

# **Coping and Depression in Older Persons**

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## Sammendrag på norsk

### Bakgrunn:

Depressive lidelser er av de ledende årsakene til nedsatt funksjonsevne, i verden. Depresjon er også trolig den vanligste psykiske lidelsen blant eldre personer. Depresjon hos eldre er assosiert med nedsatt funksjonsnivå, økt sykkelighet, dødelighet og redusert livskvalitet. Behandling av depresjon sent i livet har god effekt, og korttids-, men ikke langtidsprognosen etter behandling er god. Prognosen etter behandling av depresjon hos eldre er funnet å være knyttet til både biologiske, sosiale og psykologiske forhold.

### Mål:

Hensikten med dette forskningsprosjektet var å undersøke om mulige modifiserbare faktorer som kontroll orientering og mestrings strategier, var assosiert med prognosen etter behandling for eldre pasienter innlagt i alderspsykiatriske sengeposter med en moderat til alvorlig depressiv episode. Prosjektet definerte fire spesifikke mål; I) å få en oversikt over kunnskapsfeltet av vitenskapelig forskningslitteratur på sammenhengen mellom mestring og depresjon hos eldre personer; II) å få en mer nyansert og dypere forståelse av forholdet mellom mestring og depresjon hos eldre personer slik de selv beskriver å oppleve dette; III) å sammenligne mestring definert som kontroll orientering og mestrings strategier, mellom to grupper av eldre personer med og uten diagnostisert depresjon; og IV) å undersøke betydning av kontroll orientering og mestrings strategier hos eldre deprimerte pasienter målt ved innleggelse, for grad depresjonssymptomer og diagnose 12 måneder etter innleggelse i alderspsykiatriske sengeposter.

### Metoder:

Avhandlingen inkluderer fire artikler med ulike design og både kvalitative og kvantitative metoder er brukt. Artikkel I er en systematisk oversiktsartikkel med søk fra fem databaser. Artikkel II er en kvalitativ tverrsnitts undersøkelse der 18 eldre pasienter ble intervjuet ved innleggelse ut ifra en fenomenologisk-hermeneutisk intervju-, og fortolkningsramme. Artikkel III er en multisenter, kvantitativ tverrsnittstudie, der to grupper av eldre personer med (N=144) og uten (N=106) diagnostisert depresjon ble undersøkt med måleinstrumenter for depresjons diagnose (ICD-10) og symptomer (MADRS), kontroll orientering (LoC) og mestrings strategier (WoC). Artikkel IV er en multisenter, longitudinell observasjons studie

der pasientene (N=122) ble undersøkt på nytt etter 12 måneder for å se om mestring ved innleggelse hadde betydning for prognosen etter behandling av depresjon.

Resultater:

Artikkel I: Fra de 44 studiene med høy metodisk kvalitet ble det funnet en sterk sammenheng mellom mestring og depresjon, også over tid. Høyere grad av Sense of coherence, lavere ekstern Locus of control orientering, mer bruk av problem-fokusert strategier og religiøs mestring, samt mindre bruk av emosjon-fokusert strategier var relatert til mindre depresjon (diagnose og symptomer) i tverrsnitt og longitudinelle studier med eldre personer.

Artikkel II: Tre hovedtemaer fra intervjuer med eldre personer med moderat til alvorlig grad av depresjon ble beskrevet; 1) «En overveldende smertefull opplevelse»; 2) «Å sitte fast», og 3) «Hvorfor skjedde dette meg?».

Artikkel III: Eldre personer med diagnostisert depresjon rapporterte en sterkere ekstern Locus of control orientering og mindre bruk av problem-fokuserte mestrings strategier sammenlignet med gruppen av eldre personer uten depresjon. Det var ingen forskjell mellom gruppene i bruk av emosjons-fokuserte mestrings strategier.

Artikkel IV: Ved 12 måneders oppfølgingsundersøkelse ble 37,7 % av pasientene diagnostisert med en depressiv episode (ICD-10). Pasienter med en sterkere ekstern Locus of control orientering ved innleggelse hadde høyere odds for å ha mer depressive symptomer (MADRS) et år etter innleggelse. Hyppigere bruk av problem-fokuserte-, men ikke emosjons-fokuserte mestrings strategier ved innleggelse var signifikant assosiert med å ha en depressiv episode etter 12 måneder. Kognitiv svikt (MMSE-NR) og lavere funksjonsnivå (I-ADL) var også signifikant assosiert med depresjon etter et år (henholdsvis høyere symptomnivå og å ha en depresjons diagnose).

Konklusjon:

Svært lite forskning eksisterer på sammenheng mellom mestring og depresjon i utvalg av eldre personer med moderat og alvorligere grad av depresjon i alderspsykiatriske avdelinger. Eldre menn og kvinner med moderat til alvorlig depresjon beskriver sin tilstand som å være i en «skrustikke» de ikke kommer ut av. Resultatene fra avhandlingen indikerer at eldre personer med og uten diagnostisert depresjon har en ulik mestringsprofil og psykologiske

ressurser som kontroll orientering og mestrings strategier kan ha betydning for prognosen etter depresjonsbehandling hos eldre personer med diagnostisert moderat til alvorlig depresjon.

Implikasjoner fra dette forskningsprosjektet er viktigheten av å undersøke eldre pasienters mestringsressurser, og at intervensjoner som kan styrke eldre deprimerte pasienters indre kontroll orientering, og adaptive mestrings strategier, mulig kan bidra til at alders-relatert tap og byrde ikke blir så overveldende for dem.

## **Abstract**

### **Background:**

Depression is one of the most common causes of disability globally. Depression is also probably the most common mood disorder among older persons, and associated to poorer level of functioning and quality of life, morbidity and mortality. Treatment of depression in late life show good effect, and the short-term, but not the long-term prognosis after treatment is good. The prognosis of depression in late life is related to biological, social and psychological factors.

### **Aims:**

The aim of this thesis was to examine if potentially modifiable factors such as LoC orientation and coping strategies, were associated to the prognosis after treatment of depression in older persons admitted to psychogeriatric hospital units with a moderate to severe depressive episode. The specific aims of this thesis were as follow: I) To gain an overview of the field of knowledge from studies investigating the relationship between coping and depression in older persons; II) To contribute to a more nuanced and broader understanding of the relationships between coping and depression in older persons; III) To compare the relationships between symptoms and diagnosis of depression, and coping, defined as LoC orientation and coping strategies. Comparisons were between a group of older depressed patients from psychogeriatric hospital settings and a reference group of older persons without depression living in community-settings; IV) To examine the impact of coping, measured at baseline, on the outcome of depression measured at 12-month follow-up, more specific if LoC orientation and coping strategies at baseline were associated to with severity of depressive symptoms and a diagnosis of depression after treatment in psychogeriatric hospital units at 12-month follow-up.

### **Methods:**

This thesis included four papers where four different designs and both qualitative and quantitative methods were applied. Paper I is a systematic review where literature searches were conducted in five databases. Paper II is a qualitative and cross-sectional study where 18 older men and women were interviewed at admission to hospital using a phenomenological-hermeneutic methodological approach. Paper III is a multi-center, quantitative and cross-

sectional study, where two groups of older persons with (N=144) and without (N=106) diagnosed depression was examined with instruments for diagnosis of depression (ICD-10) and symptoms (MADRS), LoC orientation (LoC) and coping strategies (WoC). Paper IV is a multi-center, longitudinal observational study where older patients (N=122) were measured at 12-month follow-up to examine if coping at admission was associated to the prognosis after treatment of depression.

#### Results:

Paper I: From the 44 papers of higher methodological quality, a strong relationship was found between coping and depression, also during time. A stronger Sense of coherence, less external LoC orientation, more use of problem-focused coping strategies and religious coping, but less use of emotion-focused coping strategies were related to less depression (diagnosis and symptoms) in cross-sectional and longitudinal studies conducted among older persons.

Paper II: Three main-themes from the interviews with moderate to severe depression, were revealed; 1) “Terrible suffering”; 2) “Being stuck”, and 3) “Why did this happen?”.

Paper III: Older persons with a diagnosis of depression reported a stronger external LoC orientation and less use of problem-focused coping strategies compared to older persons without depression. No difference in use of emotion-focused coping strategies was found.

Paper IV: At 12-month follow-up, 37,7% of the older patients were diagnosed with a depressive episode (ICD-10). The patients with a stronger external LoC orientation at admission had higher odds for more depressive symptoms (MADRS) 12 months after admission. More use of problem-focused, but not emotion-focused coping strategies at admission were significantly associated to a diagnosis of depression after 12 months. Cognitive impairment (MMSE-NR) and poorer functional level (I-ADL) were also significantly associated to depression after 12 months (more symptoms and a diagnosis of depressive episode, respectively).

#### Conclusion:

There is a scarcity of research being conducted on the relationship between coping and depression in samples of older persons with moderate and severe depression. Older men and women described their experiences of coping with moderate to severe depression as “being in

a vice”. The results from this project indicate that older persons with and without diagnosed depression have a different psychological profile, and psychological resources as LoC orientation and coping strategies may be of importance to the prognosis after treatment of depression in older persons diagnosed with moderate to severe depression.

Implications from this project, is the importance of examining older patients’ resources and strategies of coping in the clinic. Development of interventions designed to enhance older persons internal LoC orientation, and adaptive coping strategies may contribute in so that age-related loss and burden in their lives, will not become so overwhelming.

## List of papers

**Paper I:** Bjørkløf, G. H., Engedal, K. A., Selbæk, G., Kouwenhoven, S. E., & Helvik, A.-S. (2013). Coping and depression in old age: a literature review. *Dementia and Geriatric Cognitive Disorders*, 35(3-4), 121-154. Doi: [10.1159/000346633](https://doi.org/10.1159/000346633)

**Paper II:** Bjørkløf, G. H., Kirkevold, M., Engedal, K., Selbæk, G., & Helvik, A.-H. (2015). Being in a Vice: Coping With Severe Depression in Late Life. *International Journal of Studies on Health and Well-being*, 10, 27187. Doi:10.3402/qhw.v10.27187

**Paper III:** Bjørkløf, G.H., Engedal, K., Selbæk, G., Maia, Deborah Bezerra, Coutinho, Evandro Silvia Freire, & Helvik, A.-S. (2015). Locus of Control and Coping Strategies in Older persons With and Without depression. *Aging and Mental Health*. Doi: [10.1080/13607863.2015.1040722](https://doi.org/10.1080/13607863.2015.1040722).

**Paper IV:** Bjørkløf, G. H., Engedal, K., Selbæk, G., Maia, D. B., Borza, T., Benth, J. S. & Helvik, A-S. (2016). Can depression in psychogeriatric inpatients at one year follow-up be explained by locus of control and coping strategies? *Aging & Mental Health*. Doi:10.1080/13607863.2016.1262817

## **Abbreviations**

ICD-International Classification of Mental and Behavioral Disorders

DSM-Diagnostic and Statistical Manual of Mental disorders

EOD-Early Onset Depression

LOD-Late Onset Depression

HADS-Hospital Anxiety and Depression Scale

CSDD-Cornell Scale for Depression in dementia

EURO-D-EURO-Depression scale

MADRS-Montgomery-Aasberg Depression Rating Scale

CES-D-Center of Epidemiological Studies–Depression scale

HSCL-Hopkins Symptom Check List

MRI-Magnetic Resonance Imaging

LoC-Locus of Control

WoC-Ways of Coping

SoC-Sense of Coherence

AD-Alzheimer´s Disease

QoL-Quality of Life

PST-Problem Solving Therapy

PATH-Problem Adaptation Therapy

RCT-Randomized Controlled Trials

ECT-Electro Convulsive Therapy

MMSE-NR-Mini Mental State Examination-Norwegian Revised version

I-ADL-Instrumental Activities of Daily Life

GMHR-General Medical Health Rating scale

AIC-Akaike´s Information Criterion

GP-General Practitioner



## **1.0 Introduction**

Even though different research disciplines have contributed to important, new knowledge with clinical implications for treatment and prognosis of depression for older persons, we still have limited knowledge regarding what factors influence on the prognosis of depression in older populations, and in particular, old persons with moderate to severe depression in psychogeriatric hospital settings. Depression is described as conditions caused by different interacting factors, hence a bio-psychosocial model is today a common way of understanding. This thesis is a research project investigating coping in older persons with moderate to severe depressive episodes being admitted to psychogeriatric hospital units in Norway.

## 2.0 Classifications, diagnosis and prevalence of depression

### 2.1 Classifications

There are two main systems for classification of a depressive diagnosis.

#### *Depressive episode and recurrent disorder (ICD-10)*

For the European countries the World Health Organization has developed the “ International classification of Mental and Behavioral Disorders, 10<sup>th</sup> edition, diagnostic criteria for research” (ICD-10) (WHO, 1993a). The ICD-10 criteria for depression are used in Norway (see textbox 1 below). According to ICD-10, depression is classified as a single episode, or a recurrent depressive disorder, where an episode is identified as lasting for at least two weeks. A depressive episode can be mild, moderate or severe in the presence of four, six or eight symptoms, respectively, in addition to two core symptoms. No manic symptoms, substance use or organic mental disorders must be present. The depressive symptoms must not be caused by organic mental disorder (WHO, 1993a).

#### *Major depressive episode and disorder (DSM-5)*

In the USA the American Psychiatric Association (APA) developed the DSM criteria for diagnosing depression. A fifth version of the Diagnostic and Statistical Manual of Diseases was published in 2013 (DSM-5)(APA, 2013) and classifies depression according to criteria for a major depressive disorder, single episode, or major depressive disorder, recurrent episodes, defined by presence of a single or two or more depressive episodes, respectively (see textbox 2 below). A diagnosis of dysthymic disorder is set when depressed mood have sustained for at least two years most days, most of the day, and when no major depressive episode has been present during the two first years (APA, 2013).

Textbox 1. Diagnostic criteria for depressive episode and disorder according to ICD-10, research criteria

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A General criteria

1. The depressive episode should last for at least 2 weeks
2. There have been no hypomanic or manic symptoms sufficient to meet the criteria for hypomanic or manic episode at any time in the individual's life
3. The episode is not attributable to psychoactive substance or to any organic mental disorder

B At least two of the following three symptoms must be present:

1. Depressed mood to a degree that is definitely abnormal to the individual, present for most of the day and almost every day, largely uninfluenced by circumstances, and sustained for at least 2 weeks
2. Loss of interest or pleasure in activities that are normally pleasurable
3. Decreased energy or increased fatigability

C An additional symptom or symptoms from the following list should be present, to give a total of at least four:

1. Loss of confidence and self-esteem
2. Unreasonable feelings of self-reproach or excessive and inappropriate guilt
3. Recurrent thoughts of death or suicide, or any suicidal behavior
4. Complaints or evidence of diminished ability to think or concentrate such as indecisiveness or vacillation
5. Change in psychomotor activity, with agitation or retardation (either subjective or objective)
6. Sleep disturbance of any type
7. Change in appetite (decrease or increase) with corresponding weight change

The depressive episode classified by degree:

- Mild. A total of at least four symptoms

- Moderate. A total of at least six symptoms

- Severe. All symptoms in B must be present and at least five symptoms from C must be present, to give a total of at least eight symptoms

- a. Severe depressive episode without psychotic symptoms: no delusions, hallucinations or depressive stupor
  - b. Severe depressive episode with psychotic symptoms: presence of delusions or hallucinations (not those listed as typically schizophrenic in criterion) or depressive stupor
- Mood-congruent symptoms with an affective content in form of delusions about guilt, self-blame, worthlessness, bodily disease and condemnatory auditory hallucinations
-

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- Mood in-congruent symptoms without an affective content in form of persecutory or self-referential delusions or hallucinations

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**Textbox 2. Diagnostic criteria for a major depressive episode, according to DSM-5.**

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A. Five or more of the following symptoms have been present during the same two-week period and represent a change from previous functioning. At least one of the symptoms is either 1) depressed mood, or 2) loss of interest or pleasure, and must not include symptoms that are clearly attributable to another medical condition.

1. Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g. feels sad, empty or hopeless) or observation made by others (e.g. appears tearful)
2. Markedly diminished interest and pleasure in all, or almost all, activities most of the day, nearly every day (as indicated by either subjective account or observation)
3. Significant weight loss when not dieting or weight gain (e.g. change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day
4. Insomnia or hypersomnia nearly every day
5. Psychomotor agitation or retardation nearly every day (observable by others, not merely subjective feelings of restlessness or being slowed down)
6. Fatigue or loss of energy nearly every day
7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick)
8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by subjective account or as observed by others)
9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

C. The episode is not attributable to the physiological effects of a substance or to another medical condition.

D. The occurrence of the major depressive episode is not better explained by schizoaffective disorder, schizophrenia, schizo-phreniform disorder, delusional disorder, or other specified and unspecified schizophrenia spectrum and other psychotic disorders.

E. There has never been a manic episode or a hypomanic episode.

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Bipolar disorder is by APA divided into three subgroups; bipolar I-, bipolar II disorder and cyclothymia (APA, 2013), where bipolar I disorder is characterized by a manic episode most often in addition to depressive episodes. Bipolar II disorder is characterized by hypomanic and depressive episodes, and cyclothymia of rapid shifts into both hypomanic and depressive states, but without filling the criteria of major depression (APA, 2013).

Even though both classification systems (ICD, DSM) apply the diagnosis depressive episode and disorder, the classifications of a diagnosis of depression in the two systems (ICD and DSM) are different to one another. A severe depressive episode (ICD-10) is considered to have a higher symptom load, compared to a major depressive episode (DSM-5). In this thesis I will refer to severe and major depressive episode as used by the authors being referred to.

Depression in late life is in this thesis defined as depressive symptoms or diagnoses of a depressive episode, or disorders in persons above 60-65 years of age. In the scientific literature, depression is sometimes referred to as Late-Life Depression (LLD), but is not a diagnosis according to the classification systems ICD or DSM.

#### *Age of onset of depression in older persons*

A depressive episode occurring in older persons may have an early or late onset; early onset depression (EOD) includes development of a depressive episode or disorder before 60-65 years of age and late onset depression (LOD) after 65 years of age, respectively (Aziz & Steffens, 2013; D. G. Blazer, 2003a). An early onset depression can also persist into late life, by recurring episodes, or persistent depressive disorders. The age criteria applied for depression with an early or late onset varies considerably (Korten, Comijs, Lamers, & Penninx, 2012), as age is a changing concept according to demographic shifts.

#### *Depressive symptomatology in late life*

There are studies reporting older depressed persons to present a somewhat different symptomatology (phenomenology) compared to younger persons with depression (R. Baldwin & Tomenson, 1995; Hegeman, Kok, van der Mast, & Giltay, 2012; Korten et al., 2012). Older persons in general report less affective symptoms, sadness, anxiety, and hopelessness, but more physical symptoms as disturbance in appetite and sleeping pattern, fatigue, and cognitive disturbances as problems with memory and concentration (J. Corcoran et al., 2013; A. Fiske, Wetherell, & Gatz, 2009b; Hegeman et al., 2012). Thus, diagnostic criteria developed for a general and younger adult population may be less suited to capture depressive symptoms in older populations.

Depression may also in the presence of co-morbid neurodegenerative disorders show a slightly different presentation and have been labeled thereafter, such as “depression in Alzheimer’s disease (Olin et al., 2002). Here three symptoms including depressed mood, anhedonia, social isolation, poor appetite, poor sleep, psychomotor changes, irritability, fatigue or loss of energy, feelings of worthlessness, and suicidal thoughts must be present (Olin et al., 2002). “Depression in Parkinson’s disease” is less frequently associated with dysphoria and anhedonia and is a milder form of depression (D. G. Blazer, 2nd & Hybels, 2005; Ehrt, Bronnick, Leentjens, Larsen, & Aarsland, 2006; A. Fiske, Wetherell, & Gatz, 2009a).

## *2.2 Screening of depressive symptoms*

Due to the variability in symptomatology, screening of depressive symptoms in older persons can be challenging. Cultural differences in the expression of depressive symptoms in different populations are documented (Knapskog et al., 2013). Older persons reporting depressive symptoms in surveys may also be affected by negative historic perceptions of depression and mental problems, possibly creating a fear of stigma (M. L. Bruce, 2002). Difficulties in identifying depressive symptoms due to factors as knowledge, availability of health-care systems and challenges in differentiating depressive symptoms from other physical or mental problems possibly cause depressive symptoms to be under-reported (Jorm, 2000).

There are also a huge variety of tools for screening depressive symptoms, and cut-offs for depression being used, and some scales as Montgomery-Aasberg Depression Rating Scale and Cornell scale for depression in dementia (Barca, Engedal, & Selbaek, 2010; Knut Engedal et al., 2012; Patricia Mottram, Wilson, & Copeland, 2000; Nyunt, Fones, Niti, & Ng, 2009; Portugal Mda et al., 2012), but far from all, are validated to older populations in relation to a diagnosis of depression.

## *2.3 Diagnosing depressive episodes and disorders in late life*

Symptoms of physical illness can appear as depressive symptoms (D. G. Blazer, 2<sup>nd</sup> & Hybels, 2005) hence, an examination of the patient’s physical, including neurological health, and medications is essential, and always be the first step in diagnosing a depressive episode or disorder. Anamnestic information about former illnesses and psychiatric history regarding patient and close family, cognitive functioning, ability to function in daily life, family

situation, social support and financial situation is also important to evaluate when diagnosing depression in an older person. An inter-disciplinary team-approach is recommended, where a physician, or a psychologist can set the diagnosis of a depressive episode og disorder (Helsedirektoratet, 2009).

#### *2.4 Prevalence of depression*

Depression is probably the most prevalent mental disorder in the general older population. To assess the prevalence of depression both different checklists for depressive symptoms and diagnostic assessment tools for evaluating a depressive diagnosis are used. Checklists are self-reporting symptoms scales, or observational scales used by healthcare personnel.

The prevalence of depressive symptoms varies across countries (Rosenvinge & Rosenvinge, 2003). Use of different methodological approaches in epidemiological studies as different scales for measuring depressive symptoms and disorders can influence on the estimates of prevalence (Clausen & Slagsvold, 2005). Contextual factors such as inequalities in income at a country-level are reported to contribute to different prevalence, where the poorest countries in a WHO survey report higher odds for depressive disorder compared with countries from the highest income group (Kessler & Bromet, 2013; M. Luppá, Sikorski, C, Luck, T, Ehreke, L, Konnopka, A, Wiese, B, Weyerer, S, König, H-H, & Riedel-Heller, SG 2012; Rai, 2013).

