

Negative life events' relation to psychological distress and life satisfaction in a population based study in Norway

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The master thesis is completed, and a very interesting, exciting, exhausting and educational process at the Public Health Institute, division of mental health has come to an end. It has been a privilege to have the opportunity to work with theses at the Public Health Institute, division of mental health. This process has overall been tremendously inspiring and positive, although frustration levels have been periodically elevated.

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Oslo, May 2012.

Forord

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Summary

The thesis *Negative life events' relation to psychological distress and life satisfaction in a population based study in Norway* consists of two parts: the first section provides an additional background and theoretical introduction to the subject in an extended context. The second part contains the article with the same title as the thesis. The article will be submitted to the journal "Qualitative Life Research".

The purpose of the study was to examine the associations between seven negative life events and psychological distress and life satisfaction in a large nationally representative study (N=4,823). The second aim of the study was to explore the buffering effects of the health determinants social support and sense of mastery. The study was carried out at the Public Health Institute, Division of Mental Health, Oslo.

The data was obtained from the cross-sectional Level of Living Survey conducted by Statistics Norway in 2008. Data on mental health was collected by a self-administered questionnaire and socio-demographic information was based on register statistics. The sample consisted of 4,823 people, aged 16 and older, including 2,250 men and 2,573 women. The primary type of analysis was step-wise linear regression.

The results showed a significant association between all of the negative life events and psychological distress and life satisfaction, except for events pertinent to bereavement. The strongest association was found between financial strain and both psychological distress and life satisfaction, respectively. Sense of mastery, in contrast to perceived social support, emerged as a moderating factor between financial strain and psychological distress and life satisfaction. Strengths and limitations pertaining to the study are thoroughly discussed in the methodological consideration chapter including what consequences this may have for generalizing the results to the population level. Finally, the conclusion emphasizes a complimentary approach to mental health and its importance for designing interventions in a public health perspective.

Sammendrag

Masteroppgaven; *“Negative life events’ relation to psychological distress and life satisfaction in a population based study in Norway”*, består av to deler. Første del er kapp som gir en teoretisk innføring og bakgrunnsinformasjon om emnet sett i en større sammenheng, samt folkehelseperspektivet knyttet til temaet. Andre del består av artikkelen med den same tittelen som masteroppgaven. Artikkelen vil videre bli forsøkt publisert i tidsskriftet “Qualitative Life Research”.

Formålet med studiet og artikkelens fokus var å undersøke sammenhengen mellom syv ulike negative livshendelser og psykiske plager samt tilfredshet med livet i en stor nasjonal, representativ tverrsnitt undersøkelse (N=4,823). Videre ble den modererende effekten av sosial støtte og mestring undersøkt i sammenhengen mellom negative livshendelser og psykiske plager og tilfredshet med livet. Studien ble utført ved Folkehelseinstituttet, divisjon for psykisk helse i Oslo.

Data fra Helse- og Levekårs undersøkelsen (HUS) 2008 ble benyttet til denne undersøkelsen. Utvalget besto av 4,823 personer fra 16 år og oppover, hvorav 2,250 var menn og 2,573 var kvinner. Den primære analysemetoden var trinnvis lineær regresjon.

Resultatene viste at alle de negative livshendelsene, bortsett fra tap av familiemedlem/venn/fjernere slektning, var signifikant assosiert med både nivå av psykiske plager og redusert tilfredshet med livet. Det var kun mestring som viste en signifikant modererende effekt mellom økonomiske vanskeligheter og psykiske plager og tilfredshet med livet. Ulike svakheter og styrker ved studien blir videre grundig diskutert. Konklusjonen fokuserer på den signifikante sammenhengen mellom ulike typer livshendelser og psykiske plager og tilfredshet med livet, og betydningen av dette i et folkehelseperspektiv.

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Abbreviations

HSCCL-25 Hopkins System Check List-25, also referred to as psychological distress

LS Life Satisfaction

LTE List of Threatening Experience

1 Introduction

1.1 Negative life events and mental health in a public health perspective.

Improving population health and well-being requires a complimentary approach to mental health, recognizing mental health as not merely an absence of psychopathology. By 2020, depression is expected to be the largest contributor to disease burden worldwide and will thus pose a significant burden in term of social and economic costs (WHO 2004; WHO 2005).

Negative life events such as unemployment, bereavement, illness, injury, financial strain and divorce are frequent and contributing risk factors to psychological distress and reduced life satisfaction (Luhmann et al. 2011; Mazure 1998; Tennant 2002). During a lifespan, everyone will, to a certain extent be affected by these types of events.

In Norway, roughly 45 % of all marriages are expected to end in divorce, a stable trend during the preceding five years (SSB 2009). Moreover, a marital disruption frequently involves consequences for personal economy, network support, and conflicts related to child custody (Byberg 2002; Sweeney & Horwitz 2001). The population is becoming older, in 2050 nearly 21 % of the population will be older than 67 years (SSB 2009). Extensive research indicate that care-giving engaging activities of a family member may influence the caregiver's mental and physical health negatively over a period of time due to restriction in social participation and work (Pinquart & Sörensen 2003; Roth et al. 2009). On the other hand, Norway benefits from a low unemployment rate of 3,5 % compared with countries such as Denmark 7,4 %, Spain 20, 1 % and USA 9,6 % (SSB 2011). However, a protective and well-regulated work environment in addition to available benefits in times of need do not exclude mental health problems to be among the top causes for sick-leave benefits (Ekspertgrupperapport 2010).

The prevalence of mental disorders seems to have stayed relatively stable the last decades across Europe and USA despite an increase in mental health programs (Kessler et al. 2005). The lifetime prevalence of mental illness in Norway is estimated to be between 25% and 52 %. In one year, at least one psychiatric disorder will affect one third of the Norwegian population (Mykletun et al. 2009). Studies indicate that Norway has a lower level of psychological distress compared to the rest of the world due to the high standard of living, but health related and social inequalities are increasing in Norway (Nes & Clench-Aas 2011). It

appears that a gap is forming between the prosperous living standard and happiness in Norway (Hellevik 2008).

Awareness of both the positive and negative dimensions of mental health makes focus on health promoting and preventive strategies more relevant. A framework provided by the Complete State Model of Mental Health as shown in Figure 1 (Keyes 2005), illustrates two dimensions of mental health (Keyes 2005; Slade 2010). The horizontal axis represents the degree of symptoms of mental distress from low to high, whereas the vertical axes in the model shows the range of subjective well-being from low to high. Research demonstrates that positive and negative mental states are distinct but correlated dimensions, and not simply two opposite ends on the same scale (Huppert & Whittington 2003; Keyes 2005). Mental health embraces the fundamental concepts of the individual's ability to cope with various stressful events in ordinary life (Korkeila et al. 2003). The capability an individual has to cope with adverse events depends on several internal and external factors. These capabilities are thought to act as buffers against the onset of mental health problems (Bovier et al. 2004). However, to achieve a more comprehensive understanding of the relationship between psychosocial factors and health, more research is needed to examine both positive and negative well-being (Huppert & Whittington 2003; Keyes 2005; Slade 2010).

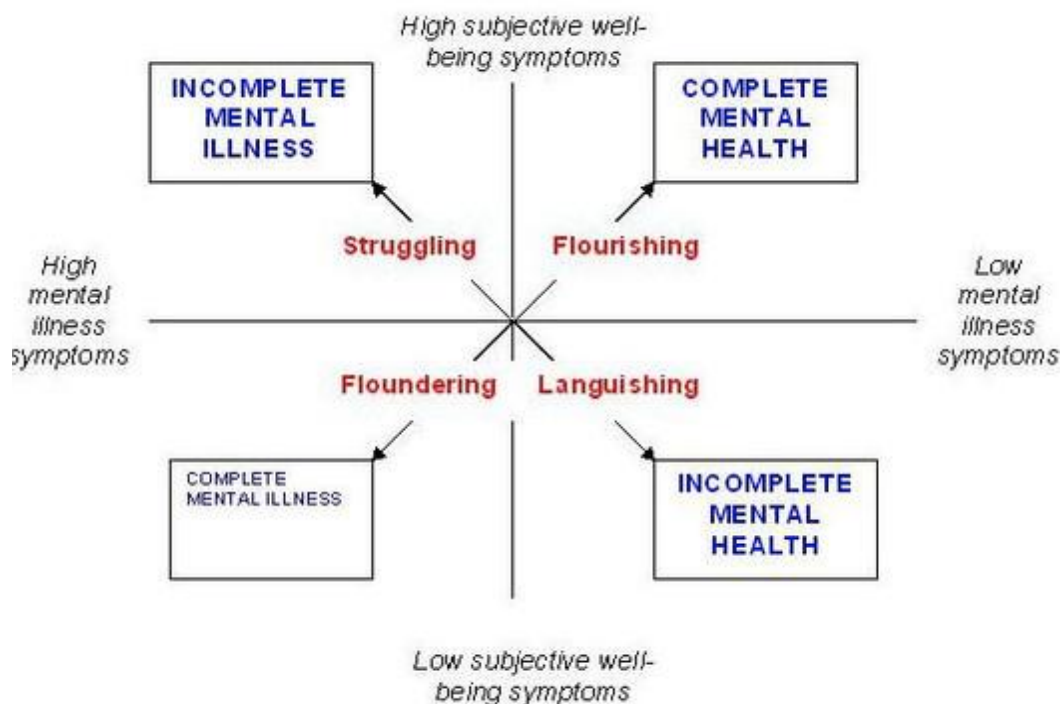


Figure 1: Keyes' Complete State Model of Mental Health (Slade 2010).

1.2 Research objectives.

The primary aim of this study is to explore the association between various negative life events and current psychological distress and life satisfaction. Secondly, we want to examine the buffering effects of social support and sense of mastery. Cumulative negative life events in relations to psychological distress and life satisfaction will also be described.

1.3 Negative life events

The impact of social stress such as a negative life event may require an individual to make extensive behavioral readjustments in their daily lives. Holmes and Rahe (1967) established a connection between checklist event measures with their Social Readjustment Rating Scale and mental health status (Turner & Lloyd 1995). A mismatch between the available resources of the individual and exposure to an overload of environmental demands, may cause an overburden of the individual's capability to cope or adapt, and hence leaving them vulnerable to injury or disease (Thoits 2010). The term stress refers to the "non-specific" reaction of the body to any demand put upon it (Selye 1956; Vingerhoets 2007). Three responses of physiological reactions were identified with regards to harmful events; alarm, resistance and exhaustion responses (Thoits 2010). A negative life event or any other undesirable event may be perceived as a stressor or stimulus that precedes a stress reaction. A stress response depends on certain characteristics of the stressor, the individual's appraisal capacity, coping capacity and available social support (Vingerhoets 2007). The appraisal process (Lazarus & Folkman 1984) is characterized by a two-step evaluation of the stressor and the situation, involving a primary appraisal that refers to "what is at stake here?" and a secondary appraisal, which encompass "what can I do about it?"

The content of stressors can be categorized in several ways due to their distinct dimensions. Stressors can be perceived as acute, chronic or as ongoing difficulties often called upon as a hassle in the literature (Muscatell et al. 2009). An acute stressor may be exams, being involved in an accident and medical procedures, whereas suffering from a chronic disease, interpersonal problems, care for a handicapped child, consistent job demands are indicators of chronic stress factors (Vingerhoets 2007). Previous research has indicated that chronic stress is a persistent and harmful predictor of mental health problems (Hammen 2005; McGonagle & Kessler 1990). Furthermore, daily hassels or ongoing difficulties have been described as; *"ongoing stressful conditions that are highly unpleasant, threatening to an individual's plans, goals and aspiration for the future, and present for a minimum of 2 years"* (Muscatell et al.

2009). Research has emphasized hassles as important threats or harm to the individual's well-being (McGonagle & Kessler 1990; Rojo-Moreno et al. 2002).

