

Psychosocial Predictors of
Psychological Distress and Life Satisfaction
in Norwegian University Students

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Abstract

Mental health has become an increasingly important concern in our society with more and more psychological disorders affecting the younger population. Moreover, the prevalence and seriousness of psychological disorder have been found to be on the rise among university students and their level of mental distress has also been found to be higher compared to the general population. Therefore, mental health of the student population deserves our special attention because not only do university students have to deal with the academic demands and heavy workloads associated with pursuing a higher education but they also have to face a wide myriad of personal, academic and social challenges in this critical and often transitional period of one's life. This cross-sectional study examines the associations between psychosocial variables and mental health in a cohort of 789 students at the University of Oslo from various areas and levels of studies. Psychosocial variables including demographic, academic, social and personality factors are included for analyses and their relationships with the levels of psychological distress and life satisfaction, measured by HSCL-25 and Satisfaction with Life Scale (SWLS) are investigated. In addition, possible gender differences in the pattern of associations are explored. The data were compiled using a self-administered questionnaire, and the collected data were processed and interpreted using comparative statistics and univariate analyses. Furthermore, multiple linear regression analyses were performed to determine the unique contribution of each psychosocial variable in predicting the two indices of mental well-being. The results indicate gender divergences in most of the study variables, and both similar and different psychosocial correlates were found across the genders. The results will be presented and the implications discussed.

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Abbreviations:

AMS	Academic Motivation Scale
B	Beta coefficient
β	Standardized Beta coefficient
DALY	Disability Adjusted Life Years
ESLS	Emotional and Social Loneliness Scale
GSES	General Self-Efficacy Scale
HELT	Student health and welfare study among students at UiO . (Helse og Trivsel blant studenter ved UiO in Norwegian)
HSCL-25	25-Item Hopkins Symptoms Check List
IQR	Interquartile Range
NEO-PI-R	Revised NEO Personality Inventory
OCEAN	Openness, Conscientiousness, Extraversion, Agreeableness & Neuroticism collectively known as the big five personality traits.
PSE	Perceived Self-Efficacy
SD	Standard Deviation
SE	Standard Error
SDT	Self Determination Theory
SPSS	Statistical Package for the Social Sciences
SWLS	Satisfaction with Life Scale
UiO	University of Oslo
WHO	World Health Organization

1. Introduction

The definition and concept of health and well-being have undergone significant changes in recent years with more and more focus being placed in areas that had been receiving much less attention traditionally. One of the areas that have received increasing attention is the field of mental health. The World Health Organization (WHO) defines health succinctly as a "state of complete physical, mental and social well-being, and not merely the absence of disease and infirmity" (WHO, 1948). Therefore, it is no longer adequate to achieve an optimal state of health by being free of diseases and physical ailments. However, recent studies have demonstrated a significant prevalence of mental disorder in our society and the associated averse conditions it may cause. Depression accounted for the greatest burden leading to non-fatal outcome resulting in almost 12% total years lived with disability years worldwide¹. WHO estimated that it contributed to 4.5% of the total global burden of disease (in terms of disability adjusted life years DALYs)² and has declared it to be an increasingly serious health condition^{1:3}. Moreover, psychological distress has been linked to serious health conditions - for example, a recent prospective study involving a large cohort showed strong evidence that psychological distress is linked to elevated risks of stroke⁴. What is even more alarming and thus prompted the initial conception of this study is the emerging trend that psychiatric disorder is affecting the younger population⁵ with most mental disorder occurring between the age of 15 to 24⁶. Moreover, there has also been evidence indicating that the frequency and seriousness of psychological distress among university or college students are on the rise^{7:8}. Recent studies indicated that over 50% of university students reported depressive symptoms shortly after the commencement of their studies⁹. In addition, numerous studies carried out in North America and Europe all point to the fact that university or college students report a higher degree of mental distress compared to the general population¹⁰⁻¹².

In light of these findings, the mental health of the younger population deserves our special attention. This study focuses on the mental health of university students because the university years can be a challenging period of one's life, and the pursuance of higher education can prove to be a stressful experience despite of its many positive rewards because of the numerous challenges it implies - students are faced with academic pressure from their heavy workloads and a myriad of challenges associated with a new environment, while at the same time thriving to develop independent identities by individuating themselves from their families and cultivating

meaningful social relationships. Furthermore, not all the students who are overwhelmed with mental distress seek help because of the stigma attached to using psychological services or unawareness of the seriousness of their problems. In Norway, however, more and more university students are seeking psychological help according to a recent article on the Norwegian national newspaper, Aftenposten (May 5, 2008). According to the report, the academic demands, worries and lack of proper rest faced by students often lead to other underlying problems which are manageable under normal circumstances but become unbearable under pressure. Hence, we can truly realize the mental distress of students deserves our attention in many regards – not only can it hinder academic performance, it can also result in insufficient self-care, relationship problems, substance abuse and in the extreme case, suicide¹³.

Since 25.4% of the population in Norway receives or has obtained tertiary education¹⁴, a good understanding of psychological distress of university students is important in developing strategies and allowing us to enhance our ability to identify high risk individuals in effectively manage and hopefully reduce the mental distress experienced by university students. Such measures are important because behavioural problems associated with psychological problems may compound depression, anxiety and low self-esteem, which reinforce the feeling of out of control forming a vicious cycle.

In addition, we would also like to explore the possible psychosocial variables that may be associated with life satisfaction, which is one of the components of subjective well-being within the realm of positive psychology. Positive psychology, which focuses on optimal human functioning¹⁵, indicates that it is more crucial to concentrate on cultivating positive features than on reducing negative ones such as anxiety and depression. Consequently, the resulting mental well-being may foster success in a wide array of life domains and human functioning¹⁶. Moreover, educators who are advocates of positive psychology have indicated that promoting psychological health is more crucial for student achievements than taking corrective action after mental problems have emerged¹⁷. Hence, it is important to understand the relationships between relevant psychosocial variables and the constructs of psychological well-being in addition to mental distress among university students. It is also worth mentioning that negative and positive affects, though related, are distinct dimensions¹⁸ that are correlated asymmetrically in form and effects¹⁹. What it means is that the absence of illness does not guarantee the attainment of mental

health. So, a better understanding of both sides of the picture will yield a more comprehensive knowledge base which is essential to tackle the psychosocial challenges faced by our students. To reiterate an important point that was mentioned at the beginning of this thesis, health is a condition that requires both the absence of pathology and the presence of optimal mental functioning, it will be a worthwhile effort to examine the correlates of both psychological distress and life satisfaction in order to gain a better understanding of student mental health.

The findings of this cross-sectional study may help identify, through psychosocial assessments, those who are at risk of development psychological distress as well as the factors associated with life satisfaction. The results may also serve to provide educators and psychotherapists with information which is useful in designing interventions to effectively deal with the problem of escalating psychological distress among university students.

1.1. Background

The sample of this study was drawn from the University of Oslo which is the largest university in Norway. Relevant information and events will be presented in order to describe the context under which the current study took place.

1.1.1. Education in Norway

In Norway, mandatory education is imposed between the ages of 6-16. Upper secondary school (videregående skole) between the ages of 16-19 is optional but is a prerequisite (along with general study competence) for enrolling in universities, colleges or other private institutions. The educational system adheres to the Bologna convention, with a three-year Bachelor program, a two-year Master's program and a 3-year Doctoral program in most studies. Some professional studies such as medicine and engineering take five years to complete.

Norway has well developed social programs that ensure universal medicare, education, social services and disability benefits. Under this system, tuition fee for attending university is covered by the Government. All students are entitled to a Government sponsored loan and part of the loan (normally 40 percent) is transferred to a scholarship upon successful completion of the

academic program. In addition, all students belong to a student welfare organization that assists student with housing, food, child care, counseling and certain health care services which are partially financed through a nominal student fee.

1.1.2. Reform of higher education in Norway

A reform of the quality of higher education took place in Norway in 2003. It was implemented in response to the Bologna declaration to raise the standards of university and college education at the bachelor and master's levels in order to make higher education more comparable and compatible with other countries around the world. It consists of new degree structure for academic programs, different system of evaluation, stricter time allowance for degree completion and more rigid curriculum requirements among other institutional changes, under which the university is required to provide better learning environment as well as support for the students in order to help them achieve their goals.

1.2. Rationale of the Study

1.2.1 General Objectives

It is important to study the pattern of psychological distress and the associated factors during the university years because it is acknowledged that the demands from university can induce excessive stress in students resulting in psychological disturbances and depression²⁰. Since reactions to stressful events often vary depending on the characteristics, personality traits, motivational factors and perceived coping ability of the individual^{21;22}, it is important to examine the associations of psychosocial factors to mental health in order to develop suitable tools and effective strategies which can appropriately address the specific needs of the target population in order to enhance their mental well-being. The awareness of psychosocial predictors may also help identify psychological disability, which is important because such disability is usually asymptomatic and thus hard to detect.

Moreover, research on student mental health in Scandinavian countries has been focusing largely on medical students and studies on the general student population are relatively rare. The present study attempts to fill in this gap by assessing the associated and potentially predisposing psychosocial variables that are linked to psychological distress and life satisfaction in a cohort of Norwegian students from different levels and faculties of studies.

1.2.2. Specific objectives

Among different associated biological, developmental, cognitive, social, demographic and contextual aspects of psychological distress and life satisfaction; this study focuses on psychosocial factors, namely academic variables, perceived social supports and personality traits since limited knowledge is available on these specific factors in relation to mental health in the general Norwegian student population.

To achieve the objectives, this study aims to answer the following questions:

- 1) Are the psychosocial factors selected for the current study associated with increased psychological distress and life satisfaction in university students?
- 2) Are there any gender differences in the pattern of associations?

In summary, this study is intended to identify the psychosocial factors that are associated with psychological distress and life satisfaction by exploring the potential links between the study variables and thereby expand our scope of understanding of the mental health of Norwegian university students.

1.3 Literature Review

Since this study includes both psychological distress and life satisfaction as dependent variables, the review of literature would have to be organized into a concise manner due to the extensive literature available on the two psychometric indices such that it is easy to follow and conceptualize. Consequently, the review is presented by outlining what has been found to date on

the study variables in the order by which they are arranged in our statistical model. Studies involving multivariate analysis, particularly those involving Norwegian students are also presented. As mentioned before, studies of mental health among students in Norway, and in Northern Europe in general, have largely focused on medical students; while these studies have no doubt contributed substantially to the knowledge of mental health among students, some of the psychosocial variables that are under investigation in the current study were not included. So, studies from other countries, mostly from North America, Australia and other European countries are also included in this literature review in order to make this a comprehensive survey on what has been discovered from past research that is relevant to our present study.

