Predicting the onset of Major Depressive Disorder by the Attachment Theory: A systematic review of longitudinal studies

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Abstract

Attachment theory is a psychodynamic theory, that is regarded to propose a reliable etiology for the onset of Major Depressive Disorder (MDD). This systematic review investigated the direct prediction of MDD, by the Attachment theory. To be included in the review, studies had to be peer-reviewed longitudinal studies and MDD had to be diagnosed with a clinical interview. Online databases were systematically searched, resulting in a total of 10.638 studies, of which, 3 were included in the systematic review. Of the included studies, 2 focused on the prediction of MDD by attachment style and insecure attachment severity and 1 on the prediction of MDD by attachment style and attachment to different people. The results demonstrated that fearful insecure attachment style and angry dismissive attachment style predicted more accurately the onset of the disorder. Moreover, for adolescents and young adults being insecurely attached to the mother, was found to be a predictor for the onset of the disorder. Nevertheless, the prediction of MDD by attachment styles is not absolute, because there are many other factors that contribute to the onset of the disorder. Attachment style cannot be considered the only predictor, to accurately determine the onset of MDD.

Keywords: MDD, attachment, predictors, onset, systematic review

Introduction

Major depressive disorder (MDD) is estimated to affect about 350 million people worldwide, at some point of their life. Its prevalence is estimated to be around 8-12% and it is considered to be the 4th leading cause of disability worldwide (World Health Organization, 2017). By 2020 it is believed to rise to 2nd place.

The first onset of MDD, usually occurs at late adolescence or early adulthood. MDD is a highly debilitating disorder. MDD patients suffer from depressed mood, weight loss, anhedonia, sleep problems, feelings of worthlessness and guilt, difficulties with concentration and suicidal ideation, amongst others (American Psychiatric Association, 2013). It is, therefore, critical to fully comprehend the reasons that lead to the onset of the disorder.

Several genetic, neurobiological and psychological theories have attempted to explain the origins of MDD. Some of these theories are, the monoamine hypothesis of depression (Delgado, 2000) and the GABAergic deficit hypothesis (Luscher, Shen & Sahir, 2011) or theories such as Beck's cognitive theory (1967) and the dysfunctional attributes theory (Abramson, 1988). These are only some of the many theories that have attempted to explain the predictors of MDD. These theories are important, because they provide a basis for understanding the different causes of MDD. They also demonstrate the complexity of the disorder.

One of the major psychological theories that attempt to explain the MDD origins, is the psychodynamic theory (Freud, 1917). According to that theory, early individual and developmental characteristics are affected by low quality attachment relationships and adverse childhood experiences. The loss of a loved person, or the unresponsiveness of the parents, contribute to difficulties in the formation of new

relationships. These experiences are followed by feelings of guilt, shame, frustration, helplessness or loneliness. As the child grows older, these early experiences change the perceptions about the self and the others, thus creating a predisposition for the appearance of depressive symptoms or MDD in the future. (Taylor, 2008)

Psychodynamic theory of depression has changed, since its conception. Different branches, that slightly or largely modify the Freud's original theory (1917) have appeared through the years, such as Carl Jung's analytical theory (Jung, 1919), object relations theory (Klein, 1952), self-psychology (Kohut, 1971) and conflict theory (Brenner, 1982). Psychodynamic approaches are still widely used all over the world and psychodynamic therapy is the primary therapy of choice in many countries. Hence, it is important to investigate whether there are empirically validated psychodynamic theories for the onset of MDD. Based on the current literature, the one that seems to have the largest empirical support is the attachment theory (Mikulincer & Shaver, 2007).

The attachment theory, was initially developed by John Bowlby (1969), as an effort to explain the bonding between an infant and its caregiver. Its basic principle is that, as all mammals, humans have a psychobiological need for proximity to significant others. The type of reactions that these significant others (or attachment figures) have in times of distress, creates a fundamental framework of security feeling for an infant. An attachment figure's immediate and loving response to the infant's needs, results to the formation of a belief that there is someone there to protect them and the development of a secure attachment style. Since not all caregivers respond immediately or lovingly to the infants' distress calls, not all infants formulate a secure attachment style (Bowlby, 1969).