Depressive symptoms and disorders are assessed in different cohorts, including different age-groups of older persons (young-old, old-old) and from different settings. Prevalence studies include community-dwelling persons, others include medically ill participants in hospitals, or are conducted in primary care health services. Women are consistently more often depressed than men (M. Luppá, Sikorski, C, Luck, T, Ehreke, L, Konnopka, A, Wiese, B, Weyerer, S, König, H-H, & Riedel-Heller, SG 2012; Steffens, 2000; Weissman, Bruce, Leaf, Florio, & Holzer III, 1991). However, the gender gap is less evident in studies including samples of the oldest old (Riedel-Heller, Busse, & Angermeyer, 2006).

Estimates of the prevalence of depressive symptoms or disorders, drawn from different samples of persons thus represent the prevalence in different older populations. Of these reasons studies report the prevalence to vary considerably, and we refer to meta-analytic- and systematic reviews where possible below.

### *Population-based prevalence of depression in late life*

From a review and meta-analysis of studies on the prevalence of depressive symptoms and diagnosed episodes (DSM) in persons above 75 years of age from all continents, a pooled prevalence rate of 17.1 % and 7.2 % for minor and major depressive disorder respectively, were reported (M. Luppá, Sikorski, C, Luck, T, Ehreke, L, Konnopka, A, Wiese, B, Weyerer, S, König, H-H, & Riedel-Heller, SG 2012). Another review reported the prevalence of major depressive disorders (DSM) in community-dwelling older persons in studies from Spain, UK, Australia and USA to range from 2.3 % to 25% (J. Djernes, 2006).

The prevalence of major depression (DSM) in community samples of older persons show a significant decline compared to midlife prevalence rates for both men and women (A. Fiske et al., 2009b). Nevertheless, among the older populations exclusively, the prevalence of depression (ICD-10) among the oldest old persons (>90 year olds) is the highest (32.3%) (Bergdahl et al., 2005). In a large Norwegian population study, the highest prevalence (17 %) of depressive symptoms (The Hospital Anxiety and Depression Scale (HADS-D)) was among the oldest age group (Stordal et al., 2001). Another Norwegian study compared the prevalence of depressive symptoms, using Center for Epidemiological studies-depression scale (CES-D) and Hopkins Symptom Check List (HSCL) in two samples of Norwegians between 40 and 79 years of age. They concluded that 21 % had depressive symptoms and that the prevalence increased with increasing age (Clausen & Slagsvold, 2005). However, when controlling for gender, health, income and social network the association to age disappeared.

Also, in a systematic review and meta-analysis an increase in depressive symptoms in the highest age groups (85 years and above) for women, but not for men was found (M. Luppá, Sikorski, C, Luck, T, Ehreke, L, Konnopka, A, Wiese, B, Weyerer, S, König, H-H, & Riedel-Heller, SG 2012).

### *Prevalence of depression in older persons living in residential care facilities*

Depressive disorders are common among older persons living in nursing homes. The prevalence of major depression (DSM-III, -III-R, -IV) in institutional settings in the USA varied from 14% to 42% in a review, where major depression was more prevalent in old persons without co-morbid dementia (J. Djernes, 2006). Another review studying prevalence of depression in long-term care homes found a median prevalence of major depressive disorder of 10% (DSM-III, -III-R, -IV), while 29% had depressive symptoms measured by a variety of scales (Seitz, Purandare, & Conn, 2010). In Norwegian nursing homes 21.2% of the residents had significant depressive symptoms (cut-off >8, CSDD) indicating a depressive



disorder (Barca, Engedal, Laks, & Selbaek, 2010). However, reviews report methodological differences in measuring depression and hindering consistent conclusions (J. Djernes, 2006).

### **3.0 Risk factors and a bio-psychosocial lifespan perspective of depression**

Factors existing before the onset of a depressive disorder can be potential risk factors. This temporal ordering is obvious to some factors, but not straight-forward when considering other factors, as some factors have a clear-cut onset, while others start more diffusely (M. L. Bruce, 2002). Longitudinal studies monitoring the onset of risk factors in groups without initial depression is a suitable design to study risk factors for depression in late life, but costly. In a systematic review and meta-analysis of prospective studies among older persons in community bereavement, sleep disturbance, disability, prior depression, and female gender were however the most important risk factors (M.G Cole & Dendukuri, 2003).

#### *3.1 Sociodemographic risk factors of depression in late life*

As mentioned earlier, female gender is more likely to develop depression late in life compared to men (Barcelos-Ferreira, Izbicki, Steffens, & Bottino, 2010; D. G. Blazer, 2003a), even though the difference becomes less evident among the oldest old (Barefoot, Mortensen, Helms, Avlund, & Schroll, 2001; J. Djernes, 2006). A difference in gender is also confirmed in large epidemiological cross-country studies, where educational attainment and poverty, being divorced or widowed also were strong predictors of more depressive symptoms and depressive episodes (ICD-10) in late life (Ladin, 2008; J. H. Park et al., 2012; Rai, 2013).

Loss of social support is a documented factor associated with increase of depression in late life (D. G. Blazer, 2003a; A. Fiske, Wetherell, J. L., & Gatz, M., 2009). As social roles in society change when individuals become older, risk of loneliness and depression may rise. Becoming a caregiver is a stressful event to many individuals in late life and is associated with greater risk of developing depression (Etters, Goodall, & Harrison, 2008). Bereavement is reported in a review to triple the risk for developing depression in late life (M.G Cole & Dendukuri, 2003).

#### *3.2 Genetics, physical health and depression in late life*

A review shows biological risk factors for development of depressive symptoms and disorders to be greater in late life compared to mid-life (D. G. Blazer, 2<sup>nd</sup> & Hybels, 2005). Some

studies point to genetic polymorphisms or mutations predisposing persons to develop depressive symptoms in late life (Jansson et al., 2003).

Higher age is inevitably related to physical decline and higher levels of morbidity, again associated to depression in late life (Engum, 2007; K. R. Krishnan, 2002; J. H. Park, Lee, S. B., Lee, T. J., Lee, D. Y., Jhoo, J. H. et al, 2007; B. W. J. H. Penninx et al., 2007). Serious illness, and chronic disease can be followed by a depressive reaction, but cardiac, cerebrovascular, and neurological conditions as Mb. Parkinson, stroke and dementias, as well as infections, malignancies and endocrine dysregulations are all associated with depression in late life (Alexopoulos, 2005a; A. Fiske et al., 2009b; B. W. J. H. Penninx et al., 2007; Tiemeier, 2003; Valkanova & Ebmeier, 2013).

When systematically comparing associated factors between depressive disorders in older persons with an EOD and LOD, persons with LOD are less likely to have a history of self-harm, to take psychotropic drugs, or to be in contact with the specialist healthcare services, but more likely to experience a recent negative life event (Grayson & Thomas, 2013). Furthermore, white matter hyperintensities are reported as common in older persons with LOD, but not in EOD (K. R. R. Krishnan, 2002). Brain pathways (frontal-striatal and frontal-limbic) affected by these alterations are involved in mood-regulation, thus the term “vascular depression” is proposed to explain these findings (Alexopoulos et al., 1997).

Depression is common after stroke, with reports of one-third of all surviving an ischemic stroke (Parikh et al., 1990). Findings of subcortical ischemic vascular damages in 54% of depressed older persons by Magnetic resonance imaging (MRI) in a study support this explanation (K. R. R. Krishnan, 2002; Olin et al., 2002).

Depression in earlier life possibly predispose to depression late in life through stress-related hormones leading to reduced secretion of neurotropic factors and decreased neurogenesis (Alexopoulos, 2005b). Depression in early life may also be a risk factor to vascular disease, which in turn can increase risk of depression in late life. Possibly these two diseases share a common pathological pathway (A. Fiske et al., 2009b; Tiemeier, 2003). Also, in older age the ability of the immune and neuroendocrine-, and cardiovascular system to respond to stress and demands are weakened, and the individual becomes vulnerable to negative interactions and effects from stress (D. G. Blazer, 2<sup>nd</sup> & Hybels, 2005; Epel, 2007; Grunewald, 2007).

Disability due to physical disease is reported as a significant risk factor to depression in late life (M.G Cole & Dendukuri, 2003).

### *3.3 Cognition and depression in late life*

In the brain, age-related changes are found in late life both as reduction in neuronal plasticity and as production of abnormal proteins in (tau-protein) and surrounding the neurons (beta-amyloid) of the brain (Blennow, 2003; Braak, 1991; Hestad, 2008). These changes are also associated to neurological disease as dementia. A decline in all cognitive domains is found in late life, representing a reduced mental capacity and resource (Nilsson, 1997; D. C. Park, Lautenschlager, G., Hedden, T., Davidson, N.S., Smith, A.D. & Smith, P.K. , 2002; Salthouse, 1996).

Many studies report cognitive impairment and depression to occur together, suggesting a close relationship (C. Q. Huang, Wang, Li, Xie, & Liu, 2011). Studies report depression in late life to be a symptom of already existing cognitive impairment, in addition to the studies reporting of cognitive impairment as a risk factor for depression in late life (Brodaty et al., 2003; Cervilla, Prince, Joels, & Mann, 2000; Dufouil, Fuhrer, Dartigues, & Alperovitch, 1996; Henderson et al., 1997; C. Q. Huang et al., 2011; Valkanova & Ebmeier, 2013). More specific, research on lesions in the orbital frontal cortex show disrupted pathways being related to depression in late life (Alexopoulos et al., 2000; Lai, Payne, Byrum, Steffens, & Krishnan, 2000).

### *3.4 Personality as risk factor for depression in late life*

Different psychological factors are documented as risk factors to the development of depression, but few are specific to the development of depression in late life. In younger adult persons, high level of premorbid neuroticism, a personality trait characterized by low thresholds for emotional distress, self-consciousness and negativity are shown to be the most predictive personality-traits of depression compared to other traits (H. J. Eysenck & Eysenck, 1967; Kendler, Kuhn, & Prescott, 2004; Kendler, Neale, Kessler, Heath, & Eaves, 1993; R. R. McCrae & Costa, 1985). In a longitudinal study, older persons with low levels of neuroticism were less likely to develop a depressive disorder when compared to older persons high on neuroticism (Oldehinkel, Bouhuys, Brilman, & Ormel, 2001).

Researchers find neuroticism in adult persons to be related to a temperamental predisposition of a reactivity to sad mood provocations, where a tendency of responding in

ruminative thinking mediated the relationship between neuroticism and symptoms of depression (Barnhofer & Chittka, 2010).

One of the best documented personality factors is a certain mindset consisting of cognitive distorted thoughts found to predispose to depression. Depressed persons' way of thinking is often negative and self-critical. Themes of thoughts are characterized by losses, threats, defeat and vulnerability. Evidence suggests a cognitive model of depression where negative thoughts can produce and maintain a depressive mental state (A. Beck, 1987).

### *3.5 Negative life events and depression in late life*

A review of psychosocial risk factors measured in samples with longitudinal designs found negative life events, bereavement and ongoing life stressors and trauma to be the risk factors most strongly associated with depression in late life (M. L. Bruce, 2002). Negative life events and to what degree events are experienced as stressful, enduring, unpleasant, out of control, personally significant, and life-threatening, is also crucial to what impact these events have upon individuals and to the development of depression (C. Aldwin, 2011; M. L. Bruce, 2002; R. R. McCrae, 1982; Pryce et al., 2011b).

Negative events in late life can be to lose a close relative or spouse (M. L. Bruce, 2002). Older persons experience more losses of close persons, but losses are otherwise distributed evenly across the lifespan (C. Aldwin, 2011; Zautra, Finch, Reich, & Guamaccia, 1991). In a review of older community-living persons, experiencing loss of a close person tripled the risk for developing depression (M.G Cole & Dendukuri, 2003). A meta-analysis showed that total number of negative life events and daily hassles had the strongest association to depression in late life (Vivian Kraaij, Arensman, & Spinhoven, 2002). In another review, severe negative events were related to higher risk of becoming depressed in late life and such events were more likely to cause the first onset of depressive episode compared to milder daily hassles (D. G. Blazer, 2003a; Brilman & Ormel, 2001).

Negative events in early life are also reported to be associated to depression in late life, where aversive childhood experiences as exposure to trauma (excessive punishment, verbal abuse, humiliation and mistreatment by an adult outside the family) doubled the risk of depression in late life and of recurrent episodes of depression (Vivian Kraaij et al., 2002; Ritchie et al., 2009). Hence, traumatic events, or periods of time in the past possibly influence later emotional processing (Pryce et al., 2011b).

## 4.0 Protective factors for depression in late life

To understand why old persons develop depression in late life, we need both to consider risk and protective factors, and possible mechanisms for how these factors interplay.

### *4.1 Aging as development*

The late part of life is associated with negative alterations and is commonly expected as being a period of time characterized by decline, and a bodily, mental- and social deterioration (Staudinger, Marsiske, & Baltes, 1993). However, mental distress in general is in late life found to decrease (Laura L. Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; H. H. Eysenck, 1988; Jorm, 2000) and older persons experience less negative affect compared to younger persons (Charles, 2001). As shown above, there are also studies reporting prevalence of depression to decrease with higher age. More contemporary gerontology also challenges traditional models of aging and better separates the effects of aging from the effects from disease and illness. There is a growing body of knowledge on aging supporting the perspective of aging as related to psychological development and in general an *increase* in psychological hardiness, resilience and plasticity (A. Fiske et al., 2009b; Jorm, 2000; Levenson, 2000; Staudinger et al., 1993).

#### *Psychological aging*

Today it is accepted that personality and psychosocial development continues to evolve after turning 50 years of age and into late life (C. M. Aldwin, 2007; P. B. Baltes & Baltes, 1990; L. L. Carstensen, 1991; Whitbourne & Whitbourne, 2014). Theories of successful adaptation into older age point to older persons acting as active agents in own life (M. M. Baltes & Baltes, 1986; P. B. Baltes & Baltes, 1990). They compensate their losses by optimizing other areas of functioning and are selective towards areas to prioritize. Through involvement and investment in the remaining time of life, self-confidence, control and well-being may be maintained and even restored or developed (P. B. Baltes & Baltes, 1990; L. L. Carstensen, 1991; L.L. Carstensen, 1993; Laura L. Carstensen et al., 2000). These increasing psychological resources may possibly act to buffer against the decline in physical health and function, and may prevent development of mental illness and depression in late life (Lawton, Kleban, Rajagopal, & Dean, 1992).

#### *4.2 Emotions in relation to aging*

Development and new learning happen as persons adapt and cope with the challenges of life, and development in emotional competency, refinement, and in emotional control is found to continue into late life (Laura L. Carstensen et al., 2000; Levenson, 2000). Older compared to younger persons are in studies reported to better regulate their emotions, and to experience less affective reactivity in response to challenges (Chow, 2007). They show increased emotional understanding, and actively and better structure their social surroundings to maximize positive and minimize negative emotion, compared to younger persons (L.L. Carstensen, 1993; Laura L. Carstensen et al., 2000). Older persons are also reporting greater life satisfaction than younger persons (Diener & Suh, 1997) and possibly develop a “knowhow of life” or wisdom increasing their resilience and buffering effects from negative events (P. B. Baltes & Staudinger, 2000). Emotional development and better affect regulation might also serve as protective factors against development of depression in late life.

#### *4.3 Social resources and aging*

Research consistently reports that older persons reduce their social activity, social networks and participation in voluntary organizations (L.L. Carstensen, 1993; Lang & Carstensen, 1994; Morgan, 1988; Rook, 2000). This withdrawal has puzzled gerontologist for decades, because the opposite was expected to happen in late life due to less time being spent related to work and family life (Larson, 1978; Rook, 2000). One part of this phenomenon is the involuntary decrease in late life in social activity due to disability, bereavement, loss of professional social network.

However, there also appear to be a voluntary reduction as older persons become more selective about whom to socialize with, partly being explained by the socioemotional selectivity theory (L. L. Carstensen, 1991; L.L. Carstensen, 1993). As persons reach higher age, time is perceived to be limited. Motivation for knowledge acquisition and social comparison found to be important motivation in younger persons become less evident compared to motivation for close and intimate emotional relationships in late life (L. L. Carstensen, 1991; L.L. Carstensen, 1993; Rook, 2000).

Thus, social networks consisting of close and supportive friends and family do not decline (Lang & Carstensen, 1994) and possibly serve as a protective factors that may enhance and compensate other age-related declines (Rook, 2000).

#### *4.4 Physical health*

Physical exercise can reduce depressive symptoms both in healthy older populations and in old patients diagnosed with major depressive disorders (Mura & Carta, 2013). From the Alameda County Study older persons without depression reporting low levels of physical activity were at significantly higher risk for depression at follow up (Camacho, Roberts, Lazarus, Kaplan, & Cohen, 1991).



## 5.0 Coping

### *5.1 Definition*

The concept of coping was first adopted by psychologists in the 1960s and 1970s and was applied to refer to the struggle to overcome and manage the stresses of living and adapting (Lazarus, 2006). Coping can be understood as a process of human adaptation that mediates the effects of risks and struggle on the human development, but also as coping episodes during a lifespan (E. Skinner & Zimmer-Gembeck, 2011).

Four different types of stressors have been recognized to be related to higher age; loss, attack, obstacles and threats (Hanley & Baikié, 1984). Losses refer to loss of close persons or loss of social roles. Attack refers to illness and injuries, and obstacles refer to different types of barriers making it difficult to fulfill needs. Threats are events creating fear for future loss, attack and obstacles (Hanley & Baikié, 1984).

### *5.2 Coping strategies and the process of coping*

According to the transactional perspective on coping, the person and surrounding environment are understood to be in an ongoing reciprocal relationship. Stressors in life are evaluated in an appraisal process where perceptions of available internal and external resources (primary appraisals) affect choice of coping strategies used to approach a certain situation (secondary appraisal) (S. Folkman, & Lazarus, R. S., 1980). Coping strategies are defined as “cognitive and behavioral efforts to master, reduce, or tolerate the internal and/ or external demands that are created by the stressful transaction” (p.843) (S. Folkman, 1984). The strategies involve different approaches aimed at altering the stressful situation (i.e. problem-focused coping strategies), as well as efforts to regulate the emotional distress associated with the situation (i.e. emotion-focused coping strategies) (R. S. Lazarus & S. Folkman, 1984). Thus, the strategies chosen to cope depend both upon the appraisals of the situational context and of personal factors; altogether constituting the individual’s available coping resources (de Ridder & Kerssens, 2003; S. Folkman & Lazarus, 1980a) (See figure 1).

In general, persons shift in their use of strategies, depending on the appraisals of the situations (S. Folkman & Lazarus, 1980a), as illustrated in the dual process model of coping (Stroebe, 2011; Stroebe & Schut, 1999). Here persons can alternate between both active and

passive coping strategies (C. Aldwin, 2011). Persons are however found to have different coping styles, or individual profiles of preferred copings strategies (Hansen & Daatland, 2016; R.S. Lazarus & S. Folkman, 1984). In situations of severe and acute stress all coping strategies can be triggered and be used in a global coping response (Sørliie & Sexton, 2001). A meta-analysis showed that few differences exist in gender and use of coping strategies, but women used more emotion-focused strategies as rumination, seeking support and positive self-talk (Tamres, Janicki, & Helgeson, 2002).

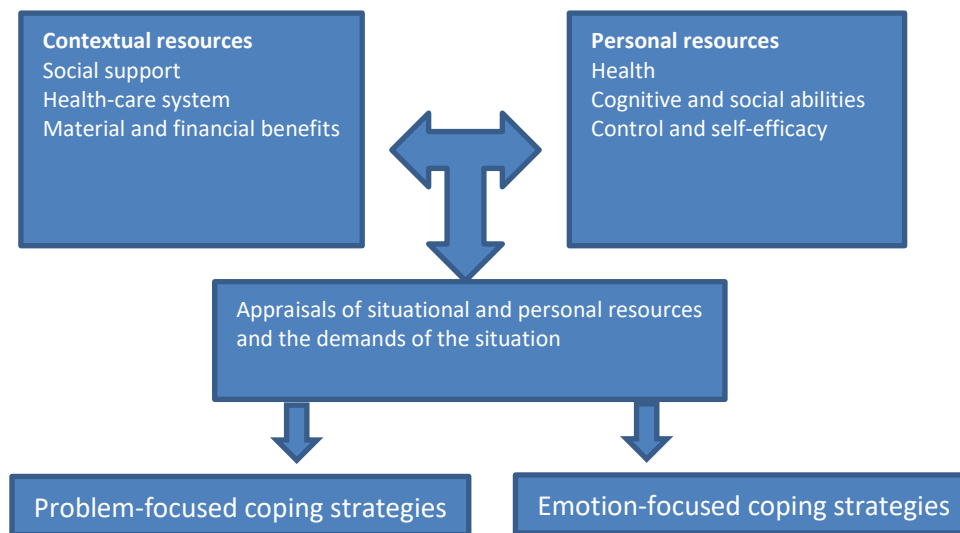


Figure 1. The process of coping, adapted from the transactional model (S. Folkman & Lazarus, 1980b)

### 5.3 Coping strategies and personality

Whether coping is a situation-specific and flexible process (S. Folkman & Lazarus, 1980a; S. Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Lazarus, 2006), or results from a more stable personality-based structure (Moos, 1974; Rossier, Dahourou, & McCrae, 2005) has also been a controversy through the decades. Stable and trait-like ways to act, think and react in response to stimuli constitutes “personality” (Lippa, 1994). Personality and coping style were seen as more or less the same phenomenon in psychodynamic theory (Vaillant, 1977) with stable and trait-like defense mechanisms consistently influencing human responses (Connor-Smith & Flachsbart, 2007; Suls, David, & Harvey, 1996).

In a meta-analysis, the five personality traits in the five-factor model (“Big Five”) (Robert R. McCrae & Costa Jr, 1997) (see figure 2) was found to be relatively stable across age groups and cultures, but were however weakly related to broadly defined coping. Nevertheless, the same study reports all five personality traits to predict specific coping strategies. Extraversion and conscientiousness predicted problem-focused strategies, and neuroticism was found to predict emotion-focused strategies (Connor-Smith & Flachsbart, 2007).

Coping strategies are influenced by both personality and situational contexts according to other researchers (de Ridder & Kerssens, 2003; S. Folkman & Lazarus, 1980a).



Figure 2. The “big five” model of personality dimensions, adapted from McCrae & Costa Jr, 1997.

#### *5.4 Religious coping*

Pargament (K. I. Pargament, 1997) shows the subjective meaning or orientation of values like religiosity, is important to decision making and is a coping resource constituting a basis for what coping strategies, activities and actions to choose, in situations. According to Pargament (K. I. Pargament, 1997) the concept of religiosity can be studied through the entire process of coping both in terms of stressors, appraisal, orientation of values, activities and outcome, thus both as a resource and as strategies of coping. Religiosity has become a specific category of coping called religious coping.