Furthermore, stressors have been classified according to life domains such as job related stressors, family related stressors, disease-related stressors, natural disasters and so forth (Vingerhoets 2007). Previous studies indicate that life events such as bereavement and divorce precede depression and are more prevalent in depressed populations than in any other forms of psychopathology (Hammen 2005). Events to which the person has contributed, so called dependent events in contrast to independent events, which is beyond the individual's control, include interpersonal events and sources of self-esteem such as work and finance (Hammen 2005). Kendler et al. (1999) found dependent events to be significantly stronger associated with onset of depression compared with independent events. In the aforementioned study one-third of the associations between stressful life events and onset of depression was regarded non-causal pertaining to individuals predisposed to major depression choose themselves into high-risk environments.

The stress response is not only determined by the intensity of the stressor or life event at stake, external and internal factors such as social support, coping, personality traits, genetic predispositions, lifestyle, previous life experiences, physical and psychological condition contribute as well (Hammen 2005; Vingerhoets 2007). The congruency model, which is a diathesis-stress model, assumes that individual vulnerabilities pertaining to personality establish how stressors are evaluated. Therefore, perceived threats affecting self-worth will eventually initiate a depressive reaction (Hammen 2005).

The relationship between stress-related factors and a positive or negative health outcome depend to certain extent on personality. However, individuals may vary significantly to stress exposure and following short-term reactions and lasting health-consequences. Various personal traits have been related to predisposal of symptoms of depression as other characteristics have been perceived as protective factors of stress reactions and thus called upon as stress resistant (Hammen 2005; Vingerhoets 2007). These dispositions will be discussed later. Personality characteristics such as neuroticism also referred to as "difficult temperament" is regarded as a genetic predisposition that pose a sensitivity to respond to stressful life events with a depressive reaction (Kendler et al. 1995; 2003). Research has reported that neuroticism was a contributing predictor of stressful life events, especially those

associated with interpersonal relationship (Kendler et al. 2003). In contrast, concepts such as hardiness, sense of coherence, optimism, internal locus of control and self-esteem are all personal characteristics that are proposed to be protective factors of stress and make the individual more or less stress resistant (Vingerhoets 2007).

1.4 Life satisfaction and psychological distress.

Positive health indicators have been increasingly recognized as important to health outcome. The field of positive psychology emphasizes the positive aspects of the human being such as enrichment, human growth, satisfaction, hope, optimism, flow, happiness, self-development and well-being. Studies show that most people are capable of thriving despite being confronted by challenges (Bonanno 2004). There are several benefits to happiness other than just feeling good. Research shows that happy people are healthier, they live longer, are more successful and more socially engaged (Lyubomirsky et al. 2005; Seligman et al. 2005). The aim of positive psychology is to be a useful supplement and try to balance out the “repair and treatment focus” on psychopathology.

In the Complete State Model of Mental Health (Figure 1), the absence of mental illness with high or low presence of subjective well-being is described as *flourishing or languishing*. Flourishing people are considered the healthiest and this implies that an individual is filled with positive emotion and is functioning well psychologically and socially (Keyes 2002). To be in a flourishing state involving benefits such as low helplessness, fewest missing days at work, high resilience, lowest risk of cardiovascular disease, low degree of chronic diseases and lower health care use (Keyes 2007). Studies have indicated that only 20 % of the adult population is flourishing (Keyes 2007). On the other hand, languishing indicates incomplete mental health and low well-being, and is further estimated as a great risk factor for major depression episodes (MDE). Thus, languishing can be seen as emptiness and stagnation (Keyes 2002; 2007). The presence of mental illness with a low or high degree of subjective well-being is characterized as *floundering or struggling*. Adults who are floundering have complete mental illness. Recent research indicates that curing or removing mental illness is no guarantee of the presence of mental health (Keyes 2007; Van Lente et al. 2012). Therefore, a complimentary strategy to mental health is necessary to reflect a fair situation of mental health in the population (Korkeila et al. 2003).

In this paper, I will be using concepts that include mental/psychological distress, which are more representative and relevant to the material that I am using than “mental illness”.

1.5 Buffering parameters

1.5.1 Social support

Despite a burgeoning body of research within the social support field, a consensus on a definition of social support has not been reached (Uchino 2004). This might illustrate the complexity of the social support concept within research. Cobb (1976), has described social support in the following manner:

”information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations”.

Social support is recognized here as the perceived availability of people with whom the individual trusts and who make one feel cared for and valued as a person (Lavikainen et al. 2006). Social support is considered an important health determinant characterized as both a risk factor as well as a protective factor with regards to health outcome. A low level of perceived support is associated with ill-health (e.g. depression and somatic disease) in contrast to high levels of perceived support, which is associated as a buffering effect in taxing situations (Schwarzer et al. 2007; Uchino 2004). There are four types of social support functions; *emotional support* concerning care, trust and empathy, *instrumental support*; which refers to provisions of financial and practical help, *belonging support*; which covers involvement and shared social activities, and *informational support*; which provides advice, guidance and recommendations (Schwarzer et al. 2007; Uchino 2004). Research suggest that the different types of support functions are provided by social relationships and are organized along two dimensions; prospective support that consists of perceived and available support and retrospective support, which is characterized by what support was actually received.

In the present study, the OSS-support scale measures perceived available support. Literature suggests that perceived available support is more highly related with positive coping compared to received support (Uchino 2004). In general, social support operates in a direct or indirect way to influence health, which in turn can be either beneficial or detrimental. The direct effect models postulates that social support has a positive effect on health outcome irrespective of taxing circumstances and life stress. The indirect effect of social support is associated with its buffering capacities in times of adversity (Schwarzer et al. 2007; Uchino 2004).

1.5.2 Sense of mastery

Coping has been defined as “*the process of managing external or internal demands that are perceived as taxing or exceeding a person’s resources*” (Lazarus & Folkman 1984). Sense of mastery is therefore considered as a psychosocial resource and an important health determinant, which promotes resilience to negative mental health (Lavikainen et al. 2006). The appraisal process consists of a primary and a secondary evaluation respectively of the stressors or demands experienced by the individual (Folkman & Moskowitz 2000; Myers et al. 2007). The estimated burden of the threat may lead to a problem oriented focus or an emotion oriented approach to handling the harm in question, or a conjunction of the two coping strategies (Myers et al. 2007). The problem oriented coping strategy has been regarded as a more appropriate method compared with the emotion coping strategy with regards to adjustment (Myers et al 2007). Problem-focused coping is directed at finding strategies or solutions to the problem that is instigating distress. Coping is influenced by personal characteristics or traits such as optimism, neuroticism and extraversion. Personality dispositions such as optimism and extraversion are associated with adaptive coping whereas neuroticism is linked with maladaptive coping (Folkman & Moskowitz 2000; Myers et al. 2007). Sense of mastery involves a sense of perceived control, which determines the personal worth, belief, goals, values or commitments in the stressful encounter (Folkman & Moskowitz 2000).

2 Methodology

2.1 Summary of method

The method is elaborated on in the article Marum et al. (in prep) included in the this document, and will therefore only briefly be described and illustrated with figures and tables.

2.2 Design

The data in the present study comes from the cross-sectional Health and Level of Living Survey conducted by Statistic's Norway in 2008, which is repeated every three years. The main focus of the 2008 survey was health, care and social contact. The purpose of the health section was to measure the health condition of the Norwegian population by investigating symptoms of health-related problems, consequences of illness, level of functioning, living habits and use of health services. The caring section covered areas such as the need for care and the care-giving role. Further, the social contact area investigated relations with family, friends and confidants as well as the opportunity of getting practical help in domestic life (Wilhelmsen 2009). Data on income, education and work status were based on register data from Statistics Norway. Participation in the study was voluntary. The Health and Level of Living Survey 2008 consisted of two parts, a postal questionnaire and a personal interview. The postal questionnaire was completed individually and returned in a postage-paid return envelope after the interview was completed. The interview was conducted either face to face or by telephone. One reminder was given to the participants with regards to the postal questionnaire in the 2008 survey, whereas three reminders were furnished to the participants with regards to the interview section. The dependent variables in the study were life satisfaction and psychological distress, which were included in the postal questionnaire. All of the independent variables; age, gender, education, income, negative life events, sense of mastery except for social support, were included in the postal questionnaire, whereas social support was placed in the interview section.

2.3 Study population

The sample was selected to be representative of the Norwegian population. The total sample was selected by Statistic's Norway two-step, standard sample plan, in which Norway is divided into 109 strata (Wilhelmsen 2009). A total sample of 10,000 residents from the age of 16, were invited to participate in the survey. A letter of consent was provided to those responsible for under-age participants. From the original sample, 316 people were removed, 46 due to death, 131 due to living in an institution and 139 due to living abroad. Hence, the

total sample consisted of 9,684 people. Of the total sample approximately 46 % (N=4,498) participated in both the interview- and the postal section of the survey. Close to 50 % (N=4,823) responded to the postal questionnaire, whereas roughly 70 % (N=6,465) responded to the interview section. In general, the overall response rate has demonstrated a decreasing trend for surveys such as the Health and Level of Living Survey from 72 % in 1998 to approximately 50 % in 2008. The mean age of the respondents was 45.5 years (SD 18.1) and 48.7 years (SD 17.6) for the interview section and the questionnaire section, respectively.

Table 1: *Number of participants of each gender divided into age groups.*

Age group and Gender							
		Gender					
		Male		Female		Total	
		Count	Column %	Count	Column %	Count	Column %
Age	16-24	213	9.5%	276	10.8%	489	10.2%
	25-44	699	31.1%	847	33.0%	1546	32.1%
	45-64	883	39.3%	968	37.7%	1851	38.4%
	65-74	279	12.4%	261	10.2%	540	11.2%
	75+	174	7.7%	215	8.4%	389	8.1%
	Total	2248	100.0%	2567	100.0%	4815	100.0%

2.4 Measures

2.4.1 Negative life events

The inventory (List of Threatening Experiences) used in present study was developed by Brugha et al. 1985. For further details about the questions please see our article Marum et al. (in prep). Two different methods in the same sample developed the negative life event inventory (LTE) and twelve events were identified and associated with a marked or moderate threat. Very rare threats were not included in the inventory (Brugha et al. 1985). Correlation analyses were completed between the negative life events as shown in Table 2.

Table 2: *Bivariate correlation between negative life events.*

Scale	1	2	3	4	5	6
1. Self suffered illness/injury	-					
2. Close relative suffered illness/injury	.125**	-				
3. Bereavement	.046**	.162**	-			
4. Divorce	.052**	.049**	.056**	-		
5. Conflict with family, friend, neighbour	.074**	.105**	.046**	.281**	-	
6. Loss of employment	.033*	.065**	.008	.154**	.102**	-
7. Financial strain	.112**	.080**	.016	.195**	.162**	.247**

Cell values are Spearman's rho

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

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

2.4.2 Life satisfaction

The single item life satisfaction instrument was used in the present study. Life satisfaction is in general terms defined as a global cognitive judgmental evaluation of quality of life as a whole. It reflects a subjective evaluation of the present circumstances rather than satisfaction with specific life domains such as marriage, work or health (Diener et al. 1985). The single item instrument measuring life satisfaction is one of the most used instruments to measure well-being worldwide

2.4.3 Psychological distress

Psychological distress was measured with the widely used self-administered Hopkins Symptoms Check List (HSCL-25). The HSCL-25 instrument measures the presence and degree of anxiety (10 items) and depression (15 items) during the preceding two weeks. A HSCL-score equal to or above 1.75 indicates that the respondent may meet the criteria for an anxiety-or depressive diagnosis (Herschberger 2005; Winokur et al. 1984). For further details with regards to the 25 items, please see Appendix 1. Regarding missing data, please see our article Marum et al. (in prep).

For information about the buffering variables social support and sense of mastery, please see the article Marum et al. (in prep).