Mary Ainsworth (1978) classified the attachment styles of infants according to the relationship to their parents. Apart from the secure attachment style, she introduced two styles of insecure attachment: The anxious-resistant and avoidant attachment styles (Ainsworth, 1978). Some years later, Bartholomew and Horrowitz (1990), investigating the role of attachment in adult relationships, divided insecure attachment into three sub-categories: Fearful avoidant, dismissing avoidant and anxious preoccupied or enmeshed attachment. People characterized by fearful avoidant attachment, view themselves as undeserving of other's love and tend to avoid social contact. This leads to lack of intimacy and social isolation, which contribute to the onset of MDD. Dismissingly attached people tend to view social support as unnecessary and thus avoid it and also become socially isolated. The anxious preoccupied or enmeshed attachment style characterizes people that need constant reassurance from others. This need for constant reassurance often drives others away from these people (Bartholomew & Horrowitz, 1990). These types of insecure attachment styles create a predisposition for the onset of MDD. The main reason is the social isolation that leads to the lack of close relationships (Mikulincer & Shaver, 2012).

Regarding the relationship between attachment and depression, Bowlby's view was that the development of an insecure or the loss of a secure attachment style during infancy, childhood or adolescence leads to a maladaptive view of the self and others. It is, thus, considered a predisposition for the onset of depression at a later age (Bowlby, 1980).

Studies on the exact relation between insecure attachment styles and depression onset, have partly corroborated Bowlby's theory. Jinyao et al. (2012) found that, when experiencing hassles, Chinese young adults with anxious attachment

style show high levels of depressive symptoms (Jinyao et al., 2012). Fearful and dismissive attachment styles seem to be associated with the onset of MDD and are significantly related to lack of social support, low self-esteem and childhood adversity (Bifulco et al., 2002).

Studies have also examined the relationship between attachment styles and depression through the mediation of cognitive models. Fearful and preoccupied attachment styles are correlated with higher levels of depressive symptomatology (Murphy & Bates, 1997). Anxious attachment is related to the onset of depressive symptoms through the mediation of high self-criticism and dependence. Avoidant attachment is also connected to depressive symptoms through the mediation of these two factors, but to a lesser extent (Catanzaro & Wei, 2010). Another mediator that seems to connect insecure attachment to MDD are negative thought patterns, such as dysfunctional attitudes. A study of a normative sample found a connection between insecure attachment, low self-esteem, dysfunctional attitudes and depression (Roberts et al., 1996). The connection between insecure attachment, dysfunctional attitudes, such as depressogenic beliefs, and depression was also found in an adolescent sample (Lee & Hankin, 2009), as well as in an adult clinical sample (Reinecke & Rogers, 2001). Other factors that have been researched and found to affect the relationship between attachment style and depression are the actual or perceived lack of social support (e.g. Simpson, Rholes, Campbell, Tran, et al., 2003; Cawnthorpe, West & Wilkes, 2004; Zhu, Wang, Chong, Chian, 2016) and maladaptive emotion regulation processes (Malik, Wells & Witkowski, 2010).

It becomes evident that although attachment style is considered a predisposing factor for the development of depression, studies are mainly examining the connection between the two as mediated by multiple other factors. Not only that, most studies

examining the matter, measure depressive symptomatology and not MDD. Some attachment researchers believe attachment style cannot be considered a direct predictor of MDD onset (Mikulincer & Shaver, 2007, 2012). According to them, attachment insecurity does not lead to the onset of MDD. Many people that have been measured to have an insecure attachment style, were not been diagnosed with MDD. These people had coping mechanisms to face adversities. Factors such as a good socioeconomic status or personality characteristics, such as high intelligence or self-esteem might prevent the onset of MDD (Mikulincer & Shaver, 2012). Nevertheless, attachment insecurity might create a predisposition for the onset of MDD. One could make the case that, generally, children that learn to be cautious or fearful towards others during their early development would face difficulties in their subsequent relationships with significant others. These difficulties would lead to behaviors that might alienate other people, thus creating unstable relationships. A pattern of unstable relationships from childhood to adulthood, would most probably contribute in the onset of MDD, but it is questionable whether it can be considered a direct predictor of the disorder onset.

