med *Psychological Distress* i slutet av graviditeten (r = -.07, p = .37/ r = -.15, p = .02) respektive, medan enbart korrelationen med CogState var signifikant.

En tre-stegs hierarkisk multipel regressionsanalys utfördes med *Psychological Distress* som beroende variabel. Utbildning och Ålder kontrollerades för i analysens första steg. Därefter lades *Daily Hassles* och kognition till (CogState/WAIS-IV VCI), för att avsluta med interaktionen mellan kognition och *Daily Hassles* i steg tre. I analysen gällande CogState predicerade Utbildning och Ålder inte resultaten på *Psychological Distress*, F(2,255) = 1.37, p = .26. Utbildning och ålder stod för 1.1% av variationen i *Psychological Distress. Daily Hassles* och kognition predicerade signifikant resultaten på *Psychological Distress*, F(2,253) = 27.85, p < .001, och förklarade ett tillägg av 17.8% av variationen i *Psychological Distress. Daily Hassles* var den enda signifikanta prediktorn av *Psychological Distress* förklarandes 16.0% av variansen i resultatet. Tillägget av interaktionstermen i steg tre förbättrade inte modellen överhuvudtaget, ΔR^2 = 0.00, F(1,252) = .091, p < .76. Tillsammans förklarade de fem prediktorerna 18.9% av variansen i *Psychological Distress*. I analysen där WAIS-IV VCI fungerade som moderator predicerade Utbildning och Ålder inte signifikant resultaten på *Psychological Distress*, F(2,176) = 1.69, p =.19. Utbildning och ålder förklarade 1.9% av variansen i *Psychological Distress. Daily Hassles* och kognition predicerade signifikant resultaten på *Psychological Distress*, F(2,174) = 20.97, p < .001, förklarandes ett tillägg av 19.1% av variansen i

Psychological Distress. Daily Hassles var den enda signifikanta prediktorn av *Psychological Distress* förklarandes 19.1% av variansen i resultatet. Interaktionstermen predicerade inte signifikant resultatet i *Psychological Distress*, $F(1,173) = 2.37$, $p < .13$, förklarandes ett tillägg av 1.1% av variansen i *Psychological Distress*. Sammanlagt förklarade de fem prediktorerna 22.0% av variansen i *Psychological Distress*. Utan att separera analysen enligt kognition i CogState och WAIS-IV VCI skilt för sig, stod *Daily Hassles* för 17.6% av variationen i *Psychological Distress*. Sammanfattningsvis var *Daily Hassles* den enda signifikanta prediktorn av *Psychological Distress*, oberoende vilken sorts kognition det rörde sig om.

Diskussion

Syftet med den föreliggande studien är att undersöka inverkan av mammans kognition på förhållandet mellan upplevd daglig stress i början av graviditeten och ångest/depression i slutet av graviditeten. Det här är viktigt för att främja tidig identifiering av mammor med risk för att utveckla ångest/depression i slutet av graviditeten. Resultaten visade en signifikant korrelation mellan *Daily Hassles* frågeformuläret i början av graviditeten och *Psychological Distress* variabeln i slutet av graviditeten vilket understryker möjligheten att använda stress-relaterade självskattningsformulär i början av graviditeten för att identifiera mammor i riskzonen för att utveckla ångest eller depression under graviditeten. Resultaten visade vidare att mammornas kognition inte modererade sambandet mellan upplevd daglig stress i början av graviditeten och ångest och depression i slutet av graviditeten.

Trots att studien inte fann en signifikant effekt av kognition på förhållandet mellan upplevd daglig stress och ångest-/depressionssymtom under graviditeten är sambandet mellan *Daily Hassles* och *Psychological Distress* variabeln av betydelse. Så som tidigare nämnts är prenatal ångest och depression bland de vanligaste psykiska sjukdomarna som drabbar kvinnor idag (Kartal & Oskay, 2017; Fairbrother et al., 2015), kopplat till långtida negativa effekter för mamman och barnet samt resten av familjen (Glover, 2014). Med tanke på sambandet mellan upplevd stress och ångest/depression under graviditeten kunde självskattningsformulär så som *Daily*

Hassles användas under början av graviditeten. Detta kunde effektivera identifieringen av mammor som har risk för att utveckla ångest eller depression under graviditeten och därmed möjliggöra tidiga interventioner och förebyggande vård. Med kontinuiteten av stress och psykiatriska symtom som syntes i resultaten i denna studie i åtanke, kunde tidig identifikation och interventioner vara av nytta.

