Personality characteristics and vulnerability to depression:
A cross-sectional and longitudinal perspective

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ABSTRACT

Depression is a serious disorder due to its highly relapsing and recurrent course, thereby highlighting the necessity to identify vulnerability factors in order to prevent and treat its course. The present thesis investigated temperament and character traits, dysfunctional attitudes, and early maladaptive schemas (EMSs) in clinically depressed (CDs), previously depressed (PDs), and never depressed controls (NDs). In a cross-sectional study, we found that CDs and PDs differed significantly on EMSs, temperament and character traits compared to NDs, indicating the presence of maladaptive personality characteristics in these two clinical groups. Furthermore, the EMSs showed a moderate overlap with some temperament and character traits. In a longitudinal study, groups of CDs, PDs, and NDs were followed up nine years later. The findings indicated: (1) a moderate overlap between EMSs and dysfunctional attitudes in the index study at Time 1; (2) moderate-to-high test-retest correlations for the dysfunctional attitude scales and half of the EMS scales after controlling for depression severity at both time points; (3) stability in mean scores for Performance Evaluation and two-thirds of the EMS scales also after excluding currently depressed subjects at Time 2; (4) some stability of depressive symptoms; (5) a majority of CDs and PDs suffered a recurrent depression over nine years; and finally, (6) EMS scales emerged as significant predictors of concurrent depression severity in the index study and of depression severity and episodes of Major Depression over the nine-year follow-up period. Our findings suggest that EMSs should be considered in further studies as vulnerability markers for depression.

SAMMENDRAG (ABSTRACT IN NORWEGIAN)

Depresjon er en alvorlig lidelse grunnet hyppig tilbakefall. Derfor er det viktig å vektlegge betydningen av å identifisere sårbarhetsfaktorer i forebyggings- og behandlingsøyemed. Avhandlingen undersøkte temperaments- og karaktertrekk, dysfunksjonelle holdninger og "tidlige mistilpasningsskjemaer" hos klinisk deprimerte (KD), tidligere deprimerte (TD) og aldri deprimerte (AD) kontrollindivider. I en tverrsnittstudie fant vi at KD og TD hadde signifikant forskjellige skårer på "tidlige mistilpasningsskjemaer", temperaments- og karaktertrekk sammenlignet med AD. Funnene indikerte således tilstedeværelse av uhensiktsmessige personlighetskarakteristika i de to kliniske gruppene. "Tidlige mistilpasningsskjemaer" viste også et moderat begrepsmessig overlapp med temperaments- og karaktertrekk. I en longitudinell studie ble grupper av KD, TD og AD fulgt opp etter ni år. Funnene viste følgende: (1) moderat begrepsmessig overlapp mellom "tidlige mistilpasningsskjemaer" og dysfunksjonelle holdninger i startstudien (Tidspunkt 1); (2) moderate til høye test-retest korrelasjoner for dysfunksjonelle holdningsskalaer og halvparten av "tidlige mistilpasningsskalaer" ved kontroll av depresjonsgrad ved begge tidspunkter; (3) stabilitet i gjennomsnittskårer for "Evalueringsutførelse" (Performance Evaluation) og totredjedeler av "tidlige mistilpasningsskalaer" også etter eksklusjon av deprimerte individer ved Tidspunkt 2; (4) noe stabilitet i depressive symptomer; (5) flertallet av KD og TD erfarte tilbakevendende depresjon over de ni årene; og til slutt (6) "tidlige mistilpasningsskalaer" fremkom som signifikante prediktorer av depresjonsgrad i startstudien og depresjonsgrad og depressive episoder ni år senere. Funnene viser at "tidlige mistilpasningsskjemaer" bør vurderes i fremtidige studier som mulige sårbarhetsmarkører for depresjon.

LIST OF PAPERS

I Halvorsen, M., Wang, C.E., Richter, J., Myrland, I., Pedersen, S.K., Eisemann, M., & Waterloo, K. (2009). Early maladaptive schemas, temperament and character traits in clinically depressed and previously depressed subjects. *Clinical Psychology & Psychotherapy, 16,* 394-407.

II Wang, C.E.A., Halvorsen, M., Eisemann, M., & Waterloo, K. Stability of Dysfunctional Attitudes and Early Maladaptive Schemas: A 9-Year Follow-up Study of Clinically Depressed Individuals. *Submitted for publication.*

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ABBREVIATIONS

Abbreviations frequently in use:

BDI   Beck Depression Inventory

CDs   Clinically depressed individuals

DAS   Dysfunctional Attitude Scale

EMS   Early Maladaptive Schema

MDD   Major Depressive Disorder

NDs   Never depressed individuals

PDs   Previously depressed individuals

TCI   Temperament and Character Inventory

YSQ   Young Schema Questionnaire

INTRODUCTION

Background

Major Depressive Disorder (MDD) is one of the most common psychological disorders in the general population, in the medically ill, among psychiatric patients, and is often associated with substantial symptom severity and functional role impairment (e.g., Andrade et al., 2003; Creed & Dickens, 2006; Kessler et al., 2003).

From a developmental perspective, MDD, hereafter referred to as depression, can be identified already in childhood occurring at an approximately equal rate in both genders. However, in early adolescence, gender differences emerge with doubled rates of depression among females. This age period to young adulthood has been identified as the typical age of onset for the initial episode of depression (e.g., Andrade et al., 2003; Kessler, Avenevoli, & Merikangas, 2001; Hankin et al., 1998). Moreover, the gender gap has been found to persist into adulthood until it declines in old age (Kuehner, 2003; Jorm, 1987; Weissman & Klerman, 1977).

The word depression comes from the Latin word "deprimere", i.e., "press down" referring to feeling pressed down, sad, or low. Accounts of such suffering are found in the Old Testament and also, in the Snorre's Saga, i.e., a collection of tales about the Norwegian kings of the 10th to 12th century and the establishment of kingdoms in Scandinavia. Accordingly, suffering from depression and depression related difficulties have a long history in our society. Depression is also recognized as a cross-cultural condition, although, different manifestations may apply (Chentsova-Dutton & Tsai, 2009). A recent cross-national epidemiological study reported lifetime prevalence

estimates for depression ranging from 3% in Japan to 16.9% in the US, with the majority in the range of 8 to 12% (Andrade et al., 2003). Moreover, the 12-month prevalence was for the majority of countries in the range of 3.5% to 5.9%. These estimates are comparable to prevalence estimates in the general population in the US and Norway, although a bit lower (Kessler et al., 2003; Kringlen, Torgersen, & Cramer, 2001). Furthermore, the 12-month/lifetime prevalence ratios reached, in the studies of Andrade et al. (2003) and Kessler et al. (2003), approximately 40%, and indicate, combined with results from longitudinal studies, that depression is typically characterized by a relapsing, recurrent or chronic course (e.g., Kennedy, Abbott, & Paykel, 2003; Solomon et al., 2000). Another well-established finding is the frequent co-occurrence of depression particularly with anxiety disorders but also personality disorders (e.g., Kessler et al. 2003; Shea et al., 2004). Consequently, the World Health Organization (2002) ranks depression as one of the most burdensome diseases in the world and highlights the necessity to identify vulnerability factors in order to understand, prevent and treat its course.

Multi-factorial vulnerability model

A challenge in research on vulnerability factors to depression is how MDD is diagnostically operationalized. The diagnostic system, DSM-IV-TR (American Psychiatric Association [APA], 2000) as consensus-driven, is mainly a-etiological and descriptive, and the diagnosis of depression covers a wide range of symptoms. Accordingly, individuals meeting criteria for MDD can present quite distinct symptom profiles pointing to a complex vulnerability model of depression as a final common pathway of interacting social, psychological, and biological factors (Akiskal & McKinney, 1975; Perris, 1994).

The role of stressful life events in the onset of depression is widely recognized, although, this association typically becomes progressively weaker with recurrent episodes (Kendler, Thornton, & Gardner, 2000, 2001; Hammen, 2005). On the other hand, a common finding is that not everyone who experiences a stressful life event develops depression (Monroe, Slavich, & Georgiades, 2009). Thus, the importance of the concept of vulnerability or diathesis has been suggested in models of psychopathology in general and of depression, in particular (e.g., Ingram & Luxton, 2005).

Dysfunctional self-schemas in terms of dysfunctional attitudes and early maladaptive schemas and personality traits such as temperament and character traits, have been suggested as vulnerability markers for depression as reviewed further below. The objective of the present thesis was to investigate such vulnerability markers in clinically depressed individuals, previously depressed individuals and never depressed controls both cross-sectionally and longitudinally. Before going through the research evidence and the specific aims of the thesis, I will first present a multi-factorial, integrative model for the understanding of psychological disorders, including depression. Carlo Perris (1988, 1994) developed a model, which attempts to integrate a range of social, psychological and biological factors (Figure 1). More specifically, the model outlines the presumed role of dysfunctional self-schemas and personality characteristics in psychopathology. Although the model is not brand new, its age makes it no less potent as recent etiological models of depression are comparable (e.g., Kendler, Gardner, & Prescott, 2002; Luyten, Blatt, Van Houdenhove, & Corveleyn, 2006). It is not my attempt to review in detail the evidence for the model itself, but to introduce the model as an organizing map to put the presumed role of personality characteristic in psychopathology into perspective.