The aforementioned research points out, that there is a connection between attachment insecurity and the onset of MDD. Moreover, there have been studies, that have tried to determine whether MDD can be predicted directly by attachment insecurity. The point of interest is to find whether different attachment styles and their specific characteristics can serve as predictors of MDD onset.

A systematic review and meta-analysis of longitudinal studies investigating whether attachment styles constitute a direct predictor of MDD has not yet been conducted. The purpose of this systematic review is to identify such studies and

determine whether there is a direct relationship between the attachment styles and MDD onset.

Methods

Systematic search and selection of articles

The current meta-analysis is part of a larger meta-analysis, in which various biological and psychological models are investigated as predictors of MDD. A systematic search was conducted in the PubMed, PsycINFO, EMBASE and Cochrane Library databases, using the strings "depression", "psychodynamic", "psychoanalytic". The duration of the search was three months starting from October and ending in December 2016. The Boolean Operators "AND" between categories and "OR" within categories were used (see Appendix C). Additionally, using the snowballing method, reference lists and relevant systematic reviews were hand searched to find any missing articles. Mendeley software was used to store all the articles and remove duplicates. Title and abstract screening was conducted in accordance to the PRISMA protocol (Moher et al., 2009). In the case of disagreement, this was solved by discussing it within the meta-analysis group. A second screener examined the abstracts and added any articles they thought were relevant, but were missed by the first screener.

Inclusion Criteria

To be included, studies had to:

1) have a longitudinal design;

2) measure depression at baseline and at a future time;

3) measure MDD with a clinical instrument or an expert interview;

4) examine a topic deriving from the psychodynamic theory, such as attachment styles or defense mechanisms;

5) include participants between the ages 15 and 65. Ages under or above these age limits were excluded as the main point of focus was the most prevalent age limits;

6) be in the English language.

Cross-sectional studies, reviews, study protocols and dissertations were excluded. Comorbidity with other disorders was not an exclusion criterion, as long as the measurement of focus regarded the diagnosis of MDD. Diagnoses other than MDD, such as bipolar or postpartum depression were excluded. Studies were also excluded if they reported MDD symptomatology on patients suffering from a medical illness (e.g. development of MDD post stroke). The reason for these exclusions was that the predictors for the development of the disorder differ when there is a medical cause. The focus of the review was specifically the predictors of MDD and no other types of depression.

Instruments

The instruments used to assess MDD diagnosis had to be validated measurements, assessed by independent raters or clinicians. Such measurements are the Structured Clinical Interview for DSM (SCID; Spitzer et al., 1990), the Schedule for affective disorders (SADS; Endicott & Spitzer, 1978) or the Composite international diagnostic Interview (CIDI; WHO, 1990).

The included studies had to use a measure of a psychodynamic concept, such as defenses, object relations or attachment styles, since the point of focus was the connection between the psychodynamic models and MDD. Some examples of such measures are the Quality of Object relations scale (Azim et al., 1991), the Defense

style questionnaire (DSQ; Bond et al., 1983) or for the assessment of attachment styles the Attachment Style Interview (ASI; Bifulco et al., 2002) or the Experiences in Close Relationships Scale (ECR; Brennan, Clark & Shaver, 1998).

Data Extraction

For the data extraction, information about participant characteristics, assessment measures, predictors, outcome measures and type of analysis were collected.

Effect sizes in most studies were mentioned as Odds Ratios (OR). In those studies, the OR's and the upper and lower bounds of the confidence interval (CI) were recorded, as well as Wald values. Two studies also used percentages to present the participant means on the measurements.

Risk of bias Assessment

The quality of studies and the risk of bias was assessed by using the GRADE quality assessment methods about longitudinal/cohort studies (Guyatt et al., 2011). These include the following criteria: a) Selection of exposed and non-exposed cohorts should be from the same population, b) Confidence in the assessment of the exposure, c) Confidence that the outcome was not present at the beginning of the study, d) The exposed and unexposed were matched for all variables, e) Confidence in the assessment of prognostic factors, f) Confidence in the assessment of the outcome, g) Adequate follow up of the cohorts, h) Similar interventions between groups. According to these criteria, the risk of bias was considered "high" or "low". If the information, regarding an item, was sufficient the risk of bias was considered "low". If the information was not enough to fulfill an item, the risk of bias was considered "high". If the information was missing, the risk of bias was also considered "high".