1.3.1 Prevalence of Psychological Disorder in Norway and among the Student Population Worldwide

There has been increasing concern that university and college students are more vulnerable to psychological distress than the general population in western societies^{10:12:23}, in addition to the high incidence rate of mental illness among younger adults. This concern is quite valid considering that empirical findings have confirmed that the student population does have a higher prevalence of mental disorder than is found in the general population²⁴. While this phenomenon is true in some countries, it does not seem to be the case in Norway as indicated in epidemiological data. Nonetheless, the trend of mental disorder occurring in younger Norwegians is still observed.

Epidemiological study in Oslo showed that the 12-month and life time prevalence of mental disorder in the general population was 32.8% and 51.4% respectively²⁵. The highest incidence rate of mental illness was among the 20-39-year age group. The prevalence of diagnosis was higher for women, but the duration of mental illnesses was longer for men⁵. With regards to Norwegian students, the intermediate HELT report stated that the prevalence of psychological distress, defined as having an HSCL-25 score ≥ 1.75 was 27 % (N=819)²⁶. The report also indicated the prevalence of psychological distress among students had increased from 1996 (19%, N=623) to 2003 but the reasons were unknown. However, from the starting year of the student reform 2003 to the year 2005, there was no significant increase in the prevalence of mental distress among Norwegian students²⁷. The problem of interpreting this finding is that the

response rate at phase II of the HELT study was rather low (among 2000 students initially selected, 41.0% responded in 2003 and only 14.6% in 2005), thus selection bias due to substantial attrition cannot be ruled out. Moreover, recent study on a cohort of Norwegian university freshmen indicated that 21% of the students reported psychological distress symptoms²⁸.

The largest psychometric study of student psychological stress to date¹⁰ indicated that the prevalence rate for elevated distress among Canadian university students was 30%. Comparable result was found by a British study and the prevalence rate year was found to be 41%²⁹. These figures illustrate quantitatively that Norwegian students in general experience less distress psychologically compared with students in other western nations and the general population even though they had become more distressed over the past decade. Nevertheless, it would be interesting to perform a survey of Norwegian students again after the reform has been implemented for a longer period of time to assess if the prevalence has changed since 2005.

Less literature is available on the Life Satisfaction on university students compared to mental distress but we did find some information from past studies which give us some idea of how satisfied university students are with their lives in general. One Norwegian study reported that the average life satisfaction score of the general student population was 5.4 (range 1-7 with 7 meaning very satisfied) and that of medical students from a cross-sectional study was 5.6 using a one-item instrument (range 1-7 with 7=very satisfied)³⁰. Another Australian study showed that the average life satisfaction sum score was 4.7 (range 1-7 with 7=very satisfied) using the Satisfaction with Life Scale (SWLS)³¹, the same instrument used in the current study. Moreover, a survey that examined university students in five Western European and five Eastern Central European countries found that the satisfaction level were 16% and 22% for each of the two regions respectively with lower percentage indicating greater satisfaction³². The instruments used in these studies vary; nonetheless, the findings from these studies do provide us with some information on the level of life satisfaction among students in different parts of the world.

1.3.2 Psychosocial Variables and their associations with Psychological Distress & Life Satisfaction

One of the objectives of the present study is to identify psychosocial predictors of mental distress and life satisfaction among university students. “Psychosocial” is defined as “involving both

psychological and social aspects” by the Merriam Webster dictionary. Under this definition, psychosocial variables can be demographic factors, social relationships, personality, motivation, self-perception and perceived stress. Since stress is a result of the ongoing transaction, or interactions between an individual and his environments and not an independent or inherent condition in the person or the milieu^{33;34}, how everyday stimuli are perceived and interpreted is inevitably dependent on a person’s psychosocial makeup. Hence, the study of the relationships between psychosocial factors and mental distress or wellness can potentially uncover important information such as the pathways of stress genesis, possible buffering factors along with other complex associative interactions.

A word on the information presented in this section: since depression and anxiety are the two aspects that contribute to the total psychological distress that was measured in the study, literature involving both depression and anxiety are referenced in order to make inferences from the results later on in this thesis. Various associations between life satisfaction and psychosocial factors from past studies will be also presented. While psychological distress is a well studied domain in the field of psychology; life satisfaction, which is one of the components of subjective well being (the others components are positive and negative affect)³⁵ is a comparatively less studied construct. As a result, compared to the amount of research that has been done on psychological distress, studies that examined the relationship between life satisfaction and psychosocial variables are relatively scarce; consequently, the ratio of the references on psychological distress and life satisfaction is rather skewed.

1.3.2.1 Age

There is a tendency of mental illnesses, including panic, generalized anxiety and somatoform disorders, occurring in younger age⁵. The same trend is also being observed in Norway as mentioned earlier. The highest prevalence of mental illness was found in the 25 to 34-year age group according to a U.S. study³⁶ and other studies also documented more psychopathology in younger adults than older cohorts³⁷⁻³⁹.

In terms of the association of age to psychological well-being, a study of Norwegian first year college students did not find any correlation between age and mental distress²⁸. Nonetheless, this finding might be due to the narrow age range of the studied population which is university freshmen. In the general population, there has been indication that association may exist between age and depression⁴⁰

1.3.2.2 Gender

Numerous studies have shown that gender is a powerful predictor of psychological distress. It has been well-established that the prevalence of depression, the life time risk of depression⁴¹⁻⁴³ and anxiety^{43;44} are higher in women than in their male counterparts. The preponderance of female psychopathology is also demonstrated in the student population.

In Norway, findings from all the epidemiological and non-psychotic mental health studies point to the fact that the women showed excess morbidity compared to men⁵ and all mental disorders were more prevalent in women²⁵. Mental disorder is also more prevalent among Norwegian female undergraduate students than their male counterparts²⁸. The same trend was indicated for medical students, as female medical students reported higher perceived academic stress and had higher increase in perceived stress from the first to the third year than their male colleagues, even though such difference leveled off and became insignificant during internship⁴⁵. This finding was in alignment with the findings from studies of American and Canadian medical students, that not only did women exhibit a higher level of psychological distress, they also showed a greater elevation in mental distress over the course of their studies^{13;46-49}. In the general population, the majority of the studies indicated that women had higher mental distress than men. For example, a study done in Sweden estimated that the lifetime risk of developing a mental illness was 73% for women compared to 43% for men⁵⁰. Another Dutch study discovered that anxiety and mood disorders were almost twice as common among women than men^{39;51}. Outside of Europe, a Canadian study showed that women had the highest self-reported rates for depression, anxiety and somatic conditions⁵². Furthermore, a large epidemiological study in the United States indicated that the risk for affective and anxiety disorders are higher in women than in men³⁶.

Nonetheless, contradictory findings do exist: A number of studies did not detect any significant difference in depression scores between men and women¹³; while another study involving an ethnically diverse college population yielded non-conclusive results regarding gender differences in terms of the incident rate of psychological distress symptoms⁵³.

In addition, there appeared to be a gender redistribution of depression in Norway: an increasing number of men and decreasing number of women have reported being depressed in recent years compared to a decade ago even though the overall prevalence of depression has remained unchanged⁵⁴.

With regards to the relation between gender and life satisfaction, most research to date has not shown any gender differences in the level of subjective well-being or life satisfaction^{16;55-57}.

1.3.2.3 Relationship status

Research has generally shown that the presence of a stable partner is associated with lower psychological distress, higher level of general subjective well-being and better life satisfaction⁵⁸⁻⁶¹. Married students reported lower stress than their single counterparts and had a reduce level of stress in the subsequent year following the marriage¹³. Interview sessions supported the hypothesis that marital partners reduce mental distress through the provision of emotional support to their spouses¹³. Moreover, first year college students who were involved in a romantic relationship also reported less psychological distress compared to students who were uninvolved with a romantic partner⁶². Moreover, several Norwegian studies indicated that living alone or not being in a cohabiting relationship predicted higher rate of mental disorder, depressive feeling and psychological problems^{25;55;63}. On the other hand, not being married correlates with higher psychological stress⁶⁴.

It can be concluded from our review of literature that having a stable partner is mostly associated with decreased mental distress and better life satisfaction, except for one longitudinal study which found that being married was associated with higher depression scores⁶⁵.

1.3.2.4 Childcare Responsibility

Some university students have to provide for dependent children concurrently with their studies and may experience additional stress due to the added responsibility. It has been shown that the depression scores at the beginning of medical school were higher among both male and female students who had to provide for dependents. Moreover, female students with children had higher depression score in their second year of studies, as well as greater increase in depression score between their freshman and sophomore years compared to other female students without dependents; but the influence of childcare responsibility on the level of depression was not observed in their male colleagues⁶⁵.

1.3.2.5 Perceived Academic Pressure

Stress is a normal part of a student's life as they have to constantly deal with course work, assignment deadlines and exams, etc. Nonetheless, academic pressure does play a determining role the mental health for students according to studies.

Academic concern is often rated as the highest source of stress by university students^{66 67}. In an Australian study, two thirds of the students expressed feelings of being overwhelmed by academic demands⁶⁸. Common stressors for students include various forms of evaluation such as assignments or examinations, heavy workload and competition between peers⁶⁹⁻⁷². Academic pressure can also pose conflicts with extracurricular activities⁶⁷ and have unfavorable impact on one's social life⁶⁴, which is an integral part of student life and also an essential element for the sustenance of psychological well-being (see subsequent "Social Support" section).

With regards to psychological distress and life satisfaction, level of perceived stress level has been shown to predict depression^{63;71;73;74} and anxiety^{71;74}, it is also known to be inversely correlated with life satisfaction among students⁷⁵. In one study, perception of stress was found to correlate with depression and life satisfaction simultaneously⁷⁶. Moreover, chronic stress - that is, continuous stress that of long duration such as the curriculum-related stress many students have to face during academic careers - is particularly detrimental to student psychological health. Not only does it predict depression⁷⁷, its predictive power for depressive symptoms is even higher than that of acute stressors⁷⁸.

1.3.2.6. Academic Motivation

Motivation has been one of the central and fundamental issues in the domains of psychological research and education due to its impact on cognitive and psychosocial functioning⁷⁹.

Motivation is a powerful underlying driving force of every day's behaviours which serves to direct, mediate, promote and justify human actions⁸⁰. Ryan and Deci, based on self-determining theory (SDT), postulated that motivation can be quantified and qualified by its degree as well as orientation and can be differentiated into three main types - Intrinsic motivation, Extrinsic motivation and Amotivation⁸¹. These three types of motivation are considered to constitute the continuum of motivated behaviours with the classic state of Intrinsic motivation on one end of the spectrum and Amotivation on the other, bridged by External motivation with varying degree of autonomy or self-determination in between⁸². Regulation of motivation can be driven towards either direction depending on one's social and contextual conditions⁸², and this shifting of internal regulation can be observed as early as childhood, when this innate propensity and inquisitive nature of intrinsic motivation are most apparent⁸³ but become either sustained or subdued over time depending on the presence of supportive environments⁸⁰. According to Ryan and Deci, the orientation of the motivation is dependent on the degree to which the innate psychological needs of autonomy, competence and relatedness are met during the process of goal pursuance and the fulfillment of these needs is the prerequisite for the development of the self-determined prototype of motivation⁸⁴.