Religious coping has been operationalized in different ways, but basically as instruments to measure either religious beliefs or behavior that serves as coping strategies to help manage emotional distress (H. G. Koenig et al., 1992). Religious coping can be positive, like spiritual support and positive religious reframing, or negative i.e. seeing the illness as God's punishment (Bosworth, Park, McQuoid, Hays, & Steffens, 2003). Persons with high levels of general religious involvement, organizational religious involvement, religious salience, and intrinsic religious motivation showed reduced risk for depressive symptoms and depressive disorders (M. Harrison, O., H. G. Koenig, J. C. Hays, A. G. Eme-Akwari, & K. I. Pargament, 2001; H. Koenig, G. & Larson, 2001; McCullough & Larson, 1999).

#### *5.5 Sense of coherence*

Antonovsky emphasized coping as a resource, and should be understood more as an etiological, than mediating psychological factor in the development of mental health. He viewed coping as a personal capacity that can be utilized in stressful situations to maintain positive health and achieve wellbeing (Antonovsky, 1979). To achieve this positive outcome of coping, a certain way of viewing the world is essential; a perceived "Sense of coherence" (SoC) described as "...a dispositional orientation toward stressors, characterized and operationalized by a view of life as being comprehensible (cognitive), manageable (instrumental) and meaningful (motivational)." (Rennemark, 1999). A high SoC is found to be associated with good mental health (M. Eriksson & Lindström, 2006).

## 5.6 Control

Yet another, but probably the most studied concept of coping, is perception of control. Consciously being able to make a difference in life by personal means is an outcome from internal or personal control, where a desired outcome can be achieved or an undesired outcome be prevented (E. Skinner & Zimmer-Gembeck, 2011).

Optimal profiles of personal control have been defined as opposites to helplessness, by expectancies of internal control and by own efforts and capacity (Connell & Wellborn, 1991; Pryce et al., 2011a; E. Skinner & Zimmer-Gembeck, 2011; E. A. Skinner, Zimmer-Gembeck, & Connell, 1998). Loss of control is defined as a transition from internal to external expectancies of control (Hansen & Daatland, 2016; Rotter, 1966a). Personal control is subjective and refers to the person's own perceptions of control. It differs from objective control which defines the factual controllability of a situation (E. Skinner & Zimmer-Gembeck, 2011).

Furthermore, Locus of control (LoC) (Rotter, 1966a) is a central aspects of subjective control, and is in research literature one of the most used measures and concepts of control (E. A. Skinner, 1996; E. A. Skinner et al., 1998). LoC refers to the generalized expectations of where control is situated and affect perceptions of who or what are responsible for outcomes (Rotter, 1966b). When powerful others or outside forces, luck or coincidence are perceived responsible, this is called external LoC orientation (K. A. Wallston, Wallston, & DeVellis, 1978).

Persons with an internal LoC orientation perceive events in life to be results mainly from own actions and under own control. They also assume a more active role in planning health-related behaviors and changing situations they do not approve of (Lefcourt, 1984; Phares, 1976; Rotter, 1975; B. S. Wallston, Wallston, Kaplan, & Maides, 1976). LoC orientation is associated to individual adaptation to health threats and how well individuals comply to health programs (Affleck, Tennen, Croog, & Levine, 1987; Anderson, 1987; A. R. Craig, J. A. Franklin, & Gavin Andrews, 1984b; Sørliie & Sexton, 2004; Taylor, 1979; K. A. Wallston & Wallston, 1982).

LoC is recognized as part of human core self-evaluations, constituting an individuals' fundamental appraisal of one self and closely related to other personality constructs and self-esteem (Judge, Erez, Bono, & Thoresen, 2002). A sense of control influences reactions to stress, through physiology, behavior, emotions, energy, attention, motivation, volition, and

cognition (E. Skinner & Zimmer-Gembeck, 2011), and is related to mental health being addressed below.

### *5.7 Coping as a protective factor*

The capacity to cope successfully can serve as a protective factor into late life (Staudinger et al., 1993).

#### *Coping strategies and aging*

There are few longitudinal studies exploring the development of coping strategies into late life, but considerable research reporting that coping strategies show developmental shifts from early childhood to adolescence (C. Aldwin, 2011; Brennan, Holland, Schutte, & Moos, 2012). One study exploring a 20 years trajectory of coping strategies however reported a significant decline in both avoidant and approach coping strategies into late life (Brennan et al., 2012). Other point to older persons compared to younger, in general use fewer strategies, but cope in efficient and nuanced ways, regulate emotion better, and are also generally more able to rely on other persons as part of their available resources of coping (C. M. Aldwin, 1991, 2007; Berg, Meegan, & Deviney, 1998; Meeks, Carstensen, Tamsky, Wright, & Pellegrini, 1989; Zarit, Pearlin, & Schaie, 2003). These age-related changes may have protective functions related to mental health in late life.

#### *Religious coping and aging*

At higher age more use of religious coping is reported, even though religiosity is not necessarily increasing per se (Krause, 2006). A growing body of evidence documents dimensions of religious coping to be associated with positive health outcomes in older persons and across the life span (Bosworth et al., 2003; O. M. Harrison, H. G. Koenig, J. C. Hays, A. G. Eme-Akwari, & K. I. Pargament, 2001; H. G. Koenig, 2008; K. I. Pargament, Smith, B. W, Koenig; H. G. and Perez, L., 1998).

#### *Sense of coherence (SoC) and aging*

SoC are reported in some studies to increase with age throughout the life span, with some findings of the highest SoC in the oldest cohorts (Boeckxstaens et al., 2016; M Eriksson & Lindstrom, 2005; Lewis, 1996; Nesbitt & Heidrich, 2000), but not in all studies (Helvik, Engedal, & Selbaek, 2013). In a review, mean scores of SoC was found to be quite stable through time, and more stable for persons with an initially high SoC. A higher SoC was

strongly associated to better perceived health, and mental health, regardless of age, gender, ethnicity and study design (M Eriksson & Lindstrom, 2006).

### *Control and aging*

Rowe and Kahn considered personal control to be a crucial marker of successful aging (Rowe & Kahn, 1987), and Caplan and Schooler claimed personal control plays a crucial role in the disablement process among older adults (Caplan & Schooler, 2003). According to research on development of control in late life specific age-related changes are not documented (C. M. Aldwin, 2007; M. M. Baltes & Baltes, 1986; Lachman & Prenda-Firth, 2004; Wolinsky, Wyrwich, Babu, Kroenke, & Tierny, 2003; Zarit et al., 2003), even though older persons are shown to be more external in health-specific locus of control orientation (Lachman, 1986). Other studies point to an age-related reduction in control. A reduction in the frontal lobes (Craik, 2006) due to higher age is shown to be of importance to control through a reduced executive functioning in planning, decision-making, and conflict resolution (L'Hermitte, 1986).

Changes in control are also appreciated to be more a function of social structure and the nature and context of the events being encountered, than age itself (C. M. Aldwin, Sutton, Chiara, & Spiro, 1996; P. B. Baltes & Baltes, 1990; R. R. McCrae, 1989; Staudinger et al., 1993; Zarit et al., 2003).

## *5.8 Coping as a risk factor for depression in late life*

### *Coping strategies as risk factor for depression in late life*

In late life, rumination and avoidant coping strategies are associated with depression (Andrew & Dulin, 2007; Garnefski & Kraaij, 2006; V. Kraaij, Pruyboom, & Garnefski, 2002). Also, the lack of capacity to adjust to unattainable goals is a risk factor to the development of depression in late life. Cross-sectional and longitudinal studies report that use of general goal disengagement coping strategies can forecast less negative affect, depressive symptoms, and lower cortisol levels, systemic inflammation, and better physical health (E. Dunne, C. Wrosch, & G. E. Miller, 2011; Wrosch, 2011; Wrosch, Bauer, Miller, & Lupien, 2007; Wrosch, Scheier, Miller, Schulz, & Carver, 2003). In a comparative study with a six year follow-up older persons showed a parallel increase in functional disability and depressive

symptoms, but only in the group that were not able to disengage from unattainable goals (E. Dunne et al., 2011).

*Religious coping as a risk factor for depression in late life*

More use of positive religious coping were in a review related to less depressive symptoms and depressive episodes (M. Harrison, O. et al., 2001).

*Sense of coherence as a risk factor for depression in late life*

Lower levels of SoC is associated with worse mental health and depression regardless of age (M Eriksson & Lindstrom, 2006) and in nursing homes residents (Drageset, Espehaug, & Kirkevold, 2012).

*Control as a risk factor for depression in late life*

How humans explain causality of events and their general expectations of where locus of control in life is situated (internally/ externally), is linked to depression (Kendler, Hettema, Butera, Gardner, & Prescott, 2003; Pryce et al., 2011a). From a literature review, a higher external LoC orientation in younger adult persons was consistently associated to higher depressive symptom score (Benassi, Sweeney, & Dufour, 1988).



## **6.0 Depression in a bio-psychosocial and ecological lifespan perspective**

Stability and development, not only decline might be possible throughout the entire life-span, including late life, even though the balance between gains and losses becomes less positive with increasing age (P. B. Baltes & Baltes, 1990; Staudinger et al., 1993). At an individual level, reserve capacity or resilience are considered to be the outcome of this transaction, where protective and risk factors influence the ways of coping with internal and external demands, resulting in positive or maladaptive outcomes (Luthar, Cicchetti, & Becker, 2000; Staudinger et al., 1993), such as depressive symptoms.

Older persons experiencing loss as bereavement, reduced levels of daily functioning and physical illness, experience different access to compensating resources. Normally persons surviving into late life are resourceful enough to adaptively cope with these constraints (P. B. Baltes & Baltes, 1990; L. L. Carstensen, 1991).

Identifying the mechanisms leading to development of depression have been theorized and studied for decades, where the stress-diathesis model summarizes a commonly accepted understanding (D. G. Blazer, 2003b; A. Fiske et al., 2009a). Depression in older persons has in this perspective a multifactorial etiology, and may best be understood in a bio-psychosocial and ecological lifespan perspective (Aziz & Steffens, 2013; A. Beck, 1987; D. G. Blazer, 2003a; A. Fiske et al., 2009b; Mazare, Maciejewski, Jacobs, & Bruce, 2002; Ormel, Oldehinkel, & Brilman, 2001) (see figure 3).

Individual differences increase during lifespan and some pathways becomes more vulnerable to the development of depression late in life (Byers et al., 2012). Different sub-groups and etiological pathways to the development of depression in late life are thus also suggested; EOD with longstanding psychobiological vulnerability, LOD as reaction to severe life stress, and LOD with vascular risk factors (Ormel et al., 2001; Van den Berg, 2001). This theory has some support in a systematic review reporting a reduced family history of depression in persons with LOD compared with EOD (Grayson & Thomas, 2013).

### RISK AND VULNERABILITY FACTORS

### PROTECTIVE FACTORS

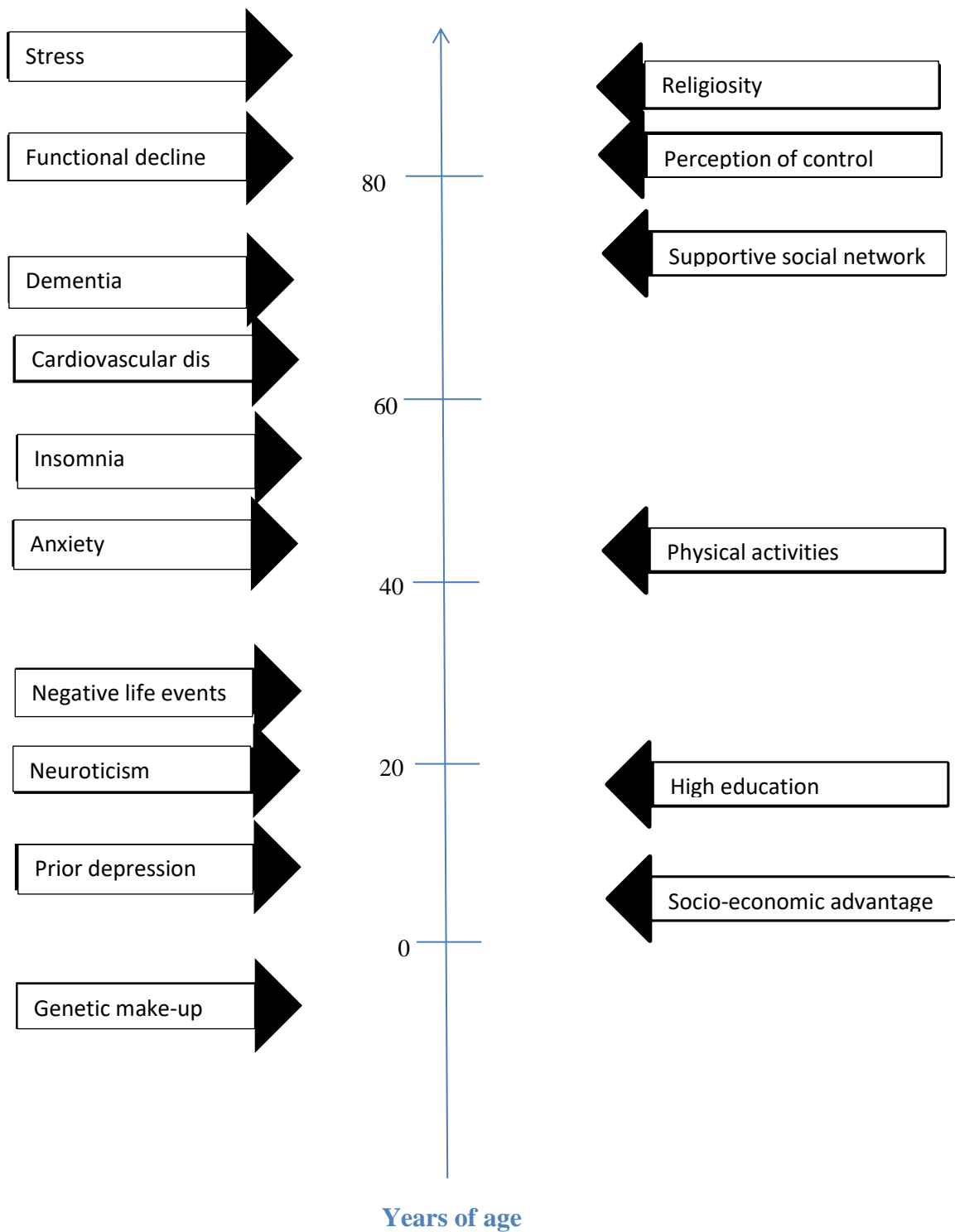


Figure 3. Stress-diathesis model of the development of depression in a life-span perspective, adapted from Blazer, 2005 and Fiske, 2009b.

## 7.0 Consequences of depression in late life

There is a rise in the number of older persons developing depression due to a rise in older populations globally, suggesting a serious public health concern caused by the following increase in risk of negative consequences (M. Luppá et al., 2010; B. W. Penninx et al., 1999; RC1 et al., 2010; Schoevers et al., 2000; T. et al., 2005).

### *7.1 Consequences of depression on cognition*

Impaired cognition is a well-known clinical symptom in depression in older persons. Even though many studies examine cognitive functioning in depression, no conclusive neuropsychological profile is found characterizing depression (Hammar & Årdal, 2009). In more severe forms of depression, there are reports of a general and diffusely lowered cognitive profile (Landro, Stiles, & Sletvold, 2001; Veiel, 1997), but also of profiles suggesting a more specific cognitive impairment (Austin, Mitchell, & Goodwin, 2001; Elliott, 1998). Again, other report of a lowered cognitive function regarding effortful tasks, but not in automatic tasks (Hammar & Årdal, 2009).

In severe depressive conditions cognition can be so affected that it has been labeled “pseudodementia”, but are shown as reversible states (Haggerty, Golden, Evans, & Janowsky, 1988; Madden, Luban, & Kaplan, 1952). The risk of converting into later dementia is found to be high (Alexopoulos, 2005b; Alexopoulos & Chester, 1992). Studies have linked depression earlier in life to development of Alzheimer disease (AD) late in life (Bennett & Thomas, 2014; Byers & Yaffe, 2011; Ownby, Crocco, Acevedo, John, & Loewenstein, 2006). Studies have reported similar neurobiological changes in both conditions, in particular white matter hyperintensities again associated to higher age, vascular risk factors and cerebrovascular disease (Breteler et al., 1994; O'Brien et al., 1998; Thomas, O'Brien, Davis, & et al., 2002). However, if this indicates shared risk factors or common pattern of neuronal damage is still not clear, but both explanations are supported by evidence (Bennett & Thomas, 2014; Byers & Yaffe, 2011).

Depression is also linked to higher levels of stress and increased levels of stress-hormone cortisol leading to possible neurotoxic effects on hippocampus (Sheline, Wang, Gado, Csernansky, & Vannier, 1996).

## *7.2 Consequences of depression on social cognition*

### *A cognitive model of depression*

As already mentioned, a cognitive model of depression suggests negative thoughts both to produce and maintain a depressive mental state (A. Beck, 1987; A. T. Beck, 2008; Clark & Beck, 1999). Depression increases and re-produces negative thoughts appearing in a reciprocal and “vicious circle” (Teasdale, 1983). Depressed persons exhibit cognitive biases for attention and interpretation, in their inferences and memory (L. Y. Abramson, Metalsky, G. I., Alloy, L.B., 1989; L. Y. Abramson, M. E. Seligman, & J. D. Teasdale, 1978; A. Beck, 1967; A. Beck, 1987).

Normally, adult persons prefer to draw internal causal explanations to external when to explain own and others' behavior, possibly because it is difficult to distinguish between behavior and the underlying causes of behavior. Adults also seem to overestimate personal responsibility for successes (internal attribution), and underreport for failures (external attribution) (Heider, 1958). In depressed persons, the cognitive profile is on the contrary; to expect failure, and to over-estimate those failures being made. Likewise, successes are being downplayed or reappraised. The core of this tendency is to attribute all negative events as global and stable personality-traits (“I am stupid”), and successes externally to uncontrollable, unstable forces (“I was lucky”) (A. Beck, 1976; Coyne & Gotlieb, 1983; Peterson & Seligman, 1984; Sweeney, Anderson, & Bailey, 1986). This leads to renewed thoughts of being a failure, and the mal-attributions become reinforced (L. Y. Abramson, M. E. P. Seligman, & J. D. Teasdale, 1978; A. Beck, 1976; Hoffart & Torgersen, 1991). Few studies have examined older depressed persons' causal explanations.

### *Depression and perceptions of control*

Depressed persons tend to assess their amount of control over negative, but not positive events, higher than non-depressed persons do (Taylor & Brown, 1988). This development may reinforce uncontrollability and lead to learned helplessness, characterized by a failure to expect to be able to protect oneself against aversive stimuli, even if adequate resources and skills are available (L. Y. Abramson, Garber, & Seligman, 1980).

### *7.3 Consequences of depression on quality of life (QoL)*

Studies including both global QoL and generic health-related QoL scales, report of an association between severity of depression and poorer QoL in older persons, also over time (Chan et al., 2009; Enkvist, Ekstrom, & Elmstahl, 2012).

### *7.4 Consequences of depression on daily functioning*

Depression is one of the leading factors to cause disability (McCall, 2013). Consequences of depression may inevitably lead to impairment in social functioning, in self-care, nutrition and daily functioning in general (A. T. Beekman et al., 2002).

### *7.5. Consequences of depression on physical health and hospitalization*

Depression in late life increases the risk of physical illness and disease such as cardiovascular disease (Elderon & Whooley, 2013; Rugulies, 2002). Depression is associated with slower recovery and re-hospitalization in heart disease patients (K. R. R. Krishnan, 2002), and in patients with coronary artery disease depression predicts future cardiac events (Musselman, Evans, & Nemeroff, 1998).

Studies find the risk of diabetes to be higher in persons with severe depression (Engum, 2007), depressed persons show higher levels of cytokines in the blood, and increase in inflammatory activity (Craddock & Thomas, 2005; Teper & O'Brien, 2008).

Depression is a major cause of weight loss in nursing home residents in late life (Morley & Kraenzle, 1994). A systematic review showed depression was a factor predicting hospitalization of persons in late life (M. Luppá et al., 2010), and that depression was the leading cause of psychiatric hospitalizations in older persons in the USA (ASHP, 1998). Depressed older persons with chronic comorbid conditions are hospitalized more frequently than older persons without depression (B. Y. Huang et al., 2000).

### *7.6 Consequences of depression on mortality*

In a meta-analysis depression was a factor increasing the risk of cardiovascular mortality (Barth, Schumacher, & Herrmann-Lingen, 2004; Musselman et al., 1998). However, the

association between depression in late life and mortality was found to be gender dependent in a large community-based and gender-stratified study. Here increasing depressive symptoms were associated with higher mortality risk; but only for men (Ryan et al., 2008). The overall cause mortality risk was highest in persons with more severe depression and use of antidepressants (Ryan et al., 2008). Depression in late life may also lead to self-neglect and a following increased mortality (J. K. Djernes, Gulmann, Foldager, Olesen, & Munk-Jorgensen, 2011).

### *7.7 Consequences of depression on suicide and suicidal behavior*

Depression is associated to own acceptance of physician-assisted suicide and euthanasia (Blank et al., 2001) and to non-adherence to treatment regimens (Ziegelstein et al., 2000). Persons 65 years and older, were in a review reported to commit suicide at a higher rate than any other age group in USA (D. G. Blazer, Bachar, & Manton, 1986). From a systematic review of persons of all ages with depression, severity of depression was a significant risk factor for committing suicide (Hawton, Casanas, Haw, & Saunders, 2013). Regarding the suicide rates in late life, old men showed a dramatic increase, while old women a decrease in suicide with age (A. Fiske et al., 2009a; Kung, Hoyert, Xu, & Murphy, 2008). The majority of those committing suicide in late life suffered from depression (A. Fiske et al., 2009a).

### *7.8 Consequences of depression on close relatives*

In a study from primary care, caregivers reported moderate to high levels of burden from being a caregiver to an older spouse with major depression (Martire et al., 2010), a finding in line with spouses to patients with stroke, dementia and Parkinson's disease (Thommessen et al., 2002a). Caregivers of older persons with depression are also more burdened if they attribute the depressive condition to the person's character or control (Polenick & Martire, 2013). There is a growing body of research documenting marital violence and victimization as a consequence of depression (Kessler, 2012; Kessler, Molnar, Feurer, & Appelbaum, 2001; Riggs, Caulfield, & Street, 2000; Stith, Smith, Penn, Ward, & Tritt, 2004), even though research on samples of older depressed persons both as victims and perpetrators are scarce (Sev'er, 2009).