Results

The systematic search retrieved 2.938 articles from PubMed, 2.223 articles from EMBASE, 7.508 articles from PsycInfo and 619 articles from the Cochrane Library, resulting in a total of 13.288 articles. Using the Mendeley software, duplicate articles (2.650) were removed, resulting in a total of 10.638 unique articles. After the initial title and abstract screening the number of articles considered for full-text screening was 341. Snowballing method was used to determine whether there were any important missed articles. One relevant article was found with this method. Of the 342 reviewed articles, 62 were considered relevant and eligible for the meta-analysis. After full-text screening 59 articles were excluded for various reasons (see Appendix A). The final number of studies reviewed was three (Bifulco, 2002; Bifulco, 2006; Agerup, 2015). One of the basic inclusion criteria was that the studies had to connect attachment styles directly to the onset of MDD, measured by a clinical interview. Studies mentioning pathways such as emotion regulation strategies or dysfunctional attitudes were therefore excluded.

Due to the high heterogeneity of the attachment and MDD measurements between the included studies, as well as the way the results were presented, it was decided that a meta-analysis was not possible. Therefore, the results were synthesized narratively.

Study Quality

Table 1 (Appendix B) provides the ratings for the risk of bias of each study.

Main Outcomes of each study

All three studies were conducted in Europe. The total sample size included 801 participants, with their age ranging from 15 to 59 years old. Table 2 (Appendix B), presents all the relevant information regarding these 3 studies. All studies used a longitudinal design, and MDD was measured by an expert interview. Since the number of included studies was very low, the review was divided by examining each study separately.

Bifulco et al. (2002). The researchers examined the onset of MDD and its association with insecure attachment style. The sample consisted of 104 mothers with current interpersonal problems and 99 women, that were the comparison group. Participants were characterized as "at risk", due to adversities they faced as adults (the mother-series) or children (the comparison group). Attachment styles were measured at baseline with the ASI and MDD was measured 12 months later with the Present State Examination (PSE). The demographic characteristics of the population, as well as the measurement instruments are presented in Table 2 (Appendix B).

The results of the study were provided in prevalence scores. The prevalence of the different attachment styles indicated that insecure attachment had a strong connection with MDD onset. More specifically, enmeshed insecure attachment style, fearful insecure attachment style and angry dismissive insecure attachment style were found to predict the onset of MDD, 12 months after the baseline measurements. Withdrawn insecure attachment style and secure attachment style did not predict MDD.

Apart from style, the researchers also examined the degree of insecure attachment and how that influenced the onset of MDD. They found that participants with "marked", meaning high, and "moderate", meaning medium, degree of insecure attachment, developed MDD in a significantly high rate. Participants with "mild", meaning low, insecure attachment did not develop MDD in the same rate.

Finally, they combined "marked" and "moderate" into a cluster and named it "non-standard" insecure attachment. They performed a logistic regression and concluded that "non-standard" enmeshed insecure attachment style (OR: 5.83), "non-standard" fearful insecure attachment style" (OR: 3.64) and "non-standard" angry dismissive attachment style (OR: 5.01), predicted the onset of MDD, 12 months after baseline measurements. This study's conclusion was that only specific attachment styles led to the onset of MDD. When the attachment insecurity was significant, the onset of the disorder was more probable. Other insecure attachment styles, as well as secure attachment style did not predict the onset of MDD.

Bifulco et al. (2006). The study focused on a sample of participants (*N*=154) from a previous study (Bifulco et al., 2002). Three years after the original measurements, a follow up interview was conducted to determine whether there was an onset of MDD, for a part of the sample that had not been previously diagnosed with the disorder. The SCID for DSM-IV was used to determine the onset of MDD. Attachment was not re-measured. Information on the participants' demographics and the measurement instruments can be found in Table 2 (Appendix B).