Genetics, pre and postnatal
influences on the capacity to gather
and process information

Culture

Experiences of parental rearing:
attachment/detachment
environmental possibilities

Inborn capacity of gathering
and processing information

Active construction of the world
development of cognitive schemas
emergence of self-identity

Basically dysfunctional
self-schemas

Systematic perceptual and
processing errors

Invariant biological
personality characteristics

Individual
vulnerability

Stressful events
(idiosyncratic meaning)

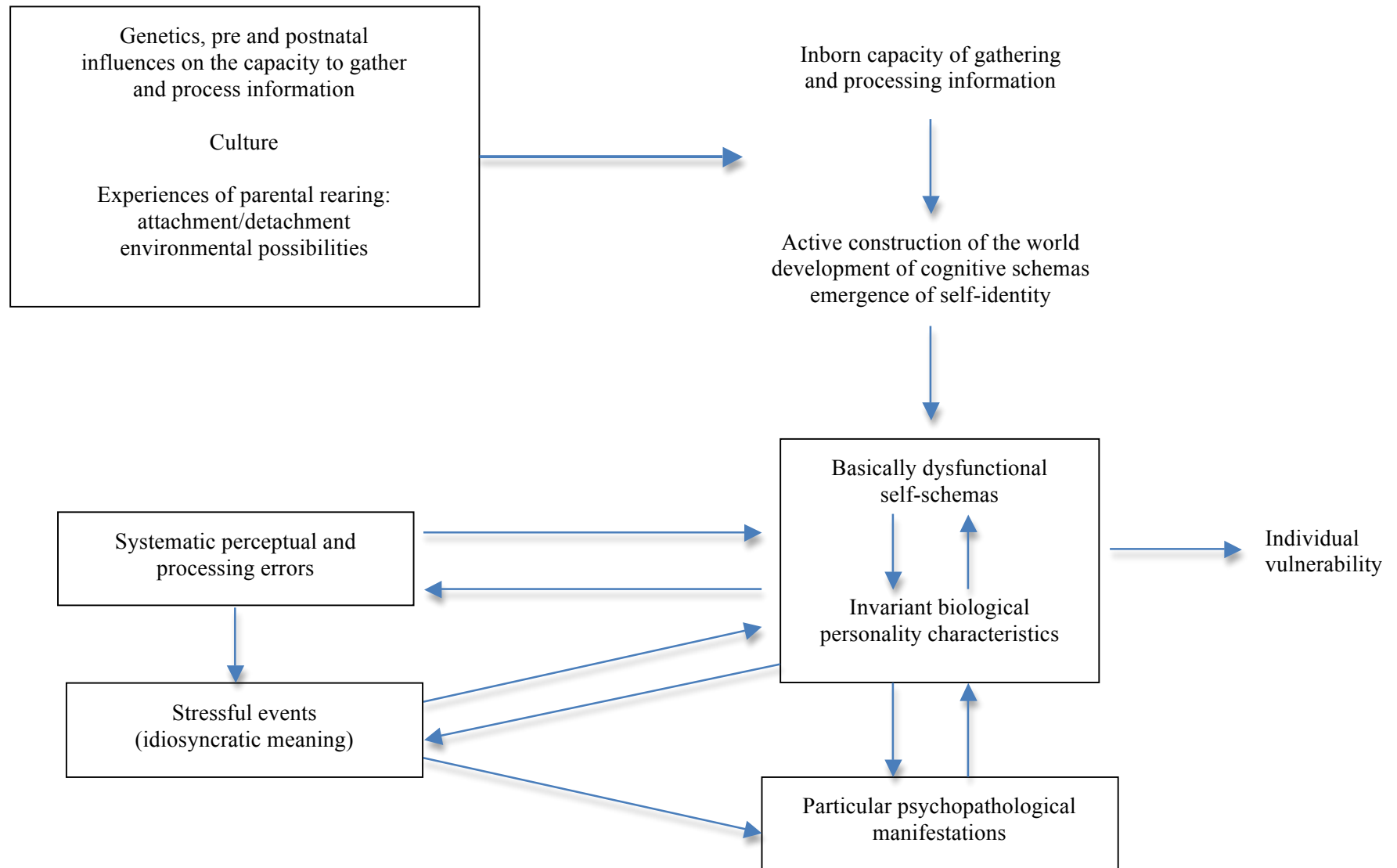Particular psychopathological
manifestations

Figure 1. *An integrative framework of individual vulnerability adapted from Perris (1994).*

Perris (1988, 1994) influenced by research on the association between dysfunctional parental rearing practice and psychopathology and by the work of Bowlby (1969, 1973) and Beck (1976) among others, developed a framework focusing on the concept of individual vulnerability. Briefly, the framework highlights the importance of taking into account the interaction of multiple variables in the development of an individual's susceptibility to psychological disorders. Furthermore, the interplay of the vulnerable individual with his/her environment is emphasized. As shown in Figure 1, the concept of dysfunctional self-schema is central. In general, a schema refers to a stored body of knowledge that is used to organize new information in a meaningful way, thus, influencing how phenomena are interpreted and conceptualized (Clark & Beck, 1999). Self-schemas can be understood as a kind of internal working models of the self and self-other relations. Accordingly, self-schemas in interplay with biological personality characteristics and concomitant schema-congruent information processing (i.e., self-confirmatory bias) are considered to constitute an individual's vulnerability to psychological disorders.

Central to the model is the notion that self-schemas may develop to become dysfunctional as part a result of disturbances in an individual's relationships during childhood with his or her parents or significant others. The concept of vulnerability in the model is not regarded as a static and fixed condition, but instead as epigenetically evolving via individual-environment transactions throughout life (Perris, 1994). Furthermore, the development of psychopathology is proposed to relate to interactions between acute or long-term stressful events and a greater endorsement of dysfunctional self-schemas. Inherent in the notion of the role of stressful events, is the recognition of how vulnerability in terms of dysfunctional schemas and personality traits may

influence the appraisal of events and coping responses. Likewise, it is recognized that vulnerable individuals play a role in creating their own stressors (Perris, 1994).

This interactive and eclectic framework of individual vulnerability can serve as a heuristic model to discover and examine the various factors involved in the development of vulnerability (Perris, 1994). The concept of individual vulnerability connotes causality, i.e., factors that shed light on processes that initiate or maintain psychological disorders (Ingram & Siegle, 2009). Inherent in the conceptualization of vulnerability factors are their trait properties and thus, the ability of such factors to show certain stability over time. Furthermore, the concept of vulnerability is considered as representing a continuum ranging from distal to more proximal factors. Distal vulnerability factors may represent developmental antecedents such as personality traits and dysfunctional self-schemas, whereas proximal vulnerability factors, which are partly based on the distal factors, may reflect cognitive dispositions such as negative automatic thoughts (Ingram & Siegle, 2009).

With this model as a background, I will give an overview of the evidence for the assumption that personality characteristics, in terms of temperament and character traits, dysfunctional attitudes, and early maladaptive schemas, are associated with and predictive of depression.

Vulnerability to depression

Temperament and character traits

From a clinical point of view the psychobiological model of personality developed by Cloninger, Svrakic, and Przybeck (1993) is appealing as it was developed from the very beginning, perhaps to a greater extent than contemporary trait approaches, to describe personality problems and disorders as well as normal personality[1].

The personality model includes temperament and character traits. The temperament traits are Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence, reflecting automatic emotion responses, manifested early in life, and moderately heritable and developmentally stable. Self-Directedness, Cooperativeness, and Self-Transcendence constitute the character traits reflecting different self-concepts (see Table 1).

With the clinical utility of the model as the main impetus Cloninger (2004) realized that a description of temperament traits alone was not sufficient to distinguish patients from healthy controls. Accordingly, he included a description of character traits reflecting different concepts of the self and self-other relations, which are regulated by higher cognitive processes and partly developed throughout life by socio-cultural learning. Cloninger, Przybeck, Svrakic, and Wetzel (1994) suggested that interactions between temperament and character traits influence how individuals adapt to life experience and constitute an individual susceptibility to depression.

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[1] It should be noted, though, that in recent years researchers focusing on aspects of the Big Five traits, e.g., McCrae and Costa (1999) with their Five-factor theory of personality, are increasingly addressing its applicability in clinical samples.