2.5 Statistical analyses

Statistical analyses were conducted by using the Statistical Package for Social Sciences (SPSS), version 17.0 for Windows. Multiple regression was chosen due to the possibility of exploring the relationship between the continuous, dependent variables psychological distress (HSCL-25) and life satisfaction (LS) and several independent (gender, age, education, income, negative life events, social support, sense of mastery) variables (Pallant 2010). Stepwise regression was conducted. The order of entry in the regression analysis was as follows: (1) socio-demographic variables, (2) negative life event variables, (3) social support and sense of mastery. The regression analyses allow us to determine whether negative life events and social support and sense of mastery are still significant predictors after adjusting for socio-demographic variables. Sample size is of concern due to generalizability when using multiple linear regression. With the large study sample size (N=4,823), this assumption was not violated in this study. Multicollinearity was tested and no violation of assumptions was found.

Effect sizes used in this study were unstandardized *b*-values with the 95 % confidence interval and standardized Beta (β). The *b*-values indicate the contribution of each independent variable to the model and the relationship between the outcome variable and each predictor (Field 2009). A positive relationship between the predictor and the outcome is expressed by positive values, whereas a negative value demonstrates a negative relationship (Field 2009). The *b*-values show to what degree each independent variable the outcome *if the effects of all other predictors are held constant* (Field 2009). The standardized Beta-value (β) provides a better understanding of the importance of each independent variable in the model. The standardized beta-values are comparable due to being measured in standard deviation units (Field 2009). With regards to missing data, please see our article Marum et al. (in prep).

2.6 Ethical aspects

The present study did not require additional permits from the Regional Board of Ethics (REK), Norway. The analyses were performed on existing data material the Health and Level of Living Survey 2008 (Levekårsundersøkelsen/HUS 2008), compiled by Statistics Norway. Participation in the Health and Level of Living Survey 2008 was voluntary. All reference to the person identification number was removed by Statistics Norway prior to delivering the data to the National Institute of Public Health. The data can thus be considered anonymous. To protect the data, the analyses were performed on the computers at the Public Health Institute, Division for Mental Health, Oslo.

3 Results

3.1 Summary of main results.

The main results of the present study showed that all of the negative life events explored, except for bereavement, were associated with reduced life satisfaction and increased psychological distress, although the strength of the associations differed by type of event. Furthermore, events pertaining to financial strain and conflict with close friend, neighbor or family emerged as the strongest variables associated with both psychological distress and life satisfaction. Sense of mastery emerged as a significant moderating factor between financial strain and both psychological distress and life satisfaction, whereas social support did not act as a moderating parameter between any of the negative life events and psychological distress and life satisfaction, respectively. For further detail about the results, please see the result section in the article Marum et al. (in prep).

Of the total sample, 2,295 reported having experienced one or more negative life event during the last 12 months. Of these 1,329 had experienced one stressor, 614 had experienced two stressors, 217 three stressors, 90 four stressors, and 45 had experienced more than five stressors. The experience of multiple stressors was negatively associated with life satisfaction (see Figure 2) and positively associated with psychological distress (see Figure 3). As shown in Figure 3, the levels of psychological distress in respondents who reported three or more stressors seem to be just above and beneath the clinical cut-off (1.75) indicative of possible clinical psychological distress.

Furthermore, descriptives showed that 26.5 % of those who were divorced experienced financial strain compared with 4.8 % of non-divorced. Cumulative life events (three or more) were more prevalent among those who were divorced (18.4 %) than married couples (3.6 %). The same pattern with regards to cumulative life events (three events) was seen for those who reported unemployment (27.3 %) and financial strain (26.3 %) compared with being employed (3.7 %) and not having financial trouble (3.5 %). It was 36.6 % who reported being out of work and at the same time experiencing financial strain compared with 4.2 % who was employed and financial strain.

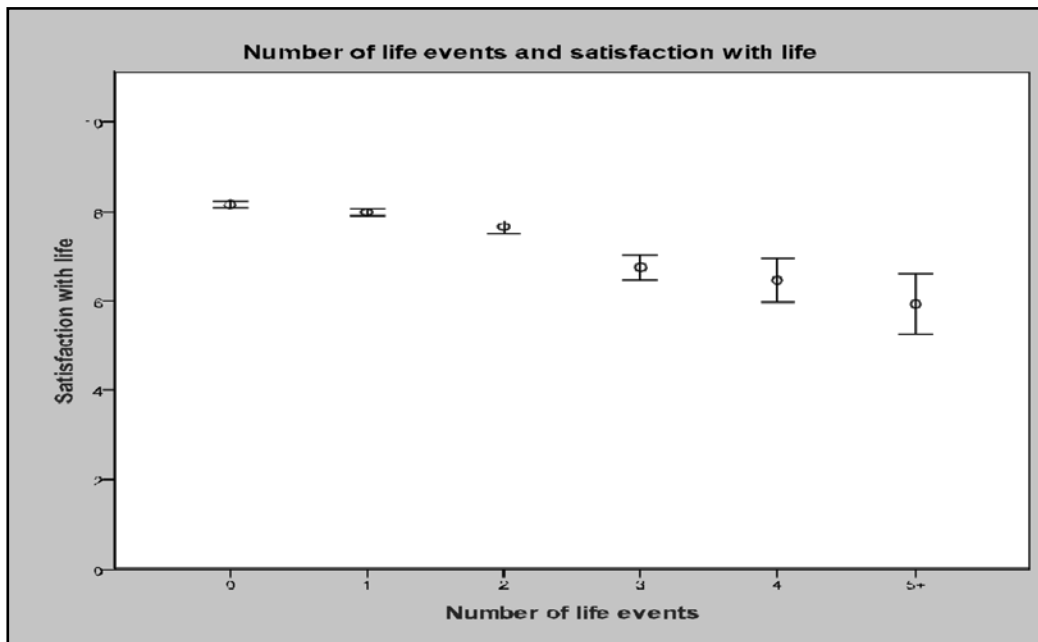


Figure 2: *Number of negative life events and life satisfaction.*

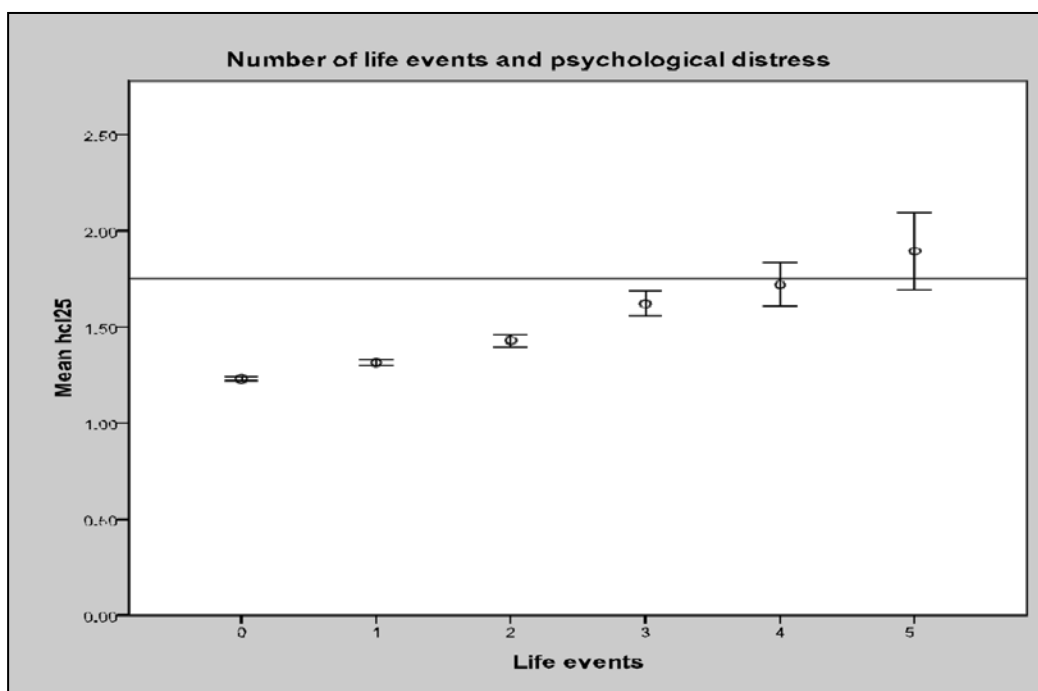


Figure 3: *Number of negative life events and psychological distress (HSCCL cut-off at 1.75).*

As presented in Figure 4, it appears that negative life events with regards to experiencing one, two and three events were dominated by experiencing disease, injury or assault to somebody

close, bereavement and conflict with close friend or relative, in that order. Whereas divorce and serious economic problems, or financial strain, becomes more prevalent as the number of negative life events increases.

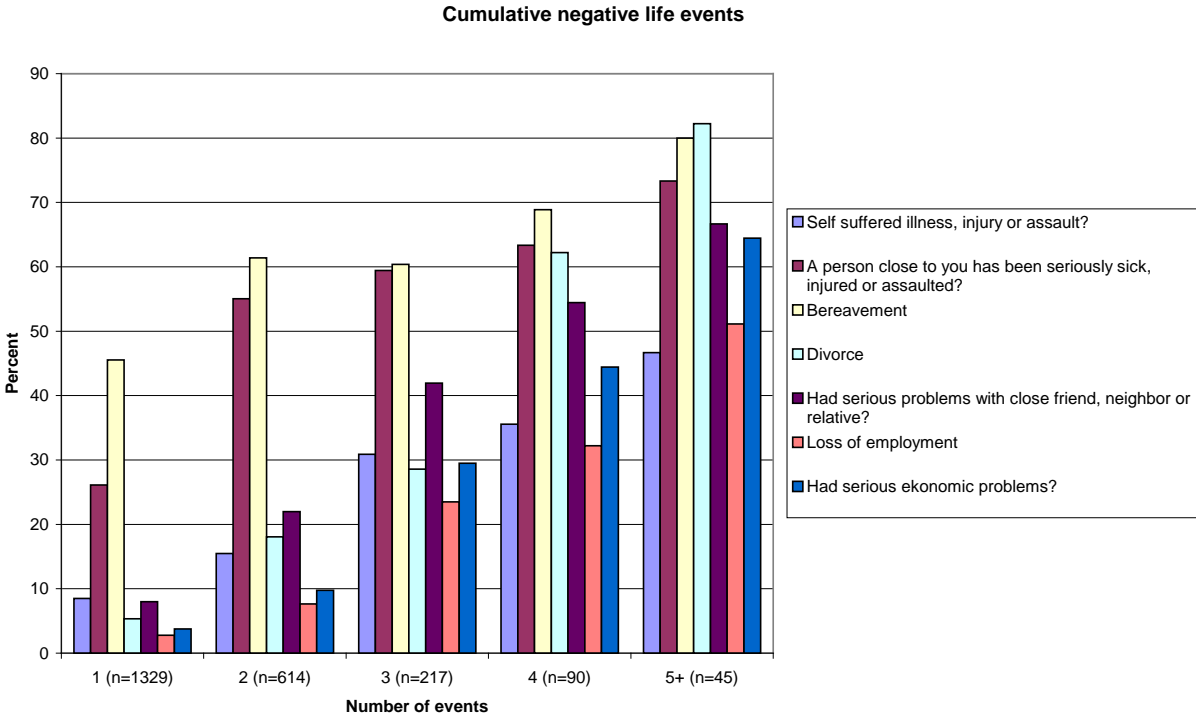


Figure 4: *Cumulative negative life events.*

4 Discussion

4.1 Methodological considerations

4.1.1 Validity

Validity of a study is concerned with whether the associations or differences that have been currently observed are valid enough to draw further inferences with regards to the population that has been studied. The validity concepts in the current study are elaborated in accordance with the principles of Shadish et al. (2002). The following validity concepts to be discussed are; construct validity, internal validity, statistical conclusion validity and external validity. Threats associated with validity and reliability will also be discussed.

4.1.2 Content and construct validity

Content validity reflects how well and specific a scale is to test that the variable measures what it is intended to measure. Construct validity is concerned with the congruence or link between the theoretical platform and the psychometric properties of the test. A scale measuring depression must reflect only this particular construct and not any closely related concepts such as anxiety or stress (Shadish et al. 2002). Convergent and discriminant validity are considered subdivisions of construct validity. Convergent validity tests that constructs that are expected to be related are indeed related to each other (convergence), whereas discriminant validity checks whether constructs that theoretically should not have any relationship, in fact, are not to be related (Shadish et al. 2002).