### *7.9 Consequences of depression on economy and health care services*

The use of health care services for depressed patients compared to non-depressed persons was shown in a study to exceed by 50-100 % (Manning & Wells, 1992; Simon, Ormel, VonKorff, & Barlow, 1995; Zivin, 2013). In USA, depression is reported to be among the tenth most costly diseases (Hall & Wise, 1995). The highest level of use of health care services is found among persons with the most severe depression (Zivin, 2013).

## 8.0 Treatment of depression in late life

### *8.1 Guidelines for treatment of depression in late life*

The National Institute for Health and Care Excellence (NICE, 2009) and the national guideline of treatment for mood disorders in Norway (Helsedirektoratet, 2009), recommend the first choice of treatment to subthreshold, and mild to moderate depression in adult persons in general, to be non-pharmacological options, such as counselling or psychological interventions (Helsedirektoratet, 2009). Further recommendations are to offer psychological treatment in combination with anti-depressive drugs if the initial non-pharmacological treatment is not successful, if the depressive condition has been recurrent or develops into more severe forms. The patients' own preferences is important in decisions concerning treatment, where treatment must support the patient's experience of coping and control (Helsedirektoratet, 2009), hence to be in line with a so-called person-centered care (NICE, 2009).

Recommendations in the Norwegian national guidelines concerning treatment to older persons with mood disorders are the same as to younger persons, but comorbid conditions and polypharmacy must be taken into account. The national guideline of treatment for mood disorders in Norway are however, basically developed from studies of treatment of depression in younger adult persons (Helsedirektoratet, 2009). Due to the fact that older persons present symptoms of depression in slightly different ways compared to younger persons, and because research points to possibly other etiologies in depression late in life, there is a need for guidelines based on research studies on treatment exclusively including older persons (Alexopoulos, Katz, Reynolds, Carpenter, & Docherty, 2001).

In the sections below different approaches to treatment for depression in older persons, will be presented. There is a variance in the methodological quality of the research these treatment options are based upon. Meta-synthesis and systematic reviews based on randomized controlled trials (RCT) are the most trustworthy scientific literature of treatment for depression in late life (Haraldstad & Christophersen, 2008).



## *8.2 Psychological treatment and effect on depression in late life*

Compared to younger persons, there appears to be no difference between the effect from psychotherapies in older persons (Cuijpers, van Straten, Smit, & Andersson, 2009). Older persons with depression are positive towards and prefer psychological interventions (Choi & Morrow-Howell, 2007; Choi, Sirey, & Bruce, 2013; Gum et al., 2006), and two meta-analyses exclusively based on high quality RCTs reported psychotherapy to be effective for depression in late life, but the effect varied with type of control group (A. X. Huang, Delucchi, Dunn, & Nelson, 2015; K. Wilson, Mottram, P. G., & Vassilas, C. , 2008). The studies included older persons from community, primary-, and specialist health care settings. All trials examined cognitive-behavioral-, or psychodynamic therapies compared to control interventions. Psychotherapy showed large effects compared to control groups, but small to moderate compared to supportive therapy, in particular. Superiority of one psychological treatment approach over another was not found, but problem-solving therapy showed the strongest evidence compared to supportive therapy (Alexopoulos et al., 2011; A. X. Huang et al., 2015).

In the sections below psychological interventions for treatment of depression recommended in the Norwegian national guideline for mood disorders will shortly be presented (Helsedirektoratet, 2009).

### *Cognitive therapy and cognitive-behavioral therapy*

This therapy is a structured and time limited psychotherapeutic approach. In treatment, problem-solving and greater understanding regarding the relations between thoughts, actions and emotions is essential. Automatic and negative thoughts characterizing depression can through this approach become challenged and exploration of alternative and possibly more adaptive interpretation of behavior can again lead to changed patterns of attributions, actions and emotions (A. T. Beck, 2008).

### *Interpersonal psychotherapy*

This intervention is a structured and time limited psychotherapeutic approach based on an interpersonal model of understanding of depression (Klerman, Weissman, Rounsaville, & Chevron, 1984), and theories of attachment (Bowlby, 1969). Emotions and relational functioning is closely linked, and focus during treatment is on facilitating coping with present interpersonal problems and conflicts that eventually has triggered the development of depressive symptoms (Nordahl, Martinsen, & Wang, 2012).

### *Psychodynamic psychotherapy*

This approach consists of several therapeutic directions, all developed from psychoanalysis, but where the psychodynamic tradition is more based on social and interpersonal aspects (Nordahl et al., 2012). Here development of depression is understood as a result of emotionally overwhelming losses related to close persons, often in early years of life. Strategies to defend against triggering of these painful emotions can result in the development of avoidance, passivity or ways to mellow or displace the emotional reaction (transference). By becoming conscious of these core mechanisms, losses and reactions can better be worked out, and more adaptive ways of coping can be adapted (Nordahl et al., 2012).

### *8.3 Modifying coping in psychotherapy in late life*

A common goal in many psychotherapies is to improve coping and the adaptive ways to handle stress. Decades of research shows stress to be associated to negative emotions and depression with deleterious effects on physical and psychological health (Brown & Harris, 1989; Cohen, Janicki-Deverts, & Miller, 2007). Studies report of an association between internal LoC orientation and adaptive behavior, and in particular an internal LoC orientation being associated to both positive assessments of therapy and favorable outcomes from psychotherapy (Baker, 1979; Foon, 1987). However, research in older groups is scarce.

Problem-solving therapy (PST) has growing evidence for being effective as treatment for older persons with depression (Alexopoulos et al., 2011; D'Zurilla, 1986; A. X. Huang et al., 2015). Persons with problems in solving challenges in their everyday life are vulnerable to depression, some when being avoided from freely using former efficient coping strategies (Choi, Sirey, et al., 2013). In PST a cognitive-behavioral intervention focusing on training adaptive problem-solving attitudes and skills is used (Bell & D'Zurilla, 2009). PST was in a meta-analysis in mixed age-groups found to be equally effective as other psychosocial therapies and medication, and significantly more effective than no treatment or support group (Bell & D'Zurilla, 2009).

Another related research approach is the Problem Adaptation Therapy (PATH) (Kiosses et al., 2015). In a randomized, clinical trial older persons with major depression and cognitive impairment, significantly reduced depressive symptoms and disability. Formal and informal caregivers compensated for the older depressed and disabled person's lost problem-focused coping strategies and made environmental adaptations. This approach strengthened the resources of coping more than strengthening the coping strategies per se, however.

#### *8.4 Medical treatment options and effects on depression in late life*

Older persons with depression often have comorbid physical disorders that may complicate the treatment strategy. They may use multiple medications, contributing to the occurrence of depressive symptoms, or to interact with the anti-depressive medication. Older persons also in general metabolize medications more slowly and are more sensitive to side effects than younger patients (Alexopoulos et al., 2001).

Studies show that the effect from using medical treatment for depression in older persons have as good effect as that in younger adult persons (Kok, 2013). A paper including three studies with exclusively older persons with major depression divided patients in three age-groups (59-69, 70-75, 76-99 years) and found the oldest-old patients to respond as good as the young- and middle-old patients, to anti-depressive medication (Gildengers et al., 2002).

No differences in effect between different anti-depressive medications to older persons have been demonstrated (P. Mottram, Wilson, & Strobl, 2006; Mukai & Tampi, 2009; K. Wilson, Mottram, Sivanranthan, & Nightingale, 2001). A systematic review showed half of all older participants with a refractory depression responded to the pharmacological treatments, pointing to the importance of an active management in treating depression in older persons. Here Lithium augmentation was the only treatment for which there was replicated evidence (Cooper et al., 2011).

Cognitive changes affect medical treatment options to depression. Even though depression in dementia according to The American Psychiatric Association (APA, 2007) is amenable to treatment and recommends pharmacotherapy for significant and persistent depressive symptoms in persons with dementia, systematic reviews and a meta-analysis of placebo-controlled anti-depressive medical treatment from in- and out-patients clinical settings, found only weak or no confirmation of efficacy (Bains, Birks, & Denning, 2002; Nelson & Devanand, 2011).

Combinations of medical and psychological interventions for older persons with depression are more effective, but still there are huge challenges in implementing and using psychological interventions in community and primary health care settings (Choi, Marti, Bruce, & Hegel, 2013; Choi, Sirey, et al., 2013; Snowden, Steinman, & Frederick, 2008).

### *8.5 Physical exercise as treatment for depression in late life*

In younger persons a systematic review reported physical exercise to have moderately better effect on reduction of depressive symptoms compared to no therapy for treating depressive symptoms (Cooney et al., 2013). However, physical exercise was not more effective than anti-depressive medical treatment or psychological treatment in reducing depressive symptoms.

Polypharmacy, greater aerobic capacity, to display psychomotor slowing, and the age of 75 years or more, characterized participants in primary care with greater likelihood for achieving remission from major depressive disorder, compared to the use of anti-depressive medication alone (Zanetidou et al., 2017). Also, shorter time to remission (a score of  $\leq 10$  on the Hamilton Rating Scale for Depression) was reported in a study including older persons using anti-depressive medication and physical exercise, compared to anti-depressive medication alone (Belvederi Murri et al., 2015).

### *8.6 Treatment in psychogeriatric hospital units*

When depression develops into a more severe or life-threatening disorder, and when other forms of treatment do not reduce the symptoms, admission to a psychogeriatric hospital unit in the specialist health care may be necessary. A psychogeriatric hospital unit is part of the specialist health care system and situated as part of a general hospital or as part of a mental health division, in Norway. In Norway the first unit was established in 1970 (K Engedal, 2012), but this type of units are not established in all countries (Dobrohotoff & Llewellyn-Jones, 2010).

In specialist health care units the older patients receive treatment from a wider range of treatment modalities, receive higher levels of care and of higher intensity. A hospital unit also provides good conditions regarding the possibility for health care professionals to observe, and evaluate symptoms and the patients' mental and physical status during treatment.

Different treatment approaches are available in different hospital units, but a basic medical treatment approach is fundamental. These units are especially developed to treat complex psychogeriatric conditions and are found to better do so than general psychiatric hospital units in treating older patients (Godemann, Hauth, Gutzmann, & Heinz, 2009). Old persons admitted to psychogeriatric hospital units in Norway receive evaluation and treatment following local hospital units' practice for treatments of depression and the national guideline for treatment of depression (Helsedirektoratet, 2009). According to the patients' physical and

mental state, and in collaboration with the patients themselves and next of kin, treatment is offered from inter-disciplinary teams and includes psychotropic drugs, electro-convulsive therapy, and individual or group-based supportive conversations and psychotherapies (Helsedirektoratet, 2009).

### *8.7 Electro convulsive therapy (ECT)*

ECT may be a good treatment option to older persons with severe and persistent depression (Alexopoulos, 2005a; Cattan et al., 1990; Greenberg & Kellner, 2005; Riva-Posse, Hermida, & McDonald, 2013; Tew et al., 1999; van der Wurff, Stek, Hoogendijk, & Beekman, 2003). Multiple studies have documented the safety of ECT in elderly persons with depressive episodes, including medical comorbid conditions such as dementias and cognitive impairment, even though side effects as memory loss also are evident (Oudman, 2012). These are most often temporary complications. The efficacy of ECT is shown well documented (Bjølseth et al., 2015; Dybedal, Tanum, Sundet, Gaarden, & Bjølseth, 2014; Riva-Posse et al., 2013).

### *8.8 The natural course of depression without treatment*

Since depressive symptoms and disorders are common in older persons researchers have tried to identify factors associated to onset and persistence of depression. When following the natural course of depressive symptoms, a large, prospective study of community-dwelling older women revealed four different trajectories during 20 years follow-up (Byers et al., 2012). The four trajectories consisted of a) 28% with minimal depressive symptoms, b) 54% with persistently low symptoms, c) 15% with increasing symptoms, and d) 3% with persistently high levels of depressive symptoms.

Four trajectory classes were also identified in a prospective six year follow-up study from The Netherlands (A. Beekman, Geerlings, & Deeg, 2002). When examining predicting factors for the course of depressive symptoms, the odd ratios for belonging to the increasing or persistently high depressive symptom class after 20-years, were women with significant life styles factors as smoking, physical inactivity, small social network, physical impairment, myocardial infarction, diabetes, and obesity at baseline (Byers et al., 2012).

In another large observational and longitudinal study from community, the factors associated with persistent depression were higher number of chronic physical illnesses and an external LoC orientation (A. T. Beekman et al., 2001). Also, a recent longitudinal study including a large community-based sample of older persons designed a prediction model of change in depressive symptoms (Garcia-Pena et al., 2013). Different trajectories were found, and in the group of older persons with persistent depressive symptoms, load of depressive symptoms were significantly associated to low social support, chronic pain, and more external LoC orientation (Garcia-Pena et al., 2013).

### *8.9 The prognosis after treatment of depression in late life*

Even though depression in late life is highly treatable, the prognosis is poor in a longer term. Compared to younger persons, depression in late life shows a worse prognosis after treatment, and to have a more relapsing and chronic course (Ismail, 2013). Longitudinal clinical studies report about one third of older depressed patients to experience remission, but report of a worsening in the long-term prognosis (Borza, Engedal, Bergh, Benth, & Selbæk, 2015; Licht-Strunk, Beekman, de Haan, & van Marwijk, 2009; Millard, 1983; Stek, Van Exel, Van Tilburg, Westendorp, & Beekman, 2002).

Rates of response, remission and recurrence of depressive episodes or symptoms are not reported to be influenced by age of onset of the first depressive episode (Grayson & Thomas, 2013). This is in line with findings from reviews reporting little difference between EOD and LOD (Mitchell & Subramaniam, 2005). Among older persons living in the community or receiving primary care, one systematic review and meta-analysis found physical illness, disability, cognitive impairment, and more severe depression to be associated with worse prognosis (M. G. Cole, Bellavance, & Mansour, 1999). Another systematic review found no prognostic factors for depression in late life with strong evidence in primary care studies, but strong evidence for the factors older age and an external LoC orientation in community studies (Licht-Strunk, van der Windt, van Marwijk, de Haan, & Beekman, 2007).

A systematic review concluded that psychotic major depression in older persons is associated with more severe clinical symptoms, compared to non-psychotic depression (Gournellis, 2004). A study by Baldwin did not find any differences between older patients with and without psychotic major depression regarding relapse rate and clinical course (R. C. Baldwin, 1988).

As shown above, both biological, social and psychological factors influence on the prognosis after treatment of depression (Ilardi, Craighead, & Evans, 1997; Licht-Strunk et al., 2007; Steunenberg, Beekman, Deeg, & Kerkhof, 2006). How psychological factors are associated to prognosis of depression in late life is by far less studied, and to our knowledge research on core concepts of the process of coping (LoC orientation and coping strategies) in older persons being clinically depressed in psychogeriatric hospital settings, is lacking.

## 9.0 The thesis

Coping, specifically defined as LoC orientation and coping strategies, are presumably modifiable factors documented to be related to depression. It may be of clinical importance to investigate if these psychological factors are associated to the prognosis of moderate to severe depression in older persons.

### *9.1 The aims of the thesis*

This thesis aims are as follows:

1. To gain an overview of the field of knowledge from studies investigating the relationships between coping and depression in older persons from different settings.
2. To contribute to a more nuanced and broader understanding of the relationships between depression and coping in older persons.
3. To compare the relationships between symptoms and diagnosis of depression, and coping, defined as LoC orientation and coping strategies, in a group of older depressed patients from psychogeriatric hospital settings and a reference-group of older persons without depression living in community settings.
4. To explore the impact of coping, measured at baseline, on the outcome of depression measured at 12 months follow-up, more specific if LoC orientation and coping strategies at baseline were associated with severity of depressive symptoms and a diagnosis of depression after treatment in psychogeriatric hospital units at one year follow-up.

The specific research questions (paper I, II) and research hypothesis (paper III, IV) related to these aims for each paper, are presented below.



## *9.2 Paper I*

By systematizing previous scientific research papers including studies investigating the relationship between different concepts of coping and depression, we asked the following research question:

What is the state of the art regarding the relationship between coping and depression in older persons?

## *9.3 Paper II*

By inviting older men and women admitted to a psychogeriatric hospital unit in Norway to be interviewed about their experiences of being severely depressed and to cope with their situation, we asked the following question:

How do you experience and cope with your depressive condition?

## *9.4 Paper III*

We hypothesized that older patients with a moderate to severe depressive episode (ICD-10) compared to older persons without depression showed:

A more pronounced external LoC orientation, less frequent use of problem-focused coping strategies and more frequent use of emotion-focused coping strategies, when adjusting for socio-demographic information and health variables.

## *9.5 Paper IV*

We hypothesized that in older in-patients admitted in psychogeriatric hospital units:

A more pronounced external LoC orientation, less use of problem-focused and more use of emotion-focused coping strategies at baseline were associated to more depressive symptoms and a diagnosis of depressive episode at 12 months follow-up, when adjusting for socio-demographic information and health variables.

## 10.0 Method

### 10.1 Study designs

Both quantitative and qualitative designs are used in this research project.

Paper I is a systematic literature review of the existing scientific papers within the field of depression and coping, in old persons. Paper II explores depressed older men and women's experiences of depression and how to cope, by in-depth interviews being analyzed by qualitative methods. In paper III, coping in older persons with depression is compared to older persons without depression, using a quantitative cross-sectional design and a reference group. Paper IV investigates the associations between coping at baseline and symptoms and diagnosis of depression at 12 month follow-up, by applying a quantitative observational and longitudinal design.

### 10.2 Study samples

#### *Paper I*

We conducted a systematic literature review based on scientific literature from the relevant data-bases Medline, PsychInfo, EMBASE, Cinahl and [www.salutogenesis.fi](http://www.salutogenesis.fi) (see figure 4). The search of literature was performed during 6 months in 2012. Two researchers (SEK/GHB) and a librarian (LMW) conducted the searches. The terms used for searching the databases were "Aged", "Aged, 80 and over", "Gerontology, aged (attitudes toward)", "Aging", "Geriatric psychiatry", "Geriatric psychotherapy", "Geriatric patient", "Elderly", "Elder care", "Depression", "Depressive disorder", "Depressive disorder, major", "Depression reactive", "Affective disorder", "Psychotic, Endogenous depression", "Long term depression", "Organic depression", "Reactive depression", "Coping", "Ways of coping questionnaire", "Locus of control", "Coping behavior", "Internal External LOC", "Exp coping behavior", Sense of Coherence and SOC. The MeSH terms and Cinahl headings were limited to major concepts (focused), except the Cinahl heading "Internal External LOC", which became an "exploded" search. The keywords, Cinahl headings and MeSH terms were combined in different ways to yield maximum results.

### *Inclusion and exclusion of studies*

We chose to include studies including older persons with a mean age of 60 years or above, where relations between depression and concepts of coping were statistically investigated.

1. Mean age  $\geq$  60 years
2. A quantitative design
3. Instrument used to assess depression was exclusive to this purpose.
4. At least one generic measure of coping was used.
5. An assessment of the relationship between coping and depression was performed.
6. The study was published in a journal and presented in English language.

Papers were excluded from the review if:

1. They were theoretical, qualitative or review articles or comments on studies.
2. They were disseminations.

In total 1,727 hits were identified and screened as potentially relevant papers among titles and abstracts; 164 articles were then retrieved for full text evaluation from the inclusion criteria, by two of the authors (ASH/GHB) (see Figure 4). Reference lists were checked to retrieve relevant publications that had not been identified through the searches. Potentially relevant articles retrieved from disseminations were included. Titles and abstracts were additionally retrieved from reference lists and disseminations. Finally, 75 articles were evaluated by two researchers (ASH/GHB) as fulfilling the inclusion criteria, and were further analyzed and their relevant data extracted in the form of tables.

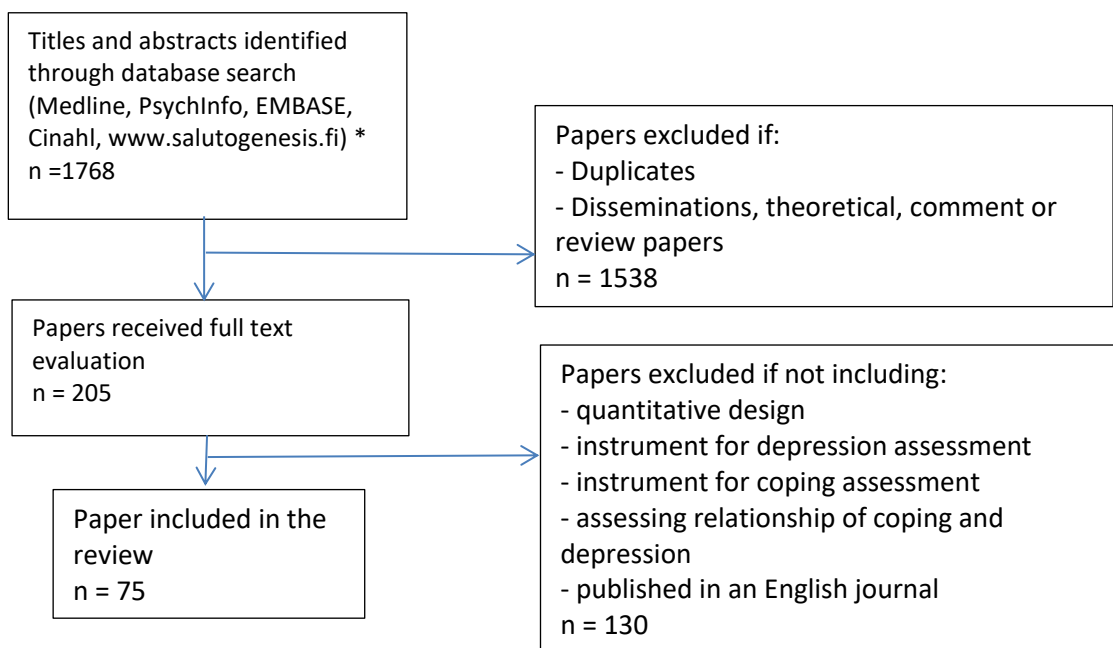


Figure 4. Flowchart of studies identified, screened and evaluated for criteria for inclusion and exclusion.

#### *Participants with depression at baseline*

Participants with a diagnosis of depression were all recruited from an observational prospective multicenter study (Borza et al., 2015) including nine Norwegian psychogeriatric hospital units (see table 1 below). The multicenter study included old women and men 60 years and above being referred and admitted to psychogeriatric hospital units in Norway because of depression. Exclusion criteria for the multicenter study were: patients with dementia who had severe dysphasia or aphasia and patients with acute life threatening diseases. The nine hospital units included in total 169 patients, nine patients were included from psychogeriatric out-patient clinics.