Korrelationsanalysen visade ett samband mellan *Psychological Distress* i början av graviditeten och *Daily Hassles* i slutet av graviditeten ($r = .37$, $p > .001$). Analysen visade vidare en korrelation mellan *Daily Hassles* i början och slutet av graviditeten ($r = .53$, $p < .001$), samt *Psychological Distress* i början och slutet av graviditeten ($r = .60$, $p < .001$). Dessa korrelationer framhäver kors- samt interkorrelationer mellan stress, ångest och depression under graviditeten. Interkorrelationen mellan *Psychological Distress* i början och slutet av graviditeten är i enlighet med resultaten i studien av Korja et al., (2018). Dessa resultat visar på kontinuerligheten av ångest-/depressionssymtom under graviditeten och presenterar möjligheten att identifiera mammor med risk för att utveckla ångest/depression under graviditeten med hjälp av EPDS och SCL-90/AS i början av graviditeten.

Färska studier antyder att ångest och depression samt den biologiska stressresponsen under peripartum perioden kan sänkas genom avslappningsövningar, psykoedukation och kognitiv beteendeterapi (Bittner et al., 2014). Studier antyder även att interpersonell terapi och medicinering kan stöda mammans välmående och barnets utveckling (Wisner et al., 2009). Bristande socialt stöd, otillfredsställelse i parförhållandet, låg självkänsla och låg självefektivitet har också förknippats med ångest och depression under peripartum perioden. Därmed kan dessa faktorer vara relevanta att inkludera i behandlingen av kvinnor i riskzonen för att utveckla ångest eller depression under graviditeten (Mendelson et al., 2013). Denna studie fann de starkaste korrelationerna mellan oro över förhållanden och pengar kopplat till ångest och depression och understryker därmed betydelsen av ekonomiskt stöd och välfungerande förhållanden för gravida kvinnor.

Tidigare forskning har visat på ett samband mellan kognition och psykiatriska symtom i den allmänna populationen (e.g. Gale et al., 2012; Shilyanski et al., 2016) men det finns få studier som fokuserat på effekten av kognition specifikt för gravida kvinnors psykiska mående (Kingston & Tough, 2014). Enligt resultaten i denna studie utvecklar mammor med lägre kognitiv kapacitet inte mer ångest- eller

depressionssymtom än vad mammor med högre kognitiv kapacitet gör. Det icke-existerande sambandet mellan kognition och ångest-/depressionssymtom i denna studie betonar betydelsen av att rikta stöd till alla mammor med upplevd stress i början av graviditeten, oberoende av deras kognitiva prestationsförmåga.

Den här studiens styrkor låg i dess stora sampel innefattande 275 försökspersoner vilket möjliggjorde observation av små samband mellan variablerna. Bristerna i studien berör främst faktumet att datat samlats in i kontexten av *FinnBrain Birth Cohort* studien, vilket innebär att mätningarna inte var optimerade för den föreliggande studiens syfte. Det syns bland annat som bristfälliga upprepade mätningar och obalanserade variabler. De kognitiva mätningarna gjordes enbart en gång. Därmed går det inte att uttala sig om möjliga förändringar i kognitiv prestationsförmåga eller potentiell kovariation med *Psychological Distress* under graviditeten. Det går inte heller att dra longitudinala slutsatser gällande kognitionens inverkan på mammornas psykiska mående.