The results of the study showed that "marked" and "moderate" insecure attachment, which were grouped in the "non-standard" category, were associated with the onset of MDD (OR= 6.67) at three years follow up. Regarding the type of insecure

attachment style, the researchers conducted a binary logistic regression and reported that there is a correlation between angry dismissive (OR=14.36) and fearful (OR= 6.36) insecure attachment styles to the onset of MDD. The results of this study confirmed those of a previous study, that "non-standard" attachment and angry dismissive attachment style led to MDD onset. Moreover, it was concluded that fearful insecure attachment style was also significantly related to the onset of MDD.

Agerup et al. (2015). This 3-wave longitudinal study examined the course of MDD in relation to the attachment to parents and peers during the period from adolescence to young adulthood. The total number of participants was 242. The participants' attachment and MDD were first measured when they were 15 and then re-measured when they were 20. Information regarding the demographics of the population and the measurements can be found in Table 2 (Appendix B).

Results indicated that, according to the Inventory to Peer and Parent Attachment (IPPA) scores, participants that developed MDD had a closer attachment to mothers (*M*=88.1), than to fathers (*M*=84.3) and peers (*M*=24.1). Moreover, insecure attachment to parents led to the onset or maintenance of MDD, while insecure attachment to peers had no effect on the onset and maintenance of the disorder. Regarding the onset of MDD, the researchers reported that insecure attachment to mothers (OR: 1.023, 95% CI 1.00, 1.05, p=.04), but not to fathers (OR 1.02, 95% CI 0.9, 1.05, p=.128) or peers (OR: .955, 95% CI 0.9, 1.03, p=.262) led to the development of MDD. Insecure attachment to fathers or peers was not statistically significant and was no predictors of the onset of MDD.

The results, overall, demonstrated the fact that insecure attachment is generally a pathway to MDD. The different types of insecure attachment and the

different people to which a person was insecurely attached to, affected the prospective onset of the disorder.

Discussion

The purpose of this systematic review was to identify predictors of the psychodynamic theory for the onset of MDD. More specifically, the attachment theory (Bowlby, 1969) was examined, as the general concept of psychodynamic theory was considered very broad. This review focused on the direct relationship between attachment styles and the onset of MDD, without the mediation of other factors. Three longitudinal studies with a total of 801 participants, measuring attachment styles with validated instruments and MDD diagnosis with an expert interview, were included in the review. Overall, we can conclude that the low number of included longitudinal studies examining the matter, pinpoint the fact that attachment styles cannot be considered definite predictors of MDD onset.

Nevertheless, the results indicated that there is an association between attachment styles and the onset of MDD. Specifically, insecure attachment style leads to MDD, as opposed to secure attachment style. As stated earlier, attachment is a trait developed during infancy and early childhood and predisposes a general attitude towards life, during adulthood. People with insecure attachment style are more prone to developing the disorder (Bifulco, 2006). The formation of a secure attachment with the parents, helps in developing stable relationships in the future. It also helps to recover faster from episodes of distress (Mikulincer & Shaver, 2007). The formation of an insecure attachment style constitutes a predisposition for the onset of mental disorders, such as MDD.

The insecure attachment style that is primary connected to MDD, according to Bifulco (2002), is the angry-dismissive style. Anger, the main characteristic of this

style, is considered to increase feelings of helplessness and guilt and it negatively affects close relationships. It originates from the rejection by one or both parents during childhood and might be the reason people with this attachment style are prone to developing MDD (Mikulincer & Shaver, 2007).

Fearful attachment style, which involves fear of rejection, poor self-image and negative view of others (Bartholomew, 1990), was also found to contribute to the onset of MDD. Fear of rejection could potentially lead to loneliness, as well as poor self-image might lead to self-blame and a feeling of helplessness. Self-blame and helplessness consist amongst others components of what Abramson (1989) called "hopeless cognitive style", which is considered a risk factor for MDD (Abramson, 1989). Findings from other studies confirm some of this information on the relationship between fearful insecure attachment and MDD (Shaver & Clark, 1994; Murphy & Bates, 1996; Roberts et al., 1996; Lee & Hankin, 2009).