1.3.2.6.1. Intrinsic Motivation

Intrinsic motivation represents motivation that is most authentic and self-determined⁸¹. In a learning environment, it manifests itself by the capacity to learn out of pure enjoyment of acquiring new knowledge and to explore out of spontaneous curiosity even in the absence of external tangible incentives or rewards⁸⁵. Intrinsic motivation has been shown to link to high academic achievement and enjoyment for learning⁸⁶, and intrinsically motivated individuals - whose motivation is more self-endorsed and genuine - exhibit more confidence, competence, excitement, interest^{87;88}, vitality⁸⁹, self-esteem⁹⁰ and overall well-being⁹¹ compared to people who are more externally motivated.

There has been evidence that intrinsic motivation is strongly correlated with life satisfaction and psychological well-being, and inversely correlated with psychological distress. Students who internalize their goals, or those who enjoy gaining knowledge just for the pleasure of learning and self-improvement, tend to experience higher life satisfaction and psychological well-being in addition to experiencing less depression⁹².

Moreover, meta-analysis has revealed strong evidence that extrinsic rewards made contingent on “task performance” consistently undermines intrinsic motivation⁹³ by shifting the locus of causality towards external regulation causing reduced autonomy.

1.3.2.6.2. Extrinsic Motivation

Certain actions are externally motivated - they are instrumental in nature and serve to substitute for deeper needs. When an individual is extrinsically motivated, the undertaking of an activity serves only as a means to an end; alternatively speaking, the action is taken to attain a separate external outcome⁸¹. For example, a student may attend the university in order to reach the ultimate goal of obtaining a better paying job upon graduation.

As far as the association between extrinsic motivation and psychological well-being is concerned, research has indicated that it depends on the extent to which the extrinsic motivation is internalized along the continuum of the extrinsic motivation subscales which are identified, introjected and external regulations. The psychological outcome thus depends on where along the spectrum the motivation approaches.

1.3.2.6.3. Amotivation

Amotivation represents the lack of motivation or intention to act. Amotivation can result when a person is unable to derive meaningful value from an activity⁹¹, feels incompetent to achieve the desired goal⁹⁴ or does not view the outcome as desirable⁹⁵. An unmotivated individual either goes through the motions without intent or simply gives up without acting at all.

According to the salutogenic model of Antonovsky⁹⁶, one has to be able to find the challenges posed by the environment meaningful and worthwhile in order to achieve a sense of coherence which is an essential element in sustaining psychological well-being. Since amotivation is related

to the inability to derive meaning from tasks and activities or find desirable values in the end results, it would most likely have a negative impact on one's psychological well-being because in this case according to the salutogenic theory, a sense of coherence which is crucial for sustaining mental health cannot be achieved.

1.3.2.7. Social Support

Social support is an important human need and the desire to form close attachments with others is a basic inherent motivation that is vital in sustaining one's psychological as well as physical well-being⁹⁷. Not only does social network provide a sense of security and emotional support during stressful time, it also offers concrete support in time of needs⁹⁸. For students, friends can provide companionship as well as instrumental support during the course of studies which in turn makes student life more pleasurable and manageable. In the absence of adequate social support, feelings of loneliness emerge.

According to the typology by Weiss⁹⁹, there are two distinct types of loneliness – social and emotional loneliness. Social loneliness results from the absence of a social network of friends with whom one can share common experiences or derive a sense of belongingness and camaraderie. It refers to the feeling of isolation and a lack of integration into a network or a social group. It can be defined as the emotionally unpleasant feeling a person experiences upon the perception of a deficiency in one's actual network compared to the ideal network one wishes to have⁹⁹. It is a cognitive construct that is influenced by the perceived quality and quantity of one's social relationships, with the quality and nature of the relationships being more meaningful than the quantity and structure when one appraises the adequacy of his/her social support¹⁰⁰. Alternatively speaking, the perceived quality of one's social relationships is more crucial than having a large number of friends (or frequent social contacts) in order not to feel socially lonely. Emotional loneliness, on the other hand, roots from not having a special person to whom one can feel attached and intimately connected¹⁰¹. For university students, that person most often is the romantic partner, even though in some situations, someone who is not a romantic partner (such as a family member) can also fulfill one's emotional need. Since forming intimate attachment is one of the primary tasks of young adults, it is not surprising to find that emotional loneliness is lined to psychological problems.

Weiss postulated that social loneliness is related to depression from the lack of social integration and emotional loneliness is related to anxiety from the lack of intimate attachment. However, investigation has indicated that social loneliness is related to both depression and anxiety whereas emotional loneliness does not have much influence on either entity in a sample of university students¹⁰².

Generally, mental health is linked to the perceived adequacy of social support¹⁰³, which plays a protective or buffering role against psychological distress¹⁰⁴. For students, peer support is associated with better adjustment to university life¹⁰⁵, enhanced ability to cope with challenges¹⁰⁶ and reduction of depression¹⁰⁷. Perhaps it is because social support provides the resources to promote the comprehensibility, manageability and meaningfulness of one's internal and external worlds¹⁰⁸. Loneliness, on the other hand, has been found to be associated with mental disorders¹⁰⁹ and depression in students. The association between loneliness and depression was demonstrated to be potentially causative in nature: perceived social support at the beginning of college studies was found to be predictive the later development of depression^{110;111}. Social support has also been shown to correlate inversely with life satisfaction¹¹⁰. A Norwegian study on medical students indicated that satisfying social life was highly valued by students and students who sustained a good social life despite of their demanding curriculum expressed higher levels of life satisfaction than those who felt that their personal lives were interfered by academic demands³⁰.

In addition, feeling connected to a social network and an intimate partner who can provide emotional support have shown to be equally important for men and women as past studies have not detected gender differences in the pattern of association between loneliness and depression¹¹².

1.3.2.8. Perceived Self-Efficacy

Perceived self-efficacy (PSE) is a person's perception or subjective assessment of his/her ability to manage the demands, challenges or stressful situations that come their way. It is an operative factor which influences resulting behaviours¹¹³ and consequently, the level of distress and mental well-being.

The relationship between PSE and mental health could perhaps be explained partially by the salutogenic model¹¹⁴, which postulates that the sustenance of mental health depends heavily on an individual's sense of coherence¹¹⁵⁻¹¹⁸, which requires the belief that one has sufficient internal or external resources to meet the challenges posed by the stimuli of the environment¹⁰⁸. It may also be explained by the stress theory of Lazarus and Folkman³⁴, that an individual perceives, processes and eventually eliminates stressors through primary and secondary appraisal processes, during which a sufficient degree of PSE may provides the person with a sense of control which influences or modifies the perceived stressfulness of threats rendering them less menacing¹¹⁹. These theories appear to be in alignment with empirical findings, which has generally shown that PSE correlates negatively to psychological distress. Investigation that involved university students from 23 countries revealed that poor perception of control was linked to depressive symptoms¹²⁰. Moreover, other research identified self doubt/feeling of insufficient self-efficacy to be one of the major stressors reported by medical students⁶⁹⁻⁷¹. It has also been demonstrated that not only was PSE inversely correlated with perceived stress in problem solving, it predicted perceived stress even better than other relevant measures such as social support and health practices (physical activity, alcohol consumption, etc.)¹²¹.

In terms of life satisfaction, self efficacy has been found to be strongly correlated with enhanced sense of personal control¹²², which in turn is associated with higher degree of life satisfaction³². Hence, it is probable that PSE would be linked to life satisfaction through to this chain of associations.

1.3.2.9. Personality

Personality encompasses a wide spectrum of unique traits and characteristics which influence an individual's reactions to daily events. In other words, how an individual reacts to environmental stimuli is dependent on the inclinations and tendencies of his/her personality dispositions¹²³. Research has suggested that personality factors contribute to resulting level of psychological distress, at least in part, by influencing the perception of stress¹²⁴ as well as how the stress is interpreted¹²⁵. A number of researchers who investigated the relationship between personality and mental distress have found that there are links between depression and personality, in a way that some characters are conducive to the development of depression while other are not¹³. It has

also been shown that personality and subjective well-being are strongly correlated¹²⁶. Since subjective well-being comprises positive affects and life satisfaction, it is most likely that personality would also be robustly correlated to life satisfaction.

The relationships of the psychological distress/life satisfaction and the five personality factors will be outline in the section that follows.

1.3.2.9.1 Big Five Personality Model¹²⁷

The taxonomy of personality in the field of psychology has gone through progressive metamorphoses over the years through diverse research efforts. A comprehensive framework that has received general consensus is the big five model, which categorizes personality into five broad dimensions: openness, conscientiousness, extraversion, agreeableness and neuroticism¹²⁸, collectively abbreviated as OCEAN (or CANOE). The big five model provides broad information on these basic personality dimensions¹²⁹ with each dimension describing a subset of individual characteristics independently¹³⁰.

1.3.2.9.1.1 Openness to experience (vs. Close-mindedness)

Openness refers to a propensity to be imaginative, independent minded, intellectually curious, unconventional, individualistic, adventurous, daring, divergent in thinking and open to changes or challenges. They welcome nouveaux experiences, alternative opinions and adjust their beliefs and behaviours more readily when exposed to new information. Closed individuals, on the other hand, tend to be more conventional, have less ability to understand abstraction and favor simplicity and familiarity.

Open people are known to be more aware of their thoughts, impulses and emotions simultaneously; as a result, both of their positive and negative experiences become more intense. This may be one of the reasons why this trait has been linked to both prospective favorable and unfavorable life events which, expectedly, are related to the genesis of stress¹³¹.

1.3.2.9.1.2 Conscientiousness (vs. Undirectedness)

Conscientiousness refers to an inclination to be disciplined, structured, systematic, well organized, dutiful, goal orientated, careful and persistent. Conscientious people usually attain a high level of achievement through diligent planning and disciplined perseverance and are considered reliable and responsible by others. Undirected people, in comparison, tend to procrastinate and are viewed as disorganized, low in ambition, unreliable and inefficient in highly structured environment.

Conscientiousness in general has proven itself to be a positive trait. Conscientiousness and self discipline predict higher level of life satisfaction¹³¹ and lower level of depression⁹². It is also related to fewer daily hassles according to a prospective study of university students^{132;133}. However, contradictory findings do exist - among Norwegian medical students, conscientiousness was found to be linked to increased level of perceived stress⁵⁵.