Samplets homogenitet med avseende på utbildning och nivåer av ångest-/depressionssymtom väcker frågor om resultatens generaliserbarhet till kliniska populationer och befolkningen i allmänhet. Resultaten kan ha påverkats av att samplet i studien i hög grad innefattar mammor med låga nivåer av ångest- och depressionssymtom och hög utbildningsnivå. Dock anses CogState testbatteriet mäta flytande intelligens (Cattell, 1987), vilket inte korrelerade signifikant med utbildning i detta sampel (r = .241, p >.01). Utbildning kontrollerades dessutom för i regressionsanalysen. Inverkan av mammornas utbildningsnivå på resultaten kan därmed ifrågasättas. Mammorna representerade grupperna med de högsta, lägsta, och genomsnittliga psykiatriska symtom från det ursprungliga samplet, vilket förbättrar generaliserbarheten av samplet.

Det är även viktigt att observera att datoriserade testresultat alltid påverkas av huruvida testet görs i enlighet med instruktionerna från testutvecklaren, samt testpersonens personliga egenskaper och egenskaper hos den teknologiska apparaturen (Bauer et al., 2012). Validiteten i de psykiatriska frågeformulären kan även ifrågasättas på grund av deras subjektiva karaktär. Det är viktigt att minnas möjligheten om en föreliggande skillnad i upplevd och verklig stress i försökspersonernas svar på frågeformulären. Över- och underdrift av symtom kan även förekomma.

Trots att mammornas nivåer av ångest-/depressionssymtom i slutet av graviditen inte påverkades av deras kognitiva prestationsnivå i detta sampel, bör detta undersökas vidare. Uppföljningsmätningar av kognition samt ångest och depression pågår vid *FinnBrain Birth Cohort* projektet för tillfället. Detta möjliggör undersökning av förändringar i kognition och ångest-/depressionsnivåer hos mammorna. I framtida studier inom detta ämne vore det viktigt att använda sig av sampel med mammor av varierande utbildningsbakgrund och nivåer av ångest-/depressionssymtom. Det skulle förbättra resultatens generaliserbarhet till både den kliniska samt den allmänna populationen.

Slutsats

Sammanfattningsvis fann studien belägg för ett samband mellan högre nivåer av dagligt upplevd stress i början av graviditeten och högre nivåer av ångest-/depressionssymtom i slutet av graviditeten. Resultaten stöder användningen av självskattningsformulär så som *Daily Hassles* vid sidan om frågeformulär så som EPDS och SCL-90/AS under den tidiga graviditeten för förbättrad identifiering och vård av mammor med risk för att utveckla ångest eller depression under graviditeten. Tidig identifikation och interventioner är av betydelse för att minska långsiktiga skadliga effekter av prenatal ångest och depression (Glover, 2014), som påverkar många kvinnor och deras familjer (Kartal & Oskay, 2017; Fairbrother et al., 2015). Resultaten understryker betydelsen av ekonomiskt stöd som tillägg till tidigare rekommenderat socialt stöd (Mendelson et al., 2013), avslappningsövningar, psykoedukation (Bittner et al., 2014), olika terapier (Bittner et al., 2014; Goodman et al., 2014) och medicinering (Wisner et al., 2009). Fynden stöder inte antagandet om att höga nivåer av kognitiv prestationsförmåga skulle fungera som en skyddande faktor i utvecklingen av psykiatriska symtom hos gravida kvinnor. Därmed understryker studien betydelsen av att erbjuda stöd till alla mammor som upplever höga nivåer av stress, ångest eller depression i början av graviditeten, oberoende av deras kognitiva prestationsförmåga. Begränsningarna i studien berör förutom homogeniteten av samplet i avseende av utbildning och ångest-/depressionsnivåer främst faktumet att datat är en del av en större studie och därmed inte optimerat för syftet av denna studie.

Det är därtill viktigt att beakta begränsningarna i användningen av datoriserad testning och självskattningsformulär. Framtida förskning bör sträva till att undersöka sampel som är heterogena i avseende av kognitiva prestationsnivåer och nivåer av psykiatriska symtom.