Findings from the study of Agerup et al., (2015) suggest that being insecurely attached to parents makes adolescents and young adults more prone to developing MDD, than being insecurely attached to peers. Especially, insecure maternal attachment contributes to the onset of MDD, while insecure paternal attachment was connected more to the maintenance of the disorder for a longer period of time (Agerup et al., 2015). The connection between insecure attachment to parents and the onset of psychopathology is a basic concept of the attachment theory (Bowlby, 1988). Insecure attachment to mothers has been found to be linked to depressive symptomatology, mainly because mothers are the primary caregiving figure (Oliver & Whiffen, 2003).

Limitations and strengths

This systematic review has several limitations. Firstly, the initial search was very broad. The terminology included search terms from a huge variety of psychodynamic theories. Secondly, two out of three included studies were conducted by the same research team, which also consists a limitation. Thirdly, despite the multitude of studies, from the original search, the studies on the predictors of attachment theory for the onset of MDD were only 3. Excluding all studies researching relapse/recurrence, as well as mediators between attachment and the onset of the disorder, was the main reason for the low number of included studies. This might not be a limitation of the current study, but rather of current research on attachment theory. Fourthly, the high heterogeneity of the presentation of the study outcomes, did not facilitate the performance of an analysis. Finally, the studies screened and included, were only on the English language, although studies in other languages were identified. This may have led to the loss of some relevant data. On account of these limitations, the results of this systematic review should be examined with caution.

Despite its limitations, this review also presents certain strengths. Systematic search was conducted, in order to ensure the minimization of missed articles. Moreover, only studies using a clinical interview for the diagnosis of MDD were included, to have the certainty of a correct diagnosis of the disorder. A further strength of the study was the use of the GRADE quality assessment for longitudinal studies, to ensure the quality of methodology assessment. Finally, this is, to our knowledge, the first systematic review examining the direct relationship between attachment styles and the onset of MDD, measured by longitudinal studies.

Clinical Implications and further research

Research indicated that attachment is connected to the onset of MDD and it should be taken under consideration during treatment. The patterns of relationships a patient has established in childhood, may indeed have a significant influence on MDD.

Attachment's exact influence to the onset of MDD could be investigated by a longitudinal study, examining the attachment patterns, beginning at childhood and reaching adulthood. Such a study would indicate how different attachment styles are formulated and how they influence the participant's general mental health and depressive symptomatology. In this manner, the exact relationship between insecure attachment style and the onset of MDD, could be defined and whether the first can predict the latter. Longitudinal studies on attachment styles and the onset of MDD have a duration of no more than 5 years. Since attachment is established in early childhood, a study should measure these relationship patterns from a young age, to determine whether they act as a predictor of the disorder. It would undoubtedly be a very difficult study to conduct, but it might be the only approach to fully estimate the influence of attachment on MDD and psychopathology in general.

Looking at the results of this systematic review from a broader scope, it becomes evident that psychodynamic theory does not have sufficient prognostic factors for the explanation of MDD onset. The majority of the mechanisms considered to be responsible for the development of clinical depression are only theoretical and are not empirically validated. Moreover, most studies on these mechanisms include the mediation of cognitive structures. Attachment theory was chosen for the review, because it was regarded as the most empirically validated, but the results of the study

indicate that attachment styles influence the onset of MDD, but cannot directly predict it. Psychoanalysis and psychodynamic treatment are used worldwide for treating MDD by many therapists and psychodynamic therapy's effectiveness has been empirically supported (Driessen et al., 2010; Shedler, 2012; Fonagy et al., 2015). It seems rather important to validate the theory's perspective on the predictors of the disorder onset. By better understanding why MDD occurs, clinicians will be able to target specific patient attributes, while conducting therapy. It will also be possible for them to act preventively and help the patient, before the symptomatology worsens. Empirical evidence will provide the clinicians specific tools, that might increase the effectiveness of the treatment.

Conclusions

Overall, the low number of studies examining the direct relationship between attachment styles and the onset of MDD confirm what Mikulincer and Shaver (2012) stated: Attachment insecurity cannot be considered a direct predictor of psychopathology. There is not enough evidence to validate attachment insecurity as a direct predictor of MDD onset. Theoretically, insecure attachment styles affect the predisposition a person might have to MDD. Nevertheless, as previously noted, there is a considerate number of people with insecure attachment style, that do not showcase any symptoms of MDD.