The single item life satisfaction (LS) measure was used in the present study to assess the subjective cognitive evaluation of global well-being, rather than satisfaction with specific life domains such as marriage, work or health (Diener et al. 1985). The single item measure is commonly regarded as a threat to validity. In the Health and Level of Living Survey of 2008, the single item measure of life satisfaction was the only construct investigating global life satisfaction at present. Previous studies have found life satisfaction to correlate strongly with positive affect whereas a negative correlation is found between life satisfaction and depression and anxiety (Beck Depression Inventory) (Lucas et al. 1996; Pavot & Diener 2008). A meta-analysis found an average convergent validity of $r = 0.42$ of self-ratings of well-being (Schneider & Schimmack 2009). Empirical evidence indicates that people use relevant and stable strategies when evaluating life satisfaction whereas environmental factors only weakly influence these judgments (Schimmack & Oishi 2005). Random error variance in life satisfaction judgments is generally found to be low (Schimmack & Oishi 2005). Single

item measures demonstrated a reliability of approximately 60 % when respondents were presented the life satisfaction question for the first time (Schimmack et al. 2010). Overall, the single item life satisfaction measure may be considered a fairly valid and reliable measure in Western countries.

The self-administered and widely used HSCL-25 instrument has provided evidence to contain satisfactory validity as a measure of psychological distress (Derogatis et al. 1974). Based on previous research (Hesbacher et al. 1980) a cut-off point of 1.75 has been set as a valid predictor of mental disorder as evaluated independently by clinical interviews. Studies have demonstrated that 50-60 % of respondents with a HSCL-score above the cut-off qualify for psychiatric morbidity by clinical interview (Derogatis et al. 1974; Sandanger et al. 1998; Sandanger et al. 1999). The two subscales of anxiety and depression are highly correlated partly due to the fact that these conditions are interrelated in both clinical as well as in normal populations (Tambis & Moum 1993). The HSCL-25 instrument was found to be comparable in measuring psychological distress to instruments such as the five-item mental health index instrument (MHI-5). Correlation between the instruments ranged from -0.76 to -0.78 (Heine Strand et al. 2003). Further, it was considered to be more sensitive to screening and identifying “cases” compared with the Composite International Diagnostic Interview (CIDI) (Sandanger et al. 1999). The sensitivity of the HSCL-25 to DSM-III-R Axis-I anxiety and mood disorder has been found to be moderate (43%-70%) and specificity to be high (83-85%) in young adults (Veijola et al. 2003). A report found support for the use of the HSCL-25 instrument in population-based surveys within multicultural Western societies (Tinghög & Carstensen 2010).

Negative life events measured using The List of Threatening Experiences (LTE) has been applied in several population studies (Dalgard et al. 2006; Korkeila et al. 2007). Literature has pointed to the limitations of checklist measures of stress (Dohrenwend 2006). The LTE does not distinguish experienced loss from death of a child, friend or parent. Thus, this category may not be sufficiently accurate and doesn't necessarily measure the same dimensions. This may have had implications for the results in our study. A recent population-based epidemiological cohort study argued in favor of including the LTE-measurement in future epidemiological studies due to its demonstrated reported retrospective stability of 0.6. Furthermore, its constructive validity, characterized by positive association with psychological distress, was also emphasized (Rosmalen et al. 2012). Previous studies have

found the list of threatening experiences to provide acceptable validity and reliability (Brugha et al. 1990). However, as literature suggests, it is necessary to take into consideration whether the items are more “topic-related” and thus not accurately operationalized due to what it is intended to measure (Dohrenwend 2006).

Social support was measured using the OSS-3 scale, which, has been extensively applied in several population studies (Dalgard et al. 2006; Van Lente et al. 2012) and in several National Health and Level of Living Surveys (1998, 2002, 2005, 2006) confirming its predictive validity with respect to psychological distress. The instrument is recommended by the World Health Organization and is further included in the European Community Health Indicator list (Lavaikainen et al. 2006).

In previous research, the sense of mastery scale has been found to possess satisfactory psychometric properties (Pearlin & Schooler 1978; Pearlin et al. 1981). Studies have shown that low sense of mastery is associated with psychological distress (Dalgard et al. 2007; Pearlin & Schooler 1978) and general ill-health (Pudrovska et al. 2005), whereas high levels of sense of mastery are associated with social support and coping (Pearlin et al. 1981). The five-item sense of mastery scale is considered an important health determinant by the EU (Korkeila et al. 2007; Lavikainen et al. 2006).

Overall, the instruments used to investigate the research objectives presented in this study have previously been exposed to thorough testing, and should be deemed to have acceptable reliability and validity.

4.1.3 Internal validity

Internal validity is concerned with causality of an inference between covariates. Due to the cross-sectional design of the present investigation, no conclusion regarding causality can be ascertained (Shadish et al. 2002).

4.1.4 Threats to internal validity

The accumulated data analyzed in the present study were all from a self-report questionnaire, except for social support, which was included in the interview section of the survey. The data collected in this study were measured mostly with validated and standardized instruments, which strengthened the reliability of the compiled data. However, the use of self-reporting instruments includes a “threat” to the internal validity due to recall bias. There is always a

likelihood of the participants misinterpreting the questions being posed and not remembering events, which occurred in the past, correctly. Recall bias might to a certain extent be connected to factors such as age and education level. The various instruments referred to somewhat different time frames. Responding to such self-administered instruments, although being short and economical, pose a risk for “mood-of-the-day effects” (Moum 1988). Literature has suggested that data from self-reporting instruments imitate the reporting behavior of symptoms rather than the relevant incidence of symptoms. However, literature suggests that in general, responding styles do not influence strongly on ratings of pleasant or unpleasant emotions (Schimmack et al. 2002). Face-to-face interviews could be influenced by social desirability bias in terms of the respondent denying or confirming symptoms depending on the relation between the interview object and the interviewer in the actual setting (Riessman 1979).

The decrease in the response rate in the present study poses a threat to the internal validity of the study with regards to the emergence of selection bias, which may cause under- or overestimation of the prevalence of for instance psychological distress. The net sample was examined to get an impression of those who did not partake in the study. Women, highly educated individuals and participants in the age group 45-64 were somewhat overrepresented in the survey, whereas elderly and non-western immigrants were underrepresented in the sample. To increase the response rate, one reminder was provided to the participants with regards to the postal questionnaire, which included most of the inquiries with relevance to mental health in the 2008 survey, whereas three reminders were sent to the participants with regards to the interview section. Regarding the national population based health surveys the response rates have fallen systematically through the period 1998-2008.

It is pertinent to examine how the participants of the interview and postal sections as well as those who took part in both the interview and postal parts differ from each other and the population, respectively. The response-drop in the 2008 survey is biased with regards to age, gender and education. The reduction is unequally distributed in the interview and the postal sections (Lillegård 2009). According to analyses by Lillegård (2009), participants with mental health problems have the highest dropout rate, leading to an underestimation of psychological distress in the population. This underestimation has been calculated to approximately one percent in the 2008 survey (Lillegård 2009).

Women, except in the age group 25-64 years, dominated the postal section compared with those who also participated in the interview section, and the difference is significant (Nes & Clench-Aas 2011). Men contributed to the postal section to a lesser extent than women, and to a certain extent a selection bias is demonstrated here. However, no trend between men and women was observed with regards to any of the sections or the survey in total (Nes & Clench-Aas 2011). Participants in the interview section were somewhat younger (mean age 45.5; SD 18.1) compared with those who only took part in the postal questionnaire (mean age 47.9; SD 19.3). The age difference was significant (Nes & Clench-Aas 2011). The age group 45-64 years was somewhat overrepresented, leading to a selection regarding age due to the decreasing response rate. In the age group 25-64 years, 37.4 % were highly educated which is elevated compared with the general population fraction of 33.7 %. In the same age group as previously mentioned the proportion of highly educated was 33.3 % and 26.5 % in the interview and postal questionnaire, respectively (Nes & Clench-Aas 2011).

4.1.5 Statistical conclusion validity

Statistical validity is dependent on accurate and correct use of the statistical methods in the study to further conclude whether the independent and dependent variables have a mutual relationship (Shadish et al. 2002). In the current study, preliminary assumptions such as normal distributions, linearity of correlations, distribution of residuals were verified to confirm the validity of the statistical analyses. Descriptives showed that assumptions of normality were to some extent violated (HSCL-25 score), however due to the large sample size ($n=4,823$) it was not considered a serious violation (Pallant 2010). The models used in the analyses indicated that they were significant. For further detail please see Marum et al. (in prep). Multiple regression was chosen due to the continuous nature of the dependent variables. The continuous nature of the life satisfaction variable, which consisted of ten response categories has been defended in previous research (Rhemtulla et al. 2010). To secure that the covariation among the negative life events variables were independent and accurate, intercorrelation analyses were performed (Table 2). Effect sizes were reported with 95 % level ($p < 0.05$) when analyses provided this opportunity. The p (probability value) indicate to what extent the observed difference is obtained by chance, and at what risk level the researcher considers it necessary for making an error when generalizing the results from the studied population. There are two risks associated with significance testing: type I error occurs when a difference is accepted as significant when it should be rejected, and type II error happens when a difference is not recognized and rejected when it should not have been.

Thus, the significance level in present study was set at three different levels. The results from this study derived from a large, representative sample, which significantly increases the statistical power of the analyses (Shadish et al. 2002).

4.1.6 External validity:

External validity is concerned with what degree the results from the current study can be generalized to a larger perspective. In other words, are the results from the sample in the present study representative or typical of the population? (Shadish et al. 2002; Skovlund & Vatn 2004). The present study was based on a nationally representative and large sample of adults. Women and the age group 45-64 years were somewhat over represented in the net sample compared to the population, whereas non-western immigrants and elderly were underrepresented. In general, women and non-western immigrants experience higher levels of psychological distress (Dalgard et al. 2007; Dalgard et al. 2006). Furthermore, it was only elderly living at home who were included in the study, excluding those who probably were seriously ill or living in an institution. Lack of sample diversity due to few non-western immigrants and elderly included in the study, make the results less representative for these groups. Moreover, the prevalence of psychological distress in this sample might be significantly lower compared with the population. Highly educated individuals were somewhat more represented compared with the population, a group recognized as physically and mentally healthier in contrast to people with low education (Næss et al. 2007). Therefore, the sample is probably characterized with better mental health, assuming less psychological distress compared with the population (Nes & Clench-Aas 2011). It is furthermore known that non-responders do have more mental problems. Those who participate in surveys are usually highly educated and have an interest and appreciation of the necessity of participating in studies.

4.2 Reliability

Reliability refers in simple terms to the consistency, accuracy, stability and repeatability of any given measuring test or instrument (Shadish et al. 2002). One of the most commonly used reliability measures of internal consistency is the Cronbach's alpha. In this study, the alphas reported for the majority of test measurements exceeded the 0.7 limit, indicating a satisfactory level of internal consistency (Shadish et al. 2002). The OSS-3 scale has been extensively used in several studies and measure different dimensions of social support. Due to these aspects the Cronbach's alpha is usually low. The estimation of the Cronbach's alpha was not performed on the life satisfaction measure due to it being a single item. In general, it is

accepted that single item instruments have limited reliability. Schimmack and Oishi (2005) reported in their study that the random error variance in life satisfaction judgments is low. Empirical tests have shown that responses to single item life satisfaction judgments are quite valid with reliability commonly ranging between 60-65 % (Schimmack & Oishi 2005; Schimmack et al. 2010).

4.3 General discussion of results

4.3.1 Negative life events and psychological distress and life satisfaction

The findings from this study showed that all of the negative life events variables explored, except for bereavement, were associated with lower life satisfaction and higher psychological distress scores, although the strength of the associations differed. The significant associations between the negative life events and psychological distress and life satisfaction were to a large extent very similar in size and emerged with moderate to weak strength (please see Table 2 in the article by Marum et al. (in prep)). These results are in accordance and consistent with previous research that suggests that negative life events seem to exert a significant, however low to moderate effect on distress symptoms and life satisfaction (Lucas 2005; Mazure 1998; Thoits 2010).