Table 1. *Overview of personality traits and cognitive characteristics as reflected in the respective models*

MODELS	VULNERABILITY CONCEPTS	MEASURES
Cloninger et al.'s (1993) psychobiological model of personality	*Temperament:* Harm avoidance, i.e., anxious, pessimistic, and shy vs. risk-taking, optimistic, and outgoing. Novelty seeking, i.e., impulsive, quick-tempered, and disorderly vs. rigid, stoical, and orderly. Reward dependence, i.e., sociable, approval seeking, and warm vs. aloof, detached, and cold. Persistence, i.e., diligent, hard working, and ambitious vs. indolent, modest, and underachieving. *Character:* Self-Directedness, i.e., responsible, purposeful, and resourceful. Cooperativeness, i.e., tolerant, forgiving, and helpful. Self-Transcendence, i.e., intuitive, judicious, and aware.	The Temperament and Character Inventory (Cloninger et al., 1994) is a 240-item self-report inventory.
Beck's cognitive theory of depression (e.g., 1967, 1987)	*Dysfunctional attitudes:* A variety of rigid and unrealistic attitudes regarding personal adequacy, acceptability, and worth.	The Dysfunctional Attitude Scale (Form A[a]; Weissman & Beck, 1978) is a 40-item self-report inventory.
Young's Schema theory (1990, 1999, Young, Klosko, & Weishaar, 2003)	*Early maladaptive schema (EMS) domains:* Disconnection[b], i.e., beliefs that one's need for safety, nurturance, and empathy will not be met in a predictable manner. Impaired Autonomy[c], i.e., beliefs that one is not able to separate, survive, or function independently. Undesirability[d], i.e., beliefs that one is fundamentally different from others in goals, values, skills, and appearance. Restricted Self-Expression[e], i.e., beliefs relating to the need to restrict or suppress one's emotions and wishes. Impaired Limits[f], i.e., deficiency in internal limits and responsibilities to others.	The Young Schema Questionnaire[g] (Young & Brown, 1990) is a 205-item self-report inventory.

Note. [a]One of the most widely used versions. [b]Includes EMSs Emotional Deprivation, Abandonment/Instability, Mistrust/Abuse, and Social Isolation/Alienation. [c]Includes EMSs Dependence/Incompetence, Vulnerability to Harm/Illness, Enmeshment/Undeveloped Self, and Subjugation. [d]Includes EMSs Defectiveness/Shame, Social Undesirability, and Failure to Achieve. [e]Includes EMSs Emotional Inhibition, Self-Sacrifice, and Unrelenting Standards. [f]Includes EMSs Entitlement/Grandiosity and Insufficient Self-Control. [g]Original version. Recent versions include the majority of the EMSs included in this version.

In several studies, high Harm-Avoidance (i.e., a tendency to be anxious, pessimistic, and shy) and low Self-Directedness (i.e., a tendency to be dependent and immature in adapting behaviour to define and pursue meaningful goals) have been most consistently identified in clinically depressed patients (Abrams et al., 2004; Brown, Svrakic, Przybeck, & Cloninger, 1992; Farmer et al., 2003; Joffe, Bagby, Levitt, Regan, & Parker, 1993; Marijnissen, Tuinier, Sijben, & Verhoeven, 2002; Richter, Eisemann, & Richter, 2000; Richter, Polak, & Eisemann, 2003; Svrakic, Przybeck, & Cloninger, 1992). Although studies have found Harm Avoidance and Self-Directedness to be related to the depression state at the time of assessment (e.g., Corruble, Duret, Pelissolo, Falissard, & Guelfi, 2002; Hansenne et al., 1999; Hirano et al., 2002), initial studies are emerging, indicating that patients in remission continue to show higher Harm Avoidance and lower Self-Directedness compared to healthy control subjects (Nery et al., 2009; Richter et al., 2000; Smith, Duffy, Stewart, Muir, & Blackwood, 2005), suggesting that they have both trait and state properties.

Few studies have investigated the temperament and character traits as predictors of depression in longitudinal studies. Cloninger, Svrakic, and Przybeck (2006) found in a 12-month follow-up study of a representative general population sample ($n = 631$) that baseline personality scores, particularly high Harm Avoidance and low Self-Directedness, explained 44% of the variance in depression after controlling for initial depression severity. Farmer and Seeley (2009) found in a 4-year follow-up study in a large community sample ($n = 591$) that high Harm Avoidance significantly predicted future depression severity after controlling for initial depression severity. Another longitudinal study with undergraduates ($n = 167$) found, after controlling for initial symptoms of depression, that low Self-Directedness measured at baseline was

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predictive of depressive symptoms approximately three months later (Naito, Kijima, & Kitamura, 2000). Methodological differences in the three studies relate to diverse sampling procedures, variation in follow-up intervals, varying measures of depression severity, and the fact that temperament and character trait scores have been found to vary between countries (Miettunen, Kantojärvi, Veijola, Järvelin, & Joukamaa, 2006). However, the findings indicate that high Harm Avoidance and low Self-Directedness may reflect a vulnerability predictive of future depression. Other prospective studies have found that neuroticism or neuroticism related traits, which are substantially correlated with Harm Avoidance (Cloninger et al., 2006), are predictive of first-onset of depression (Clayton, Ernst, & Angst, 1994; Hirschfeld et al., 1989; Kendler, Gatz, Gardnerm, & Pedersen, 2006; Kendler, Neale, Kessler, Heath, & Eaves, 1993; Mattisson et al., 2009; Nyström & Lindegard, 1975).

In sum, the vast majority of studies investigating the role of temperament and character traits in depression are cross-sectional and correlational referring to observations of groups at different points along the disorder's trajectory (e.g., individuals in episodes vs. individuals in remission vs. non-depressed individuals) tested on one occasion. Hence, any interpretation of causal directions of the findings is precluded. It is time to focus research efforts on using prospective, longitudinal studies to establish the role of temperament and character traits as vulnerability markers for depression. The few existing longitudinal studies reviewed above suffer from methodological shortcomings and differences in various aspects, which make it difficult to compare their findings. For instance, it was not determined whether any of the subjects had a prior history of depression. Hence, it is difficult to know whether the implicated personality traits in the respective studies reflect premorbid traits or scar effects of having experienced

depressive episodes (Klein, Durbin, & Shankman, 2009). Related, Cloninger's theory implicitly assumes that the traits predispose to both first-onset and recurrent depressive episodes. Further studies should clearly address this assumption and investigate the role of such traits in the course of depression from first-onset to relapse and recurrence.

In Cloninger's model, there is an emphasis on the heritability of the personality traits, which is in contrast to cognitive theories focusing on dysfunctional self-schemas and the social environment in the acquisition of the schemas.

Dysfunctional attitudes

In Beck's cognitive model of depression (1967, 1987) negative self-schemas represent key vulnerability factors to depression. Negative self-schemas have been frequently operationalized at the level of dysfunctional attitudes reflecting a variety of rigid and unrealistic attitudes regarding personal adequacy, acceptability and worth measured by the Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978) (see Table 1). Examples of DAS items are *"If other people know what you are really like, they will think less of you"* and *"My happiness depends more on other people that it does on me"*. The negative self-schemas, as key vulnerability factors, are suggested to arise from adverse experiences in childhood. In a recent comprehensive review, Alloy, Abramson, Smith, Gibb, and Neeren (2006) found fairly consistent evidence of a link between dysfunctional parenting styles such as low care, but also high psychological control (e.g., overprotection) or the provision of negative inferential feedback and unipolar depression in offspring. Similarly, maltreatment in childhood, in particular emotional abuse, was found linked to unipolar depression. Moreover, findings from

several studies indicate the role of cognitive vulnerability factors, including dysfunctional attitudes, as mediators between dysfunctional parenting and depression in offspring (Alloy et al., 2006). Although, fewer studies have directly investigated the mediator role of cognitive vulnerability factors, including dysfunctional attitudes, in relation to maltreatment and depression, Alloy et al. (2006) concluded tentatively, that the evidence so far suggests such a mechanism.

In what way may dysfunctional attitudes, embedded within the negative self-schemas, be implicated in vulnerability to depression? The negative schemas are suggested to remain latent until activated by stressful events that are congruent with core vulnerability themes and subsequently guide information-processing in accordance with the schemas and as such contribute to maintain the vulnerability and predispose to psychopathology. In particular, Beck, Rush, Shaw, and Emery (1979) proposed that activated schemas tend to generate negative automatic thoughts and negative affects, which may spiral into a depressive episode.

Research on dysfunctional attitudes has largely focused on the DAS total score (Halvorsen, 2009). A frequent finding is that, although endorsement of dysfunctional attitudes often is characteristic of depressed individuals, DAS mean scores often decrease after remission to a level of never depressed individuals (Dent & Teasdale, 1988; Haaga, Dyck, & Ernst, 1991; Peselow, Robins, Block, Barouche, & Fieve, 1990). Consequently, there has been debated whether dysfunctional attitudes should be considered as concomitants of a depressed mood state as opposed to playing an etiological role, i.e., reflecting traits, which temporally precede depression (e.g., Coyne & Gotlib, 1986; Segal & Shaw, 1986). However, studies investigating DAS scores in

depressed individuals and following up the same individuals into remission, have demonstrated a moderate to high relative stability (i.e., test-retest correlation) of the DAS scores (Beevers & Miller, 2004; Otto et al., 2007; Zuroff, Blatt, Sanislow, Bondi, & Pilkonis, 1999). Accordingly, it has been suggested that the DAS total score reflects both state and trait properties (Beevers & Miller, 2004, Power, Duggan, Lee, & Murray, 1995; Zuroff et al., 1999). This is in accordance with research findings from other clinical perspectives, e.g., research on personality traits such as neuroticism and Harm Avoidance in depression (Costa, Bagby, Herbst, & McCrae, 2005; Hirano et al., 2002). Miranda and Persons (1988) have proposed the mood-state dependent hypothesis in line with Beck et al.'s theory (1979), implicating that cognitive vulnerability factors such as dysfunctional attitudes, become latent upon recovery from depression until activated by negative mood. Indeed, in a comprehensive review Scher, Ingram, and Segal (2005) found support for this notion of cognitive reactivity as multiple studies showed that previously depressed individuals as compared to never depressed individuals reported elevated levels of dysfunctional attitudes when they experienced negative mood states. This is in line with the state-trait vulnerability model by Zuroff et al. (1999), which proposes that the availability of the cognitive–affective structures remains fairly constant over time but that the accessibility of the structures is dependent on current levels of depressive symptoms.