According to research, multiple social, biological and psychological factors mediate the relationship between the insecurity of attachment and the onset of MDD. Attachment theory should be examined very extensively, to establish whether it can serve as sole predictor of MDD. Attachment styles are formulated at a very young age and MDD onset, usually, occurs during early adulthood. Hence, it seems rather

unlikely, that attachment theory can provide definite predictors for MDD. Therefore, considering that attachment insecurity is a direct predictor for the onset of the disorder would currently be an inconclusive assumption. It might be more purposeful, to direct research to more concrete predictors of MDD onset and regard attachment style, as a useful, but secondary factor to investigate.

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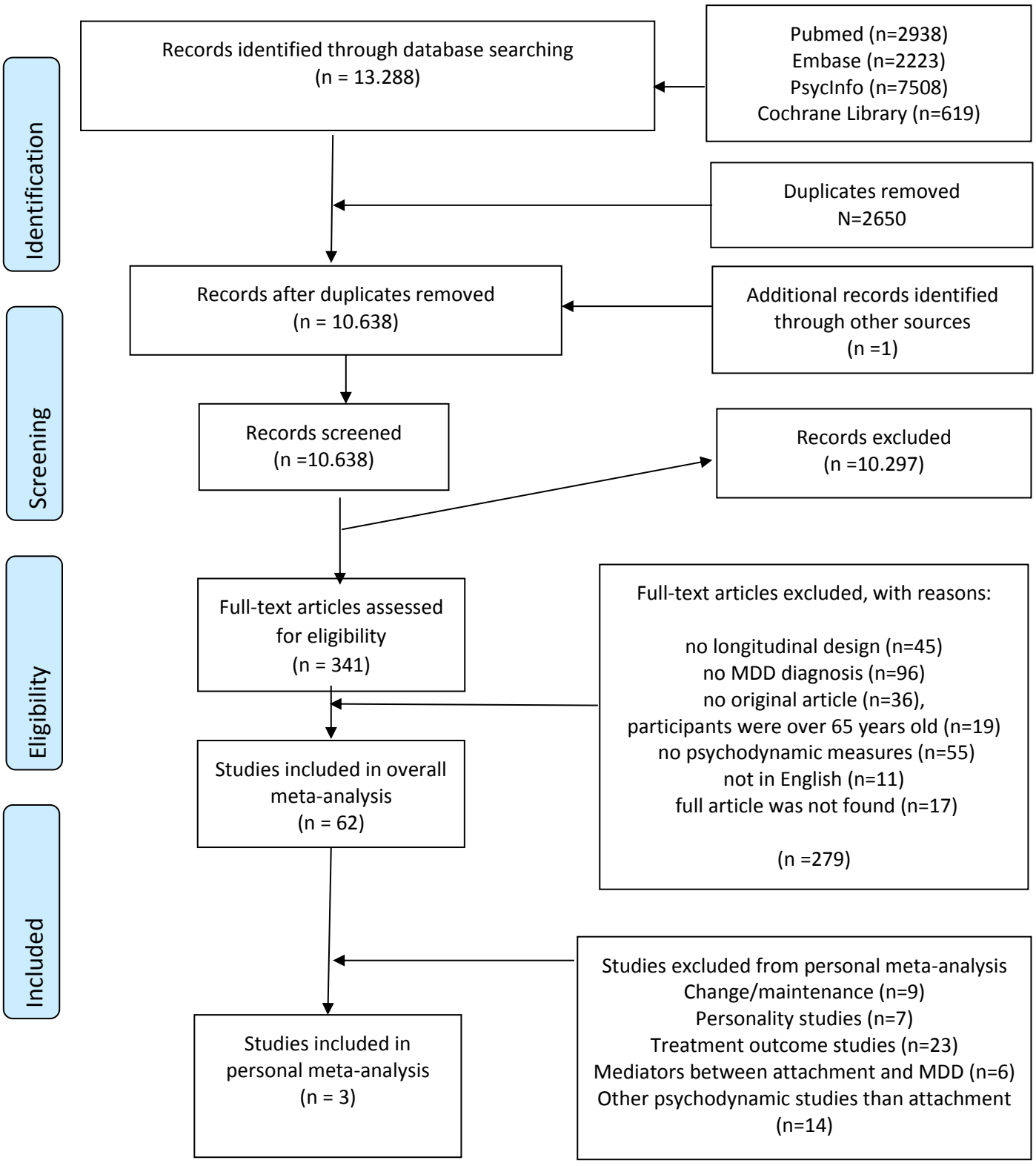
APPENDIX A

PRISMA Flow Diagram



APPENDIX B

Table 1.