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6 Appendix

Päivittäiset huolet ja ilonaiheet

Päivittäin meille tapahtuu ärsyttäviä tilanteita tai asioita, jotka voivat saada meissä aikaan vihanpuuskia tai aiheuttaa huolta. Meille tapahtuu myös monia mieltä ylentäviä ja iloa tuottavia asioita. Merkitse, missä määrin seuraavat asiat ovat tuottaneet sinulle *VIIMEISEN KOLMEN KUUKAUDEN AIKANA* HUOLTA tai HYVÄÄ MIELTÄ. – *Jotkin asiat ovat voineet olla molempia. Ympyröi siis joka rivillä ensin vasemmalta puolelta (A-kohta) yksi numero ja sitten oikealta puolelta (B-kohta) yksi numero.*

(A) Missä määrin **ärsyttävä tai huolta aiheuttava asia**?					**(B)** Missä määrin **iloa tuottava asia**?			
Erittäin paljon	Melko paljon	Melko vähän	Ei yhtään		Ei yhtään	Melko vähän	Melko paljon	Erittäin paljon
-3	-2	-1	0	**Ihmissuhteet** (puoliso, lapset, sukulaiset, ystävät tai naapurit)	0	1	2	3
-3	-2	-1	0	**Työasiat** (suhteet esimiehiin, työntekijöihin tai asiakkaisiin, työn aikataulut tai työn tavoitteet, työkiireet)	0	1	2	3
-3	-2	-1	0	**Rahojen riittäminen** (ruokaan, vaatetukseen, säästämiseen tai vapaa-aikaan)	0	1	2	3
-3	-2	-1	0	**Kotityöt** (siivous, pyykki, remontit)	0	1	2	3
-3	-2	-1	0	**Uutiset** (lehti-, TV- tai radio-)	0	1	2	3
-3	-2	-1	0	**Tupakointi, alkoholin tai huumeiden käyttö**	0	1	2	3

Korpela, K., Ylén, M., Tyrväinen, L. & Silvennoinen, H. (2008). Determinants of restorative experiences in everyday favourite places. Health & Place, 14, 636-652. doi:10.1016/ j.healthplace.2007.10.008

Mieliala

Ole hyvä ja **laita rasti ruutuun**, joka parhaiten vastaa **tuntemuksiasi** kuluneen **VIIMEISEN VIIKON AIKANA,** ei ainoastaan tämänhetkisiä tuntemuksiasi.

1. Olen pystynyt nauramaan ja näkemään asioiden hauskan puolen.

- ☐ Yhtä paljon kuin aina ennenkin
- ☐ En aivan yhtä paljon kuin ennen
- ☐ Selvästi vähemmän kuin ennen
- ☐ En ollenkaan

2. Olen odotellut mielihyvällä tulevia tapahtumia.

- ☐ Yhtä paljon kuin aina ennenkin
- ☐ Hiukan vähemmän kuin aikaisemmin
- ☐ Selvästi vähemmän kuin aikaisemmin
- ☐ Tuskin ollenkaan

3. Olen syyttänyt tarpeettomasti itseäni, kun asiat ovat menneet vikaan.

- ☐ Kyllä, useimmiten
- ☐ Kyllä, joskus
- ☐ En kovin usein
- ☐ En koskaan

4. Olen ollut ahdistunut tai huolestunut ilman selvää syytä.

- ☐ Ei, en ollenkaan
- ☐ Tuskin koskaan
- ☐ Kyllä, joskus
- ☐ Kyllä, hyvin usein

5. Olen ollut peloissani tai hädissäni ilman erityistä selvää syytä.

- ☐ Kyllä, aika paljon
- ☐ Kyllä, joskus

- Ei, en paljonkaan
- Ei, en ollenkaan

6. Asiat kasautuvat päälleni.

- Kyllä, useimmiten en ole pystynyt selviytymään niistä ollenkaan
- Kyllä, toisinaan en ole selviytynyt niistä yhtä hyvin kuin tavallisesti
- Ei, useimmiten olen selviytynyt melko hyvin
- Ei, olen selviytynyt yhtä hyvin kuin aina ennenkin