The possibility of becoming seriously ill or disabled, loss of steady income and work, or ending a steady relationship are events feared by most people. Several possible explanations have been pursued to reveal and understand the mechanisms contributing to the relative weak relationship between negative life events reduced well-being. Most studies show that life events influence well-being relatively shortly, indicating that humans bounce back to baseline and adapt to most life circumstances (Headey & Wearing 1992; Suh et al. 1996). Furthermore, most people confronted with some sort of negative life event or life-threatening situation do not submit to mental illness, also indicating a resilient capacity (Bonanno 2004). Research has extensively explored whether life events were buffered by other factors such as social support and sense of mastery (Dalgard et al. 2007; Dalgard et al. 2006; Thoits 2010). Another approach has been that important dimensions with regards to negative life events and health outcomes were not captured by the check list measures (Dohrenwend 2006). Ballas and Dorling (2007) reported in their study on impact of major life events upon happiness that it seemed that people may be a bit reluctant to express adverse events in social surveys, since events related to happiness were reported 14,283 times (10.32 %), whereas negative events were expressed 10,465 times (7.29 % of all life events). The strength of the associations

between the various negative life events and life satisfaction in the present study are equivalent to those found in previous reports or correspond well with previous research (Ballas & Dorling 2007, Diener et al. 1999).

The relative impact of the various types of negative life events associated with increased psychological distress and reduced life satisfaction is discussed in the article by Marum et al. (in prep). Furthermore, the difference between the predictors of psychological distress and life satisfaction is elaborated on in the same section as relative impact in the aforementioned article. The results from present study may lend support to literature suggesting that positive and negative mental health measures are two discrete dimensions of mental health rather than opposite endpoints on the same dimension (Huppert & Whittington 2003; Keyes 2002; Keyes 2005).

4.3.2 Self-suffered illness, injury or assault

Findings from our study indicate that self-suffered illness was significantly associated with increased psychological distress and reduced life satisfaction. However, self-suffered illness showed a stronger relationship with psychological distress compared to life satisfaction. Illness reflects an inherent uncertainty factor when facing an acute illness or chronic disease, which involves loss of control and unpredictability with regards to future situations (Vingerhoets 2007, Wright et al. 2009). This may be reflected in the strength of the association between self-suffered illness and increased psychological distress and reduced life satisfaction in our study. For further details with regards to the discussion of this result please see the article Marum et al. (in prep).

4.3.3 A serious illness, injury or assault happened to a close relative

Having a close relative suffering from an injury, disease or assault was significantly associated with increased psychological distress and with reduced life satisfaction. The finding from our study may reflect research recognizing the stress of being a caregiver for a family member and its negative impact on the caregiver's mental and physical health (Brown et al. 2009; Haley et al. 2003; Roth et al. 2009). Moreover, the care-giving responsibilities are recognized as an important public health issue due to the fact that the population is ageing, hence the increased prevalence of chronic diseases and the higher survival rates of people with disabilities (Roth et al. 2009). An epidemiological study found that reduced quality of life is more common among families that experience high strain from their caregiving activities. However, Roth and colleagues also found that caregivers who expressed no strain

from caregiving reported better quality of life compared with non-caregivers. A longitudinal study among the elderly married, indicated that spending at least 14 hours per week involved in caregiving activities for the spouse reduced mortality for the caregiver (Brown et al. 2009). Furthermore, a small study which investigated risk (caregiving stressors, caregiver health, negative social interactions) and protective factors (caregiving appraisals and social resources) of depression and life satisfaction among caregivers of hospice patients with lung cancer or dementia, indicated that caregivers who were capable of finding meaning and personal benefits from caregiving experienced lower depression and elevated life satisfaction (Haley et al. 2003).

4.3.4 Bereavement

The findings from the current study did not find a significant association between the bereavement variable and life satisfaction or psychological distress. This finding was to a certain extent a bit extraordinary due to the abundance of research which supports such an association (Ballas & Dorling 2007; Boelen 2012; Mazure 1998). For further detail regarding the discussion of this result please see the article Marum et al. (in prep).

4.3.5 Divorce

In the current study, findings showed that the divorce variable was significantly associated with increased psychological distress and lower life satisfaction. This finding is in keeping with previous literature that proposes that divorce is a typical disruptive life event that contributes to psychological distress (Johnson & Wu 2002; Mazure 1998) and reduced life satisfaction (Lucas 2005; Luhmann et al. 2011). Literature suggests that married couples express elevated levels of happiness compared to divorced and single people (Gustavson et al. 2012). A longitudinal study on reaction and adaptation to divorce found that divorce contributes to a reduction in life satisfaction and that recovery to baseline was still not complete after seven years (Lucas 2005). Furthermore, it was suggested that those who eventually would divorce were already less happy before marriage compared with those who stayed married. These pre-existing conditions combined with post divorce changes were all relevant to the association between divorce and life satisfaction (Lucas 2005).

However, the somewhat more feeble association between the divorce variable and life satisfaction compared with divorce and psychological distress in the present study may reflect research that suggest that leaving a disruptive relationship may be beneficial for life satisfaction (Gustavson et al. 2012; Luhmann et al. 2011). Gustavson et al. (2012) explored

the association between relationship difficulties, divorce and life satisfaction among 369 heterosexual couples. Findings from the study showed that those who remained married through the study claimed higher life satisfaction compared with the divorced. However, those who left a severely dysfunctional relationship experienced higher life satisfaction at a 15-year follow-up compared with those who stayed together.

With regards to a public health and health promoting perspective, assisting couples in troubled relationships may also influence their general life satisfaction (Gustavson et al. 2012). Although, a divorce may be beneficial for life satisfaction in the long run, it takes courage in addition to other consideration such as economy, children, judgments from family and others, isolation, loneliness (Gardner & Oswald 2006). In the current study, descriptive statistics showed that those who were divorced 28.6 % experienced serious financial trouble compared with 4.8 % of married couples. Furthermore, of those who experienced three negative life events; 18.4 % were divorced whereas 3.6 % claimed relationship status.

4.3.6 Conflict with a close friend, family or neighbor

Social disruptions with a close friend, neighbor or family, described as a conflict in this context, showed a significant and stronger association with psychological distress compared to life satisfaction in the present study. The association between psychological distress and conflict with friend or family also suggested a stronger relationship (the second strongest association between a life event and psychological distress) in the present study, compared to the associations between psychological distress and for instance divorce (please see Table 2 in the article Marum et al. (in prep). A possible explanation to the association between increased psychological distress and conflict with a close friend, family or neighbor, may be that such a conflict may be perceived as a chronic difficulty (DeLongis et al. 1982). Previous studies have indicate that daily irritations may be better predictors of well-being than life events (DeLongis et al. 1982). Lack of social support may be perceived as a chronic stressor and associated with mental health problems, pertaining to, for example, the loss of an honored relationship with family, friend or neighbor (Paykel 2003). Furthermore, a study based on data from the British Household Panel Survey, suggests that personal relationships are among the factors that matter the most in peoples lives in Britain, and are thus essential in terms of feeling good (Ballas & Dorling 2007).

4.3.7 Loss of employment and financial strain

Loss of employment was significantly associated with increased psychological distress and reduced life satisfaction. This finding is in line with previous research suggesting loss of work to be associated with impaired mental health and reduced well-being (Ballas & Dorling 2007; Paul & Moser 2009). In the current study, women in employable age (25-64 years) and highly educated were somewhat overrepresented (for further detail, please see paragraph 4.1.4, regarding external validity). A weaker association may have occurred between unemployment and psychological distress with regards to the increased presence of the highly educated in the study. A recent meta-analysis suggested that men in blue-collar jobs were affected more negatively by unemployment compared with women and people with typical white-collar jobs (Paul & Moser 2009). Furthermore, the study indicated that psychological problems were twice as high among the unemployed (34 %) compared to employed individuals (16 %). The negative effect of unemployment was suggested to be weaker in countries with established welfare benefits programs and a high level of economic development such as experienced in Norway (Paul and Moser 2009).

A 15-year longitudinal study, which explored whether the set-point for life satisfaction was changed after being unemployed, proposed that even though life satisfaction is assumed to be moderately stable over time, life events such as unemployment may have long lasting consequences for subjective well-being (Lucas et al. 2004). Previous research ascertains a causal relationship between unemployment and distress and reduced life satisfaction (Lucas and colleagues 2004, Paul and Moser 2009). However, no causality is claimed in the present study due to its cross-sectional design. The current economic climate affecting greater parts of the world and with unemployment rates as high as 23 % in certain European countries, place the finding from the present study into a greater context and thus make a complimentary approach to mental health even more relevant facing the probable consequences of an unstable labor market and economic hardship.

Financial strain emerged as the factor most strongly associated with increased psychological distress and reduced life satisfaction. In the current study it was 38.6 % who reported being out of work and at the same time experiencing financial difficulties compared to 4.2 % who was employed and reporting financial difficulties. This finding is in line with previous research where self-reported economic hardship such as not being capable of paying rent, ordinary bills and not having any cash reserves were suggested to provide a stronger

association with impaired mental health than more conventional low-income measures in a Swedish National Public Health Survey (Ahnquist & Wamala 2009). For further details please see the article Marum et al. (in prep).

4.3.8 Multiple negative life events

Findings from the current study show that the survey respondents were almost divided in two equal parts with regards to those who reported no experiences of negative life events (50.4 %, N=2,335) the preceding twelve months, and those (N=2,295) who expressed having been exposed to one or more negative life events. Furthermore, the results showed that the experience of increasing multiple stressors was negatively associated with life satisfaction and positively associated with psychological distress as shown in Figure 2 and 3, respectively.

It is interesting to note that the respondents who were divorced reported experiencing more negative life events compared to those who were not divorced. Of those experiencing for instance three multiple stressors, 3.6 % were married, whereas 18.4 % were divorced. The same pattern was seen for those who experienced negative life events such as e.g. unemployment, financial trouble, and conflict with a relative or friend. These findings are consistent with previous research that indicate that the pile-ups or cumulating negative life events predict elevated levels of distress and reduced life satisfaction (Keinan et al. 2011; Seery et al. 2010; Thoits 2010; Turner & Lloyd 1995). Literature further suggests that negative life events often co-occur (Seery et al. 2010). Most studies in this area are one-time, cross-sectional data that may confound retrospectively events that occurred in the past with concurrent responses to mental health measures (Shmotkin et al. 2009).

A dose-response relationship regarding the association between cumulative adversity and positive and negative mental health has been suggested (Keinan et al. 2011). In the study by Keinan et al. (2011) it was demonstrated that higher number (>3 events) of reported events were associated with a co-activation of distress and well-being. However, the activation of both distress and well-being occurred only with regards to events that involved accommodating others in times of difficulties such as comforting due to loss. As previously described, assisting and caring for others may not only be perceived as stressful but provide the opportunity of feeling useful and productive (Brown et al. 2009; Keinan et al. 2011).

Population Attributable Risk (PAR) for risk-factors such as cumulative negative life events (two or more) during the last twelve months were estimated to almost 40 % for HSCL-score above 1.75 in the same sample as investigated in present study (Nes & Clench-Aas 2011). Population Attributable Risk is a measure of the improvement that could theoretically be expected in the population if the given risk factors were eliminated (Rothman 2002).

4.4 Buffering parameters

The second objective of our study was to investigate the buffering capacity of social support and sense of mastery. Sense of mastery only moderated the association between financial strain and psychological distress and life satisfaction, whereas social support did not show any moderating impact between any of the negative life events and psychological distress and life satisfaction. A considerable body of literature have investigated social support and its positive impact on health and longevity (Dalgard et al. 1995; Dalgard et al. 2006; Fyrand et al. 2002; Uchino 2004). However, findings from the current study do not lend support to the stress-buffering hypotheses. This finding is, however, in accordance with a prospective cohort study among women that indicated limited support for the stress-buffering hypotheses (Vaananen et al. 2005). A possible explanation to the finding that sense of mastery buffered the association between financial strain and both psychological distress and life satisfaction may be that they feel in control, may have savings in the bank, are able to diminish the value of money, the assurance of receiving benefits until the situation improves and that it is a temporal situation (Pudrovska 2005).