1.3.2.9.1.3 Extraversions (vs. Introversion)

Extraversion has an interpersonal element and refers to someone who is outgoing, sociable, friendly, enthusiastic, dominant in social situations; whereas introverts tend to be less sociable, slower to self-disclosure, appear less energetic, and are inclined to internalize cognitive processes.

Due to its outgoing nature, extraverts are usually more successful in seeking social support, have larger social network and receive greater amount of social support¹³⁴. Extraversion is also a multifaceted construct, but one important characteristic is its disposition to experience more pleasant emotions¹³⁵⁻¹³⁷. Consequently, it is generally associated with positive affects. It has been found to correlate negatively with symptoms of depression and anxiety⁴⁰, and have possible modifying effects of reducing perceived stress when combined with other personality traits such as conscientiousness and neuroticism⁵⁵. Extraversion has also been shown to be associated positively with life satisfaction^{129;131;138}.

1.3.2.9.1.4 Agreeableness (vs. Disagreeableness)

Agreeableness, like extraversion, also has a social component and refers to a disposition of being friendly, pleasant, considerate, compassionate and cooperative. Agreeable people value solidarity in interpersonal relationships and such inclination usually creates social affiliations which can potentially provide emotional rewards. On the other hand, disagreeableness refers to a disposition of being unpleasant, unfriendly, uncooperative, cynical, and antagonistic.

There has not been any conclusive evidence on the relationship of disagreeableness to psychological distress. However, it was reported to be related to higher life satisfaction¹³¹ as well as fewer daily hassles among university students¹³³.

1.3.2.9.1.5 Neuroticism (vs. Emotional Stability)

Neuroticism refers to an inclination to be nervous and tense. Neurotic individuals are more prone to unpleasant emotions such as fear, anger, guilt, sadness and self doubt. They experience negative emotions more frequently partly because of their tendency to worry more, dwell on negative feelings and their lower reaction threshold to aggravating situations^{136;137}. Emotional stability, on contrary, refers to individuals who have lower emotional reactivity, less mood swings and less negative mood state both in frequency and duration¹³⁹.

Therefore, it is understandable why this trait is strongly related with symptoms of depression and anxiety, and broadly to psychopathology^{40;140-142}. It was found to be a significant predictor of depression^{55;111}, perceived academic stress⁵⁵, heightened level of anxiety as well as irrationality in reaction to stressful situations^{143;144} which makes it especially difficult for neurotic individuals to deal with stress effectively. With regards to life satisfaction, the depressive aspect of neuroticism has emerged as a strong and consistent predictors of reduced level of life satisfaction^{126;145;146}.

2. Methods

2.1. Background of Study

This study is part of a larger study that is carried out by the Student Health Service and Administration of the University of Oslo following the implementation of a Quality Reform which intends to standardize the quality of higher education of Norway with other countries around the world. The study, titled Oslo Student Health and Welfare study (or HELT in Norwegian, from HELse- og Trivsel blant studenter ved UiO), aims to measure the impact the quality reform has on students' health and well being, as well as to compile information on the general health status of the students in order to improve the existing health services to better suit their needs.

To date, two reports and one study have been published based on the HELT study: two summary reports were published by the Student Service under the same title, Oslo Student Health and Welfare study^{26:27}; the other study was submitted as a degree thesis by a psychology student at the same institution¹⁴⁷.

2.2. Design and Procedures

A structured questionnaire along with an invitation letter were mailed out to a randomly selected sample of 1800 Norwegian students in the spring of 2003 and the same questionnaire were distributed two years later to the same group of participants. The completed questionnaires were returned by mail. International students were also included in the study, but they comprised two different groups of participants (200 students in each year) due to the limited number of international enrolment at the university. The sample was drawn from various levels of studies and faculties at the university and the gender distribution corresponds to the distribution on campus with 60% females and 40% males. The questionnaire consisted of structured questions

that can be grossly subdivided into seven different categories 1) general demographics such as age, relationship status and childcare responsibility; 2) health practices such as alcohol and tobacco use; 3) general health condition; 4) social relationships, motivational outlook and personality; 5) recent life events, 6) psychological distress assessed by the 25-item Hopkins Symptoms Check List (HSCL-25)¹⁴⁸ and 7) life satisfaction assessed by the 5-item Satisfaction with Life Scale¹⁴⁹.

The present study is a cross-sectional study which analyzed the data collected in 2003, which provides baseline information at the beginning of the quality reform. Only the data collected from the Norwegian students were included in our current study because the data for the international students are being analyzed in another project.

2.3. Ethical considerations:

Information regarding the study was provided to the selected participants in the letter of invitation. The selected students were informed that participation was strictly voluntary and they could choose to withdraw from the study at anytime. The identities of the respondents were kept confidential throughout the process.

The study had been approved by the Norwegian Committee for Research Ethics and Data Inspectorate.

2.4 Dependent Variables

2.4.1 Instruments for the Dependent Variables

2.4.1.1. 25-Item Hopkins Symptoms Check List (HSCL-25)

The HSCL-25¹⁴⁸ is a self-reported questionnaire which has been used extensively to identify mental health problems and their relationship to psychosocial risk factors. The HSCL-25 is a relatively short questionnaire which comprises 25 questions that assess the presence and intensity of anxiety and depression symptoms over the last two weeks based on a scale of 1 to 4 with “1” meaning “not at all bothered” and “4” = “extremely bothered”. The total HSCL-25 score was computed by dividing the sum score by the number of items (i.e. 25). Clinically, a score equal to or larger than 1.75 is generally defined as a “case”.

HSCL-25 is a good and reliable indicator for depression, panic and generalized anxiety disorder¹⁵⁰, unspecified distress^{151;152} or difficulty adjusting life situation¹⁵³. The score from HSCL-25 also shows high agreement with professional assessment of emotional distress¹⁵⁴⁻¹⁵⁶ and high sensitivity to detect symptoms associated to somatic illness¹⁵⁷.

2.4.1.2 Satisfaction with Life Scale (SWLS)¹⁴⁹

The Satisfaction with Life Scale (SWLS) is designed to assess the cognitive judgment of one’s overall level of life satisfaction, which is one of the elements of subjective well-being. Life satisfaction represents a global cognitive judgment of one’s life according to one’s own criteria¹⁵⁸. Since it is a comparison between the satisfaction level of one’s own chosen standard and present state of affairs, the construct is free of influence by the researcher or other external means¹⁵⁹ and the questions do not make references to specific life domains¹²⁹. It is important to emphasize the generality and impartiality of SWLS because individual differences exist in the life domain that is deemed most important (for example, some individuals may place a great deal of attention to wealth or power while others may feel that health or family is more important),

thus, a global assessment offers a means to compare the levels of life satisfaction between individuals.

SWLS is a simple instrument that can be used for a wide range of age groups¹⁴⁹. It contains five questions that can usually be completed in less than a few minutes. The respondents are asked to assess their lives subjectively using their own defined criteria and responses are made on a 7-point Likert scale with 1 meaning “strongly disagree” to 7 “strongly agree. Despite of its brevity, the scale shows favorable psychometric properties, including good internal consistency, temporal reliability and convergence with other measures of life satisfaction or subjective well-being^{149;160}. The high correlation between the self- and peer- reported scores indicates that it is a relatively stable measure and not a momentary, fleeting judgment¹⁶⁰.

2.5. Independent Variables

2.5.1. Instruments for Independent Variables

2.5.1.1 Academic Motivation Scale (AMS)¹⁶¹

The Norwegian version of the 28-items academic motivation scale (AMS) was used to assess the academic motivation of the students. The scale is subdivided into three main categories: intrinsic motivation (12 items), extrinsic motivation (12 items) and amotivation (4 items). Students were asked why they pursued a university education and the answers were given in a scale of 1 to 7 with 1 meaning “strongly disagree” and 7 meaning “strongly agree”. The average scores of the each of the three types of motivation were then computed and analyzed.

2.5.1.2 Emotional vs. Social Loneliness Scale (ESLS)¹⁰¹

The Norwegian version of the 10-item emotional versus social loneliness scale (ESLS) was used to evaluate the quality of the social relationships of the participants in the past year. Emotional loneliness (5 items) refers to the absence of a close attachment relationship with another person, whereas social loneliness (5 items) denotes a perceived deficiency of one’s social network. The

participants were asked to rate the frequency of experiencing the described the statement based on a 5-point Likert scale from “1=never” to “5=very often”.

2.5.1.3 General Self-Efficacy Scale (GSES)¹⁶²

A short, Norwegian version of the General Self-Efficacy Scale (GSE) scale was used. The original GSES¹⁶² is a 10-item questionnaire which aims to assess one’s general perceived self-efficacy in overcoming difficult challenges and coping with stressful events. It is designed for adults (including adolescents) to examine the confidence level of one’s own competence to master new tasks or adapt in aversive situations across various life domains. Responses were given on a 4-point scale with 1 being “not at all true” and 4 being “very true”. The average score was calculated and analyzed.

2.5.1.4 Big Five Personality Trait Questionnaire¹³⁹

A short, Norwegian version of the adjective-based questionnaire was used to assess the big five personality traits. This questionnaire comprised 20 items which were evenly divided into the five personality dimensions: Openness (vs. close-mindedness), Conscientiousness (vs. undirectedness), Extraversion (vs. introversion), Agreeableness (vs. disagreeableness) and Neuroticism (vs. emotional stability), collectively abbreviated as OCEAN. The participants were asked to rate their personality characters on a 7-point scale which had a pair of antonyms describing a single attribute placed on each end (e.g. 1=passive & 7=active). Recoding is necessary for certain items and the average score was calculated for each personality dimension with higher score representing higher degree of OCEAN.

2.5.1.5 Perceived Academic Pressure

Perceived academic pressure was calculated by taking the average from two questions which pertained to the frequency of experiencing stress from 1) school work and 2) from others to succeed academically. It is not a non-standardized instrument; nonetheless, it was included in this study due to its strong relevance to the population under study.

Cronbach's Alpha

Cronbach's alpha was computed for each instrument to assess its psychometric properties in this study and the values are presented in Table.1. The values of the α -coefficients indicate that the tests used in this study have shown good reliabilities and internal consistencies.

Table.1 The values of Cronbach's alpha for the study instruments

Instruments	Cronbach's α
<u>AMS</u>	
Intrinsic	.91
Extrinsic	.84
Amotivation	.83
<u>ESLS</u>	
Social Loneliness	.77
Emotional Loneliness	.76
GSES	.78
<u>Big Five Personality Trait Questionnaire</u>	
Openness	.83
Conscientiousness	.86
Extraversion	.74
Agreeableness	.66
Neuroticism	.78
HSCL-25	.92
SWLS	.90

2.6 Statistical Analyses

Two sample t-tests were applied to test for the differences between the female and the male groups. The associations between the variables were estimated by Pearson correlations. The simple and multiple linear regression analyses were carried out to assess the individual and the total influences of the psychosocial variables on HSCL-25 scores and levels of life satisfaction. Assumptions, such as normal distributions, linearity of correlations, distribution of residuals, were verified to confirm the validity of the statistical analyses.