Evaluation of the criteria for inclusion and exclusion and of the patient's competence to consent to participation in the study was done by project nurses, physicians and psychologists at the included centers. A diagnosis of depression was evaluated according to WHO's diagnostic criteria of depression (ICD-10)(WHO, 1993a) by psychiatrists and gerontopsychologists experienced in geriatric psychiatry and geriatric psychology. Six of the nine hospital units collected data on age and gender of patients who declined participation, as seen in table 1. In these six units, 174 patients were approached and 38 refused to participate in the study. There were no significant differences in age ( $p=0.88$ ) or gender ( $p=0.13$ ) between those who participated in the study and those who refused to participate.

For the present research project (paper II-IV) additional exclusion criteria were: depressed patients recruited from out-patient clinics, or not being able to fill in the questionnaires regarding LoC orientation and coping strategies. All data collected from the depressed in-patients at baseline was conducted during the first two weeks after admission. The nine out-patients and sixteen in-patients with incomplete data were excluded from the study, thus 144 participants with depression from nine psychogeriatric hospital units constitute the basic group of depressed older persons at baseline.

Table 1. Participating study centers and included patients in the four papers.

<b>Psychogeriatric hospital unit</b>	<b>Number of eligible patients</b>	<b>Total number of assessed patients</b>	<b>Total number of in-patients</b>	<b>Total number of in-patients paper III</b>	<b>Total number of in-patients paper IV</b>
Oslo University Hospital, Vardåsen	*)	22	22	15	11
Diakonhjemmet Hospital	15	11	11	10	6
Oslo University Hospital, Aker	*)	4	4	4	0
Innlandet Hospital Trust, Sanderud	51	38	38	37	33
Innlandet Hospital Trust, Reinsvoll	9	5	5	5	6
Vestre Viken Hospital Trust, Lier	55	50	46	42	39
Stavanger University Hospital, Stavanger	8	4	4	3	0
St. Olav Hospital, University Hospital of Trondheim	36	28	23	22	20
Haukeland University Hospital, Bergen	*)	7	7	6	7
<b>Total</b>		<b>169</b>	<b>160</b>	<b>144</b>	<b>122</b>

\*) = information not available

Common procedures with common measures used in daily clinical practice in Norwegian psychogeriatric hospital units were collected following a protocol applied by all the centers of the study. All assessors received structured training in applying the measures before the project start and twice yearly during the project period. We also developed handheld foils with large fonts to facilitate the use of the coping questionnaires. Here the project nurse read aloud the questions and statements and filled in the right values from what the participants answered at the questionnaire-sheet. The patients could point at the right values of the scale on the foil. These strategies optimized the procedure and the process of data collection.

The participants included in paper III are from two different samples; baseline data from older in-patients with depression (N=144), and community-dwelling older persons

without depression (N=106), that constituted a reference group. The reference group without depression will be presented last in this section.

#### *Participants with depression included for in-depth interviews*

Patients invited to participate in a qualitative study were in-patients included in the quantitative multicenter study, but admitted at one of the psychogeriatric hospital unit (Vestre Viken HF). In addition to the inclusion and exclusion criteria applied in the quantitative part of the study, the participants had additionally to be able to understand the purpose of the interviews, and to give oral and written consent to participation in the qualitative study. They also had to be able to tell their stories and to describe their experiences.

All included patients were interviewed between seven and 14 days after admission to the hospital, and the interviews were performed by the author at the hospital unit where the author was in practice as a specialist in clinical gerontopsychology.

In total, 18 patients (13 women and five men) were included between 2010 and 2011.

#### *Participants with depression at follow-up*

All included patients from baseline (N=144) were invited at admission to a 12-month follow-up evaluation by trained project nurses, psychologists, and physicians, either at out-patient clinics or in the patient's home. At follow-up, three patients had died, five patients did not consent to participate, and 14 had missing endpoint information on the dependent variable (MADRS, ICD-10). Thus, 122 patients were included in the analyses of paper IV.

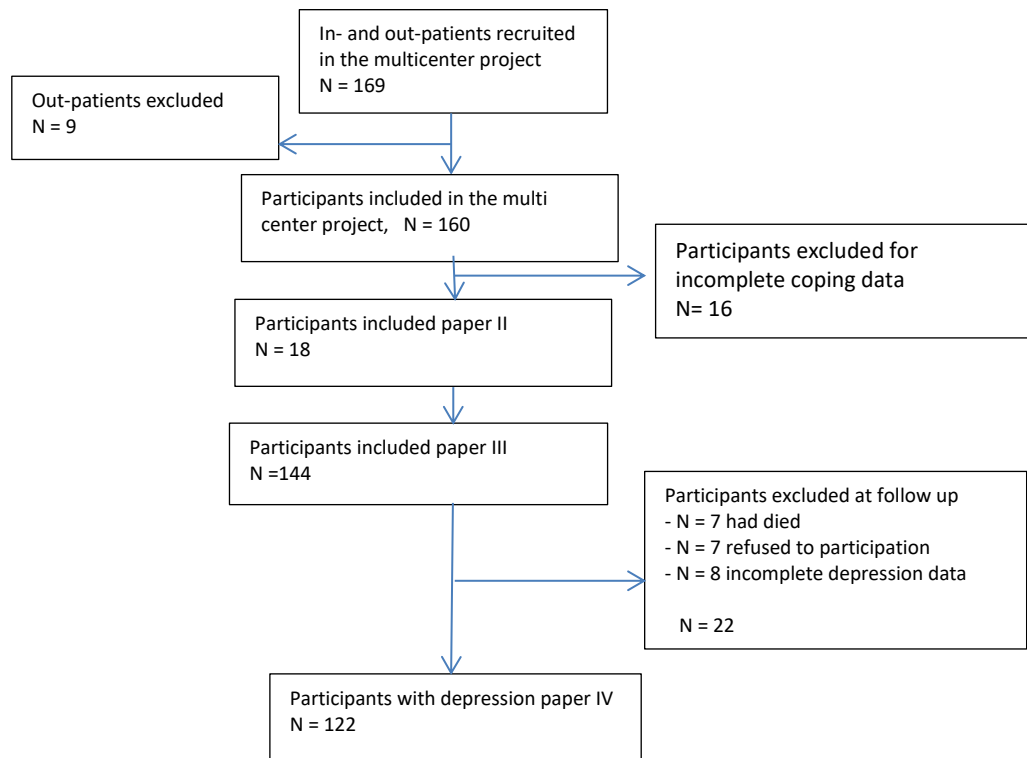


Figure 5. Flowchart of the recruitment of the depressed patients.

#### *Participants without depression*

The participants without depression were all recruited from the study “Quality of life, coping and depression in community-dwelling older adults”, conducted by the National Advisory Unit on Ageing and Health, Vestfold hospital, and Buskerud and Vestfold University College. The study was conducted in cooperation with in-home nursing healthcare services in four counties of Norway and last-term nursing students in practice at University College of Southeast Norway.

Older community-dwelling persons without in-home nursing healthcare were also recruited from four counties on the south-eastern part of Norway (Akershus, Buskerud, Oslo and Vestfold). Recruitment was done through advertisement in the local newspaper, senior centers, and various voluntary organizations.

The participants lived in rural areas and in large cities and included persons between 60 and 90 years with and without depression, and with and without cognitive impairment. The included participants were recruited to different research projects.

Participants were screened for symptoms of depression and cognitive impairment by trained healthcare personnel students. A blinded evaluation of the diagnostic criteria (ICD-10

template) and criteria of inclusion and exclusion were done by an experienced psychologist in geriatric psychiatry and an experienced general practitioner (GP).

Exclusion criteria were: a current depressive episode, or depressive disorder, and current symptoms of a psychiatric disorder (ICD -10), cognitive impairment, as defined by a score on the MMSE-NR of  $\geq 27$  points (C. Strobel, & Engedal, K., 2008), severe aphasia or an acute life threatening condition, not being able to fill in the questionnaire or understand the purpose of the study or capacity to make a written consent.

In total, 215 community-dwelling older persons volunteered to participate in the study and were eligible for inclusion. After initial screening, 47 persons were excluded due to a MMSE-NR score below 27 points, 56 persons were excluded because they filled the criteria of a depressive episode, and six persons did not fill in the LoC scale, thus 106 persons constitute the non-depressed reference group.

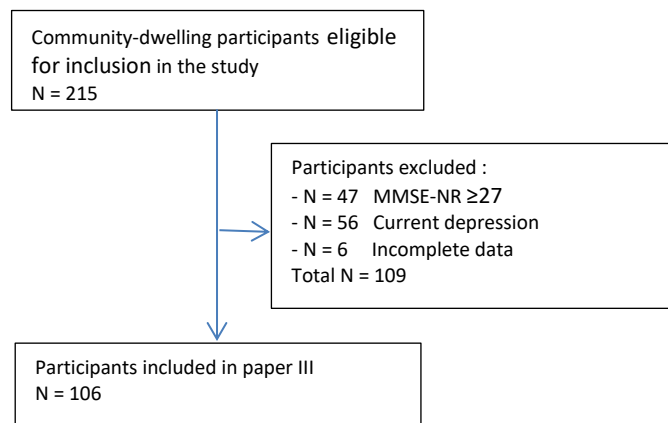


Figure 6. Flowchart of the recruitment of the reference group without depression.



### 10.3 Collection of data

#### *Paper I*

The 75 included papers in the literature review varied considerably in sample-size, descriptions of the settings, participants, and regarding the measures that were used to assess the various concepts of coping and depression.

According to Altman, poor quality of published data is an argument against meta-analysis (Altman, 2009), hence systematic reviews are suitable to evaluate published studies with variation in the characteristics of the study and participants supposed to be compared (Altman, 2009). Furthermore, Altman points to a number of problems with systematic reviews of prognostic studies, as inadequate reporting of methods, variations in study designs, inclusion criteria and methods of analysis (Altman, 2009). With this background, we chose to evaluate the methodological quality of each of the included studies based on theoretical considerations and methodological aspects (Licht-Strunk et al., 2007; Oxman & Guyatt, 1988). Based on what were regarded to be most important methodologically for the purpose of our literature review; examine the relation between coping and depression in older persons, we chose to assess the studies according to seven chosen quality criteria (Oxman & Guyatt, 1988). Two researchers (G.H.B./A.-S.H) independently evaluated all 75 papers according to the checklist of these seven predefined criteria (see table 2).

Table 2. Criteria for assessment of quality.

Quality criteria	2 points	1 point
Diagnosis of depression (ICD /DSM)	X	
well-established measure of depression	X	
Well-established measure of coping	X	
Longitudinal design		X
Information about setting of the study		X
N ≥100		X
Definition of coping		X

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We chose to give three of the criteria two points because valid and reliable information about the assessment of coping and depression in the papers were essential to methodological

quality of the main focus in this literature review; assessment of the relationships between coping and depression. The papers receiving more than five points ( $\geq 60\%$  of the maximum attainable score of 10) were considered to be of higher methodological quality, whereas papers receiving five or less points were considered to be of lower methodological quality.

### *The interviews Paper II*

The essence of knowledge on how depressed older men and women experience, cope and make sense of their world, may be produced in a more nuanced and broad way by facilitating a situation where the participants as openly as possible can tell about their experiences in their own words. Thus we chose to apply in-depth interviews in this study.

The interviews were conducted in a psychogeriatric hospital setting and took place either in the participant's room if they preferred this, or in an office connected to the unit. The setting of the interview was adapted to the participants' wishes as much as possible. If a participant was perceived to be in discomfort during the interview, either by the researcher or expressed by the participant, the researcher would suggest to end the interview, to pause it, or in other ways make changes according to the participant's needs (Kvale, 1996).

The participants were invited to tell their stories, and to some this was not easy even though their participation was expressed in a willing and positive way. Some could struggle to find words and form sentences, and to express their thoughts and whole narratives. The researcher supported the participants verbally and by non-verbal communication in confirming and showing interest in what the participants were telling.

The research interview is a form of conversation, and in this study the participant and researcher had dialogs in response to the researcher asking open-ended questions (Kvale, 1996). The participants and researcher had also another relationship in that the participants being interviewed were admitted to the psychogeriatric hospital unit where the researcher also worked as a clinical psychologist. This could influence on the equivalence of power, possibly influencing the participants to experience boundaries in the role as a "patient" in relation to the "psychologist". The researcher opened the interviews by talking about roles and the possible boundaries these roles may create.

The interviewer used a thematic interview guide (Kvale, 1996; Moyle, 2002). The following main questions were asked: "How do you experience being depressed?", "How do you understand your condition and situation in life right now?" and "How do you cope?" The researcher aimed to follow the participants' stories, but also probed to encourage more in-

depth descriptions. It was necessary for the researcher to ask and validate her interpretations during the interview in order to understand their told experiences.

The interview was ended either by the participant, or suggested by the researcher continuously observing the mental condition of the participant, but also if no new information was revealed. The interviews lasted between thirty minutes and two hours, and were audio recorded. When descriptions of the participants' experiences from all the interviews became repetitive and no new nuances were revealed, the inclusion of new participants ended (Kvale, 1996).

If a participant wanted to read the transcript afterwards, he or she could do so and make comments. This was done to assure the participants that their stories were recognizable to them after transformation from spoken to written words. The researcher however, considered these comments as additional information and not as part of the interviews and informed the participants of this approach (P. Ricoeur, 1974a).

#### *Assessments and measures Paper III and IV*

In this research project, standardized assessment scales were used. All included participants in paper III and IV were screened and assessed by measures and diagnostic tools following a strict protocol. Except the variables LoC orientation, coping strategies, the same variables were assessed at baseline for participants both with and without depression, and for the depressed in-patients at follow-up.

The following measures and scales were applied:

**Locus of control of behavior (LoC)** (A. R. Craig, J. A. Franklin, & G. Andrews, 1984a), a self-report questionnaire, was used to assess to what degree control is perceived as an out- or inside resource (external/ internal Locus of control). The LoC scale consists of 17 questions and a six-point response-scale (0-5). By inverting the seven internal items and adding the sum to the external items, a total score of externality (external LoC orientation) is computed. Higher externality indicates lower perceived personal control (min-max 0-85 points). A Norwegian translated scale is applied in several studies in Norway (F. K. Bruvik, I. D. Ulstein, A. H. Ranhoff, & K. Engedal, 2013; Fosse & Holen, 2007; Nordthug, Krokstad, & Holen, 2011).

**Ways of coping questionnaire** (Wocq) (S. Folkman & Lazarus, 1980a), a version of 26 self-report items from original 66 items with a five-point response-scale (0-4), was used to assess problem- and emotion-focused coping strategies. The questionnaire is derived from a five-factor model (Sørli & Sexton, 2000), constituting problem-focused strategies (seeking social support and cognitive action; item 1-3, 8-9, 4, 10-11, 14, 17, min-max score 0-40) and emotion-focused coping strategies (passive thinking, wishful thinking, and avoidant thinking, item 5-7, 12-13, 15-16, 18-26, min-max score 0-64). A higher sum score indicates more frequent use of the respective coping strategies (Sørli & Sexton, 2000). The scale is translated and applied in clinical studies in Norway (Sørli & Sexton, 2000; Sørli & Sexton, 2001). Sum scores from both coping questionnaires were used as continuous variables.

**Recent Life events** (Paykel, 1997), a widely internationally used interview developed to identify recent negative life events the last 12 months, was applied. A short version (three items of originally 64) were used to identify recent negative life events common to older persons; Life-threatening situations as illness or accident; loss by death of spouse or close person; breakup of close relationship (yes/no). Secondly, a scale consisting of four categories ranging from “not at all” to “highly relevant”, was applied if “yes” was answered in one or more of the mentioned life events, in order to measure to what degree the event was upsetting to the person the last seven days. A “highly relevant” score indicates more distress related to the life event (Paykel, Prusoff, & Uhlenhuth, 1971). The three items (Q1) are used in a large population study in Nord- Trøndelag in Norway (HUNT, 2011), carried out in three waves (1984-2008).

To evaluate diagnosis and symptoms of depression, the following instruments were applied:

**Diagnosis of depression.** Diagnostic evaluation of the participants at baseline and at follow up (paper II, IV) was done according to the criteria of WHO’s ICD-10 Classification of mental and behavioral disorders: diagnostic criteria for research (1993), tenth version, by psychiatrists and psychologist trained in geriatric psychiatry and psychology. Diagnostic evaluation of the community dwelling participants (paper III) was performed by a psychologist and a General Practitioner trained in geriatric psychology and psychiatry. A history of depression or other mental health problems, family history of mental health problems, and current mental health problems were recorded. A diagnosis of depression was dichotomized into a categorical variable (depressed/ not depressed).

**Montgomery-Aasberg Depression Rating Scale (MADRS)** (Montgomery & Asberg, 1979b) was applied to evaluate severity of depressive symptoms. This is a ten-item observational scale with each item scored on a seven-point rating scale (0-6) where a higher score corresponds to more severe symptoms (min-max 0-60). MADRS is translated, validated and used in several Norwegian studies including older persons (K. Engedal et al., 2012a; Lovdahl, Andersson, Hynnekleiv, & Malt, 2008; Naess, Nyland, Thomassen, Aarseth, & Myhr, 2005; Thommessen et al., 2002b). A sum score of MADRS was used as a continuous variable.

**The Hospital Anxiety and Depression Scale (HADS)** (Zigmond, 1983) was used to assess symptoms of depression and anxiety. It consists of 14 items; seven items relate to anxiety, seven items to depressive symptoms. The items are scored on a four-point scale from zero to three (not present-considerable), and added. Sub-scale scores on HADS-A and HADS-D ranges from min-max of 0-21. HADS was developed in order to avoid reliance on aspects also common to somatic illness. A review showed that the instrument assessed well both symptom severity of anxiety and depression in physical, psychiatric patients, and in the general population (Bjelland, Dahl, Haug, & Neckelmann, 2002). HADS is translated to Norwegian, tested and applied in several Norwegian studies including older persons (Helvik, Engedal, Krokstad, Stordal, & Selbaek, 2012; Helvik, Engedal, Skancke, & Selbaek, 2011; Mykletun, 2001; Olsson, Mykletun, & Dahl, 2005).

Cognitive and functional levels were evaluated by:

**The Mini-Mental-State Exam - Norwegian Revised Version (MMSE-NR)** (Folstein, Folstein, & McHugh, 1975) is a 20-item interviewer-administered measure with a minimum score of zero and a maximum score of 30. A higher score indicates better cognition and, a MMSE-NR score of 27 or more usually indicates a level of healthy cognitive functioning (C. Strobel & Engedal, 2008) and was used as cut-off for participation in the reference group. The MMSE-NR has been used, translated, adapted and validated for older persons in Norway (Bystad, Skjerve, & Strobel, 2013; K. Engedal, Haugen, Gilje, & Laake, 1988).

**Instrumental Activities of Daily Living (I-ADL)** (Lawton & Brody, 1969c) was assessed using Lawton and Brody's scale consisting of eight items with a response scale ranging from one to four points on three items, one to five points on two items, and one to three points on three items (min-max 8-31 points), representing different levels of daily activities to be mastered. A higher sum score indicates lower level of I-ADL function. The scale has been

translated, and used in several Norwegian studies, including older persons (Gro, Fossa, & Dahl, 2010; Omli, Hunskaar, Mykletun, Romild, & Kuhry, 2013).

Physical health assessment includes a history of physical activities, history of diseases, drug use, and clinical examinations. The following instrument was used in the study:

**The General Medical Health Rating (GMHR)** (C. Lyketsos et al., 1999) is a global rating of medical comorbidity, originally used in patients with dementia. The rating consists of one item with four categories (Excellent-good-fair-poor). GMHR is found to be highly reliable (weighted kappa = .91), and has been used in large international population studies including older persons with and without dementia (C. Lyketsos, et al., 2004) and has been translated and used in Norway (Sylliaas, Selbaek, & Bergland, 2012).

**Socio-demographic background** (social status, living arrangements and level of education) was assessed by a self-report questionnaire used in previous studies in Norway (HUNT, 2011; A. Valen-Sendstad, Engedal, K, Stray-Pedersen, B, ADACT study Group, Strobel, C, Barnett, L, Nurminemi, M, & Meyer, N. , 2010)

#### *Data collection at 12-month follow-up (Paper IV)*

The time frame from baseline to follow-up examination was Nov. 2012 to Feb. 2014 (15 months). All patients included at baseline were invited to a follow-up examination 12 months after inclusion to the study. The data collection was carried out by health professionals at the study centers. Data were collected from a clinical assessment, case notes, and information from carers. It was not possible to do a clinical examination of 25 patients and for those patients data were collected from all available sources of relevant information including telephone interviews, if possible. These 25 patients were recruited from six different study centers. Additionally, for patients deceased during the follow-up time, the time of death was collected by health personnel. LoC orientation and coping strategies were not assessed at follow-up.

#### 10.4 Analyses of the collected data

##### *Paper I Analysis of existing publications*

To secure robustness and trustworthiness, two researchers evaluated independently all included papers in this study (Oxman & Guyatt, 1988). From the 75 papers, 44 papers underwent further systematization, and are presented in tables in paper I.

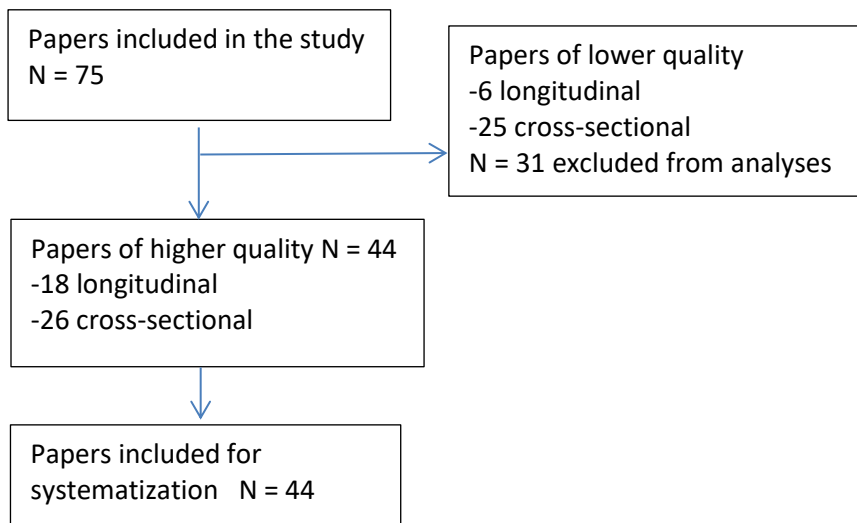


Figure 7. Flowchart of papers included for further systematization.