5 Further studies

The findings presented in this study are exposed to limitations and weaknesses. However, they do provide insight into the associations between various types of negative life events, psychological distress and life satisfaction based on a large, nationally representative study. Further research is needed to more fully understand the complex mechanisms involved in the associations between negative life events and psychological distress and life satisfaction in the population. The design of the study does not allow for any causal ordering due to the cross-sectional nature of the study. Longitudinal studies are therefore needed to further clarify the role of negative life events with regards to both positive and negative mental health, which is beyond the reach of the current cross-sectional study.

Secondly, this study revealed similar associations between different types of negative life events and psychological distress and life satisfaction. However, some differences were observed. Future longitudinal studies including both positive and negative mental health outcomes are needed to further clarify the complex interplay between these two distinct but highly correlated dimensions and its association with various life stressors.

Third, research of longitudinal character would be of particular interest to further explore the relationship between cumulative life events and psychological distress and life satisfaction, respectively and the long-term outcomes due to the fact that negative events tend to co-occur.

The role of social support and sense of mastery as buffering parameters is well recognized in taxing situations. However, the role of these parameters as important health determinants, is still poorly understood. Further examination may yield useful explanations for the non-significant associations between either social support or sense of mastery and psychological distress and life satisfaction, respectively, in the current study.

6 Conclusion

The present study indicates to a certain extent the potential of the associations between various life events and increased psychological distress and reduced life satisfaction. The results in this study were based on a large, nationally representative sample, giving an indication, however not causal due to the cross-sectional design of the study, of the role that negative life events pose with regard to increased psychological distress and reduced life satisfaction. In a public health and health promoting perspective, focusing on both positive and negative health indicators in both cross-sectional and longitudinal research will contribute to a more comprehensive understanding of the mechanisms involved, and for designing future interventions based on recognition of the impact of risk and protective factors that reduce psychological distress and reinforce well-being.

7 References

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8 Article:

Negative life events' relation to psychological distress and life satisfaction in a population based study in Norway

Negative life events' relation to psychological distress and life satisfaction in a population based study in Norway.

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Abstract

Objectives: Experiencing negative life events may increase psychological distress and reduce life satisfaction. The aim of this study was to investigate the associations between negative life events and both positive and negative mental health, and to explore the extent to which these associations were buffered by sense of mastery and social support. *Methods:* The data was obtained from the cross-sectional Level of Living Survey conducted by Statistics Norway in 2008. Data on mental health was collected by a self-administered questionnaire and socio-demographic information was based on register statistics. The Hopkins Symptom Check List (HSCL-25) was used to measure psychological distress and Life Satisfaction (LS) was measured by a single question. Life events were measured using a 12-item List of Threatening Experiences (LTE). *Results:* There was a significant association between all of the negative life events and both HSCL-25 and LS, except for events pertinent to bereavement. The strongest associations were indicated for financial strain and conflict with close friend, neighbour or family. Sense of mastery, but not perceived social support, emerged as a moderating factor between financial strain and psychological distress (HSCL-25) and life satisfaction (LS). *Conclusion:* The majority of negative life events were significantly associated with both life satisfaction and psychological distress. Although similar findings with the two measures were found, there are some dissimilarities which emphasize the call for inclusion of both life satisfaction and psychological distress in measures of consequences of negative life events.

Keywords: mental health problems, life stressors, HSCL, well-being.

Introduction

Throughout life, most people will to some extent be affected by negative life events such as a divorce, financial strain, disease, or the loss of a loved one. These adverse life events constitute significant risk factors for mental health problems such as psychological distress, anxiety and depression (Mazure 1998; Paykel 2003; Tennant 2002) or life satisfaction (Gustavson et al. 2012; Lucas et al. 2004; Lucas 2007; Luhmann et al. 2011). Since such events constitute significant risk factors, it is important to examine the specific impact of such adverse events on essential dimensions of mental health. As positive and negative psychological states constitute important dimensions of overall mental health that appear to be essentially independent (Huppert & Whittington 2003; Keyes 2002; 2005). Although the majority of studies to date have examined the negative health impact of adverse events, the last decade has seen an increasing interest in positive indicators of mental health (e.g. well-being, happiness, and life satisfaction), and a number of studies have investigated the relationship between life events and such positive indicators (Ballas & Dorling 2007; Luhmann et al. 2011). Studies exploring the impact of negative life events on psychological distress or well-being represent complimentary research approaches.

A recurrent finding from studies that have investigated how people respond and adapt to negative life events is that negative life events influence both life satisfaction and psychological distress, although the strength of the effects varies depending on the life events considered (Gustavson et al. 2012; Lucas et al. 2004; Lucas 2007; Luhmann et al. 2011; Mazure 1998; Paykel 2003). Longitudinal studies have established a causal link between stressful life events and onset of depression (Kendler et al. 1999). Studying happiness rather than distress, Ballas & Dorling (2007) found that ending a relationship, loss of a parent, and employment-related loss had the highest negative impact on happiness, in that order. A recent meta-analysis (Luhmann et al. 2011) showed that bereavement, unemployment and divorce had strong and persistent negative effects on subjective well-being. Furthermore, Rhoades et al. (2011) showed that dissolving an intimate relationship was associated with both increased psychological distress and reduced life satisfaction.

A negative life event usually requires individuals to make extensive behavioral readjustments in their daily lives (Holmes & Rahe 1967). An overload of changes during a short period of time may therefore lead to an overburden of the individual's capability to cope or adapt (Thoits 2010). However, human beings are often capable of thriving despite being confronted

with various challenges and adapt positively despite experiencing adversity (Bonanno 2004). The ability of an individual to cope with major negative events depends on several internal and external factors. These factors may act as buffers against the development of mental health problems. A considerable body of literature has investigated the buffering effects of *social support* and *sense of mastery* in taxing situations and found considerable support for their moderating effects (Cohen & Wills 1985; Dalgard et al. 1995; Dalgard et al. 2007; Fyrand et al. 2002).

Since life satisfaction and distress are moderately correlated constructs and do not simply reflect two opposite ends on the same dimension, (Keyes 2002; 2005; Huppert & Whittington 2003) and most studies exploring the impact of adverse life events on *either* well-being or distress, the primary aim of this study was to explore the association between different types of negative life events and both psychological distress and life satisfaction in a large nationally representative study in Norway. Secondly, we want to examine the buffering effects of social support and sense of mastery.

Methods

Design, participants and procedure

The data in the present study stems from the cross-sectional Health and Level of Living Survey conducted by Statistics Norway's in 2008, covering 10,000 individuals over the age of 15 years. The sample was selected to be representative of the Norwegian population on a stratified selection by municipality of residence. Information on mental health and psychosocial variables was obtained by a postal questionnaire after an initial interview by home visit or by telephone. Additional data on income, education, and work status was based on register data from Statistics Norway. The response rate was roughly 50 %. The final sample (N = 4,823) consisted of 2,250 men (mean age 49, SD 17.4) and 2,573 women (mean age 48, SD 17.9). The sample size by age group can be found in Table 1. Each participant gave informed consent and an additional letter of consent was furnished to those responsible for under age (≤ 18 year) respondents. The Regional Board of Ethics (REK), Norway has prior to the present study approved the use of The Health and Level of Living Survey 2008 data. Variables of interest in the present study were psychological distress and life satisfaction treated as dependent variables and gender, age, education, income, negative life events, social support and sense of mastery were treated as independent variables.

Measures

Psychological distress was measured by the frequently used 25-item version of the “Hopkins Symptoms Check List” (HSCL-25) (Derogatis et al. 1974; Hesbacher et al. 1980), which measures the presence and degree of symptoms of anxiety (10 items) and depression (15 items) during the preceding two weeks. Each question was scored on a scale from 1 (not troubled) to 4 (seriously troubled), and the HSCL-score was calculated as the sum score of items divided by number of items answered. Only cases with responses to more than 20 items were included. Missing data was substituted with the sample mean values for each item. Cronbach’s alpha was 0.9. A cut-off point of 1.75 is commonly used as a valid predictor of mental disorder with prediction being somewhat better for depression than other disorders (Derogatis et al. 1974; Strand et al. 2003) and was also applied in the present study. The sensitivity of the HSCL-25 to DSM-III-R Axis-I anxiety and mood disorder has been found to be moderate (43-70%) and specificity to be high (83-85%) in young adults (Veijola et al. 2003).

Life satisfaction (LS) was measured by the following single question “*How satisfied are you with your life in general?*” The response alternatives were rated on a scale ranging from 1 (completely dissatisfied) to 10 (completely satisfied). Empirical tests have shown that responses to single item LS judgements such as the one used here are quite valid with reliability commonly ranging between 60-65% (Schimmack & Oishi 2005; Schimmack et al. 2010).

Negative life events during the preceding twelve months were measured using a 12-item List of Threatening Experiences (LTE) (Brugha et al. 1985). The two response codes were: 1=yes, 0=no. Six out of the twelve questions were stratified into three groups based on being i) pertaining to loss of a loved one/relative/friend, ii) reflecting dissolution of a relationship, and iii) pertaining to work status. Specifically, responses to two questions concerning “*the loss of mother, father, spouse or child*” and “*loss of other family member or a close family friend*” due to death were combined and recoded into one variable labeled “*Bereavement*”. Further, responses to the two questions pertaining to “*dissolution of a close relationship*” and “*separation due to marital problems*” were also combined and recoded into the same variable, labeled “*Divorce*”. In terms of work status, the responses to the two questions concerning “*becoming unemployed or searched for work for more than a month*” and “*having been fired from work*” were also combined and recoded into the same variable, labeled “*Loss*”

of employment". Consequently, the list of negative life events in the present study were as follows: "You yourself suffered a serious illness, injury or assault", "A serious illness, injury or assault happened to a close relative", "You had a serious problem with a close friend, neighbor or relative" "You had a major financial crisis". The *Bereavement category* covered two statements related to loss of a family member, close friend, relative with the following questions; "Your parent, child or spouse died" and "A close family friend or another relative died". The *Divorce events* category covered two statements related to relationship with the following questions; "You had a separation due to marital difficulties/partnership", "You broke off a steady relationship. The *loss of employment* category included the following questions; "You became unemployed or were seeking work unsuccessfully for more than one month", "You were fired from your job. Classification into one of the event categories required that at least one question within a given category was completed. The instrument has been used in several population studies and is recommended by EEU and WHO as an important predictor for monitoring health determinant (Dalgard et al. 2006; Korkeila et al. 2007). Two out of the 12 items were excluded due to low prevalence rate of responses to these items ("problems with police/court appearance" and "something valuable lost or stolen").

Social support was measured with The Oslo Social Support scale (OSS-3) (Dalgard et al. 2006; Meltzer 2003). It consists of the three following questions: "How many close confidants would you have if you have serious personal problems?" Response was given on 4-point scale (1=None, 2=1 or 2, 3=3-5, 4=6 or more). "How much interest and concern do people show in what you are doing?" Response was given on a 5-point-scale (1=No concern and interest, 2=Little concern and interest, 3=Uncertain, 4=Some concern and interest, 5=A lot of concern and interest). "How easy is it to get practical help from your neighbors if you should need it?" Response was given on 5-point scale, (1=Very difficult, 4=Difficult, 3=Possible, 4=Easy, 5=Very easy). Responses to these questions were summarized to an index with values from 3 - 14.