The analyses were performed using Statistical Package for the Social Sciences (SPSS) for Windows, version 14.0.

3. Results

3.1 Response Rate and Profile of Respondents

789 students returned the questionnaires and the response rate was calculated to be 44%. There is no remarkable difference in response rate between various faculties (see Appendix A), but the percentage of women who responded was slightly higher than that of men (see Appendix B). The distribution of respondents by faculty is as follows:

Table 2a: Distribution of Respondents by Faculty

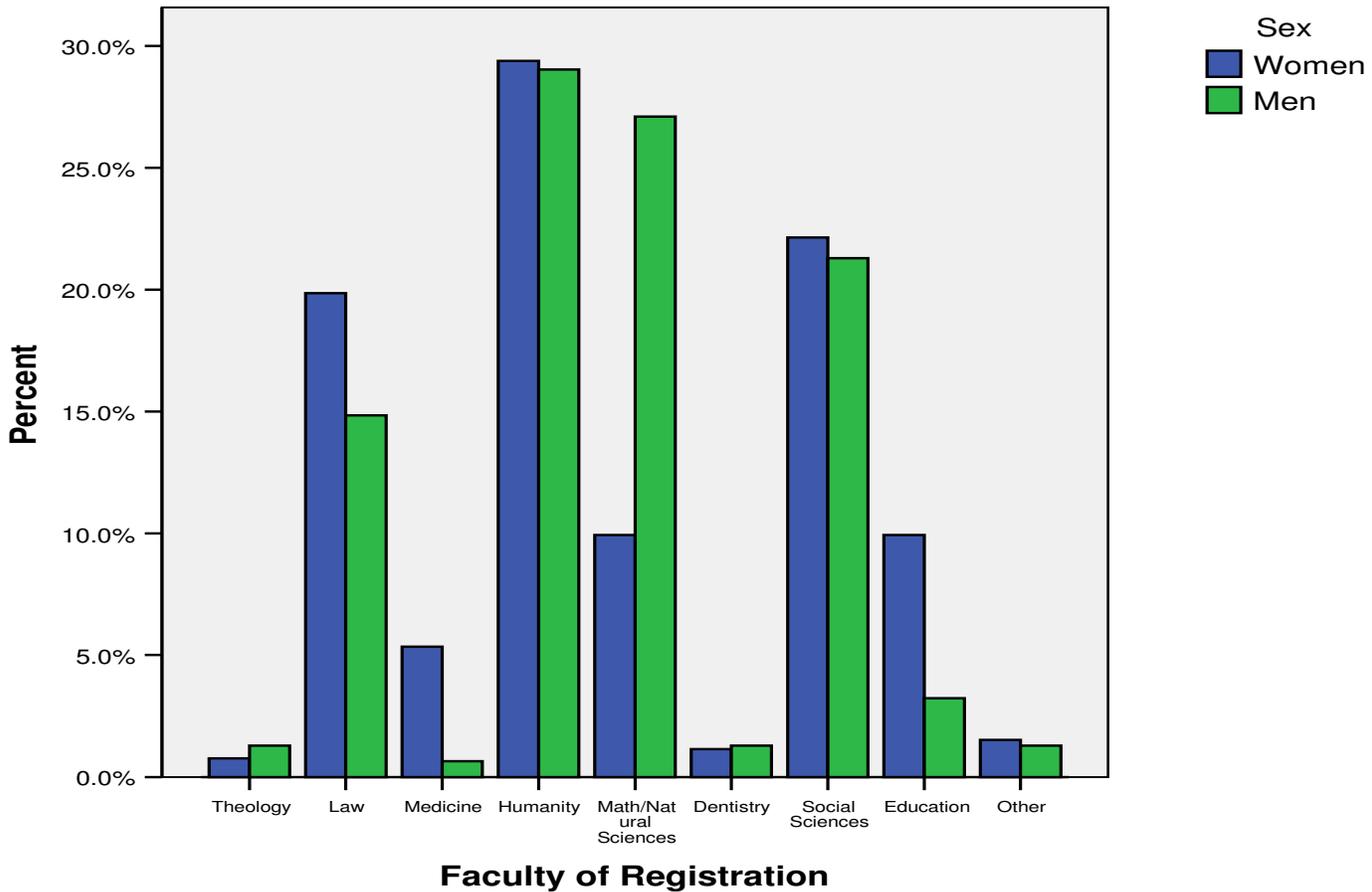
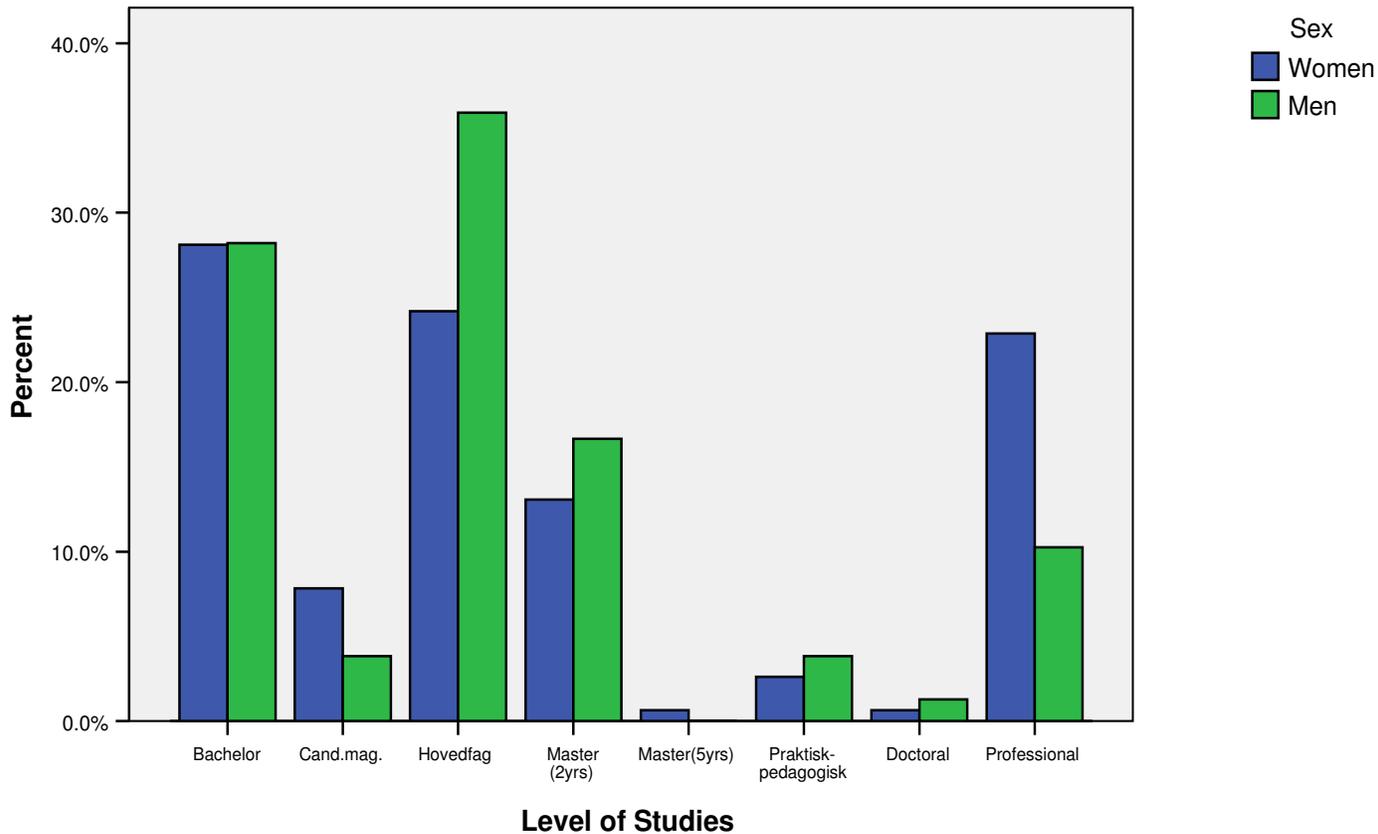


Table 2b Distribution of Respondents by Level of Studies



The sample was drawn from all levels of study and various faculties including professional studies (see table 2a & 2b). Of the respondents, 33.5 % were men and 66.5% were women making the female to male ratio 2:1 which is similar to the gender distribution of the university population. Their age ranged between 18-75 years with a mean of 27.7 years (SD=8.8) and a median of 25 years. Over 74% of the respondents were under 30 years of age - as expected from a university sample - with most women (41%) falling between the 18-24 age range whilst most men in the 25-29 bracket.

Relationship status indicated that 68% of the female and 58% of the male students were partnered (married, cohabiting or have a stable partner). Moreover, 13.6 % of the students had to provide for dependents (Table 3).

Table 3: Demographics of the Respondents

	Females		Males		Total	
	N	%	N	%	N	%
Age						
18-24	215	41.0	81	30.7	296	37.1
25-29	184	35.0	113	42.8	297	37.2
30-39	76	14.5	43	16.3	119	14.9
40+	50	9.5	27	10.2	77	9.6
	Relationship Status					
Single	187	35.9	112	42.4	299	38.1
Partnered	334	64.1	152	57.6	486	61.9
	Childcare Responsibility					
w/Dependents	81	15.5	25	9.6	106	13.6
Total	525	66.5	264	33.5	789	100

3.2 Findings

3.2.1 Means and Medians of All Variables

The medians of depressive symptom and life satisfaction levels were 1.48 (IQR=0.56) and 4.60 (IQR=0.8) respectively. The means and medians of the sample are presented in table 4: means are calculated for variables that exhibit normal distributions whereas medians are computed for variables that are not skewed.