As an alternative to examining the general role of dysfunctional attitudes, as reflected by the DAS total score in depression, it has been suggested to relate specific themes of dysfunctional attitudes to vulnerability to depression. Power et al. (1994) have, by means of factor analytic studies of the DAS (forms A and B), developed a short version of the DAS (i.e., DAS-24) comprising three subscales reflecting *dependency* (e.g., "A

person should think less of himself if other people do not accept him), *achievement* (e.g., "My life is wasted unless I am a success"), and *self-control* issues (e.g., "I should always have complete control over my feelings"). These subscales have been confirmed in a Japanese sample lending initial cross-cultural support for the subscales (Tajima et al., 2007). Furthermore, in a study by Power et al. (1995) in a sample of depressed, recovered depressed patients, and their never ill first-degree relatives, it was found that the recovered depressed patients had elevated scores on the dependency subscale compared to a healthy control-group. Moreover, in a 1-year follow-up study of depressed patients, the relationships between the subscales of the DAS-24 and congruent life events were examined in relation to length of survival and relapse (Lam, Green, Power, & Checkley, 1996). Findings revealed that levels of dysfunctional attitudes at the index episode, i.e., measured when subjects were depressed, did not alone predict whether subjects relapsed. However, it was found that relevant life events (i.e., interpersonal difficulties) and the dependency subscale of the DAS-24, contributed significantly to whether or not the subjects relapsed and to the number of weeks before relapsing. Accordingly, the authors suggested that investigating the DAS in more detail, i.e., by focusing on content-specific subscales such as the dependency theme, might tap into vulnerability factors even in a recovered state. This proposal broadens Beck et al.'s (1979) and Miranda and Persons (1988) suggestion that dysfunctional attitudes become latent upon recovery. However, more research with the DAS is clearly needed to examine whether the more specific subscales are more mood-state independent compared to using the DAS total score as an indicator of vulnerability.

Cane, Olinger, Gotlib, and Kuiper (1986) have, in a similar way, examined specific themes of dysfunctional attitudes. They identified, in a factor analytic study, a two-

factor solution of Performance Evaluations and Approval by Others, to account for a large proportion of the variance of the DAS total score (Form A, Weissman & Beck, 1978). Moreover, several researchers have argued that the components of dysfunctional attitudes as reflected in conceptually derived content-specific subscales reflect different personality characteristics, i.e., self-criticism/perfectionism/autonomy and dependency/sociotropy, respectively, with different developmental origins, and represent various vulnerabilities to depression in relation to achievement vs. interpersonal-related stress (Beck, 1983; Blatt, 1974; Zuroff, Mongrain, & Santor, 2004).

Taken together, dysfunctional attitudes have been found associated with a depressed mood-state. On the other hand, such attitudes have also been found to show satisfactory relative stability over time as reflected by adequate test-retest correlations. What is the evidence, then, that dysfunctional attitudes, in fact, act as vulnerability markers for depression?

The accumulated research findings, to date, suggest a role of dysfunctional attitudes in predicting depressive symptoms and depression (see, e.g., Abramson et al., 2002; Beck, 2008; Clark & Beck, 1999; Jacobs, Reinecke, Gollan, & Kane, 2008, for reviews). Beck (2008) has argued that many earlier studies have "overlooked the role of stress in activating previously latent dysfunctional schemas" (p. 970). Accordingly, in a comprehensive review of studies focusing on priming (e.g., sad mood-induction) and longitudinal designs in line with the vulnerability-stress hypothesis, Scher et al. (2005) concluded that considerable research supports the concept of cognitive vulnerability (i.e., dysfunctional attitudes) to depression among adults. However, they stressed the

need for future studies to examine the role of such vulnerability factors in the course of depression from onset to relapse and recurrence. In this regard, there is a recent study emerging from the Temple-Wisconsin Cognitive Vulnerability to Depression Project, which followed up initially non-depressed individuals ($n = 159$) who later developed at least one depressive episode during the first 2.5 years (Iacoviello, Alloy, Abramson, Whitehouse, & Hogan, 2006). The majority of the non-depressed individuals had no prior history of depression. The authors found that non-depressed individuals with characteristics of negative attributional styles and endorsement of dysfunctional attitudes experienced a higher frequency of depressive episodes, more severe episodes, and a more chronic course in the follow-up period, compared to individuals with low levels of such cognitive characteristics. Furthermore, in a study by Segal et al. (2006), outpatients with remitted major depressive disorder ($n = 99$) who responded with elevated levels of dysfunctional attitudes after a priming procedure with mood-induction, ran a significantly greater risk of relapse during the subsequent 18 month of follow-up, even after controlling for the effect of past depressive episodes. Findings from a recent study of remitted individuals ($n = 52$) from a community sample, however, showed that levels of dysfunctional attitudes assessed after a mood-induction procedure did not predict relapse in the follow-up period of 12 months (Lethbridge & Allen, 2008). On the other hand, Alloy et al. (2006) found that among college freshmen ($n = 347$), prospectively followed-up for 2.5 years, premorbid negative cognitive characteristics (i.e., negative attributional style and endorsement of dysfunctional attitudes) were similarly predictive of both first-onset as well as recurrence of major depression, although, the prediction of first-onset of minor depression was stronger than recurrence.

In sum, although there is a need for future prospective studies, emerging evidence so far indicates, in line with Beck's theory, the role of dysfunctional attitudes as part of a diathesis to first-onset depression as well as relapse and recurrence. As pointed out, the use of the DAS total score as a vulnerability marker has been criticized as representing a too broad distress-construct in addition to containing items reflecting state effects of depression. The concept of dysfunctional attitudes per se seems to have received far less attention. For instance, are dysfunctional attitudes good as a form of representation system? How do they relate to schemas? The research field would indeed benefit from a thorough discussion and examination of such important conceptual issues.

Early maladaptive schemas

The concept of schema as a vulnerability factor also plays a central role in Young's Schema theory (1990, 1999; Young, Klosko, & Weishaar, 2003). Influenced by Beck and the work of Bowlby (1973, 1980) on attachment theory, Young elaborated on the schema concept. According to Young (1990), early developmental experiences of unmet basic emotional needs in relationships with significant others will give rise to the development of Early Maladaptive Schemas (EMSs). The EMSs refer to the deepest level of cognitive structures and are defined as self-defeating emotional and cognitive patterns regarding oneself and one's personal relationships (Young et al., 2003). The key assumption in Young et al.'s Schema Theory (2003) is that the EMSs play a causal role in the development of later psychopathology.

Based on clinical experience, Young (1990) originally hypothesized sixteen primary EMSs grouped into five broad domains of unmet emotional needs related to core themes such as autonomy and intimacy (Schmidt, Joiner, Young, & Telch, 1995) (see Table 1).

Examples of items reflecting the proposed EMSs, as assessed by the Young Schema Questionnaire (YSQ; Young & Brown, 1990), are: *"For much of my life, I haven't felt that I am special to someone"* and *"I subscribe to the belief: Control or be controlled"*. Recent research has attempted to investigate the origins of the EMSs. Although, the use of cross-sectional designs, studies are emerging lending initial support for an association between retrospectively assessed maladaptive parenting or maltreatment in childhood and EMSs in adolescents and adults with psychological disorders and symptoms (Cecero, Nelson, & Gillie, 2004; Harris & Curtin, 2002; Lumley & Harkness, 2007; Meyer & Gillings, 2004; Shah & Waller, 2000).

In common with Beck et al.'s (1979) theory, Young et al.'s Schema theory (2003) hypothesizes, that the activated schemas will narrow the individual's information-processing span in accordance with the schemas and, thus, filter out contradictory and potentially falsifying input. As a result, the vulnerability will be maintained and possibly intensified over time. In particular, the activated schemas are suggested to generate negative automatic thoughts and negative affects. The Schema theory is not developed specifically for an understanding of depression and depressive symptoms, but for deep-rooted and chronic psychological disorders (Young et al., 2003). However, the occurrence of MDD has to be regarded as a serious and deeply ingrained disorder due to its highly recurrent and for a substantial number of individuals, chronic course (e.g., Andrade et al., 2003; Kessler et al., 2003; Solomon et al., 2000). Accordingly, examining the relationship of EMSs to depression seems warranted.

To date, few studies have investigated the role of EMSs in depression. As concerns the issue of stability, Young (1999) has proposed that the EMSs reflect highly stable and

enduring vulnerability themes. This proposal has recently been investigated in depressed outpatients ($n = 55$), who were followed-up for a 2.5 to 5-year period (Riso et al., 2006). Findings showed moderate to satisfactory levels of relative stability (i.e., test-retest correlations) even after controlling for depression severity at both assessments. Additionally, despite a significant decrease in depression severity at follow-up, mean scores of the majority of the EMSs did not drop significantly. The overall results on stability analyses remained after excluding participants not in remission.