Sense of mastery was measured using the five-item version of a 7-item scale that was developed by Pearlin and Schooler (1978). It comprises the following statements: "I have little control over the things that happen to me", "There is really no way I can solve some of the problems I have", "There is little I can do to change many of the important things in my life", "I often feel helpless in dealing with the problems of life", and "Sometimes I feel that I

am being pushed around in life". Responses were given on a 5-point scale (1 = "strongly agree" to 5 = "strongly disagree"). Responses to these questions were summarized to an index with values from 5 – 25, and recoded to values from 0-20. Cronbach's alpha was estimated to 0.84 in the current sample.

The socio-demographic variables included age, gender, education and income. Net household income level was defined as the sum of net income in the household divided by the square root of household members, and split into quartiles. Educational level was categorized in three groups according to years of education: 7-10 years (low), 11-14 years (moderate) and 15 years or more (high). Age was a continuous variable from 16 years and older.

Data analyses

The Statistical Package for Social Sciences (SPSS) version 17.0 was used to perform all analyses. Multiple linear regression analyses were performed to estimate the relationships between the negative life events, psychological distress, life satisfaction, social support and sense of mastery. Gender, age, education and income were entered stepwise before the negative life event variables. The buffering effect of social support and sense of mastery, were entered in the final step.

Except for the HSCL-variable, missing data were treated by SPSS by using exclude cases listwise. No significant interaction terms were observed in the present study. Preliminary analyses did not reveal any violations of multicollinearity among the independent variables. The model fit procedure used in previous analyses demonstrated a Durbin-Watson value of 1.848 and 1.99 for the outcome variables psychological distress and life satisfaction, respectively. The correlation among the independent variables was (Pearson's r) ≤ 0.2 (data not shown), except for *divorce-* and *conflict with close friend, neighbour or family variable*, which was estimated to 0.287.

Results

Descriptives

Descriptive data of the sample is presented in Table 1. Approximately 10 % of the sample reported elevated levels of psychological distress (HSCL-25 > 1.75), whereas life satisfaction mean was estimated to 7.9 (SD[±] 1.7), based on a range of 1 to 10. Roughly 50 % of the sample had experienced at least one negative life event. Descriptives showed that 26.5 % of

those who were divorced experienced financial strain, compared with 4.8 % of non-divorced. Of those who reported loss of employment 36.6 % expressed simultaneously experiencing financial strain, compared to 4.2 % who was employed and concurrently reporting financial strain. Furthermore, more than 8 % of the sample expressed low levels of support, whereas low level of mastery was reported more than 25 % of the sample.

Psychological distress

As presented in Table 2, all of the negative life events were significantly associated with psychological distress, when controlling for gender, age, education and income. Furthermore, with the exception of *bereavement*, all the negative life events showed a positive and significant association with psychological distress, indicating that the suffering of various negative life events are related to anxiety and depressive symptoms. *Financial strain* and *conflict with close friend, neighbour or family* appeared to be more strongly associated with psychological distress than the events pertaining to *loss of employment, illness, divorce, and bereavement*, as indicated by the standardized betas (Table 2). Explained variance was 22.3 %, $F(11, 4306) = 112.52, p < .000$, with all the independent variables entered in the regression (Table 2).

Life satisfaction

As shown in Table 2, all of the negative life events with the exception of *bereavement* were significantly related to life satisfaction ($p < .001$) when controlling for gender, age, education and income. Furthermore, results from the multiple regression analyses as observed in the standardized beta, demonstrated that almost all independent variables contributed significantly to life satisfaction, except for *bereavement*, which remained insignificant. Of the various life stressors, events related to *financial strain* ($\beta_i = -.213, p < .001$), showed the strongest association with life satisfaction and the association was approximately three times stronger than that of *divorce* ($\beta_i = -.076, p < .001$). However, events pertaining to *loss of employment, conflict with close friend or neighbour* and *self-suffered illness* showed almost equal strength. The independent variables explained 11.4 % of the variance in life satisfaction ($F(11, 4372) = 52.08, p < .001$) (Table 2).

Buffering effects

Sense of mastery significantly moderated ($p < .001$) the impact of *financial strain* on both psychological distress (Table 3) and life satisfaction (Table 4) when adjusting for socio-

demographic variables and the remaining negative life events. A border-significant moderating effect (tightly overlapping CI interval) of *sense of mastery* on psychological distress was also found for *self-suffered illness* and *conflict with close friend or neighbour*. *Social support* was not found to have any moderating impact on any of the negative life events and psychological distress (Table 3) and life satisfaction, respectively (Table 4).

Discussion

In the current study we examined associations between negative life events, psychological distress, and life satisfaction in a national sample of Norwegians aged 16 and older. All of the negative life events explored, were associated with lower life satisfaction and higher psychological distress scores, although the strength of the associations differed by type of events.

In this study *financial strain* emerged as the stressor most strongly associated with both increased psychological distress and reduced life satisfaction. Several mechanisms may be involved in this relationship. *Financial strain* can be a result of either loss of work, disability-dependent income, or going from a two-to-one income status due to separation or divorce. Furthermore, it is possible that worries about the financial situation or work situation may either induce or deteriorate depressive episodes. In the present study, 36.6 % suffered from both *loss of employment* and *financial strain*. In a large Swedish Public Health Survey, Ahnquist and Wamala (2011) found that current self-reported financial strain such as inability to meet expenses and lack of cash reserves, were more significantly associated with psychological distress whereas conventional low income was not. In the present study, events pertaining to *loss of employment* were related to increased psychological distress and reduced life satisfaction. This is in accordance with other studies, which have reported that unemployment and loss of work considerably impair both positive and negative indicators of mental health (Ballas & Dorling 2007; Luhmann et al. 2011; Paul & Moser 2009; Wanberg 2012). Furthermore, literature suggests that being unemployed is particularly difficult to adapt to and has a long-term effects on life satisfaction (Lucas et al. 2004) leading to feelings of helplessness and reduced self-esteem (Darity & Goldsmith 1996; Kokko & Pulkkinen 1998). Loss of employment is not only regarded as a strong risk factor for common mental health disorders, but also attributed a causal effect (Paul & Moser 2009). The cross-sectional nature of the present study does not allow ascertaining any causality of our observations. However,

our results underscore the value of current financial strain and loss of employment to mental health.

In this study, we found that *divorce* and *conflict with a close friend, neighbor or relative* were significantly associated with increased psychological distress and lower life satisfaction. This finding is in accordance with other studies suggesting that relational problems such as divorce might have a disruptive effect on the personal network (Brugha et al. 1990), and thus pose a particularly negative effect on both positive and negative mental health (Ballas & Dorling 2007; Korkeila et al. 2003; Mazure 1998). However, the slightly weaker association between *divorce* and life satisfaction compared with *divorce* and psychological distress may lend support to research that suggests that there are benefits pertinent to divorce such as relief from a bad marriage (Gardner & Oswald 2006; Luhmann et al. 2011). A recent 15-year population-based longitudinal study showed a similar result: those who remained in severely troubled relationships had lower life satisfaction compared to those who divorced (Gustavson et al. 2012). However, married couples claimed higher life satisfaction than divorced at a 15-year follow-up in the same study (Gustavson et al 2012) as in accordance with previous studies (Lucas 2005). Other studies have shown that divorce has a long-lasting effect on life satisfaction, and that adaptation back to baseline is not always rapid and complete (Lucas 2005). Certain features pertaining to life events, such as surprise, variability, certainty, explanatory coherence, and explanatory content might affect the rate of the adaptation process. Divorce is more likely to be actively initiated and thus associated with more certainty (Wilson & Gilbert 2008).

Conflict with a close friend, neighbour or family was significantly associated with increased psychological distress and reduced life satisfaction. In fact, it showed the second strongest impact on both psychological distress and life satisfaction. A possible explanation reflecting the strength of the association between interpersonal conflict, distress and life satisfaction may be due to the fact that a conflict or feud may act as a persistent hassle and irritation. Then again, studies have indicated that personal relationships are tremendously important for people's happiness (Ballas & Dorling 2007). Furthermore, on-going difficulties such as work-family conflicts or disagreement and tension with co-workers were found to influence more strongly on mental health than negative life events (Mazure 1998; Pearlin et al. 1981; Thoits 2010; Turner & Lloyd 1995). For this study, the phrasing of the questions did not allow us to

explore whether this event was perceived as an on-going difficulty or as an unexpected type of event.

Self-suffered illness was significantly associated with increased psychological distress and reduced life satisfaction. Furthermore, the stronger association between distress and *self-suffered illness* was stronger than that with life satisfaction. However, *self-suffered illness* was rated as the third strongest variable for both psychological distress and life satisfaction. A considerable body of literature argues in favor of the finding that personal health-related experiences such as injury and illness are associated with impaired mental health (Ballas & Dorling 2007; Finlay-Jones & Brown 1981; Klauke et al. 2010; Li et al. 2001). Becoming severely ill may be considered as an “independent or fateful” event, which is beyond the control of the individual and thus poses a serious threat for positive and negative mental health (Hammen 2005; Mazure 1998). A longitudinal study found disability to be associated with moderate to large reductions in life satisfaction followed by little adaptation over time (Lucas 2007).

Witnessing a *close relative suffering from an injury or illness* was significantly associated with increased psychological distress and reduced life satisfaction. Some previous studies are in accordance with this finding, which suggest that care-giving duties are associated with increased stress burden and impaired mental and physical health (Haley et al. 2003; Roth et al. 2009). Other studies indicate that those capable of appraising care giving duties as less demanding, positive and meaningful are subjective to lower levels of depression and higher life satisfaction (Haley et al. 2003; Keinan et al. 2011).

Bereavement did not emerge as a significant factor associated with psychological distress or life satisfaction. A majority of studies have, in contrast to our study, found associations between loss-related events and impaired mental health and well being (Ballas & Dorling 2007; Luhmann et al. 2011; Mazure 1998). With regards to the results in the present study, differences in gender and age were examined. Not surprisingly, it was primary respondents in the age group 45-66 that reported “loss of parent, partner or child”. A possible explanation for the lack of association between bereavement, life satisfaction and distress in this study may at least partly be pertinent to respondents experiencing expected losses they were prepared for. Quite possibly, a number of the respondents in this age category had lost parents who were old and their passing away neither sudden nor traumatic. However, the phrasing of the

question did not allow us to discriminate between the loss of a parent, child or partner to explore this further.

The relative impact of negative life events associated with psychological distress and life satisfaction varied by type of event. Although the strength of the associations differed between the specific types of events and psychological distress and life satisfaction, the relative severity order of types of events was very similar in comparison to both psychological distress and life satisfaction. *Financial strain* and *conflict with close friend, neighbour or family* emerged as the two life events which increased psychological distress and reduced life satisfaction the most, whereas *a close relative suffering disease or injury, divorce* and *loss of employment* emerged with weaker associations with psychological distress and life satisfaction, respectively. These findings are in accordance with previous reports (Ballas & Dorling 2007; Mazure 1998). The most obvious difference between predictors of psychological distress and life satisfaction emerged in the relation to the influence of on-going *conflict with close friend, neighbour or family* and *loss of employment*, where the association was nearly twice as high with psychological distress compared with life satisfaction. Whereas, *self-suffered illness* was approximately a third less associated (demonstrated in standardized Beta) (Table 2) with life satisfaction as compared to psychological distress. The same pattern was seen for the negative life event “*a close relative suffered injury/illness or assault*”. Furthermore, the total of negative life events explained approximately 22.3 % of the variance in psychological distress compared to 11.4 % with life satisfaction, after controlling for age, gender, education and income. This seems to lend support to literature (Huppert & Whittington 2003; Keyes 2002; 2005) suggesting that positive and negative mental health measures are two discrete dimensions of mental health rather than opposite endpoints on the same dimension.

The buffering effects of *sense of mastery* and *social support* were further investigated. Sense of mastery emerged only as a moderating factor between *financial strain* and psychological distress and life satisfaction. This finding is in accordance with previous studies which, indicated that perceived control was associated with less mental health problems in financially struggling women exposed to substantial stress (Grote et al. 2007). Furthermore, Pudrovska et al. (2005) suggested that mastery moderated the effects of economic hardship on physical and mental health among elderly. *Social support* did not emerge as a buffering parameter between any of the negative life events and distress or life satisfaction. Even though a relationship

between social support and mental and physical health is well established (Cohen & Wills 1985; Dalgard et al. 1995; Fyrand 2002; Uchino 2004), many studies question the buffering effect of social support (Tennant 2002; Vaananen et al. 2005). The conflicting results may be due to different samples and methods used.