Table 4: Means and Medians of All Variables

	Range	Mean	SD	Median	Lower - Upper Quartiles
Academic Pressure	3	1.82	0.58		
Intrinsic Motivation	7	4.33	1.10		
Extrinsic Motivation	7	4.15	1.13		
Amotivation	7			1.00	1.00 – 1.75
Social Loneliness	5			2.00	1.80 – 2.60
Emotional Loneliness	5			1.80	1.20 – 2.60
Perceived Self Efficacy	4	1.97	0.87		
Openness	7	4.36	0.65		
Conscientiousness	7	4.81	1.30		
Extraversion	7	4.65	1.09		
Agreeableness	7	5.50	0.88		
Neuroticism	7	3.79	1.26		
HSCL average	4			1.48	1.24 – 1.80
Life Satisfaction average	7			4.60	3.50 – 5.40

3.2.2 Comparison between Female and Male Respondents

Gender differences were tested in all variables including psychological distress and life satisfaction levels using a two-tailed test and the results are presented in Table 5. Significant differences were detected in most variables (see table 4) with women reporting higher Academic Pressure (M=1.89, SD=0.58 vs. M=1.69, SD=0.54, $t=4.69$, $p\leq.001$), Extrinsic Motivation (M=4.26, SD=1.10 vs. M=3.94, SD=1.16, $t=3.73$, $p\leq.001$), Conscientiousness (M=4.92, SD=1.28 vs. M=4.60, SD=1.31, $t=3.28$, $p\leq.001$), Extraversions (M=4.77, SD=1.08 vs. M=4.41, SD=1.07, $t=4.47$, $p\leq.001$), Agreeableness (M=5.63, SD=0.84 vs. M=5.24, SD=0.91, $t=6.04$, $p\leq.001$), Neuroticism (M=4.01, SD=1.26 vs. M=3.37, SD=1.16, $t=6.83$, $p\leq.001$) and HSCL score (M=1.65, SD=0.46 vs. M=1.46, SD=0.40, $t=6.04$, $p\leq.001$) than men. Meanwhile, men reported higher Amotivation (M=1.69, SD=1.09 vs. M=1.49, SD=0.84, $t=2.54$, $p<0.05$), Social Loneliness (M=2.31, SD=0.72 vs. M=2.11, SD=0.63, $t=3.78$, $p\leq.001$), Emotional Loneliness (M=2.15,

SD=0.96 vs. M=1.88, SD=0.82, $t=3.74$, $p\leq.001$, Perceived Self Efficacy (M=3.17, SD=0.46 vs. M=3.09, SD=0.43, $t=2.29$, $p<0.05$ than women. Gender difference was observed in HSCL scores but not in levels of Life Satisfaction.

Since gender diversions exist in most variables, subsequent analyses were done separately for women and men.

Table 5 Comparison of the average of all variables between females and males

	Females		Males		<i>t value</i>
	Mean	SD	Mean	SD	
Academic Pressure	1.89	0.58	1.69	0.54	4.69***
Intrinsic Motivation	4.37	1.12	4.27	1.06	1.21
Extrinsic Motivation	4.26	1.10	3.94	1.16	3.73***
Amotivation	1.49	0.84	1.69	1.09	-2.54*
Social Loneliness	2.11	0.63	2.31	0.72	-3.78***
Emotional Loneliness	1.88	0.82	2.15	0.96	-3.74***
Perceived Self Efficacy	3.09	0.43	3.17	0.46	-2.29*
Openness	4.33	0.67	4.40	0.60	-1.51
Conscientiousness	4.92	1.28	4.60	1.31	3.28***
Extraversion	4.77	1.08	4.41	1.07	4.47***
Agreeableness	5.63	0.84	5.24	0.91	6.04***
Neuroticism	4.01	1.26	3.37	1.16	6.83***
HSCL	1.65	0.46	1.46	0.40	6.04***
Life Satisfaction	4.44	1.34	4.38	1.33	0.67

*** $p\leq0.001$

* $p<0.05$

3.2.3 Univariate Analyses

Univariate analyses were carried out to determine the independent effect each independent variable has on the levels of psychological distress and life satisfaction for each gender. A summary of the analyses is presented in table 6.

3.2.3.1 Psychological Distress

In the univariate analysis, the adjusted beta coefficient (β) will be examined in order to compare the contribution of each independent variable to psychological distress (and later for life satisfaction). For both females and males, neuroticism is strongly associated with HSCL score ($\beta=.63$, $SE=.01$ for females; $\beta=.64$, $SE=.02$ for males). It means that for every 1 standard deviation (SD) increase in neuroticism, there is a .63 and .64 SD increase in HSCL score for females and males respectively. Social loneliness ($\beta=.41$, $SE=.03$ for females; $\beta=.50$, $SE=.03$) and perceived self efficacy ($\beta= -.35$, $SE=.05$ for both genders) showed moderate correlations whereas Academic pressure ($\beta=.24$, $SE=.03$ for females; $\beta=.30$, $SE=.04$ for males), Amotivation ($\beta=.30$, $SE=.02$ for females; $\beta=.29$, $SE=.02$ for males), Emotional Loneliness ($\beta=.27$, $SE=.03$ for females; $\beta=.28$, $SE=.03$ for males), Conscientiousness ($\beta= -.18$, $SE=.02$ for females; $\beta= -.26$, $SE=.02$ for males) and Extraversion ($\beta= -.16$, $SE=.02$ for females; $\beta= -.19$, $SE=.02$ for males) showed significant but relatively weak association with HSCL.

For females only, Age ($\beta= -.13$, $SE=.002$), relationship status ($\beta= -.09$, $SE=.04$, meaning the presence of a partner is correlated with lower HSCL score), extrinsic motivation ($\beta= .15$, $SE=.02$) Openness ($\beta=.13$, $SE=.03$) and Agreeableness ($\beta= -.12$, $SE=.02$) are associated with HSCL. A summary of the analysis can be found in Table 6.

Table 6 Univariate Analysis of Independent Variables with average HSCL score

	Female			Male		
	B	SE	β	B	SE	β
Age	-.007	.002	-.126**	.002	.003	.054
Relationship Status	-.085	.043	-.089*	-.017	.050	-.022
Childcare Responsibility	-.096	.057	-.076	-.021	.084	-.016
Academic Pressure	.184	.034	.235***	.215	.044	.296***
Intrinsic Motivation	.012	.019	.029	-.030	.024	-.081
Extrinsic Motivation	.063	.019	.152***	.012	.022	.036
Amotivation	.163	.023	.301***	.103	.022	.286***
Social Loneliness	.297	.030	.410***	.272	.030	.498***
Emotional Loneliness	.152	.025	.272***	.118	.026	.284***
Perceived Self Efficacy	-.364	.045	-.345***	-.301	.051	-.350***
Openness	.091	.030	.133**	.075	.041	.114
Conscientiousness	-.064	.016	-.180***	-.079	.018	-.264***
Extraversion	-.065	.019	-.155***	-.071	.023	-.192**
Agreeableness	-.063	.024	-.115*	-.037	.027	-.085
Neuroticism	.228	.013	.626***	.219	.016	.642***

*p<0.05

**p<0.01

***p≤0.001

3.2.3.2 Life Satisfaction

For both females and males, neuroticism has the strongest association with life satisfaction among all variables ($\beta = -.42$, $SE = .04$ for females; $\beta = -.52$, $SE = .06$ for males). Social loneliness ($\beta = -.39$, $SE = .09$ for females; $\beta = -.40$, $SE = .11$ for males), Emotional Loneliness ($\beta = -.39$, $SE = .07$ for females; $\beta = -.37$, $SE = .08$ for males) and perceived self efficacy ($\beta = .39$, $SE = .13$ for females; $\beta = .42$, $SE = .17$ for males) showed moderate correlations whereas Academic pressure ($\beta = -.10$, $SE = .10$ for females; $\beta = -.14$, $SE = .15$ for males), Intrinsic motivation ($\beta = .09$, $SE = .05$ for females; $\beta = .16$, $SE = .08$ for males), Amotivation ($\beta = -.29$, $SE = .07$ for females; $\beta = -.18$, $SE = .08$ for males), Conscientiousness ($\beta = .27$, $SE = .04$ for females; $\beta = .30$, $SE = .06$ for males) and Extraversion ($\beta = .17$, $SE = .05$ for females; $\beta = .29$, $SE = .08$ for males) showed significant but relatively weak association with Life Satisfaction.

For females only, Relationship status ($\beta = -.09$, $SE = .04$, meaning the presence of a partner is correlated with better Life Satisfaction), Openness ($\beta = .13$, $SE = .03$) and Agreeableness ($\beta = .13$, $SE = .07$) are associated with Life Satisfaction. A summary of the analysis can be found in Table 7.

Table 7: Univariate Analysis of Independent Variables with average Life Satisfaction score

	Female			Male		
	B	SE	β	B	SE	β
Age	.004	.007	.026	-.002	.009	-.011
Relationship Status	.630	.119	.226***	.315	.167	.117
Childcare Responsibility	.191	.162	.052	.171	.284	.038
Academic Pressure	-.230	.100	-.101*	-.335	.152	-.137*
Intrinsic Motivation	.110	.053	.092*	.199	.079	.158*
Extrinsic Motivation	-.024	.054	-.020	.039	.073	.034
Amotivation	-.457	.067	-.289***	-.219	.075	-.180**
Social Loneliness	-.835	.086	-.395***	-.737	.106	-.400***
Emotional Loneliness	-.645	.068	-.394***	-.509	.084	-.365***
Perceived Self Efficacy	1.19	.125	.386***	1.22	.165	.422***
Openness	-.206	.087	-.103*	-.065	.138	-.029
Conscientiousness	.277	.044	.265***	.305	.060	.301***
Extraversion	.205	.053	.166***	.359	.075	.287***
Agreeableness	.205	.070	.129**	.060	.091	.041
Neuroticism	-.442	.043	-.415***	-.604	.062	-.524***

* $p < 0.05$

** $p < 0.01$

*** $p \leq 0.001$

3.2.4. Multivariate Analyses

3.2.4.1. Correlation Matrix of Variables

The intercorrelations of all study variables are listed in Table 8a (Females) and 8b (Males). Due to multiple testing, Bonferroni correction was used to test for significance of the correlations between the variables; thus, a more stringent p-value had to be used and was calculated to be: $p \leq 0.05/17$ (where 17 is the number of variables) $\Rightarrow p \leq 0.003$.

Table 8a Intercorrelations of Study Variables - Females

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age																	
2. Relationship Status	.18																
3. Childcare Responsibility	.28*	.20*															
4. Academic Pressure	-.07	.04	.08														
5. Intrinsic Motivation	.09	.12	.13	.09													
6. Extrinsic Motivation	-.29*	.00	-.03	.23*	.35*												
7. Amotivation	-.03	-.01	.01	-.04	-.32*	-.13											
8. Social Loneliness	.03	-.05	.09	.09	-.06	-.08	.28*										
9. Emotional Loneliness	-.12	-.71*	-.12	.08	-.05	.00	.09	.39*									
10. Perceived Self Efficacy	.05	-.01	-.03	-.08	.17	.09	-.17	-.33*	-.14								
11. Openness	-.11	.00	-.05	-.03	.16	-.11	.10	.01	-.02	.11							
12. Conscientiousness	.09	-.05	.09	.03	.14	-.03	-.23*	-.02	-.03	.30*	-.09						
13. Extraversion	.03	.12	.07	.02	.14	.12	-.03	-.29*	-.19**	.37*	.24*	.20*					
14. Agreeableness	.06	-.04	.10	-.14	-.11	-.09	-.07	-.16	-.14	.08	.06	.13	.17				
15. Neuroticism	.01	.03	-.04	.18*	-.05	.04	.18*	.29*	.15	-.50*	.05	-.24*	-.29*	-.08			
16. HSCL total	.05	-.02	-.02	.30*	-.08	.04	.29*	.50*	.28*	-.35*	.11	-.26*	-.19*	-.09	.64*		
17. Life Satisfaction	-.01	.12	.04	-.14	.16	.03	-.18	-.40*	-.37*	.42*	-.03	.30*	.29*	.04	-.52*	-.54*	

* Correlation is significant at the 0.003 level (2-tailed).