The remaining studies, investigating the role of EMSs in clinical depression were based on cross-sectional designs. Shah and Waller (2000) found depressed outpatients ($n = 60$) compared to healthy controls ($n = 67$), in discriminant function analyses, distinguished by elevated scores on the EMSs of Defectiveness/Shame, Self-Sacrifice, and Insufficient Self-Control. Further, Hoffart et al. (2005) found that the EMS domain scales Disconnection and Impaired Autonomy explained up to 53 % of the variance in depression severity in a sample of clinically depressed, previously depressed, and never depressed individuals ($n = 149$). Furthermore, these authors found that asymptomatic previously depressed individuals scored higher on these two EMS scales compared to never depressed individuals. This indicates that the EMSs may reflect cognitive vulnerability, even when the vulnerable individuals are not currently depressed. Another study examined EMSs in chronically depressed outpatients, non-chronic outpatients with major depressive disorder, and a control group with no ongoing or past psychological disorder (Riso et al., 2003). Findings showed that the two depressed groups showed elevated scores on all the EMS domains compared to the control group. When comparing the two depressed groups, and also controlling for depression severity, the chronically depressed outpatients had elevated scores on the EMS domains Impaired

Autonomy and Overvigilance (i.e., reflecting rigid expectations for performance and fear of making mistakes).

Taken together, there is an obvious need for further studies to investigate the stability of EMSs independent of a depressed-mood state. That is, studies should examine whether the EMSs temporally precede depression and also if they remain stable upon remission and recovery. It seems reasonable to expect that the relation of EMSs to depression can be characterized by both trait and state properties in accordance with research findings on dysfunctional attitudes. Given the proposed highly stable and enduring nature of EMSs they may be conceptualized as cognitive personality characteristics influencing an individual's thoughts, feelings, and behavior. Whether these dysfunctional characteristics play a part in the origin as well as the course of depression seems vital to investigate in prospective, longitudinal studies. Taking account of previous research findings indicating that the DAS total score reflect a too broad distress theme (e.g., Power et al., 1994), it seems warranted to study the proposed specific vulnerability themes in Young et al.'s model (2003) as well as to investigate the relation of the EMSs to more established personality traits and cognitive characteristics in order to establish further their unique conceptual standing.

AIMS OF THE THESIS

The thesis is based on a cross-sectional and a longitudinal study, both including groups of clinically depressed (CDs), previously depressed (PDs), and never depressed controls (NDs). The aims of the thesis were as follows:

1. To examine cross-sectionally, temperament and character traits, and early maladaptive schemas (EMSs) in CDs, PDs, and NDs, and how they relate to concurrent depression severity (Paper I).

2. To examine the relationship between: (i) EMSs and temperament and character traits (Paper I); (ii) EMSs and dysfunctional attitudes (Paper II).

3. To examine longitudinally, both relative and absolute stability in terms of test-retest correlations and mean-level stability of dysfunctional attitudes, EMSs, and depressive symptoms (Paper II).

4. To examine dysfunctional attitudes and EMSs as predictors of depression severity nine years later and the occurrence of new depressive episodes in the follow-up period (Paper III).

METHODS

Participants and procedure

The thesis is based on data from both a longitudinal and a cross-sectional study including groups of CDs, PDs and NDs. The longitudinal study is described first as the cross-sectional study is partially overlapping with the last assessment point in the longitudinal study.

Longitudinal study: The index sample at Time 1 (T1), consisted of 149 subjects who were categorized as CDs, PDs, or NDs. The subjects took part in a study on depression and cognitive vulnerability in the years 1997-1999, i.e., the index study (T1) (Wang, 2006; Wang, Brennen, & Holte, 2005). They were a mixture of undergraduate students and patients consulting their general practitioners (GP). In an initial screening phase questionnaires about current depressive symptoms (BDI-I; Beck Depression Inventory – First Edition, Beck et al., 1979) and previous depression (PDQ; Previous Depression Questionnaire, Wang, 1996) were administered to approximately 800 undergraduate students at the University of Tromsø, Norway, and to approximately 600 GP patients, also in Tromsø. The response rate was 43% (n = 340) for the students and 30% (n = 180) for the patients. From this sample subjects were invited to take part if they had a BDI-I score above 16 (i.e., potentially clinically depressed), or a score below 16 and met the requirements for a previous depression on the PDQ (i.e., potentially previously depressed). In addition, a random sample was selected among those who had a BDI-I score between 0 and 9 (normal range), and who did not meet the criteria for a previous depression on the PDQ (i.e., potentially never depressed) (Wang et al., 2005). This screening resulted in a sample of 184 subjects (84 patients and 100 students).

All subjects were then diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994), using the Structured Clinical Interview for DSM-IV, Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997).

None of the subjects was treated as an inpatient at the time of the assessment. The exclusion criteria were: ongoing manic/hypomanic episode, or psychotic symptoms. The final sample consisted of 149 subjects. The group-classification reliability was tested and a highly satisfactory reliability was found (cf., Wang et al., 2005). The Dysfunctional Attitude Scale (Form A, DAS; Weissman & Beck, 1978), the Young Schema Questionnaire (YSQ; Young & Brown, 1990) and the BDI-I were administered and completed by all subjects on the same occasion as the diagnostic interview.

The follow-up sample at Time 2 (T2) consisted of 115 subjects from the index study (see Figure 1 flowchart). At the follow-up assessment in the years 2006-2007 all subjects were, as in the index study, allocated to the groups of CDs, PDs, and NDs according to their diagnostic status (DSM-IV-TR, APA, 2000; SCID-I) at T2. The group-classification reliability was tested and a highly satisfactory reliability was found (cf., Paper III). None of the subjects was treated as an inpatient at T2.

The mean period of time from T1 to T2 was nine years (M = 8.94, Mdn = 9.00, SD = 0.99). Among the 34 subjects who did not take part in the follow-up study, one had died, 15 were not traceable, and 18 were unwilling to participate due to various reasons. At the follow-up assessment (T2) the DAS and YSQ were completed on separate occasions as the follow-up study was designed with a procedure over more than one day in which the diagnostic interview took place on the first day of testing.

A neuropsychological assessment in addition to some self-report measures not part of this thesis was also included. Accordingly, the DAS was administered first and completed by all subjects, while 82 subjects completed the YSQ some days later. The Beck Depression Inventory – Second Edition (BDI-II; Beck, Steer, & Brown, 1996) was administered separately in relation to both the DAS and the YSQ. There were no significant group differences on any of the demographic variables between the original T1 sample of 149 subjects and the two T2 samples of 115 and 82 subjects, respectively. Slightly fewer never depressed subjects from T1 took part in the follow-up study at T2. Demographic and clinical characteristics of the 115 subjects at T1 and T2 are presented in Table 2. Additionally, when entering the study 65% of the subjects were married/ had a partner. An overview of their group status at T1 and T2 according to the diagnostic assessment is presented in Table 3.
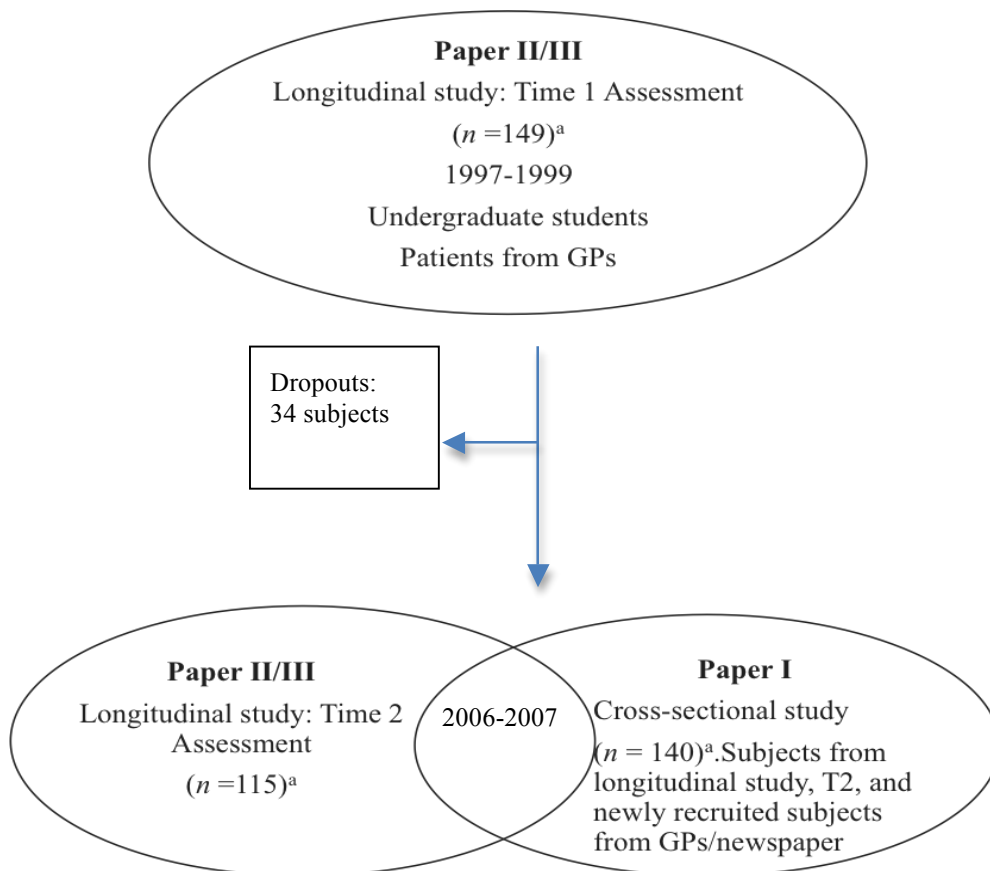
Figure 2. *Flowchart of study subjects.*

GP = general practitioner. [a]Clinically depressed, previously depressed and never depressed individuals.