## *Paper II Qualitative analysis*

To reveal the essence of meaning from the stories told by the participating men and women we chose a methodology grounded in phenomenological hermeneutics, inspired by Ricoeur and Lindseth & Norberg (Geanellos, 2000; Heidegger, 1962; Lindseth & Norberg, 2004; P. Ricoeur, 1974a; P. Ricoeur, 1981a).

The following steps of analyses of the material from the interviews were conducted:

(1) *Naïve reading*. The audiotapes were listened to and the transcripts were read through several times in order to gain an overall understanding of what the participants told, the atmosphere of the interview and the meanings from the stories of the participants (Lindseth & Norberg, 2004). Condensation of the participants' stories was also initially performed to bring their stories further into "relief" and to bring forward the essence of the stories (Malterud, 2011). This was important because the participants had problems with forming sentences and needed time to express themselves verbally. The researcher's impressions from every transcript were written down and summarized as an initial interpretation of the text (not shown).

(2) *Structural analysis* was conducted by first dividing the text into units of meaning, and by labeling the words, phrases and sentences according to their meaning. Units of text revealing similarities and variations of experiences and meaning from across the transcripts were then grouped into larger units of text, forming categories and emerging themes. The categories and emergent themes were compared to each other, revealing further variety and density of meaning. Themes were then read as wholes and different sub-themes emerged related to every main theme (Lindseth & Norberg, 2004).

(3) Through the process of *comprehensive understanding*, the researchers summarized and reflected upon the main themes and sub-themes in order to understand the analyzed and complex text as a whole and to see the essences of meaning being revealed. By returning to the original transcripts and the initial naïve understanding, again as open-mindedly as possible, the themes and sub-themes were read in relation to their original context to see if the abstracted and condensed units of text still reflected the meanings from the original transcripts (Lindseth & Norberg, 2004).



Qualitative research methodology is based on theories of human experiences (phenomenology) and interpretation (hermeneutics) (Malterud, 2011). Phenomenology is concerned with the phenomena we consciously perceive, in engaging with the surrounding world (Willig, 2009). In phenomenology, we aim to perceive the world as it is experienced by the person within their individual historic, social and relational contexts.

To gain knowledge from the old persons' stories of how they experienced and coped with depression, a hermeneutic approach was also applied. In trying to obtain an understanding of the person's experiences, the researcher both use interpretation in approaching the phenomena of interest, in forming the research questions, but also in interpreting bodily and spoken language of the participants being interviewed. The researcher interprets the meaning of what is said as well as how it is spoken (Kvale, 1996). Furthermore, the interviews were transcribed into text where the researcher further interpreted and translated the spoken language into meaningful text before analyzing the text into meaningful entities. By this, the researcher used interpretation through the entire process of the study. The phenomenological-hermeneutic approach does not separate description of experiences from interpretation, but rather understand descriptions as results from interpretation (Heidegger, 1962; Lindseth & Norberg, 2004; Van Manen, 1990; Willig, 2009).

Furthermore, according to Husserl (Husserl, 1931), to be able to gain the essences of knowledge about individual's experiences (the phenomenon) one has to suspend own assumptions, judgements and interpretations. It is important to strive to describe the phenomenon as totally as possible, and to be able to identify the conditions or contexts wherein the phenomena exist (Moustakas, 1994; Willig, 2009). As a consequence, instead of down-playing the role as a psychologist and contextual influences (the hospital-setting) as "noise", or trying to reduce and diminish influence from the researcher, the researcher act according to principles of scientific transparency and so-called personal and epistemological reflexivity (Willig, 2009). Openness and reflections about own influences on the participants and the research process were communicated explicitly and presented as integrated parts of the results. The interview is thus a site of construction and co-production of knowledge (Kvale, 1996).

To extract the essence of meaning from the old persons' experiences of coping with depression, the audio-taped interviews were transcribed verbatim from the iPod into written text as accurately as possible, including pauses, and non-verbal sounds. During this transformation the written text was considered "objectified" or disentangled from the

participant, as according to the principles of hermeneutics mentioned above. During transcribing the interviews, the researcher processed the information and unavoidably interpreted spoken words and sounds herself, to be able to write it down into readable text (Geanellos, 2000). Interpretation can thus be understood as a result of an interplay between the interpretation and the interpreter (Geanellos, 2000; P. Ricoeur, 1974a; P. Ricoeur, 1981a).

The researcher as an interpreter is of these reasons contributing to the extracted meaning and final results extracted from the participant's stories (Geanellos, 2000). It was important to highlight the researchers' pre-understandings, hence all analyses and categorizations of the material included three researchers; one psychologist and two nurses (GHG/ASH/MK). The researchers' contributions during the interview and interpretative process were continuously reflected upon in a reflexive journal, together with the participants' reactions towards the researcher and the situation regarding how the interview was arranged.

### *Paper III Statistical analyses*

The statistical analyses in paper III were performed using SPSS version 19.0 (SPSS, Chicago, Ill, USA). Descriptive statistical analyses were performed.

In paper III data was collected at baseline and compared in two independent groups of older persons; a depressed in-patient group and a community-dwelling reference group without depression.

#### *The dependent variables*

The continuous main outcome variables in paper III were LoC orientation, and ways of coping (problem-focused and emotion-focused coping strategies). The scores of the dependent variables were normally distributed in both the depressed in-patients and the reference-group. Pearson correlation test was used to check if the three coping variables could be seen as three separate constructs.

#### *Pearson correlation*

Correlation analysis is a way to describe strength of co-variation between two variables (Pearson, 1895), and to explore collinearity between variables. Pearson product-moment correlation coefficient is designed for linear continuous variables, or one linear continuous and one dichotomous variable. The coefficient can range from -1 to +1, indicating a positive or negative relationship, or as one variable increase, the other increase or decrease, respectively. The strength of the correlation is indicated by the size of the absolute value  $r$ , where 1 is perfect, and 0 is no relationship between the two variables. A small  $r$  value is considered up to 0.29, medium from 0.30 to 0.49, and strong 0.5 to 1.0 (Bjørndal & Hofoss, 2010).

#### *The independent variables*

The independent variables included in paper III were as follows and are presented in more detail in the above sections; Recent Life Events (Paykel, 1997), depressive symptoms by MADRS (Montgomery & Asberg, 1979a) and HADS (Zigmond, 1983), cognition by MMSE-

NR (Folstein et al., 1975; C. Strobel & Engedal, 2008), medical health by GMHR (C. Lyketsos et al., 1999), instrumental activities of daily living by I-ADL (Lawton & Brody, 1969b), and socio-demographic information (HUNT, 2011; A. Valen-Sendstad et al., 2010). Data were described as means and standard deviations (SD) or frequencies and percentages, as appropriate. Choice of covariates was based on clinical considerations and previous clinical research in groups of older persons conducted in the research group.

A simple comparison between characteristics in the two independent groups (patients and reference group) was performed with Independent samples t-test for continuous data and Pearson's chi-squared test and Fisher's Exact Probability Test for categorical data. Probability values below 0.05 were considered statistically significant for differences between the two independent groups of older persons with and without depression.

#### *Independent samples t-test*

To compare the means of the continuous variables in the two independent groups of participants (in-patients and reference group) Independent samples t-test (Gosset, 1908; Kirkwood, 2003; Mankiewicz, 2004) was applied for the variables age, reaction to life events, MMSE-NR, I-ADL, MADRS, HADS and the three coping variables.

#### *Chi-square tests*

To assess the relationship between categorical variables in the two samples we applied the Chi-square tests (Kirkwood, 2003; J. Pallant, 2010; Yates, 1934); Pearson's chi-squared test and Fisher's Exact Probability Test (when sample sizes were small) (R. A. Fisher, 1922; R.A. Fisher, 1954; Kirkwood, 2003) in a 2 by 2 table design. These tests compared the observed frequencies occurring in each category with expected values, and explored if the frequencies were equally distributed in both groups (Kirkwood, 2003). Pearson's chi-squared test is a chi-square test applied to sets of categorical data to evaluate how likely it is that any observed difference between the sets arose by chance. It is suitable for unpaired data from larger samples (Gosall, Kaur, & Gurpal, 2012).

In this study, we explored the differences between the two groups on the categorical covariates; socio-demographic information (gender, education), life events (life-threatening situation, loss of close person, breakup in close relationship), and clinical variables (history of

cardiovascular disease and general medical health). When chi-cells had an expected count less than 5, Fisher's Exact Probability Test was used. The independent variable "Break-up in relationship" was analyzed with Fisher's Exact Probability Test.

### *Sample sizes*

The data from the depressed in-patients collected for paper III and IV were from nine and seven psychogeriatric hospital units in Norway (see table 1 above). The sample sizes depended on the data the hospital units managed to collect within the timeframe of the project. This multicenter project was the first study of this scale being conducted in psychogeriatric hospital units in Norway and the included centers were able to invite all patients of 60 years and above being admitted to the psychogeriatric hospital for depression, to be included.

With too small samples sizes, there was a risk of a falsely non-significant result to occur and we may draw false conclusions (Skovlund & Vatn, 2008), also called a type 2 error. We then falsely fail to reject the null hypothesis and we assume there is no relationship, but there is in fact a relationship (Aalen et al., 2012). Inversely, if the null hypothesis is true, but is rejected ( $H_0$ =There is no difference between the two groups) and we falsely assume there is a relationship, a type 1 error is drawn (Aalen et al., 2012).

Paper III was part of a Norwegian multicenter research project where nine psychogeriatric hospital units participated. Data could have been clustered due to the centers cultures for how to evaluate and collect data. However, the dependent variables were based on coping questionnaires filled in by the patients themselves, hence no cluster effect due to different centers was expected.

### *Multiple regression analysis*

Multiple regression are often used to explore whether independent variables of potential importance are associated with a particular outcome, when statistically controlling for additional variables (Kirkwood, 2003). To explore associations between the continuous dependent coping variables and independent variables of possible importance, linear regression analysis (The "Enter" method) was performed. By conducting multiple linear regression analysis several independent variables of potential importance for the main

outcome under study can be explored simultaneously and adjusted for each other. So the result of the associations may be more precise than when using bivariate or unadjusted analysis.

### *The “Enter” method*

When applying the commonly used standard multiple regression, also called the “Enter” method, all independent variables of interest are included simultaneously into the model (J. Pallant, 2016). This is an appropriate method because we had a set of variables we wanted to examine in how they affected the dependent variables of coping, as a whole. Additionally, we examined the unique variance each of the covariates could explain for the dependent variables.

### *Unadjusted regression analyses*

First we conducted unadjusted linear regression analysis and developed two models. We included in model 1 the independent variables depression vs non-depression (ICD-10), age, gender, marital status, living alone and degree of education, life events, cardiovascular disease (yes vs. no), and general medical health. Age ( $\geq 75$  years), level of education (< ten years vs.  $\geq$  ten years) and general medical health (poor vs. not poor) were categorized because of a non-linear association with the dependent coping variables. The variables MMSE-NR and I-ADL were excluded from the analyses, because cognitive-, instrumental- and daily function is prone to be heavily affected by the older patients’ depressive symptomatology (Alexopoulos, 2005a; D. G. Blazer, 2003b), and assumed to be highly correlated to depression and thus act as mediators.

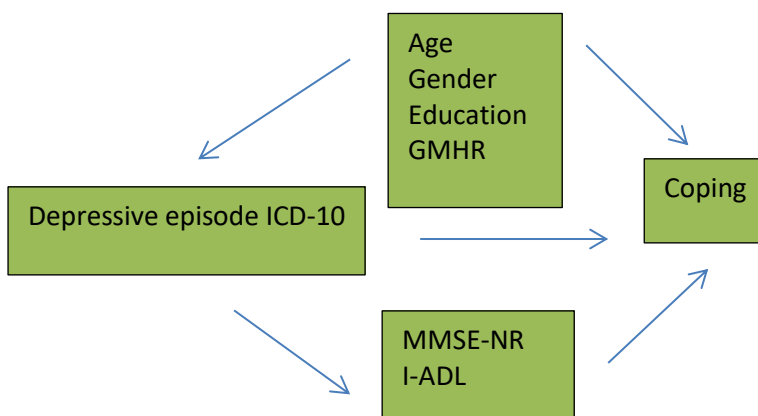


Figure 8. Model of the relationship between independent and dependent variables in a cross sectional study

Covariates associated with one of the three dependent outcome variables at a  $p \leq 0.1$  level were presented and included in the adjusted linear regression models.

#### *Adjusted regression analysis*

In adjusted linear regression analysis, the associations between LoC orientation and problem-focused coping strategies and the independent variables; group of belonging (depressed/ not depressed), age ( $\geq 75$  years), gender (females), education ( $< 10$  years) and general medical health (as poor) were included (see figure 8). No adjusted linear regression analysis was performed with emotion-focused coping strategies as outcome, since this outcome was not associated with any of the independent variables under study ( $p \leq 0.1$ ). Probability values below  $p \leq 0.05$  were considered statistically significant.

#### *Paper IV Statistical analyses*

IV IBM SPSS Statistics version 22 (IBM Corp, Armonk, New York) and SAS v 9.2 were applied.

In paper IV data from one sample of older depressed in-patients at baseline and from a 12 month follow-up were used.

#### *The dependent variables*

The main outcome variable in paper IV was “depression versus no depression” at 12-month follow up, a categorical variable evaluated according the ICD-10 criteria (WHO, 1993a) for a depressive episode. In addition, a continuous sum score outcome variable for degree of depressive symptoms by MADRS (Montgomery & Asberg, 1979b) was used. The sum scores of the dependent variable MADRS, was normally distributed.

#### *The independent variables*

Independent variables supposed to be of clinical importance were included in paper IV.

LoC orientation, (Craig et al., 1984a) problem-focused and emotion-focused coping strategies (S. Folkman & Lazarus, 1980a)(continuous variables), sociodemographic variables including gender, age, living arrangements, and level of education (HUNT, 2011; A. Valen-Sendstad et al., 2010) and general health (GMHR) (C. Lyketsos et al., 1999)(categorical variables) were assessed. Cognition was assessed by MMSE-NR (Folstein et al., 1975; C. Strobel & Engedal, 2008), instrumental activities of daily life by Lawton and Brody’s I-ADL scale (Lawton & Brody, 1969a), and depressive symptoms at baseline assessed by MADRS (Montgomery & Asberg, 1979a) (continuous variables). MADRS was also included as a control variable.

Data were described as frequencies and percentages, or means and standard deviations (SD). All covariates included in multiple regression analyses were assessed only once at baseline. LoC orientation, problem-focused and emotion-focused coping strategies were normally distributed.

For assessment of differences between the two sub-groups of females and men, and depressed and not depressed (categorical data) at follow up, Pearson’s chi-squared test and Fisher’s Exact Probability Test, as described above, was used. Probability values below  $p \leq 0.05$  were considered statistically significant.



### *Representativeness*

To assess representativeness, a simple comparison between characteristics in the two independent groups; the participating patients at follow-up (n=122) and those not participating at follow-up (n=22 dropouts) was conducted. For categorical variables, we applied Pearson's chi-squared test, and for continuous variables Mann-Whitney U Test (non-parametric analysis) was used. Pearson's chi-squared test is described in the section above.

### *Mann-Whitney U Test*

This non-parametric test was applied to test for differences between medians in two independent groups measured on a continuous variable, and is often used when samples are small (Kirkwood, 2003). By converting scores into ranks it was possible to estimate if the groups were significantly different (Aalen et al., 2012; J. Pallant, 2016). To describe distributions of LoC orientation and coping strategies (continuous data) in small sub-samples of gender and depression (depressed and non-depressed patients) at follow up, Mann-Whitney U test (non-parametric analysis) was applied.

### *Paired samples t-test*

Paired samples t-test was used to calculate descriptive changes in the continuous variable MADRS sum score, in the total sample of depressed in-patients, from baseline to follow-up. This repeated measure was used when comparing mean scores from continuous variables assessed in the same sample on two different points (Aalen et al., 2012). MADRS sum score was normally distributed at both baseline and follow-up.

### *Multi-level analyses*

The main outcome variables of depressive episode (ICD-10) and depressive symptoms (MADRS) in paper IV were evaluated and collected by healthcare personnel at the different psychogeriatric hospital units. The data collected from clinical evaluations may potentially exhibit a hierarchical structure due to the multicenter structure of the design. Data from psychogeriatric units (at a lower level) can hence, because of clinical culture show within-unit similarities and lead to organized or nested data (at a higher level) (Bryk, Raudenbush, & Anthony, 2002; Fidell & Tabachnick, 2007).

A statistician (J.S.B.) was invited into the research project constituting paper IV for adjusting for possible cluster effects and conducting multi-level analysis. To adjust for these biases two-level models are most common to estimate where the dependent variables have to be examined at the lowest level of analysis.

A possible cluster effect due to hospital units was in paper IV assessed by intra-class correlation coefficient (ICC) in all variables of interest. No or negligible cluster effects was found in the outcome variables and multi-level models were not used when exploring these variables.

#### *Model reduction*

Because the sample size constituting baseline data in paper IV was relatively small, statistical power was considered to be too low to include all covariates of importance in adjusted models and a model reduction was decided. In paper III this was decided by a clinical judgement and p-value in unadjusted analyses. In paper IV with a prospective design, Akaike's Information Criterion (AIC) was suggested by a statistician (J.S.B.) when multi-level analysis was considered.

In AIC, a smaller value means a better model. AIC was applied for model reduction before presenting adjusted regression models. AIC is a measure of the relative quality of the statistical model for a given set of variables, offering a relative estimate of the information lost when a given model is used to represent the process that generates the data. Given a collection of models for the data, AIC estimated the quality of each model, relative to each of the other models. Hence, AIC provided a mean for model selection. There will very often be information lost due to using a model to represent the "true" model (i.e. the process that generates the data). We wanted to select the model that minimized the information loss the most (Aho, Derryberry, & Peterson, 2014; Akaike, 1973). The results were presented as odds ratios (OR) or regression coefficients with the corresponding 95% confidence intervals (CI) and p-values.

#### *Multiple regression analyses*

Logistic regression analyses were used to study the associations between independent variables from baseline and the categorical dependent outcome variable (being depressed, or not depressed according to ICD-10 criteria) at 12 months follow up (Aalen et al., 2012). Inclusion of independent covariates was based on clinical and statistical considerations, and included covariates from adjusted regression analyses in paper III age  $\geq 75$ , female, education, < ten years vs.  $\geq$  ten years, and general medical health, poor vs. not poor. Additionally, we included all three coping variables, living arrangements, cognitive function (MMSE-NR) and instrumental activities of daily life (I-ADL) in this prospective design.

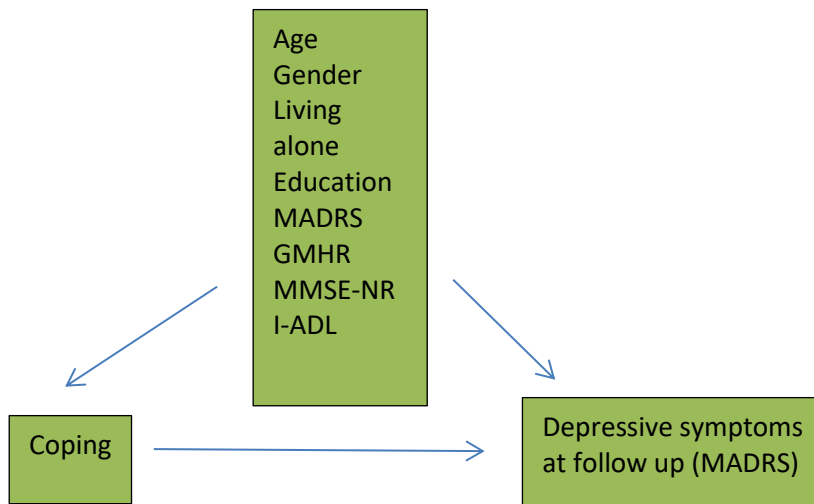


Figure 9. Model of the relationship between independent and dependent variables in a longitudinal study

The “Enter method” was chosen, see description above from paper III. First, unadjusted logistic regression analyses were estimated, one for each covariate. Two different models were estimated. Each of them, after model reduction was performed based on potentially independent variables for the chosen model.

In model 1 coping, sociodemographic conditions and depressive symptoms (MADRS) were included (see figure 9). In model 2 the previous mentioned variables, health and functional level (GMHR, MMSE-NR, I-ADL) were introduced. Model 1 contained after model reduction problem-focused coping variable, living alone, education, and MADRS sum score. Model 2 contained after model reduction the following covariates; problem-focused coping variable, living alone, MADRS sum score (baseline) and I-ADL.

Linear regression analyses were applied for studying associations between the independent variables at baseline and the dependent continuous outcome variable; depressive symptoms by MADRS at 12 months follow up. First, unadjusted analyses were estimated, one for each covariate. Two different multivariate models were estimated. The same procedure as in logistic regression analyses were applied in linear regression analyses. Probability values below  $p \leq 0.05$  were considered statistically significant.

### *10.5 Ethical considerations*

Two groups of participants in this research project were recruited as patients: in psychogeriatric hospital units in Norway, and community-dwelling participants receiving homecare (paper II, III, IV). The studies described in paper II, III, and IV were approved by the Regional Committee for medical and Health Research Ethics in the South East of Norway, and was conducted according to the World Medical Association Declaration of Helsinki (WMA, 2000). Trial registration: ClinicalTrials.gov NCT01952366.

To be able to invite participants from the two groups of older patients; patients admitted to psychogeriatric hospital units and patients receiving home-care, a careful process of inclusion was necessary. Both written and oral information were given to the patients and their next of kin about the purpose of the study, the assessments, security of personal information, and that participation was voluntary. The participants were informed that it had no consequences to them if they withdrew their consents, or refused to participate. The patients were invited to the study and written informed consent to participate in the study was then collected, before the researchers approached to participants.

If a patient was evaluated as having reduced capacity to consent, the next of kin was asked to consent on behalf of the patient (paper III, IV). More details concerning ethical considerations can be found in paper II, III and IV.

## 11.0 Main results

In this section results from all four studies will be described. First we present the characteristics of the participants in three of the papers (table 3).

Table 3. Characteristics of the samples.