Table 8b Intercorrelations of Study Variables - Males

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Age																	
2. Relationship Status	.11																
3. Childcare Responsib.	.37*	.12															
4. Academic Pressure	-.26*	-.00	-.13														
5. Intrinsic Motivation	.06	-.09	.02	.04													
6. Extrinsic Motivation	-.32*	.03	-.09	.31*	.44*												
7. Amotivation	-.12	-.10	-.02	.03	-.24*	-.09											
8. Social Loneliness	.05	-.02	.05	.01	-.03	.02	.19*										
9. Emotional Loneliness	-.04	-.69*	-.04	.01	.02	-.02	.17*	.35*									
10. Perceived Self Efficacy	.02	.01	.00	-.05	.11	-.02	-.11	-.27*	-.18*								
11. Openness	.06	-.10	.02	-.04	.13*	-.09	.03	-.07	-.00	.11							
12. Conscientiousness	.12	.12	.07	-.00	.04	.04	-.22*	-.09	-.15*	.19*	-.10						
13. Extraversion	.06	.02	.08	.05	.13*	.06	-.11	-.29*	-.18*	.29*	.23*	.23*					
14. Agreeableness	.08	.07	.15*	-.04	.05	-.03	-.13*	-.22*	-.27*	.09	.08	.15*	.25*				
15. Neuroticism	-.11	.02	-.09	.18*	.01	.14*	.17*	.37*	.13	-.40*	.02	-.07	-.19*	-.08			
16. HSCL total	-.13	-.09	-.08	.24*	.03	.15*	.30*	.41*	.27*	-.35*	.13*	-.18*	-.16*	-.12	.63*		
17. Life Satisfaction	.03	.23*	.05	-.10	.09	-.02	-.29*	-.40*	-.39*	.39*	-.10	.27*	.17*	.13*	-.42*	-.58*	

* Correlation is significant at the 0.003 level (2-tailed).

3.2.4.2. Regression Analyses

The linear regression analyses were performed separately for females and males and the variables are entered in three steps by hierarchical forward selection. First, the academic variables were entered while controlling for the demographical variables (age, relationship status and childcare responsibility). Subsequently, social variables which comprise social and emotional loneliness are entered in step two. Finally, personality dimensions were added to see how they influence the total variances of psychological distress and life satisfaction. The result of the multiple linear regressions for Psychological Distress and Life Satisfaction are presented in Table 9 and 10 respectively.

Table 9 Multiple Linear Regression Analysis – HSCL

	<i>Females</i>				<i>Males</i>			
	B	SE B	β	<i>p</i>	B	SE B	β	<i>p</i>
Model 1								
Age	-.001	.003	-.01	.83	.01	.003	.13	.06
RelationshipStatus	-.05	.04	-.05	.24	-.03	.05	-.04	.54
ChildcareResponsibility	-.04	.06	-.04	.45	-.09	.09	-.06	.31
Academic Pressure	.15	.04	.19	<i>p</i> ≤.001	.23	.05	.32	<i>p</i> ≤.001
Intrinsic Motivation	.02	.02	.05	.35	-.01	.03	-.03	.69
Extrinsic Motivation	.04	.02	.10	.06	.02	.02	.05	.51
Amotivation	.17	.02	.31	.06	.11	.02	.30	<i>p</i> ≤.001
Model 2								
Age	-.001	.003	-.03	.56	.01	.002	.12	<i>p</i> <.05
RelationshipStatus	.07	.06	.07	.22	.11	.07	.14	.10
ChildcareResponsibility	-.07	.05	-.05	.22	-.13	.08	-.10	.09
Academic Pressure	.15	.03	.19	<i>p</i> ≤.001	.19	.04	.25	<i>p</i> ≤.001
Intrinsic Motivation	.03	.02	.06	.19	-.02	.02	-.06	.33
Extrinsic Motivation	.03	.02	.07	.15	.03	.02	.08	.18
Amotivation	.13	.02	.23	<i>p</i> ≤.001	.06	.02	.17	<i>p</i> <.01
Social Loneliness	.23	.03	.31	<i>p</i> ≤.001	.20	.04	.36	<i>p</i> ≤.001
Emotional Loneliness	.09	.03	.17	<i>p</i> <.01	.08	.04	.20	<i>p</i> <.05
Model 3								
Age	-.001	.002	-.01	.78	.01	.002	.12	<i>p</i> <.05
RelationshipStatus	.05	.05	.06	.26	.05	.05	.06	.36
ChildcareResponsibility	-.03	.05	-.02	.56	-.07	.06	-.05	.30
Academic Pressure	.10	.03	.13	<i>p</i> ≤.001	.14	.03	.20	<i>p</i> ≤.001
Intrinsic Motivation	.01	.02	.03	.48	-.02	.02	-.06	.25
Extrinsic Motivation	.03	.02	.06	.15	.02	.02	.06	.24
Amotivation	.09	.02	.16	<i>p</i> ≤.001	.03	.02	.07	.14
Social Loneliness	.11	.03	.15	<i>p</i> ≤.001	.17	.03	.31	<i>p</i> ≤.001
Emotional Loneliness	.09	.03	.16	<i>p</i> <.01	.06	.03	.14	<i>p</i> <.05
Percvd Self Efficacy	-.09	.04	-.09	<i>p</i> <.05	.05	.05	.05	.34
Openness	.10	.02	.15	<i>p</i> ≤.001	.06	.03	.09	.07
Conscientiousness	-.02	.01	-.06	.07	-.04	.01	-.15	<i>p</i> <.01
Extraversion	.003	.02	.01	.86	.01	.02	.03	.53
Agreeableness	.01	.02	.03	.46	.03	.02	.06	.18
Neuroticism	.17	.01	.45	<i>p</i> ≤.001	.16	.02	.48	<i>p</i> ≤.001

Table 9.a. Values for Adjusted R square & R square change – Models for Psychological Distress

<u>Model</u>	<i>Females</i>		<i>Males</i>	
	<u>Adjusted R sq.</u>	<u>R sq. Change</u>	<u>Adjusted R sq.</u>	<u>R sq. Change</u>
1	.15		.17	
2	.29	.14	.35	.18
3	.51	.23	.58	.23

3.2.4.2.1. Psychological Distress

The final models account for 51% and 58% of the variance in HSCL scores for females and males respectively. Demographical and academic variables together can explain 15% for females and 17% for males of the variance, social variables an additional 14% for females and 18% for males, and personality variables gained a further 23% for both sexes.

In the multivariate analysis, the standardized beta coefficient (β) will be used instead of the beta coefficient (B) in order to compare the unique contribution of each independent variable to psychological distress (and later for life satisfaction). After controlling for all study variables, neuroticism emerged as the strongest predictor of psychological distress for both females ($\beta = .45$, $SE = .01$) and males ($\beta = .48$, $SE = .02$), which means that for every one standard deviation (SD) increase in neuroticism score, HSCL score increases by .45 and .48 SD for females and males respectively. Academic pressure ($\beta = .13$, $SE = .03$ for females; $\beta = .20$, $SE = .03$ for males), Social loneliness ($\beta = .15$, $SE = .03$ for females; $\beta = .31$, $SE = .03$ for males) and Emotional loneliness ($\beta = .16$, $SE = .03$ for females; $\beta = .14$, $SE = .03$ for males) are also correlated positively with HSCL for both sexes. For women only, Amotivation ($\beta = .16$, $SE = .02$) and Openness ($\beta = .15$, $SE = .02$) show positive correlations and Perceived self efficacy has an inverse association with HSCL. For men only, Conscientiousness show an inverse association ($\beta = -.15$, $SE = .01$) and Age has a positive correlation ($\beta = .12$, $SE = .002$) with HSCL. Amotivation was a significant predictor for men in Model 2, but became insignificant in Model 3 when all the personality variables were controlled.

Table 10 Multiple Linear Regression Analysis – Life Satisfaction

	Females				Males			
	B	SE	β	p	B	SE	β	p
<u>Model 1</u>								
Age	-.02	.01	-.10	<i>p</i> <.05	-.01	.01	-.07	.33
RelationshipStatus	.61	.12	.22	<i>p</i> ≤.001	.31	.18	.11	.08
ChildcareResponsibility	.13	.17	.03	.46	.15	.30	.03	.63
Academic Pressure	-.21	.11	-.09	.053	-.40	.16	-.16	<i>p</i> <.05
Intrinsic Motivation	.12	.06	.10	.051	.15	.09	.12	.12
Extrinsic Motivation	-.12	.07	-.09	.08	-.01	.08	-.01	.91
Amotivation	-.41	.07	-.26	<i>p</i> ≤.001	-.19	.08	-.15	<i>p</i> <.05
<u>Model 2</u>								
Age	-.01	.01	-.06	.18	-.01	.01	.07	.28
RelationshipStatus	.13	.17	.05	.45	-.48	.24	-.18	<i>p</i> <.05
ChildcareResponsibility	.19	.16	.05	.22	.25	.28	.06	.36
Academic Pressure	-.20	.10	-.09	<i>p</i> <.05	-.23	.15	-.10	.11
Intrinsic Motivation	.10	.06	.08	.08	.20	.08	.16	<i>p</i> <.05
Extrinsic Motivation	-.08	.06	-.06	.21	-.05	.08	-.04	.55
Amotivation	-.29	.07	-.18	<i>p</i> ≤.001	-.05	.08	-.04	.52
Social Loneliness	-.57	.10	-.27	<i>p</i> ≤.001	-.44	.13	-.24	<i>p</i> ≤.001
Emotional Loneliness	-.39	.10	-.24	<i>p</i> ≤.001	-.53	.13	-.38	<i>p</i> ≤.001
<u>Model 3</u>								
Age	-.01	.01	-.08	.07	-.01	.01	-.08	.18
RelationshipStatus	.15	.15	.05	.33	-.31	.21	-.12	.15
ChildcareResponsibility	.14	.15	.04	.33	.11	.24	.03	.64
Academic Pressure	-.12	.09	-.05	.18	-.15	.13	-.06	.27
Intrinsic Motivation	.12	.05	.10	<i>p</i> <.05	.14	.08	-.03	.06
Extrinsic Motivation	-.08	.06	-.06	.17	-.04	.07	-.03	.59
Amotivation	-.19	.06	-.12	<i>p</i> <.01	.04	.07	.03	.57
Social Loneliness	-.37	.09	-.17	<i>p</i> ≤.001	-.28	.12	-.15	<i>p</i> <.05
Emotional Loneliness	-.35	.10	-.21	<i>p</i> ≤.001	-.45	.12	-.33	<i>p</i> ≤.001
Percvd Self Efficacy	.59	.13	.19	<i>p</i> ≤.001	.29	.18	.10	.12
Openness	-.23	.08	-.12	<i>p</i> <.01	-.12	.13	-.06	.33
Conscientiousness	.15	.04	.14	<i>p</i> ≤.001	.17	.06	.17	<i>p</i> <.01
Extraversion	-.04	.05	-.04	.38	.06	.07	.05	.39
Agreeableness	-.05	.06	-.03	.41	-.13	.08	-.09	.09
Neuroticism	-.23	.05	-.21	<i>p</i> ≤.001	-.36	.07	-.32	<i>p</i> ≤.001

Table 10.a Values for Adjusted R square & R square change – Models for Life Satisfaction

<u>Model</u>	Females		Males	
	<u>Adjusted R sq.</u>	<u>R sq. Change</u>	<u>Adjusted R sq.</u>	<u>R sq. Change</u>
1	.13		.06	
2	.27	.14	.23	.18
3	.40	.13	.42	.20

The assumptions of linear regression (outliers, normality of distribution, linearity) were checked (using histograms, q-q plots and scatter plots).