Table 2. *Demographic and clinical characteristics at T1 and T2 for the three groups of participants (n = 115).*

VARIABLE	T1-CD (n = 47)		T1-PD (n = 39)		T1-ND (n = 29)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Gender (f/m)	41/6		32/7		24/5	
T1-Age	31.00	10.50	27.31	8.48	26.48	9.18
T2-Age	40.06	10.49	36.23	8.03	35.24	8.92
T2-Education, years	14.55	3.20	15.54	2.61	16.17	3.48
T1-BDI-I	14.57	8.46	6.44	4.16	0.93	1.33
T2-BDI-II	14.09	11.79	7.97	6.86	2.72	2.70
T1-Single/recurrent depression	19/28		16/23			
T2-Single/recurrent depression	8/39		7/32		3/0	
T1-Antidepressant	8		1			
T2-Antidepressant	8		5			

Note. T1 = time 1; T2 = time 2; CD = clinically depressed; PD = previously depressed; ND = never depressed; BDI = Beck Depression Inventory

Table 3. *Participants in the longitudinal study and their group status at T1 and T2 according to the diagnostic assessment (n =115).*

GROUP-STATUS		T2 CD	PD	ND	TOTAL	T1-T2 DEP.[a]
	CD	14	33	--	47	36
T1	PD	5	34	--	39	25
	ND	--	3	26	29	3
	Total	19	70	26	115	64

Note. DEP = Depression. [a]Subjects who had one or more major depressive episodes during the follow-up period.

Cross-sectional study: The sample consisted of a total of 140 subjects who were CDs, PDs, or NDs. The subjects participated in the study in the years 2006-2007. About half of the subjects were part of the follow-up sample (T2) from the longitudinal study described above. The other half was recruited through GPs and local newspaper ads in Tromsø, Norway (see Figure 1 flowchart). None of the subjects was treated as an inpatient at the time of the assessment. To recruit potential participants from GPs/newspaper respondents, an initial screening procedure included questionnaires about current depressive symptoms (BDI-II) and previous depression (PDQ). Subjects were invited to take part if the scores on the questionnaires indicated that they were (1) potentially clinically depressed; (2) potentially previously depressed; or (3) potentially never depressed (cf., Paper I). One-hundred-and-ten subjects recruited successively from GPs/newspaper passed the initial screening phase of which 46 were excluded due to the diagnostic criteria, described below, or incomplete questionnaire data. Of the 115 subjects from the follow-up sample (T2) in the longitudinal study described above, 39 subjects were excluded due to the diagnostic criteria described below, or incomplete questionnaire data.

All subjects were diagnosed according to DSM-IV-TR using the SCID-I interview. The exclusion criteria were: Ongoing or past manic/hypomanic episode, dysthymic disorder, or psychotic symptoms, i.e., only CDs and PDs with a history of major depression were included; and only NDs without ongoing or past Axis I disorders were included. The final sample consisted of 140 subjects. The group-classification reliability was tested and a highly satisfactory reliability was found (cf., Paper I).

The Temperament and Character Inventory (TCI; Cloninger et al., 1994) and the YSQ were administered on separate occasions for the same reasons as described above concerning the follow-up assessment in the longitudinal study. That is, the TCI was administered in relation to the first day of testing and completed by all 140 participants, while the YSQ was completed and returned by 103 participants some days later. Accordingly, there was a 26% drop-out difference between the TCI and the YSQ. However, the dropout was not systematically related to severity of depression (BDI-II), and was independent of group membership, age, gender, and years of education. Demographic and clinical characteristics of the total sample of 140 subjects are presented in Table 4. Additionally, at intake 59% of the subjects were married/ had a partner.

Table 4. *Demographic and clinical characteristics for the three groups of participants (n =140).*

VARIABLE	CD (*n* = 37)		PD (*n* = 53)		ND (*n* = 50)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Gender (f/m)	27/10		46/7		40/10	
Age	37.32	11.93	36.79	9.98	38.26	12.64
Education, years	13.92	3.76	14.53	2.57	15.02	3.61
BDI-II	25.49	9.75	8.75	7.54	3.06	2.92
Single/recurrent episodes	8/29		13/40			
Antidepressant	8		5			

Note. BDI = Beck Depression Inventory.

An overview of variables assessed in the cross-sectional and longitudinal study is presented in Table 5.

Table 5. *Variables reported in the thesis.*

VARIABLES	PAPER I	PAPER II/III
PDQ	X	X
SCID-I	X	X
BDI-I		X
BDI-II	X	X
DAS		X
YSQ	X	X
TCI	X	

Note. PDQ = Previous Depression Questionnaire;

SCID= Structured Clinical Interview for DSM-IV, Axis I;

BDI = Beck Depression Inventory;

DAS = Dysfunctional Attitude Scale;

YSQ = Young Schema Questionnaire;

TCI = Temperament and Character Inventory

Ethical considerations

The Regional Medical Research Ethics Committee had approved the studies part of this thesis. All participants gave written informed consent before taking part in the studies.

Measures

The Beck Depression Inventory - First Edition (BDI-I; Beck et al., 1979) and *The Beck Depression Inventory - Second Edition* (BDI-II; Beck et al., 1996) are 21-item self-report inventories designed to assess the presence and severity of depressive symptoms. They are rated on a four-point Likert-type scale ranging from 0 to 3, based on severity of each item. Beck and Steer (1987) classified BDI-I scores as follows: 0-9 normal range; 10-18 mild-moderate; 19-29 moderate-severe; and 30-63 severe. The BDI-II scores are classified somewhat differently: 0-13 minimal range; 14-19 mild; 20-28 moderate; and 29-63 severe (Beck et al., 1996). A full description of inventories, including their psychometric properties can be found in Beck, Steer, and Garbin (1988) and Steer, Ball, Ranieri, and Beck (1999). Concerning the longitudinal study, the BDI-I was used at T1 and the BDI-II at T2. Although similar to the BDI-I, in the BDI-II previous items relating to changes in body image, somatic preoccupation, and work difficulty were replaced by other depressive symptoms such as worthlessness, concentration difficulties, and loss of energy. Because of differences in psychometric characteristics of these two versions of the BDI, we used the scoring adjustment recommended in the BDI-II manual (Beck et al., 1996) whenever comparing BDI at T1 and T2 in the longitudinal study.

The Previous Depression Questionnaire (PDQ; Wang, 1996) is a 10-item self-report inventory with a yes/no response format. In the case of a yes response, the respondent shortly delineates his/her past experience of the symptom. The PDQ is based on DSM-IV criteria for a past major depressive episode. It was developed as an initial screening instrument to identify currently non-depressed individuals who had previously been

depressed, and also to identify individuals who had never experienced a depressive episode.

The Structured Clinical interview for DSM-IV, Axis I disorders (SCID-I; First et al, 1997) is a semi-structured interview administered individually by a trained interviewer. It is designed to identify diagnosis for Axis I disorders as outlined in the DSM-IV (APA, 1994).

The Temperament and Character Inventory (TCI; Cloninger et al., 1994) is a 240-item self-report inventory with a true/false response format designed to assess individual differences on the basic dimensions of temperament and character. It measures four higher-order temperament dimensions and three higher-order character dimensions by related subscales for each dimension (see Table 1). The TCI has been found to be an internally consistent and factor-analytically valid instrument in both clinical and normative samples (Brändström et al., 1998; Sato et al., 2001). A full description of the inventory, including psychometric properties can be found in Cloninger (2004) and Cloninger et al. (1994).

The Young Schema Questionnaire (YSQ; Young & Brown, 1990) is a 205-item self-report inventory rated along a six-point Likert scale ranging from "completely untrue of me" to "describes me perfectly" designed to assess the 16 EMSs. A higher score indicates a greater endorsement of EMSs. The 205 items are grouped within 16 subscales, which are further grouped within five domain scales (see Table 1). The YSQ has been subjected to psychometric evaluation, and the majority of the EMSs have been

supported in student and clinical samples (Hoffart et al., 2005; Lee, Taylor, & Dunn, 1999; Rijkeboer & van den Bergh, 2006; Schmidt et al., 1995).