GRADE Study Quality Assessment

Study	Selection of samples from the same population	Confidence in the assessment of the exposure	The outcome was not present at the beginning of the study	Equal match for all variables	Confidence in the assessment of the prognostic factors	Confidence in the assessment of the outcome	Adequate follow up of cohorts	Similar interventions between groups
Agerup et al., 2015	+	+	+	+	-	+	+	-
Bifulco et al., 2002	+	-	+	+	+	+	-	-
Bifulco et al., 2006	+	+	+	+	+	+	+	-

Note: (+) Information was clear = Low risk of bias, (-) Information was unclear or missing = High risk of bias

Table 2.

Summary Data of the included Studies

Author, year	Country	Sample Source	Sample Characteristics	Attachment Measure	Depression Measure	Main Outcomes
Bifulco et al., 2002	Great Britain	Community women from a research investigating vulnerability to depression	*N*= 302 Age *M*: 34.6 (S.D. 6.84) 32% working class, 61% married, 69% with children	Attachment Style Interview (Bifulco, 1998)	Present State Examination (Wing et al., 1978)	Insecure attachment style has a significant relation to the onset of clinical depression. Angry-Dismissive insecure attachment style and "Marked" insecure attachment have the strongest connection to the disorder.
Bifulco et al., 2006	Great Britain	Selected from north London GP practices	*N*= 154 Age: 26-59	Attachment Style Interview (Bifulco, 1998)	Structured Clinical Interview for DSM-IV (SCID)	Mainly Fearful and secondly Angry-Dismissive insecure attachment styles predict the onset of depression. These styles also partially mediate the relationship between childhood adversity and disorder.
Agerup et	Norway	Selected	*N*= 345	Inventory of	Schedule for	Both maternal and paternal insecure attachment are connected to the

al., 2015	from Schools of 4 regions in Norway	Age: 15 72.5% females 91.6% both parents Norwegian 2.6% one parent Norwegian 5.8% both parents non-Norwegian	Parent and Peer Attachment (Armdsen, Greenberg, 1987)	affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL)	onset and course of depression from adolescence to adulthood.

APPENDIX C

Search Terms:

(("depressive disorder"[MeSH Terms] OR "depression"[MeSH Terms] OR depression[Title/Abstract] OR depressive[Title/Abstract] OR depressed[Title/Abstract] OR affective[Title/Abstract]) AND ("attachment anxiety"[Title/Abstract] OR "secure attachment"[Title/Abstract] OR "insecure attachment"[Title/Abstract] OR "avoidant attachment"[Title/Abstract] OR "withdrawn attachment"[Title/Abstract] OR "attachment style"[Title/Abstract] OR "dismissive attachment"[Title/Abstract] OR "object relations"[Title/Abstract] OR "object relational functioning"[Title/Abstract] OR "self object"[Title/Abstract] OR "loved object"[Title/Abstract] OR "self object representations"[Title/Abstract] OR "depressive position"[Title/Abstract] OR "mirroring"[Title/Abstract] OR "twinship"[Title/Abstract] OR "poignant sadness"[Title/Abstract] OR "remorseful guilt"[Title/Abstract] OR "guilt"[Title/Abstract] OR "shame"[Title/Abstract] OR "compromise formation"[Title/Abstract] OR "narcissistic identification”[Title/Abstract] OR psychodynam*[Title/Abstract] OR psychoanal*[Title/Abstract]) AND Humans[Mesh] AND English[lang]) NOT ("review"[Publication Type] OR "review literature as topic"[MeSH Terms] OR "review"[All Fields])

APPENDIX D

PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	0
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	7
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	-
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	8-9
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	8

Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	30
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	10
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	-
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	10
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	9-10
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	-

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	10
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	-
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	26
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	28-29
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	27

Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	12-14
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	-
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	-
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	-
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	15
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	16
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	17-19
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	-

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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