		<b>Paper II</b> <b>Qualitative</b> <b>study</b>	<b>Paper III</b> <b>Cross-sectional study</b> <b>(at baseline)</b>		<b>Paper IV</b> <b>Prospective</b> <b>study</b>
<b>Diagnosis of depression</b>		Depressed	Depressed	Non-depressed	Depressed
Number	N (%)	18 (100)	144 (100)	106 (100)	122 (100)
<b>Socio-demographics</b>					
Females	N (%)	13 (72.2)	104 (72.2)	70 (66.0)	87 (71.3)
Age	Mean (SD)	77.4 (7.9)	76.0 (6.8)	73.0 (8.0)	75.4 (6.6)
Living alone (No)	N (%)	12 (66.7)	80 (55.6)	53 (50.0)	58 (47.5)
Education < 10 y	N (%)	7 (38.9)	83 (57.6)	25 (23.6)	65 (56.0)
<b>Coping</b>					
LoC orientation	Mean (SD)	42.7 (8.8)	40.7(10.6)	28.1 (10.1)	40.9 (10.8)
Problem-focused coping strategies	Mean (SD)	14.3 (7.3)	16.7 (6.3)	23.4 (21.2)	16.7 (6.8)
Emotion-focused coping strategies	Mean (SD)	25.4 (9.4)	23.9 (9.1)	23.6 (8.6)	25.4 (9.0)
<b>Life events last 12 month</b>					
Life-threatening situation (yes)	N (%)	1(5.6)	10 (6.9)	11 (10.4)	7 (5.9)
Loss of close person (yes)	N (%)	7 (38.9)	37 (25.7)	20 (18.9)	31 (26.1)
Break-up in relationship (yes)	N (%)	0	3 (2.1)	2 (1.9)	3 (2.5)
<b>Clinical variables</b>					
GMHR as poor	N (%)	8 (44.4)	71 (49.3)	16 (15.1)	58 (47.5)
MMSE-NR score	Mean (SD)	27.0(2.6)	26.0 (3.7)	29.0 (1.1)	26.3 (3.6)
I-ADL	Mean (SD)	14.9 (5.8)	15.1(6.2)	9.6 (4.2)	15.2 (6.2)
History of psychiatric illness	N (%)	9 (50.0)	109 (73.2)	71 (67.0)	94 (77.0)
MADRS	Mean (SD)	24.3 (8.6)	25.6 (8.6)	2.2 (2.9)	26.1 (8.8)

The samples in the three papers were described by gender, age, social status (living alone), education, life events, depression, general medical health, cognitive and functional status.

Representativeness paper III: The in-patients being excluded (n=16) from paper III because of missing information on the coping questionnaire, had significantly higher levels of depressive symptoms (mean MADRS sum score 26.0, SD= 8.55,  $p= 0.02$ ). The missing group did not differ in cognition (mean MMSE-NR sum score 25.9, SD= 3.58,  $p= 0.08$ ) nor age (mean age 76.0, SD= 6.8,  $p=0.51$ ) compared to the included participants.

Representativeness paper IV: The in-patients not participating at follow-up (n=22) were significantly older (mean age 79.5, SD=6.7 years,  $p=0.008$ ) and had a lower mean MMSE-NR sum score at T1 (24.5, SD=3.6,  $p=0.028$ ) than the participating patients. Gender, baseline MADRS, LoC- and WoC-scale sum scores, and I-ADL scores did not differ between those who participated and not participated at follow-up.

### *11.1 Paper I*

#### *Samples of older persons*

Of the 75 studies in total, 38 studies were clinically based and 37 were community based. Of the clinically based studies, 26 were conducted in hospitals or in GP's practices, six in psychogeriatric clinics, four in nursing homes and two studies were from memory clinics. The clinical studies included older patients with a diagnosis of depression in 12 studies.

#### *Quality of the studies*

In total, 24 studies had a longitudinal and 51 had a cross-sectional design. Two studies met all seven quality criteria and received ten points, 44 of the 75 studies received six points or more and were evaluated to be of relatively high quality (18 longitudinal and 26 cross-sectional studies).

#### *Assessment of depression*

Information about depressive symptoms was obtained from self-report instruments, observation inventories, structural interviews, or from diagnostic evaluations applying the DSM-III/ -R/ IV criteria. A total of 21 different instruments were used in the studies to assess the symptoms of depression. The Center for Epidemiological Studies – Depression scale

(CES-D) (Radloff, 1977) was most often applied (24 studies). Four studies used a scale constructed for the specific study.

#### *Concepts and assessments of coping*

In all, 55 different measures of coping were applied in the 75 studies, and the instruments were found to be related theoretically in the following clusters: 1) sense of coherence, 2) various instruments of control orientation, 3) coping strategies, style or actions (referred to as coping strategies hereafter), and 4) religious coping. These clusters are again found to represent two different, but related parts of the coping process; resources and strategies of coping. The SoC scale (Antonovsky, 1996) was the most frequently used instrument, applied in nine studies.

#### *Assessment of coping in samples of older persons*

No studies reported information about difficulties with administration of the coping questionnaire in older participants. However, 11 studies excluded participants with a cognitive impairment, a diagnosis of dementia or major depression. Ten papers including older persons with a clinical depression, cognitive impairment, or from nursing homes screened participants for cognitive impairment and nine applied the Mini Mental Status Examination (MMSE)(Folstein M, 1975).The criteria of exclusion varied from  $MMSE \leq 6$  to 25 points, but most often a cut-off at 24 and 25 points was used.

#### *Coping and depression in older persons*

In the 44 studies with a quality score of six or more points, the main finding was of a strong relationship between resources and strategies of coping and depression, and this relationship appeared to be stable over time. A stronger Sense of coherence, less external LoC orientation, more use of problem-focused coping strategies and religious coping, but less use of emotion-focused coping strategies were related to less depression (diagnosis and symptoms). See more detail of the results in paper I.

## 11.2 Paper II

The themes are based on all the interviews, but some of the participants described their experiences and situation in greater detail than others and these interviews are more often referred to, regardless of the severity of their depressive condition. Three main themes were identified from the material capturing the participants' experiences of depression and how to cope with it: (1) "Terrible suffering", (2) "Being stuck" and (3) "Why did this happen?".

The first two themes, described in all the interviews, were continuously and constantly present during the interviews, capturing the patients' intense and agonizing mental state and efforts to cope. The third theme reported the participants' own understanding or explanation of the reasons and context of their experiences. The main themes were strongly related to each other (see textbox 3).

Textbox 3. Main and sub-themes are presented with representative quotes to illustrate the main findings.

<b>Terrible suffering</b>	
1. An overwhelming feeling of restlessness	Just wandered, and wandered and wandered. Went about like a dog in a cage... couldn't sit and eat. I stood and... stood and ate actually... don't remember what controlled my legs...went like drumsticks. Don't know what is steering. That is what is scaring, that you don't manage to hold your legs still. You will... and...and don't manage to get control of your nerves. It's... It's like a motor inside that has started and that you have no control of.
2. Aches and pains all over the body	No, it's terrible with all this pain... and isolation. I ended up sitting in my sofa with a feeling of being stressed. Then my neck started to ache, head started to ache, shoulders and back. It aches all those places... and it's terribly painful in my jaws and eyes. It is stress and maybe that I have been doing too much crosswords. Then I went to my doctor again and he said: 'Well, now you have been examined all over, and there is nothing more we can do for you'. Then he sent me to a psychologist and I said that was not what I needed. I need something else. I need help to get started and to get rid of all the pain.
3. Drained of energy	I just slept away and... I was sad and ... that is the terrible thing with being depressed. You become powerless and...you try to stay active ... to eat... I try...it's not much to do with these things...I will die.
<b>Being stuck</b>	



1. I lost my way	Don't know what to do.... I used to go out and visit friends...ask them what they do... and if I could pay them a visit... yes, that helped...but now the feeling has gone...before it could feel so good when the phone rang, but now... I'm longing so much... when I hear a voice.
2. Can't pull myself together	I thought I could cope with this ... through...until she died. I managed to get energy to pull myself together ... to function together with her... the laundry and all that. To take her out for a walk... I could... at the end I was down at the bottom.
3. Giving in	<p>Annie (A): When you... are at my age, it is not that easy to get up on your feet again ... and I thought that when I went out there for the second time [to hospital], I would never manage to do so. There were so many thoughts inside your head...</p> <p>Researcher: What thoughts could that be?</p> <p>A: Well... that I rather could end it all than have to experience this.</p> <p>R: You would rather die?</p> <p>A: I would rather die than to live like this.</p>
<b>Why did this happen?</b>	
1. Too much of a burden from caring	Then my son said to me, 'Is this because of me?' No, I said. It's just that it has been so many things throughout so many years... that I have just shuffled it and shuffled it away. It just had to go! ... and ever since...it has been so many things in the family...it has been like that all my life, I think.
2. Being left alone	<p>H: When you don't manage to find things to be right as it is now, then you probably get more easily irritated. In addition, I am getting older and more jealous.</p> <p>Researcher: How do you feel about that?</p> <p>H: [Laughs] Well, it's not a good feeling!... it has more or less added up into ... She is very charming towards other people. Has a lot to say and can make a joke and things like that....so then, but not directly... a charming woman...it's natural that another part, the way I see it, finds this attractive and finds her attractive and so on... I can't find any direct example, but it is probably a part of the background.</p>
3. Fear of becoming too	I blame myself for having... that is, I'm blaming myself.... that I have put myself into this situation I'm in now...yes... self-blaming you could say... [whisper]...

<p>much of a burden to others</p>	<p>no... I'm totally ...no, I... that I was going to manage myself without... that I wasn't going to manage the expenses of my housing and ... yes...that I was bothering... my family.. They say they don't ...that there is no reason...for... no, that I have disappointed them in some way...</p>
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*Being in a vice*

The stories revealed experiences of being locked or fixed in a most painful existence by forces that participants could do very little to loosen the grip of. No matter how they approached their situations, how hard they tried, or what strategies they sought, they were stuck and not able to alter their conditions. We found the metaphor “being in a vice” useful to capture the essence of meaning from the participants stories.

### 11.3 Paper III

Characteristics of the participants in paper III is presented in table 3 above.

#### *Locus of control and coping strategies*

The depressed in-patients had a significantly higher external LoC orientation and used problem-focused coping strategies significantly less frequently compared with the non-depressed group. Use of emotion-focused coping strategies did not differ between the patient and comparison group. In unadjusted analysis, higher age, female gender, low education and poor general medical health, were associated with higher externality.

In the multiple linear regression analysis adjusted for age, gender, years of education and general medical health, the depressed older patients had higher external LoC orientation and less frequent use of problem-focused coping strategies, compared with the non-depressed group. No significant association was found in use of emotion-focused coping strategies between the two groups.

The  $\beta$  coefficients for both LoC externality and problem-focused coping strategies were reduced when data was adjusted for age, education and general health, (from 13.026 to 9.536 and from -6.678 to -4.730, respectively).

#### 11.4 Paper IV

See table 3 above for characteristics of the sample at baseline and at follow-up. There was a significant reduction in mean MADRS sum score from baseline (26.1, SD=8.8) to follow-up (11.3, SD=9.2) for the total sample of participants ( $p=0.002$ ).

At follow-up, no significant gender differences or differences between depressed and non-depressed patients in LoC sum scores or emotion-focused coping strategies sum scores were found. Those patients who filled criteria for a depressive episode at follow-up had higher problem-focused coping strategies sum scores at baseline than those who did not fill the criteria for an episode of depression at follow-up ( $p=0.018$ ), but there were no differences between males and females in problem-focused coping strategies sum scores.

##### *Factors associated with depression and depressive symptoms at follow-up*

According to the bivariate logistic regression models, the increased problem-focused coping strategies sum score ( $p=0.036$ ) and the higher I-ADL values ( $p=0.026$ ) were significantly associated with being depressed (ICD-10) at follow-up. The same associations remained significant in Model 1 and Model 2. According to the bivariate linear regression model, the LoC sum score ( $p=0.002$ ) was significant and positively associated with MADRS sum scores. A lower MMSE-NR sum score and higher I-ADL score were significantly associated with increased MADRS sum score ( $p<0.001$  and  $p=0.032$ , respectively).

In multivariate Model 1, a higher external LoC sum score remained significantly associated with higher MADRS sum score ( $p=0.007$ ), while a higher external LoC sum score and only a lower MMSE-NR sum score were significantly associated with higher MADRS scores in Model 2 ( $p=0.017$  and  $p=0.010$ , respectively).

## 12.0 Discussion- methodological considerations

A discussion of methodological issues will be presented, before a discussion of the four specific objectives of the project.

### 12.1 Paper I

#### *Design*

We wanted in this research project to gain an overview of studies exploring the relationship between coping and depression in older persons, but no such reviews had been conducted. Consequently, in conducting the first literature review on coping and depression in older persons, we chose to include all studies of older persons independent of setting and concepts of coping and depression being used in the studies. We consider it a strength to paper I, it is the first review of coping in older persons and this broad scope towards the concepts and settings being included. Also considered as a strength was the thorough literature searches, and two researchers independently evaluating all papers for inclusion and exclusion, in addition to including an evidence-based methodology-analysis by predefining a set of quality criteria in order to evaluate the instruments and to enhance systematization, validity and robustness to our conclusions (Higgins & Green, 2006; Van Tulder, Furland, Bombardier, & Bouter, 2003).

We did not include unpublished literature and so-called “grey literature”, and we may have included papers using both qualitative and quantitative methods, and a mixed-method approach. However, choosing an even broader methodological scope in examining concepts of coping might also have brought further challenges to validity and reliability of the review, as addressed below. The availability of studies in English language was good, but exclusion of papers written in other languages may have contributed to the pool of research in this field to be limited.

There are obvious methodological challenges in comparing studies defining and operationalizing the concept of depression differently as in *depressive symptoms*, *depression* and *depressive disorder*. Furthermore, among 75 papers 21 different scales for measuring depressive symptoms were found. The depressive symptom scales were mostly self-reported,

or interview-based scales and the content of the scales and number of items varied. Diagnoses of depression were also evaluated according to criteria of different versions of the DSM classification systems identified as DSM-III, III-R, IV, respectively. In the papers, the concepts of coping were defined even more broadly and operationalized using a wide variety of instruments (55 self-filling inventories). The broad approach to our inclusion of studies may of this reason be considered problematic, again with respect to performing a comparison of the studies.

Nevertheless, despite the variety in definitions and measures, we found the different forms of coping to constitute four clusters of theoretical concepts, i.e. sense of coherence, control orientation, coping strategies, and religious coping, which made the comparison and analyses more plausible. One may have restricted the review to one or two of the coping concepts. Because there were no former reviews exploring the relationship between coping and depression in samples of older persons, we however kept this broad scope of concepts. This may increase the usefulness of the study. However, we support the need for a further systematization of the theory and methodology of the coping field (E. A. Skinner, Edge, Altman, & Sherwood, 2003).

#### *Evaluation of the quality of the reviewed studies*

Of 75 papers, 44 were evaluated to be of high quality. All papers were scored after predefined quality criteria in line with the method by Licht-Strunk et al. (Licht-Strunk et al., 2009) and Oxman (Oxman & Guyatt, 1988). We gave priority to studies applying a definition of coping with reference to the literature, giving information about diagnosis of depression according to established criteria and using well established assessment tools for depressive symptoms and coping, all criteria given priority to the main scope of this project; the relationships between coping and depression in older persons. This approach strengthened the basis for our conclusions. However, with another focus, other quality criteria could have been chosen.

#### *Representativeness and generalization*

From our results, we find lower sense of coherence, more external LoC orientation and more emotion-focused coping strategies, less use of problem-focused coping strategies and less use of positive religious coping to be related to more symptoms and a diagnosis of depression in the cross-sectional and prospective studies. There were fewer longitudinal, compared to cross-sectional studies, consequently conclusions from these studies are less robust and less representative. Also, the scientific literature covering older persons in need of hospitalization

due to the severity of depression, i.e persons from psychogeriatric hospital units, was very scarce (4) compared to the number of studies of older persons recruited from other clinical (38) and community-based (37) settings. For this reason the findings in this review is less representative to the more severe forms of depression.

## *12.2 Paper II*

### *Design*

This study is the first to conduct interviews with older in-patients in the acute phase of an episode of depression, and we consider this as a strength. In addition we consider the inclusion of a qualitative study in this research project as an important contribution of knowledge to the entire project. However, also in this study methodological issues need to be addressed.

The findings in paper II are based on the interviews of 18 in-patients conducted in one psychogeriatric hospital unit in Norway. The findings represent the experiences from older, hospitalized and depressed patients from a limited geographic area. When compared to depressed in-patients in other psychogeriatric hospital units in Norway, there are however no reasons to believe the findings are very different or peculiar. Both high and low educated men and women were recruited from both densely populated and more remote areas. Furthermore, participants were recruited for interviews until the material produced were evaluated to be saturated and both rich, and dense, thus inclusion of new participants was continued until no new information was identified.

We consider it as a strength in that this material as unique, however, the findings from this study may of the same reasons also be limited, and more studies need to confirm or nuance our conclusions.

Also, older persons with more severe depressive episodes and disorders may cope with their depressive conditions differently in Norway compared to other countries, even though our findings are in line the findings from a meta-synthesis of studies on experiences of depression in older persons, including samples from different parts of the world (Jacqueline Corcoran et al., 2013).

### *Collection of data in the acute phase of a depressive episode*

We found a hermeneutical-phenomenological methodological research approach to be proper to capture the older individuals' unique experiences, their actions, thoughts and emotions,

described in their own words. However, to conduct a study with this methodological approach the individual participant being interviewed had to tell about his or her experiences. Patients admitted to a psychogeriatric hospital unit with a moderate or severe depressive condition may in many ways find this difficult, and one may ask if it was a proper approach to illuminate and bring nuance into the knowledge field on coping and depression.

None of the invited participants refused to take part in this study. A conclusion from this study was that older in-patients with depression were able to tell their stories. The old and severely depressed in-patients were also apparently positive and willing to tell their stories. However, some researchers consider this group of older patients to be too vulnerable to be interviewed (Usher & Holmes, 1997). This may also be one of the reasons for the scarcity of studies on this population. We consider it a strength to this study that older in-patients themselves were contributing directly to clinical research and to bring more knowledge about their situation. This may have important clinical implications that will be addressed further below.

#### *Trustworthiness*

The researcher worked as a psychologist at the unit where all the interviews were conducted. It was crucial not to have any formal role in relation to the participating patients and by this to put a participant under pressure during inclusion or during the interviews. This conflicting double-role was reflected upon from the beginning and was continuously discussed in a reflexive journal and with the other researchers and colleagues at the hospital unit during the entire period of the project (Tong, Sainsbury, & Craig, 2007).

Also being an experienced specialist in clinical psychology influenced on the pre-understandings and made it challenging to keep enough distance to the participant to see more than the “depressed patient”. Methodologically, being an experienced psychologist might also have contributed to the feeling of security when talking with older persons suffering from the severest depressive conditions. This might also have made it possible to conduct the interviews during the acute phase of the hospitalization and can be considered a methodological strength to this study.



### *12.3 Paper III*

#### *Design*

Considered a strength in the design of this cross-sectional study was the inclusion of a reference group constituting older community-dwelling persons without depression. This approach enabled us to study coping both in depressed and non-depressed older persons and to compare their LoC orientation and coping strategies. However, the two samples of older persons with and without depressive symptoms and disorders were not matched. The reference group was more educated, younger and more physically healthy than the depressed in-patients.

Since paper III used a cross-sectional design, all information was collected at one point of time and we could not draw any conclusions about causality. A comparison of coping strategies and LoC orientation over time (follow-up study) in both persons with and without depression at baseline would give us a better basis for understanding of the relationship between coping and symptoms and diagnosis and prognosis of depression, and is preferable in later studies.

#### *Reliability and validity*

We applied well-tested and internationally accepted questionnaires and scales for assessment of both coping strategies and LoC orientation and depressive symptoms and disorders, for sociodemographic information, functional level and health. The questionnaires for coping strategies and LoC orientation had been used in studies including older persons, also in Norway (Frøydis Kristine Bruvik, Ingun Dina Ulstein, Anette Hylén Ranhoff, & Knut Engedal, 2013; S. Folkman, Lazarus, Pimley, & Novacek, 1987; Sørli & Sexton, 2000; Sørli & Sexton, 2001). Symptoms of depression were assessed by MADRS, validated to clinical samples of older persons (K. Engedal et al., 2012b), which is a methodological strength. The diagnosis of depression was evaluated using the classification system ICD-10 for depressive episodes and disorders, research criteria (WHO, 1993b) applied in all the hospital units in this multicenter study and in all included participants in the reference group. Evaluation was conducted by using a template ensuring reliability during evaluation at the different hospital units and in the community by experienced physicians and psychologists in geriatric psychiatry. .

The inclusion of study participants and the collection of data followed a strict protocol developed by the researchers. Inclusion was conducted by healthcare personnel who received lectures and training in workshops by the researchers in how to use screening tests in older persons. These strategies allowed us to collect data in quite consistent ways, using the same measures and procedures.

An aspect of measure validity is how appropriate the content of the instruments for LoC orientation and coping strategies was when assessing coping strategies and LoC orientation in older persons. The questionnaires were developed for younger adult persons. Older persons may differ from younger persons in ways of coping, in values and orientations (Labouvie-Vief, Hakim-Larson, & Hobart, 1987; E. A. Skinner, & Zimmer - Gembeck, M. J., 2011). However, similar questionnaires as used in the present study for assessing LoC orientation and coping strategies are widely applied in studies recruiting older people as the number of included studies in paper I revealed. To fill in the coping questionnaires, the persons need to understand the meaning of the questions. Thus, persons with severe cognitive impairment could not fill in these questionnaires in a valid way. We do not know about studies examining a cut-off for when the questionnaires are not valid related to cognitive impairment. In the depressed sample of this study the mean MMSE sum score at baseline was 26.0 (SD3.65), and consequently some patients might have had some difficulties in filling in the questionnaires of LoC orientation and coping strategies. However, the majority would have given valid answers to the two questionnaires. Also for this reason, by in-depth interviewing in-patients about coping from their own understanding, and in own words, this research project has an additional methodological strength regarding the validity, to our opinion.

### *Sample representativeness and generalization*

#### Depressed sample

In-patients with a current depressive episode were recruited in a large Norwegian multi-center project included from nine psychogeriatric hospital units. However, the hospital units participating were not randomly chosen, and thus, we do not know if the participants are representative for depressed older persons being hospitalized due to depression, or the entire group of moderately or severely depressed in Norway.

Furthermore, it is possible that the 16 in-patients being excluded from the study because of missing information on the coping questionnaires, were representing the most severely depressed part of this population (mean MADRS sum score 26.0, SD= 8.55,  $p= 0.02$ ). The

missing group did not differ in cognition (mean MMSE-NR sum score 25.9, SD= 3. 58,  $p=0.08$ ) or age (mean age 76.0, SD= 6.8,  $p=0.51$ ). Neither do we know whether they could fill in the questionnaire per se, or this was due to their current situation in life.