The Dysfunctional Attitude Scale, form A (DAS; Weissman & Beck, 1978) is a 40-item self-report inventory rated along a seven-point Likert scale ranging from "totally agree" to "totally disagree" designed to assess the presence of maladaptive attitudes that may relate to cognitive vulnerability to depression. Scores on the DAS can range from 40 to 280, with higher scores indicating more dysfunctional attitudes. Two major factors, Performance Evaluation (i.e., reflecting achievement and autonomy issues) and Approval by Others (i.e., reflecting dependency issues), have been found to account for a large proportion of the variance in the total DAS score (Cane et al., 1986). A full description, including psychometric properties have been provided by Chioqueta and Stiles (2004), Dobson and Breiter (1983), and Oliver and Baumgart (1985).

Paper I

One- hundred-and forty clinically depressed (CDs), previously depressed (PDs), and never depressed controls (NDs) completed the Young Schema Questionnaire (YSQ), the Temperament and Character Inventory (TCI), and the Beck Depression Inventory (BDI). Results showed that CDs and PDs differed significantly on early maladaptive schemas, temperament, and character traits compared to NDs. In accordance with previous research, higher levels of Harm Avoidance and lower levels of Self-Directedness were found in CDs and in recovered PDs. Moreover, CDs and PDs showed a substantial variability in the scores on the YSQ and the TCI, when controlling for concurrent depression severity. In multiple regression analyses YSQ domain scales of Disconnection, Impaired Autonomy, Restricted Self-Expression, and Impaired Limits emerged as significant predictors of depression severity. Likewise, as concerns TCI higher-order scales, high Harm Avoidance, low Self-Directedness, and high Persistence emerged as significant predictors of depression severity. Harm Avoidance was positively related to several EMSs, whereas Self-Directedness was negatively related to a majority of the EMSs.

Paper II

Wang, C.E.A., Halvorsen, M., Eisemann, M., & Waterloo, K. (submitted). Stability of Dysfunctional Attitudes and Early Maladaptive Schemas: A 9-Year Follow-up Study of Clinically Depressed Individuals.

In a nine-year follow-up study, 149 clinically depressed (CDs), previously depressed (PDs) and never depressed individuals (NDs) completed the Dysfunctional Attitude Scale (DAS), the YSQ and the BDI, in the index study (Time 1) and were followed-up (Time 2). Results showed: 1) elevated scores in CDs and PDs as compared to NDs at T1; 2) some stability of depressive symptoms; 3) significant moderate to high test-retest correlations for the DAS scales and the YSQ domain scales of Disconnection and Impaired Limits in addition to half of the YSQ subscales also after controlling for depression severity at both time points; 4) stability in mean scores for DAS Performance Evaluation and two-thirds of the YSQ scales also after excluding currently depressed subjects at T2; 5) moderately to highly significant correlations between DAS and YSQ scales.

Paper III

One-hundred-and-fifteen clinically depressed (CDs), previously depressed (PDs), and never depressed individuals completed the DAS, the YSQ, and the BDI in the index study, and were followed up nine years later in relation to diagnostic status, depression severity and course of depression. From multiple regression analyses YSQ domain scales emerged as significant predictors of concurrent depression severity in the index study, and depression severity and episodes of Major Depression, nine years later. A majority of CDs and PDs experienced a recurrent depression over nine years.

GENERAL DISCUSSION

This thesis sought to expand on current knowledge of relevant depressogenic vulnerability markers by examining temperament and character traits, early maladaptive schemas (EMSs), and dysfunctional attitudes in clinically depressed (CDs), previously depressed (PDs), and never depressed (NDs) individuals. I will first present the main findings and then discuss the implications of the findings in more detail.

Findings from the cross-sectional study indicate the presence of maladaptive personality characteristics in terms of EMSs and temperament and character traits in CDs and PDs compared to NDs (Paper I). The finding of higher levels of Harm Avoidance (i.e., reflecting tendencies to be anxious, pessimistic, and shy) and lower levels of Self-Directedness (i.e., reflecting tendencies to be dependent and immature in adapting behavior to define and pursue meaningful goals) in CDs and PDs are in accordance with previous research. For both inventories, i.e., YSQ and TCI, the adjusted mean scores for PDs, when controlling for residual depressive symptoms, resembled the scores for NDs, hence highlighting the issue of statistical significance vs. clinical significance (Jacobson, Follette, & Revenstorf, 1984). However, it would be premature to disregard the importance of this difference because of the finding of a large within-group variability in the sample. That is, for some individuals with a past episode of major depression, the difference may, indeed, be clinically meaningful.

Secondly, findings indicate a moderate and positive relation between several EMSs and Harm Avoidance and a moderate negative relation between a majority of the EMSs and Self-Directedness after controlling for depression severity (Paper I). Likewise, the

findings from the index study as part of the longitudinal study, indicate overall, that the majority of the EMSs were moderately and positively related to the dysfunctional attitudes, as reflected by the scales of DAS total, Performance Evaluation and Approval by Others, after controlling for depression severity (Paper II). Concerning the DAS total score, the strongest correlations were between the DAS total score and the EMS domain scales Undesirability and Restricted Self-Expression after controlling for depression severity. Comparably, the weakest correlation was between the DAS total score and the EMS domain scale Impaired Limits.

Thirdly, the findings from the longitudinal study indicate a moderate to high relative stability (i.e., test-retest correlations) of the dysfunctional attitude scales and half of the EMS scales after controlling for depression severity at both time points and excluding currently depressed subjects at T2 (Paper II). Because previous research has indicated that a depressed mood state influences reporting of personality traits and cognitive characteristics (e.g., Zuroff et al., 2004), such a control reduces the possibility that our apparent findings of stability are artefacts, i.e., reflect a state-related reporting bias. Moreover, the relative stability of depression severity (i.e., BDI) over the follow-up period was moderate. However, when excluding currently depressed subjects at T2, the test-retest correlation coefficients were substantially reduced. Therefore, the dysfunctional attitude scales and most of the EMS scales showed higher stability compared to the BDI.

In relation to absolute stability (i.e., stability in mean scores), mean scores for depression severity (i.e., BDI) were significantly reduced in the total sample at follow-up after excluding currently depressed subjects at T2 (Paper II). Mean scores for DAS

total and Approval by Others were significantly reduced at re-test for the total sample, while mean scores for Performance Evaluation remained stable. The results persisted when excluding currently depressed subjects at T2 and re-running the analyses both for the total sample and subsamples of CDs and PDs, respectively. Comparably, two-thirds of the EMS scales in the total sample showed stability in mean scores at follow-up. Moreover, subsample analyses showed that only PDs' mean scores on the EMS scales were significantly reduced at follow-up in the same manner as for the total sample.

Taken together, despite a significant decrease in depression severity over the follow-up period, dysfunctional attitudes as reflected in Performance Evaluation and many of the EMSs exhibited satisfactory absolute stability.

Fourthly, when examining the dysfunctional attitude subscales Approval by Others and Performance Evaluation in conjunction with the EMS domain scales in multiple regression analyses, the EMS scales ruled out their effects as significant predictors (Paper III). More specifically, the EMS domain scale Undesirability measured at T1, emerged as a significant predictor of concurrent depression severity and depression severity nine years later after controlling for initial depression severity, prior history of depression at T1 and the DAS scales. Similarly, Impaired Limits remained as a significant predictor of depressive episodes in the time interval.

Personality characteristics and depression

The wide diagnostic category of MDD implies heterogeneity in etiology. Accordingly, the finding in the cross-sectional study of substantial within-group variability in the scores on the TCI and YSQ, when adjusted for depression severity, can be expected

among individuals with an ongoing or previous history of depression. This implicates that maladaptive personality characteristics may be part of a vulnerability to depression for some individuals, but not all. However, it is important to emphasize that the study's design, precludes any causal interpretation of the findings, and is accordingly unable to shed light on whether these traits in PDs reflect premorbid personality characteristics or scar effects of having experienced depressive episodes (Klein et al., 2009). Several studies though, have identified a high level of Harm Avoidance and a low level of Self-Directedness as reflecting premorbid personality characteristics (Cloninger et al., 2006; Farmer et al., 2003; Richter et al., 2003). Nonetheless, the present finding of maladaptive personality characteristics in recovered subjects indicates difficulties, i.e., symptoms and malfunctioning, beyond the extent, which would be predicted from severity of depression ratings (Costa et al., 2005).

A key aspect of the respective vulnerability constructs in the theories of Beck and Young are their proposed relatively stable and enduring properties. Different from previous research using mainly cross-sectional and treatment designs, we sought to investigate the stability of the vulnerability markers over a nine-year follow-up period without any treatment intervention. Overall, the findings of fairly stable dysfunctional attitudes and EMSs as reflected by the DAS and YSQ are in accordance with the conceptualization of the respective constructs by Beck and Young. Although, dysfunctional attitudes and EMSs show state properties, they can also be characterized by trait properties. The latter finding is important since a defining feature of vulnerability markers is their ability to remain relatively stable over time (Ingram & Siegle, 2009). Accordingly, this finding of a long-term stability may indicate that these markers can be conceptualized as personality characteristics.