The link between negative life events and the onset of mental health disorder has been the subject of massive research. However, to our knowledge, less extensively investigated appears negative life events associations with both life satisfaction and psychological distress in a national representative population based study. In this regard, the results from this paper may provide an important contribution.

Strengths and Limitations

A major strength of this study is the nationally representative and large sample of adults in the Health and Level of Living Survey. Use of questionnaires might be perceived as more voluntarily than an interview and thus contribute to more trustworthy responses due to more privacy in contrast to an interview situation. On the negative side, a non-response rate of roughly 50 % is challenging. Furthermore, women, highly educated individuals, and participants in the age group 45-64 years were somewhat overrepresented in the survey. Only elderly people (>65 years) living at home, and not in institutions were invited, thus including only the healthiest among the elderly. Similarly, non-western immigrants were underrepresented in the sample, which may be related to language barriers. It is known in national surveys that non-responders usually have lower socio-economic status and struggle with more mental health disorders. Hence, results presented in this study may underestimate the association between types of negative life events and psychological distress and reduced life satisfaction, respectively. Psychological distress was further (HSCL-25 score ≥ 1.75) self-reported and not clinically diagnosed. The cross-sectional design of the study makes it difficult to ascertain causality. Some concerns associated with the life satisfaction results may need to be given consideration due to reliability issues with the life satisfaction single item instrument (Schimmack et al. 2010). Thus the psychological distress results may be considered as more accurate compared with life satisfaction-results.

Conclusions

The majority of negative life events were significantly associated with both life satisfaction and psychological distress. These findings emphasize the call for a comprehensive approach

to population mental health promotion, and thus support the inclusion of measures of both positive and negative psychology in future population health surveys.

Norway, and the other Scandinavian countries, tops the list of the best place to reside in due to the high standard of living. Although shielded to a certain extent from the current economic climate impacting on the rest of the world, the present study finds financial strain and unemployment to be the strongest factors associated with both psychological distress and life satisfaction. Overall, studies on the association between negative life events and psychological distress and life satisfaction are of even greater importance, not least as a background for designing more efficient interventions, and recognizing the influence of the risk- and protective factors that reduce psychological distress and reinforce well-being (Nes et al. 2008; Prince et al. 2007; Veenhoven 2008).

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Table 1: *Prevalence for independent (gender, age, education, income, types of negative life events, social support, sense of mastery) and dependent variables (LS and HSCL).*

	Response alternatives	N (%)
Total sample		4823
Outcome variables		
Life Satisfaction	1-10	4785
HSCL-25	< 1,75	4214 (89.7)
	> 1,75	484 (10.3)
Socio-demographic variables		
Age groups	1)16-24	489 (10.2)
	2)25-44	1546 (32.1)
	3)45-64	1851 (38.4)
	4)65-75	540 (11.2)
	5)75+	389 (8.1)
Gender	Male	2250 (46.7)
	Female	2573 (53.3)
Education	Low:	1049 (22.9)
	Middle:	1998(43.5)
	Higher:	1542 (33.6)
Household income (adjusted household income into quartiles)	Lowest quartile:	1077 (22.3)
	2 nd quartile:	1199 (24.9)
	3 rd quartile	1251 (25.9)
	Highest quartile:	1295 (26.9)
Exposure variables/negative life events		
Self suffered injury/illness/assault	No	4411 (92.9)
	Yes	337 (7.1)
Close relative suffered injury/illness/assault	No	3787 (80.5)
	Yes	920 (19.5)
Parents/child/spouse died	No	4430 (94.2)
	Yes	274 (5.8)
Close friend/relative died	No	3602 (76.5)
	Yes	1108 (23.5)
Separated due to marital problems	No	4585 (97.3)
	Yes	126 (2.7)
Broke off steady relationship	No	4429 (94.1)
	Yes	276 (5.9)
Conflict with friend/neighbour/relative	No	4287 (91.1)
	Yes	421(8.9)
Became unemployed	No	4536 (96.3)
	Yes	172 (3.7)
Fired from job	No	4669 (98.5)
	Yes	73 (1.5)
Financial strain	No	4454 (94.5)
	Yes	257 (5.5)
Social support (OSS-scale) (cut-off 8)	High social support:	3978 (91.6)
	Low social support	363 (8.4)
Sense of Mastery (cut-off 12)	High mastering	3527 (74.3)
	Low mastering:	1222 (25.7)

Table 2: *Multiple regression analysis examining associations between life satisfaction (LS) and psychological distress (HSCL-25) and negative life events, social support and sense of mastery.*

Independent variable	HSCL-25 (N = 4318)		LS (N = 4384)	
	<i>r</i>	β_i	<i>r</i>	β_i
Self-suffered illness	.179***	.120***	-.125***	-.080***
Close relative suffered injury/illness	.132***	.070***	-.080***	-.043**
Bereavement	.050***	.013	-.003	.018
Divorce	.211*** ^A .212***	.084*** ^A .119***	-.160*** ^A -.163***	-.076*** ^A -.101***
Conflict with friend/neighbour	.241*** ^B .244***	.149*** ^B .171***	.154*** ^B -.155***	-.085*** ^B -.103***
Loss of employment	.208***	.116***	-.144***	-.067***
Financial strain	.338***	.231***	-.280***	-.213***
Adjusted multiple R ²		.223		.114

*p≤0.05, ** p≤0.01, *** p≤0.001

Cell values are Pearson's *r* and standardized regression coefficients (β_i).

Controlled for gender, age, education, income.

^A Controlled for "Conflict with friend/family/neighbour".

^B Controlled for "divorce".

Table 3: *Multiple regression analysis examining associations between psychological distress (HSCL) and negative life events and the buffering capacities of social support and sense of mastery when controlling for socio-demographic and other variables.*

HSCL-25	Model 1	Model 2	Model 3
	B (95 % CI) <i>N=4318</i>	B (95 % CI) <i>N=3920</i>	B (95 % CI) <i>N=4269</i>
Self-suffered illness/injury/assault	.162 (.126, .199)***	.160 (.123, .197)***	.101 (.069, .133)***
Close relative suffered injury/illness	.062 (.038, .086)***	.061 (.037, .085)***	.029 (.008, .049)**
Bereavement	.010 (-.012, .031)	.009 (-.012, .031)	.005 (-.013, .024)
Divorce	.114 (.076, .152)***	.125 (.086, .163)***	.086 (.053, .119)***
Conflict with friend/neighbour	.185 (.151, .220)***	.187 (.152, .222)***	.124 (.094, .154)***
Loss of employment	.210 (.160, .259)***	.189 (.138, .240)***	.133 (.089, .176)***
Financial strain	.358 (.314, .402)***	.308 (.262, .353)***	.248 (.209, .286)***
Social support		-.028 (-.034, -.023)***	
Sense of Mastery			-.040 (-.043, .038)***
R square	.223	.237	.419

*p<0.05, ** p<0.01, *** p<0.001

Cell values are unstandardized beta with 95 % CI.

Model 1: Adjusted for sex, age, education, income, negative life events

Model 2: Adjusted for sex, age education, income, negative life events, social support.

Model 3: Adjusted for sex, age education, income, negative life events, sense of mastery.

Table 4: *Multiple regression analysis examining associations between life satisfaction (LS) and negative life events and the buffering capacities of social support and sense of mastery when controlling for socio-demographic and other variables*

LS (life satisfaction)	Model 1	Model 2	Model 3
	B (95 % CI) <i>N=4384</i>	B (95 % CI) <i>N=3982</i>	B (95 % CI) <i>N=4336</i>
Self-suffered illness/injury/assault	-.527 (-.714, -.339)***	-.459 (-.655, -.264)***	-.237 (-.406, -.068)**
Close relative suffered injury/illness/assault	-.184 (-.308, -.061)**	-.172 (-.298, -.046)*	-.040 (-.151, .070)
Bereavement	.072 (-.039, .182)	.065 (-.049, .179)	.085 (-.014, .189)
Divorce	-.502 (-.700-.305)***	-.550 (-.752, -.348)***	-.360 (-.537, -.184)***
Conflict with friend/neighbor	-.519 (-.697, -.340)***	-.503 (-.684, -.322)***	-.228 (-.388, -.067)**
Loss of employment	-.594 (-.854, -.334)***	-.503 (-.773, -.233)***	-.250 (-.483, -.017)*
Financial strain	-1.62 (-1.85, -1.39)***	-1.53 (-1.76, -1.29)***	-1.08 (-1.29, -.870)***
Social support		.143 (.116, .170)***	
Sense of Mastery			.188 (.177, .199)***
R square	.115	.134	.293

*p≤0.05, ** p≤0.01, *** p≤0.001

Cell values are unstandardized Beta with 95 % CI.

Model 1: Adjusted for sex, age, education, income, negative life events

Model 2: Adjusted for sex, age education, income, negative life events, social support.

Model 3: Adjusted for sex, age education, income, negative life events, sense of mastery.

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9 Appendix

The HSCL-instrument

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Plager

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3 Nedenfor finner du en oppstilling av plager og problemer som man av og til har. Angi hvor mye hvert enkelt problem har plaget deg eller vært til besvær i løpet av de siste 14 dagene. Sett ett kryss for hver linje.

	Ikke plaget	Litt plaget	Ganske mye plaget	Veldig mye plaget
Hodepine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skjelving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Matthet eller svimmelhet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nervøsitet, indre uro	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plutselig frykt uten grunn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stadig redd eller engstelig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hjertebank, hjerteslag som løper av gårde	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av å være anspent, oppjaget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anfall av angst eller panikk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Så rastløs at det er vanskelig å sitte stille	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mangel på energi, alt går langsommere enn vanlig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lett for å klandre deg selv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lett for å gråte	⌵ <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tanker om å ta ditt liv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dårlig matlyst	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Søvnproblemer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av håpløshet med tanke på fremtiden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nedtrykt, tungsindig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av ensomhet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tap av seksuell lyst og interesse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av å være lurt i en felle eller fanget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mye bekymret eller urolig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Uten interesse for noe	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av at alt er et slit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Følelse av å være unyttig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The negative life events instrument

Livshendelser		
	Ja	Nei
10 Har noe av det følgende hendt deg i løpet av de siste 12 månedene?		
Du har selv vært utsatt for en alvorlig fysisk sykdom, skade eller overfall	<input type="checkbox"/>	<input type="checkbox"/>
En av dine nærmeste har vært alvorlig syk, utsatt for skade eller overfall	<input type="checkbox"/>	<input type="checkbox"/>
Din mor eller far, din ektefelle/samboer eller barn har avgått ved døden	<input type="checkbox"/>	<input type="checkbox"/>
En annen slekting eller nær familievenn har avgått ved døden	<input type="checkbox"/>	<input type="checkbox"/>
Du er blitt separert på grunn av problemer i ekteskapet/samboerskapet	<input type="checkbox"/>	<input type="checkbox"/>
Du har brutt et langvarig vennskap/forhold	<input type="checkbox"/>	<input type="checkbox"/>
Du har hatt et alvorlig problem med en nær venn, nabo eller slekting	<input type="checkbox"/>	<input type="checkbox"/>
Du er blitt arbeidsledig eller har søkt forgjeves etter ny jobb i mer enn en måned	<input type="checkbox"/>	<input type="checkbox"/>
Du er blitt avskjediget fra din jobb	<input type="checkbox"/>	<input type="checkbox"/>
Du har hatt alvorlige økonomiske problemer	<input type="checkbox"/>	<input type="checkbox"/>
Du har hatt problemer med politiet og blitt fremstilt for retten	<input type="checkbox"/>	<input type="checkbox"/>
Noe du satte pris på er mistet eller blitt stjålet	<input type="checkbox"/>	<input type="checkbox"/>