#### Non-depressed sample

Two strategies were used to recruit participants to the reference group, consisting of older persons without depression. In their home nursing practice nurse students at Buskerud and Vestfold University collage recruited older participants by giving written and oral information about the research project and invite them to participate. Participants were also recruited by “convenience” sampling where older community-dwelling persons were invited into the research project through newspapers, flyers, and by “snowballing” among recruited participants’ social networks. Use of these two recruiting strategies may contribute to selection of motivated participants, thus not necessary representative as a whole to the community-dwelling older population.

Furthermore, those recruited trough advertising, may possibly be the healthiest among the older community-dwelling persons. However, by including the community-dwelling older persons receiving in-home nursing care they represent a less healthy part of the community-dwelling older population in the reference group, possibly strengthening representativeness of community-dwelling older persons in general. Even so, there is a selection bias.

In addition, the reference group was only recruited from the southeastern part of Norway, due to administrative challenges, and the reference sample is not randomly chosen or representative for all Norwegian community-dwelling older persons without depression (participant bias).

The sample of community-dwelling participants were somewhat limited in size and not matched (age and gender) to the older in-patient group. A simple direct comparison between the groups is difficult, but comparisons adjusted for some important socio-demographic and health variables were performed in the analyses in this study. Thus, we need to be cautious with generalizing findings from paper III.

## 12.4 Paper IV

### *Design*

This study examined if older persons' LoC orientation and coping strategies at admittance to psychogeriatric hospital had significant influence on the level of symptoms and diagnosis of depression after 12 months. Depressive symptoms and diagnosis was evaluated (ICD-10 template) both at admittance and at 12-month follow up ensuring us a broad outcome of depression. Diagnosing depression was conducted in all included depressed patients in this project.

The chosen design did not allow us to examine stability in coping strategies or LoC orientation between baseline and follow-up, and potentially if any change affected the level of depression at follow-up. However, there were no systematic interventions applied in the protocol for the psychogeriatric units to alter coping, hence this was an observational study and we did not expect coping strategies and LoC orientation significantly to alter during a follow-up period of 12 months.

Even though variables were included based on the researcher groups' extensive experience with conducting clinical studies in older persons, there are possibly confounding variables of importance to level of depression at follow up, not identified in this study. Also, in the present paper, a relatively small sample size limited the number of relevant included covariates in the regression analyses, causing a reduced statistical power.

### *Measure reliability and validity*

In paper IV standardized assessment scales were used as in paper III, and the diagnostic procedure was the same. We therefore, will refer to paper III in this regard.

Depressive symptoms were assessed in structured interviews conducted by the healthcare professional at the different hospital units with the use of MADRS (Montgomery & Asberg, 1979a) at follow-up. The assessors had received standardized training prior to the study and also twice a year during the period of data collection, in order to increase reliability of the data. Even so, there may be a possibility for different clinical cultures to develop in how to assess, evaluate and score depressive symptoms and depressive disorders within each hospital unit, causing clustering effects on the multi-center data being collected. Of this reason, multilevel analyses were considered and an intra-cluster correlation coefficient (ICC) was calculated. The analyses however, revealed no cluster effects on the outcomes under study,

and multilevel adjustments were not included into the logistic and linear regression analyses of paper IV.

#### *Representativeness and generalizability*

Recruitment of depressed in-patients and the data collection are described above (paper III). At 12-month follow up the included participants were contacted for a new collection of data. All 144 patients had at baseline given their consent to be contacted one year later. However, this sample of older patients was a vulnerable group due to severity of depressive symptoms and disorders, in addition to common comorbidity. For these reasons, we were not able to include all in-patients from baseline at follow-up. Those not participating at follow-up were significantly older, and had lower mean MMSE-NR sum score than the participating patients, but there were no differences regarding gender, baseline MADRS, LoC orientation, coping strategies, or I-ADL scores. Thus, the participants at follow up were not different from those not included at follow up on the main variables under study.

Also as discussed in paper III, it is common in older persons to develop cognitive impairment during a depressive episode (Hammar & Årdal, 2009). The depressed in-patients from psychogeriatric hospital units in Norway also commonly have several multi-morbid conditions possibly contributing to cognitive impairment. A strict and extensive protocol and diagnostic evaluation to diagnose depression (ICD-10 template) were used to exclude other disorders as main diagnosis as best as possible according to Norwegian common clinical practice and national guidelines (Helsedirektoratet, 2009). Consequently, a tool for screening cognitive impairment (MMSE-NR) (regardless of etiology) rather than specifically diagnosing dementia (ICD-10), were chosen in Paper IV. Including diagnosis of dementia into the same analyses would possibly lead to inter-collinearity.

As pointed to in paper III, even if this was a multicenter study including the majority of psychogeriatric hospital units of Norway, we had preferred our sample sizes to be larger to ensure that our samples were more representative to the population of depressed in-patients from psychogeriatric hospitals in Norway. Of this reasons we cannot exclude type 2 error and if there were associations we could not detect. After 12 months, LoC orientation showed a significant association to depressive symptoms (MADRS) expressed as a continuous variable, at follow-up, but was not associated to a diagnosis of depression (ICD-10). The sample sizes may have been too small for LoC orientation to significantly influence on the diagnosis of depression as this is a categorical variable. Conclusively, the results should be interpreted with caution until further studies can confirm our findings.

## 13.0 Discussion of the main findings

In the sections below the main findings related to the overall aims of this thesis (paper I-IV), will be discussed. The discussion of the results will for this reason not be discussed only within each of the four papers, but used to highlight the main focus across all four papers. The findings will also be discussed in light of existing literature.

### *13.1 On the relationship between LoC orientation and depression in late life*

To our knowledge, paper IV is the first longitudinal study to examine if external LoC orientation at baseline in older psychogeriatric in-patients is associated with a depressive episode or higher levels of depressive symptoms at 12-month follow-up. Our findings indicate that a stronger external LoC orientation at admittance to hospital is associated to a worse prognosis of depression at 12-month follow-up.

The finding is in line with two literature reviews, mainly including younger persons where an external LoC orientation was moderately related to higher symptom level of depression in longitudinal studies (Benassi et al., 1988; Licht-Strunk et al., 2007). The result is also in line with the findings in our review (paper I), where the ten longitudinal studies of higher quality reported a high “internally oriented recovery LoC” or “desired locus of control” (perceived personal control of a situation), self-efficacy, optimism, mastery and a low external LoC orientation and low sense of control at baseline to be associated with fewer depressive symptoms and/or less persistent depressive episodes at follow up. Also, the results from the cross-sectional paper (III) support this finding, where the sample of in-patients with a current depressive episode reported a significantly higher external LoC orientation compared to the sample of older persons without a diagnosed depressive episode.

There were plausible reasons for the in-patients in paper III to report less personal control due to their lowered physical and functional status in addition to symptoms of cognitive impairment, compared to the reference group. Consequently, they were more dependent of caregivers and healthcare services. They were also affected by moderate to severe depressive episodes and had to be hospitalized to receive treatment, conditions possibly also affecting LoC orientation to become externalized.

Moreover, due to LoC orientation being assessed only once, at baseline, we cannot exclude the possibility that the in-patients were initially and pre-morbidly externally LoC orientated and that this contributed to the negative health status to develop. LoC orientation is of some theorists described as a trait-like personality construct (Horner, 1996; van den Heuvel, Smits, Deeg, & Beekman, 1996) and studies report older persons to report more externally LoC orientation in health-related domains (Coats, 2008), as mentioned in sections above. We know from the coping literature that when situations are perceived as controllable persons are more likely to appraise negative events as challenges rather than threats (E. Skinner & Zimmer-Gembeck, 2011). This leads to coping responses where they focus on problem solutions, use their cognitive resources and regulate in flexible and constructive ways reducing stress responses and the likelihood for stressful events to occur (E. Skinner & Zimmer-Gembeck, 2011). Cycles may develop, where persons over time can magnify initial individual differences and even strengthen LoC orientation. When conditions in life are perceived as uncontrollable, stressful situations more easily becomes threats, found to result in more passivity, rigid problem-solving and avoidance, again raising the likelihood for stress to evolve, and to develop into maladaptive resignation (Dweck, 1999; Peterson, Maier, & Seligman, 1993; E. Skinner & Zimmer-Gembeck, 2011). A chronic, or recurrent stress activation is thus associated with deleterious long-term implications for mental and physical health (McEwen, 2007; McEwen & Stellar, 1993; Seeman & McEwen, 1996; Uchino, Cacioppo, & Kiecolt-Glaser, 1996).

Lastly, the result is in line with a main finding in paper II revealing that old men and women being admitted to psychogeriatric hospital with moderate and severe diagnosed depressive episodes described themselves to be overwhelmed by an experience of being stuck in an immensely painful existence. They described despair, powerlessness, and perplexity; could not pull themselves together, and felt dependent of care from health care professionals in the hospital unit. Moreover, the participants in paper II told of helplessness related to great losses, violence, of fears of becoming a burden to others, experiences characterizing close relationships where control was perceived as lost and attributed to powerful others over a longer period of time in their lives.

Factors as support may be of great importance to perceptions of control orientation. We found in paper IV a poorer level of daily functioning (I-ADL) significantly associated to more depressive symptoms at follow-up. Becoming dependent of social and practical support might have been a struggle to many, forcing them to give away autonomy and control and also

increased risk to loose predictability in daily life. Findings of associations between disability and depression in late life is well supported in a review (Martha L. Bruce, 2001).

How well older persons cope with own evolving or acute disability, or with caring for close members of their family with disability may of these reasons very well be related to an externalized LoC orientation and depressive symptoms, in addition to depression and hospitalization.

### *13.2 On the relationship between problem-focused coping strategies and depression in late life*

In paper III the depressed in-patients reported to use problem-focused coping strategies less frequently than the community-dwelling sample of older persons without a depressive episode. This finding is in line with the results of the literature review (paper I) where an increased use of adaptive- and approach-oriented coping strategies (as opposed to avoidance), acceptance, finding meaning, appraisal, positive reappraisal, and low avoidance coping at baseline were associated with less depression (i.e. symptoms and diagnosis) at follow-up in all studies of higher quality.

In contrast to paper I and III, we found in paper IV *more* frequent use of problem-focused coping strategies at baseline to be significantly associated with a diagnosis of a depressive episode (ICD-10), and associated, but not significantly ( $p < 0.055$ ) to more depressive symptoms (MADRS) at 12-month follow-up. A year earlier the depressed patients had used problem-focused strategies, as seeking social support, solving problems, making decisions (cognitive action), or coping by direct action when confronted with stressful situations, significantly more often than those not being depressed at follow-up. This finding did not support our hypothesis of more frequently use of problem-focused coping strategies being associated to less depression at one year follow-up.

In paper II however, the participating depressed in-patients told of former problem-focused strategies of coping and that these were no longer available to them, or sufficient for them to cope efficiently in their daily lives. Descriptions of powerlessness and frustration were given from persons who used to cope by being active *doers*, who had worked their entire life and used to feel powerful enough to make a change if that was needed. At some point in retrospect they experienced conditions in daily life to become overwhelmingly demanding, described as loss of health, support, poorer functional level, and bereavement. Many of the



participants however did not stop in trying to actively change these demanding conditions. To some this active problem-focused coping style made them even more exhausted, and frustrated, eventually some resigned, but all became deeply depressed.

### *In trying to change the unchangeable*

From literature, we know problem-focused ways of coping increase in situations appraised as changeable through appraisal processes recognizing resources to be both available and sufficient to make a change (S. Folkman et al., 1986; S. Folkman et al., 1987; Vitaliano, DeWolfe, Maiuro, Russo, & Katon, 1990). Normal age-related changes on the other hand can create situations where more use of problem-focused strategies may not be so adaptive, i.e., when goals in life or situations of significance are no longer attainable (Bandura, 1997; Erin Dunne, Carsten Wrosch, & Gregory E. Miller, 2011; Taylor & Brown, 1988; Wortman & Brehm, 1975).

Furthermore, research has documented that resources and opportunities for attaining personal goals show a sharp decline as persons grow old (Wrosch, 2011). Age-related declines in physical health and social activities can bring older persons to focus their resources on the most important goals, and consequently to abandon others (P. B. Baltes & Baltes, 1990). Hence, they might adapt better by adjusting and compensating for their losses and challenges by selecting other goals or fewer domains in which to optimize their efforts and thereby sustain identity, function, and autonomy (P. B. Baltes & Baltes, 1990).

Negative affect can emerge in situations where goal pursuits are experienced as difficult. Older compared to younger persons in higher degree strive to reach their personal goals, and are more likely to fail due to age-related biological and functional constraints (Wrosch, 2011). As a result individuals may become stuck in strenuous and exhausting attempts to try to change negative circumstances in their lives they are no longer in control of, in line with main findings from paper II and IV. By being able to “let go” (adaptive resignation) and make a psychological shift from trying to change the unchangeable to rather regulate emotional reactions to the unavoidable, future defeats are perhaps better avoided (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Erin Dunne et al., 2011).

There is a possibility that the in-patients were too burdened by own illness, and caring for others, and at the same time were still relying too heavily on their problem-focused

strategies, and that this partly can explain these findings, where more use of their usual problem-focused coping strategies turned out to be less adaptive.

### *13.3 On the relationship between emotion-focused coping strategies and depression in late life*

In the literature review (paper I) we identified seven longitudinal studies of higher quality which report that low avoidance (emotion-focused) coping at baseline was associated with lower levels of depressive symptoms at follow-up. In addition, seven cross-sectional studies of higher quality reported low levels of passive coping and emotion-oriented coping (avoidance), denial, self-blame, complaint behavior, catastrophizing and mystery beliefs to be associated with lower levels of depressive symptoms.

Among the main findings in paper II, descriptions of experiences of being stuck, and not being able to alter a difficult life situation were present among all 18 participants. Some refused to resign, others gave up and tried to sooth down their pain by the use of opioids, by venting out, ruminations, or avoidance, descriptions in line with emotion-focused coping strategies from the coping strategies questionnaires being used in paper III and IV.

In the cross-sectional study (paper III) however, there was no association between group of belonging (with or without a diagnosis of depression) and use of emotion-focused coping strategies, however the mean frequency in use of emotion-focused coping strategies in both groups was high. High use of emotion-focused coping related to depression is in line with the coping literature and paper I, but high use of emotion-focused coping in the samples of older persons without depression was of this reason surprising. Again considering the literature of coping in older ages, presented above, there may be reasons to believe that more healthy older persons without depression may use both problem-focused and emotion-focused strategies in adaptive manners when dealing with age-related changes.

Also, in paper IV the use of emotion-focused coping strategies at baseline was not associated with depressive symptom level (MADRS) or depressive episode (ICD-10) at follow-up, suggesting emotion-focused strategies not to be of importance to explain the odds for being depressed or to the level of depressive symptoms in the in-patients after 12 months. Other factors may better explain the depressive conditions after one year, as external LoC orientation, high use of problem-focused coping strategies, poorer cognition and ability to manage instrumental activities in daily life.

The finding of no difference in use of emotion-focused coping strategies between the groups with and without depression (paper III), and no association between emotion-focused coping strategies and depressive symptoms or depressive disorder in paper IV is however intriguing, because the association is what reviews report as “perhaps the most consistent finding... in the coping literature” (Aldao et al., 2010; Coyne, Aldwin, & Lazarus, 1981; Coyne & Racioppo, 2000, p. 657; S. Folkman et al., 1986; Vitaliano, Russo, Carr, Maiuro, & Becker, 1985), as confirmed in paper I. However, the coping literature is mainly based on samples of younger adult persons, and of samples without clinical depression.

To our knowledge paper III and IV are the first quantitative studies of emotion-focused coping strategies from a psychogeriatric hospital setting, including older in-patients with diagnosed moderate and severe depressive episodes. These depressed samples may use coping strategies slightly different than older community-dwelling persons without a depressive disorder, as confirmed in paper III. We also can not exclude the possibility of methodological explanations for this finding to occur, as addressed in the methodological section of the discussion above. Possibly this particular questionnaire was susceptible for cognitive impairment due to moderate to severe depression.

#### *13.4 Experiencing depression and coping with depression in late life*

In paper II, the interviews of the 18 patients revealed three main themes capturing the participants’ experiences of depression and how to cope; (1) “Terrible suffering”, (2) “Being stuck” and (3) “Why did this happen?”. The first two themes, described in all the interviews, were in line with the findings of a meta-synthesis of qualitative papers on depression in older persons, including 13 studies from both primary healthcare and from psychogeriatric hospital units (Jacqueline Corcoran et al., 2013). Here emotional pain, powerlessness and hopelessness were experienced by the included samples.

##### *Life events and burdens in a lifespan perspective*

The third main theme in paper II revealed the participants’ own understanding or explanation of the reasons and context of their agonizing experiences; “Why did this happen?”. Some expressed they did not understand at all why they ended up being depressed, whereas other participants explained their current condition and situation in relation to the life they had lived, ongoing burden or events resulting in an acute crises.

About half of the participants described themselves as a caregiver in a relationship that had developed into a heavy burden, either in caring for dying spouses or spouses with a physical disability or dementia. They also cared for children being abused; some cared for children addicted to drugs, alcohol or who had a physical illness. Some experiences were from a long time ago and some were traumatic, i.e. being stabbed with a knife, finding their husbands shot dead. To be a caregiver was a natural role to take, but now they felt overwhelmed by never being able to work through it or to be able to relax. They described eventually developing a depressive episode from all the grief, worry and exhaustion. They seldom asked for help for themselves, but were used to standing up for another person's needs.

This finding is also in line with studies (Hedelin & Strandmark, 2001) reporting depressed participants to anchor their sadness and pain to a loss of close persons and family problems and conflicts. The relationship between negative life events and ongoing difficulties and depression in late life is also well documented in quantitative studies (D. G. Blazer, 2nd & Hybels, 2005; M. L. Bruce, 2002).

Findings of experienced burden and negative life events in relation to depression revealed in paper II, where not reflected in the statistical data in paper III. Here no difference in reports of recent negative life events the last 12 months between the two groups of older persons with and without depression was found.

In paper III we included variables for life events by using a questionnaire "Recent life events" (Paykel, 1997; Paykel et al., 1971), a widely internationally used questionnaire developed to identify recent negative life events the last 12 months, also translated and used in large population studies in Norway (HUNT, 2011). Why the negative life events reported in paper II did not appear from the statistical data in paper III may be because the described negative events happened more than 12 months ago. One may consider in future studies to further expand the timeframe for the questionnaires being used, possibly including a life-span perspective, but again this may have methodological limitations as mentioned above (recall bias). Another reason for this information to be revealed in paper II and not in paper III can be due to the setting of the data collection. In interviewing the participants the researcher had established a setting facilitating a situation where the participants could tell their personal stories and where intimate issues could be addressed, a basic methodological approach in conducting qualitative interviews (Malterud, 2011). Methodologically, in-depth interviews may have been more suited than questionnaires in collecting potentially sensitive data from the older depressed in-patients.

### *13.5 The present knowledge and future research on coping and depression in late life*

In paper I the main finding was of a high consistency in the relationship between depression and coping, regardless of definition among the included prospective and cross-sectional studies. Our findings are in line with the consistent and well-documented relationship between coping and depression in younger adult persons, as shown in sections above. In contrast, it is less documented how interventions can modify or alter these resources and strategies of coping in older groups.

Risk and prognostic factors for depression in late life are studied, and some, but not all factors seem modifiable. LoC orientation is a well-known psychological risk- and prognostic factor associated to ability to adapt to health-threats and healthy life-style programs. Preventive and intervention studies focusing on changes in external LoC orientation may be future steps in research on how to improve and sustain healthy lives into older ages.

Both psychological and medical treatment interventions in older persons with depression is effective, especially in combinations, but more knowledge on effective interventions for treatment of depression in cohorts of older severely depressed, disabled and cognitively impaired persons is needed. Implementation is needed for those interventions already being shown as effective, such as the therapies PST and PATH.

Lastly, older moderately to severely depressed in-patients are by some researchers considered to be too vulnerable to be included into research. On the basis of our research, we disagree with such a suggestion. In contrast, we find it even more important to conduct more research on this vulnerable group that may bring new insight to the field of knowledge and possibly also bringing clinical psychogeriatric practice forward.

## 14.0 Implications

This multicenter project confirms psychological resources as LoC orientation and coping strategies to be related to depression in late life and to influence on the prognosis after treatment of depression in late life.

Older persons developing moderate to severe depressive episodes are in need of medical treatment, and older patients receiving recommended medical treatment show a good short-term prognosis. However, when the effects from less modifiable and age-related conditions as comorbid illness, functional decline and bereavement continue to trigger stress, maladaptive coping strategies seem to act as vulnerability factors, possibly increasing the risk of developing new or more severe depressive symptoms in a longer term.

Interventions enhancing problem-solving coping strategies in older depressed patient are shown useful. Furthermore, problem-solving interventions through compensatory strategies by formal and informal caregivers towards overwhelming situation-specific demands in patients lives, can be useful in clinical psychogeriatric settings, and for older persons with additional disability after leaving the hospital. Lastly, support to older persons in grief when being forced to give up on approaching unattainable goals, may also seem useful.

In facilitating a confident dialogue with the depressed in-patients, health care personnel can also identify less obvious burdens from patients' lives, such as conflicts and relational difficulties, possibly also affecting levels of stress and depressive symptoms in the present. A sensitivity for vulnerable topics in health care personnel's awareness towards the older depressed patients, may also enhance even more tailor-made and accurate treatment regimens.

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## **Errata**

Paper III.

At page two the words “severe cognitive impairment, evaluated by a score of  $\leq 22$  on the Mini Mental State Examination- Norwegian Revised Version (MMSE-NR) (K. Engedal et al., 1988; Folstein M., 1975; C. Strobel, & Engedal, K., 2008),” should be removed.

At page three the sentence “A score of  $\leq 22$  was used as cut-off for inclusion of depressed persons in the present study.” should be removed.

## Errataliste

Side	Linje	Originaltekst	Type rettelse	Korrigert tekst
s. 1-130			Sidetall forskjøvet med en side pga innsatt tittelside som starter på side 1	
s. 2	5	abstracts	Fjernes -s	abstract
s. 4	16		Fjernet (...) slik at sidetall kom på samme linje som tittel	
s. 4	17		Fjernet (...) slik at sidetall kom på samme linje som tittel	
s. 13	6	Patients	's	Patient's