The majority of CDs and PDs experienced a recurrent depression over the nine-year follow-up. This finding is in line with a conceptualization of MDD as a recurrent and consequently a chronic disorder in the sense of a long-term vulnerability (Segal, Williams, & Teasdale, 2002). Thus, an important clinical implication is that inherent in the treatment of the acute depression should be an equal focus on preventing and alleviating the recurrence of future episodes. Moreover, when exploring the ability of the vulnerability markers DAS and YSQ in predicting depression prospectively, findings indicated that dysfunctional attitudes as reflected in Performance Evaluation (i.e., reflecting achievement and autonomy issues) had some utility when employed alone as a predictor of depression severity at T2. However, the EMS domain scales Undesirability and Impaired Limits appeared as relatively more reliable vulnerability markers of depression severity and depressive episodes at T2, respectively. The Undesirability domain reflects beliefs that one is unlovable, worthless, unskilled, and unattractive. As such, the items are characteristics of a depressed-mood state, although some of the items closely resemble Beck's (1967, 1987; Kovacs & Beck, 1978) suggestions of core content in the negative self-schemas. Impaired Limits reflects, in general, deficiencies in relating to others in a reciprocal manner. The mean scores in the sample on this domain were low considering the potential range of the scale. In Young et al.'s theory (2003) milder forms of its underlying EMS of Insufficient Self-Control reflect discomfort avoidance of conflict and responsibility and Entitlement/Grandiosity reflects overcompensation for the EMS of Emotional Deprivation (i.e., part of the Disconnection domain). Accordingly, the finding indicates that such schema content might be part of a vulnerability for depression. However, the findings from this longitudinal study need to be replicated in a larger sample, which would also allow a

comparison of the relative contributions of the EMSs Insufficient Self-Control and Entitlement/Grandiosity as predictors.

Specific versus general vulnerability factors

An issue concerning the proposed vulnerability factors in the respective theories is, whether they are to be considered as predictors of specific affective symptoms as reflected in depression or emotional distress, in general. In particular, high Harm Avoidance, low Self-Directedness and EMSs have been identified in patients with anxiety disorders (e.g., Ampollini, Marchesi, Signifredi, & Maggini, 1997; Delattre et al., 2004), bipolar disorders (e.g., Loftus, Garno, Jaeger, & Malhotra, 2008), eating disorders (e.g., Unoka, Tölgyes, & Czobor, 2007), and alcohol- and substance abuse (e.g., Brotchie, Meyer, Copello, Kidney, & Waller, 2004). Concerning the temperament and character traits, most studies have investigated the higher-order traits in depression. Accordingly, it might be that this level of analysis is too broad, i.e., reflecting distress themes common for emotional disorders, and that using a facet-level analysis would have a greater potential of representing specific vulnerability factors to depression. On the other hand, the issue of specificity has not yet been adequately addressed in studies investigating temperament and character traits and EMSs in depression, as such studies to date, have been based mainly on cross-sectional designs and, furthermore, not considered the high rates of comorbidity of depression with other psychological disorders. In comparison, dysfunctional attitudes are proposed originally as specific vulnerability factors for depression and, as this overview indicates, have been extensively investigated. Fewer studies though, have tested whether dysfunctional attitudes predict future depression specifically in comparison to other psychological disorders. Alloy et al. (2000) found that non-depressed individuals with high level of

dysfunctional attitudes compared to individuals with low levels of such attitudes, had a higher lifetime prevalence of depressive disorders while lifetime prevalence of anxiety, substance use or other psychological disorders did not differ between the risk groups. Moreover, Hankin, Abramson, Miller, and Haeffel (2004) found in three prospective studies with different time intervals and designs, that dysfunctional attitudes interacted with negative events to predict future depressive symptoms and depression specifically but not anxiety. These findings are in accordance with findings from other prospective studies taking into account comorbid psychological disorders (e.g., Hankin, Kassel, & Abela, 2005; Joiner, Metalsky, Lew, & Klocek, 1999; Lewinsohn, Joiner, & Rohde, 2001), indicating a promising role of dysfunctional attitudes as specific vulnerability markers for depression.

Taken together, it is important to emphasize that whether the suggested vulnerability markers for depression in this overview, might be shared with other psychological disorders, they nonetheless may represent vulnerability factors for depression as indicated by the research evidence. Moreover, vulnerability to depression is not the same as inability to recover from depression. Compelling with these vulnerability approaches is the fact that Self-Directedness, dysfunctional attitudes and EMSs have shown to be improved by therapy (e.g., Anderson, Joyce, Carter, McIntosh, & Bulik, 2002; Nordahl & Nysæter, 2005; Quilty, McBride, & Bagby, 2008). Thus, future studies should address whether therapeutic changes in these characteristics may reduce vulnerability for relapse and recurrence.

Young Schema Questionnaire and its limitations

The construct of EMS referring to deep-rooted self-defeating emotional and cognitive patterns regarding the self and self-other relations seems at face value clinically meaningful. Research has supported the EMSs in student and clinical samples (Hoffart et al., 2005; Lee et al., 1999; Rijkeboer & van den Bergh, 2006; Schmidt et al., 1995). The finding in the present study of moderate relations between several EMSs and the more well-established personality traits Harm Avoidance and low Self-Directedness, in addition to generally moderate relations with the well-established DAS, indicates a conceptual overlap of the constructs. On the other hand, it also shows that the construct of EMS, as reflected in the YSQ, has unique conceptual bearings.

Young has revised the scale several times since presenting the original scale in 1990 (Young et al., 2003). The original YSQ used in the present study showed a substantial association between some of the EMS domain scales in correlation analysis, in particular between the Disconnection and Undesirability domains. Such an overlap represents a major limitation of the YSQ and warrants a comment. A closer inspection of the items belonging to the different underlying EMSs, shows a conceptual overlap in the item contents of Social Isolation/Alienation, Defectiveness/Shame, Social Undesirability, and Failure to Achieve. Commonly, the respective items reflect aspects pertaining to being an outsider, alienated, and worthless in relation to significant others. However, in the most recent revision of the YSQ (Young et al., 2003), the Undesirability domain is removed and the EMS Social Undesirability is merged with Defectiveness/Shame and now belongs to the Disconnection domain. Research is needed, however, in firmly replicating the higher-order and lower-order factor structure in the revised version of the YSQ. A concern is in place, though, regarding the

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expansion of the YSQ with new scales in the latest version, as such additional scales may be to over-inclusive and potentially overlap with the other scales. The present findings indicate that the YSQ, indeed, would profit from further work at an item level in which items reflecting mainly mood-states should be discarded or refined.

Methodological considerations and further directions

The design of the present follow-up study is unable to shed light on whether dysfunctional attitudes and EMSs reflect premorbid characteristics or scar effects of having experienced depressive episodes as the majority of the subjects were a mix of clinically depressed and previously depressed individuals at the initial assessment. Although, it must be noted that when comparing subjects in the longitudinal study who had suffered 1-2 depressive episodes vs. those who had suffered 3 or more depressive episodes in the follow-up period on the dysfunctional attitude and EMS scales, no differences were found (cf., Paper II). That is, dysfunctional attitudes and EMSs did not become more elevated with recurrent episodes. Furthermore, for the same reasons as noted above, the study is unable to differentiate between vulnerability to first-onset vs. recurrent depression.

The role of EMSs as potential vulnerability markers of depression warrants further studies. An important issue to be addressed is illuminating which processes are involved in the translation of such vulnerability markers into depression. Moreover, an ideal design would be to use the so-called high-risk design, in which never-ill individuals identified as presenting high and low vulnerability, based on their profile of the vulnerability measures, are followed-up for a substantial time to allow a comparison of the predictive ability of such measures concerning first-onset vs. recurrence (Abramson

et al., 2002). This would however, certainly be far more costly to execute. Accordingly, such studies are relatively rare in the research literature.

Finally, further limitations of this study should be noted. Firstly, the sampling procedure and exclusive use of self-reports in assessing negative self-schemas and personality traits may compromise the generalizability of the findings. Secondly, there is significant evidence indicating that the use of sad mood-inductions prior to the assessment of the cognitive vulnerability markers (i.e., at least as it pertains to the DAS), in addition, to examining their interaction with negative life-events in the follow-up interval, would probably have provided a more sensitive assessment of depression (e.g., Scher et al., 2005; Segal et al., 2006). Accordingly, the pathways to depression might be somewhat different for each of the groups of clinically depressed, previously depressed, and never depressed individuals in the sample. That is, the occurrence of negative life-events typically becomes progressively weaker with recurrent episodes (Kendler et al., 2000). Thirdly, we did not assess the presence of Axis-II disorders among the participants. Fourthly, our samples consisted of mainly females and mildly depressed subjects. Further research is needed to replicate our findings among clinical samples in order to test their generalizability to more severely depressed and male groups of patients.

Conclusion

The cross-sectional study indicates the presence of maladaptive personality characteristics in terms of temperament and character traits and EMSs in clinically depressed and previously depressed individuals compared to never depressed controls.

The findings from the longitudinal study underscore a conceptualization of MDD as a serious disorder due to its highly recurrent course, thereby highlighting the necessity to identify and tackle long-term vulnerability factors. Thus, inherent in the treatment of the acute depression should be an equal focus on preventing and alleviating the recurrence of future episodes.

Dysfunctional attitudes and many of the EMSs possessed adequate levels of long-term stability. EMS domain scales showed the ability to predict depression prospectively. Consequently, the EMSs originally developed for an understanding of entrenched, chronic psychological disorders are promising as vulnerability markers for depression to be tested in further investigations.

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