7. Olen ollut niin onneton, että minulla on ollut univaikeuksia.

- Kyllä, useimmiten
- Kyllä, toisinaan
- Ei, en kovin usein
- Ei, en ollenkaan

8. Olen tuntenut oloni surulliseksi tai kurjaksi.

- Kyllä, useimmiten
- Kyllä, melko usein
- En kovin usein
- Ei, en ollenkaan

9. Olen ollut niin onneton, että olen itkeskellyt.

- Kyllä, useimmiten
- Kyllä, melko usein
- Vain silloin tällöin
- Ei, en koskaan

10. Ajatus itseni vahingoittamisesta on tullut mieleeni.

- Kyllä, melko usein
- Joskus
- Tuskin koskaan
- Ei koskaan

Ahdistuneisuus

Missä määrin sinua on **VIIMEISEN KUUKAUDEN AIKANA** vaivannut:

	ei lainkaan	melko vähän	jonkin verran	melko paljon	erittäin paljon
1. Vapina	1	2	3	4	5
2. Pelästyminen äkillisesti ilman mitään syytä	1	2	3	4	5
3. Pelokkuus	1	2	3	4	5
4. Sydämentykytykset tai – jyskytykset	1	2	3	4	5
5. Jännittyneisyys tai kiihtyneisyys	1	2	3	4	5
6. Pelon tai pakokauhun puuskat	1	2	3	4	5
7. Levottomuuden tunne, joka estää rauhassa istumisenkin	1	2	3	4	5
8. Tunne, että tutut asiat ovat outoja ja epätodellisia	1	2	3	4	5
9. Tunne, että sinua painostetaan tekemään tehtäväsi	1	2	3	4	5
10. Hermostuneisuus tai sisäinen Rauhattomuus	1	2	3	4	5

PRESSMEDDELANDE

Mammans kognition påverkar inte sambandet mellan dagligen upplevd stress och ångest samt depression under graviditeten

Pro gradu-avhandling i psykologi
Fakulteten för humaniora, psykologi och teologi vid Åbo Akademi

Resultaten från en färsk pro gradu-avhandling vid Åbo Akademi tyder på ett samband mellan högre nivåer av självskattad dagligt upplevd stress i början av graviditeten och mera ångest- samt depressionssymtom i slutet av graviditeten. Därtill ger resultaten indikationer på att mammors kognitiva prestationsnivå inte påverkar sambandet mellan upplevd stress och psykiatriska symtom i den utsträckning som tidigare forskning gällande befolkningen i allmänhet antytt.

Avhandlingen av Emma Vihervaara utfördes som en del av FinnBrain projektet vid Åbo Universitet. 275 gravida kvinnor i åldern 19-45 deltog i studien. Syftet med studien var att utforska sambandet mellan stress och psykiatriska symtom under graviditeten samt den möjliga inverkan av mammornas kognitiva prestationsförmåga på detta samband.

Fynden tyder på att stressrelaterade självskattningsformulär vid sidan om psykiatriska frågeformulär i början av graviditeten kunde effektivera identifikationen av mammor med risk för att utveckla ångest och depression under graviditeten. Den modifierade ”Daily Hassles” skalan, SCL-90/AS eller EPDS som användes i studien, relaterade till stress, ångest och depression respektive, kunde användas i detta syfte. Resultaten tyder dessutom på att stöd borde riktas till alla mammor som upplever höga nivåer av daglig stress, ångest eller depression i början av graviditeten, oberoende av deras kognitiva prestationsförmåga. Vihervaara poängterar slutligen att kognitionens inverkan på utvecklingen av psykiatriska symtom hos gravida kvinnor bör undersökas vidare. För att erhålla mera generaliserbara resultat, kunde framtida studier använda sig av mer heterogena sampel med tanke på kognitiv prestationsförmåga och nivåer av psykiatriska symtom.

Avhandlingen utfördes av Emma Vihervaara under handledning av doktorand Elisabeth Nordenswan, docent Mira Karrasch, och professor Matti Laine.

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