3.2.4.2.2. Life Satisfaction

The independent variables in the final models account for 40% and 42% of the variance in life satisfaction for females and males respectively in the model. Demographical and academic variables together can explain 13% for females and 6% for males of the variance, social variables an additional 14% for females and 18% for males, and personality variables contributed a further 24% for females and 20 for males.

After controlling for all study variables, neuroticism ($\beta = -.21$, $SE = .05$ for females; $\beta = -.32$, $SE = .07$ for males) and emotional loneliness ($\beta = -.21$, $SE = .10$ for females; $\beta = -.33$, $SE = .12$ for males) are the strongest predictors of Life satisfaction for both sexes, which means that higher neuroticism and emotional loneliness scores are associated with lower life satisfaction. Social loneliness is correlated negatively ($\beta = -.17$, $SE = .09$ for females; $\beta = -.15$, $SE = .12$ for males) and Conscientiousness positively ($\beta = .14$, $SE = .04$ for females; $\beta = .17$, $SE = .06$ for males) with Life satisfaction for both sexes. For women only, Intrinsic Motivation ($\beta = .10$, $SE = .05$), Amotivation ($\beta = -.12$, $SE = .06$), Perceived self efficacy ($\beta = .19$, $SE = .13$), and Openness ($\beta = -.12$, $SE = .08$) are associated with Life satisfaction. So higher levels of intrinsic motivation and perceived self efficacy are linked to better life satisfaction while the lack of academic motivation and higher degree of openness are related to lower life satisfaction.

3.3 Summary of Results

A visual summary of the linear regressions is illustrated in Table 10 below.

The two columns represent the dependent variables HSCL-scores and levels of life satisfaction. Significant correlates are listed under each dependent variable column by split genders. The signs in the brackets denote the direction of correlations: (+) = positive correlation and (-) = negative correlation. When a variable shows 2 signs with one on each side – for example, if it has (+) on the left side and (-) on the right, it means that it is positively correlated with psychological distress and negatively with life satisfaction.

Table 10. Summary of Significant Correlations between Independent and Dependent Variables in the Multiple Regressions

HSCL		Life Satisfaction	
Females	Males	Females	Males
		(+ Social loneliness (-)	
		(+ Emotional loneliness (-)	
		(+ Neuroticism (-)	
Academic pressure (+)		-	
	Conscientiousness (-)	Conscientiousness (+)	
Amotivation (+)	-	Amotivation (-)	-
Self Efficacy (-)	-	Self Efficacy (+)	-
Openness (+)	-	Openness (-)	-
	Age (+)	Intrinsic Motiv (+)	

(+)/(-) Direction of correlation

4. Discussion

From the analyses, female students reported higher psychological distress compared to male students but no significant gender difference was observed in the level of Life Satisfaction. Gender divergences also emerged in the mean values of most of the study variables indicating that there were significant gender differences in the selected psychosocial variables most notably in neuroticism, academic pressure, extraversion and agreeableness, in all of which women reported significantly higher levels than did men.

In the multiple linear regression models, the study variables accounted for greater variance for HSCL scores (adjusted R sq.= .51 for females & .58 for males) than for Life Satisfaction (adjusted R sq.=.40 for females and .42 for males), so, the psychosocial variables selected for this study predict psychological distress better than life satisfaction. Moreover, personality variables, which include perceived self-efficacy, contribute quite significantly (R sq.change=.23) in the prediction of HSCL scores as indicated in the linear regression model. This finding indicates that personality factors account for quite a proportion (23%) of the total variance observed in psychological distress.

When all the study variables were controlled for, emotional loneliness, social loneliness and neuroticism all significantly predict both psychological distress and life satisfaction, with neuroticism having the strongest association with HSCL scores. Furthermore, the association of neuroticism with life satisfaction was stronger in men than in women. Interestingly in men, social and emotional loneliness correlated especially strongly with HSCL scores and life satisfaction respectively; whereas in women, the associations of these two social variables were more even across the dependent variables. In addition, perceived academic pressure only predicts psychological distress and not life satisfaction for male and female students.

Different associations between the psychosocial variables and the mental health indices used in this study were noted across the genders. Conscientiousness was inversely correlated with HSCL scores only for men but predicts life satisfaction for both genders. Amotivation, PSE and openness predict both HSCL scores and life satisfaction only in female students. Furthermore,

intrinsic motivation predicts life satisfaction in women and age is positively associated with psychological distress in men. These findings will be discussed in detail in the following sections.

4.1 Gender

The level of psychological distress was higher in women than in men according to our results, but there was no gender difference in the levels of life satisfaction. These findings are in line with what has been indicated in the majority of current literature (see literature review on “Gender”). Different explanations have been proposed to explain the preponderance of depression and anxiety in females and we will concentrate on theories that involve the psychosocial aspect which is the focus of the current study.

It has been suggested that the exposure and reactivity to stressors may be greater for women than for men¹⁶³. Studies have shown that female students experienced higher stress level than their male counterparts⁶⁹ despite some studies did not find such difference^{164;165}. In this study, previous finding - that gender difference exists in stress level - was replicated as female students reported significantly higher perceived academic stress than males in our sample (see Table 5).

The notion that women exhibit greater reactivity in response to stressors has been gaining more consensus¹⁶⁶ since more studies have indicated that compared to men, women are more prone to depression in the face of stress^{78;167}. The comparative analyses of this study showed that female students had significantly higher level of neuroticism compared to their male colleagues. Since neuroticism is linked to higher frequency and duration of negative affects triggered by heightened sensitivity to aversive situations and stimuli, it follows that females would experience more negative emotions and consequently elevated mental distress in reaction to stress due to their higher level of neuroticism. Hence, our results seem to support the theory that the female preponderance of depression and anxiety is related to their greater reactivity to stress, which is due at least in part, to the higher level of neuroticism found in women.

Moreover, it has been found that the response to the chronic type of stress was twice as strong in females as was in males across different cognitive domains¹⁶⁸. Example of chronic strains that are perceived as stressful particularly by women are role related pressures in the form of gender inequalities such as reduced power, lack of affirmation in close relationships, role expectation and its associated burden. These chronic strains were found to both predict depression and mediate the differences between women and men in the prevalence and seriousness of depression¹⁶⁷.

In summary, the results from this study suggest that women experience higher psychological distress than men because firstly, their level of perceived stress is higher and secondly, their reactivity to stress is stronger possible due to higher level of neuroticism. Moreover, evidence has shown that chronic strains in various forms, possibly including academic pressure, also trigger stronger stress reaction in women compared to men.

4.2. Social Relationships

Both Social and Emotional Loneliness were significantly associated with mental distress and lower level of life satisfaction in both men and women in our study, with both measures of loneliness correlated positively to HSCL scores and negatively to Life satisfaction.

Even though causal relationship cannot be established in the current cross-sectional study, past studies have indicated possible causal relationships between loneliness and depression^{110;111}. Therefore, our findings perhaps confirmed the importance of positive social relationships on the psychological well-being of students; or at least suggest that social and emotional support may be important for student mental health. This is perhaps not surprising considering that people are social beings, and it is our nature to form positive, meaningful and supportive interpersonal relationships from which we derive a sense of belongingness and identity⁹⁷. The goals of relationship forming is especially important for university students as most of them are in a stage of their lives where they try to individuate themselves from their families to form their own identities.

Social relationships fulfill human needs through various provisions: they provide attachment, social integration, opportunity for nurturance, reassurance of worth, reliable alliance and guidance¹⁶⁹; and each personal relationship can offer one or more types of provisions. Students who are socially lonely may suffer certain impediments in their psychosocial functioning, which can subsequently affect their mental health because loneliness has been shown to be linked to desperation (feeling hopeless and vulnerable), depression (feeling melancholy and sad), impatient boredom (feeling uneasy, having difficulty concentrating), self-deprecation (having low self-esteem and self-pity), low social competence and in the extreme case, suicidal behaviours¹¹⁰. These are understandable consequences because in a university setting, not only do peers provide emotional support during stressful time, they also provide instrumental assistance such as note lending or provision of study-related information during the course of studies. Hence, while students with larger social network would likely experience less stress knowing that help will be available from their circle of friends when needed; students who are socially lonely may be vulnerable to mental distress since they do not have access to an engaging social network which can offer direct or buffering effects in the time of stress or just plain and simple companionship.

An interesting observation is noted pertaining to the strength of correlations in the regression models for male students: social loneliness was correlated to HSCL scores more than twice as much as was emotional loneliness; and emotional loneliness was associated with Life Satisfaction twice as strongly as was social loneliness; whereas the strength of correlations was rather consistent for the female group. Thus, it seems to be more crucial for men to have an adequate social network in order to keep mental distress at bay and an intimate partner to sustain a decent level of life satisfaction according to our results. Upon examination of the correlation tables, the association of neuroticism with social loneliness in men was notably stronger than that in women, and it was almost three-fold stronger than that between neuroticism and emotional loneliness (see Table. 8b), so it is possible that part of the association of social loneliness to psychological distress in men is related to the higher neurotic tendency in socially lonely men. The explanation of the gender difference between emotional loneliness and life satisfaction is unclear, but it may be contributable to the different manifestations of social and emotional loneliness across genders, which have to be explored by further comparative research in order to gain a better understanding on the dynamics of social/emotional loneliness and mental health.

It is perhaps not surprising to find that social and emotional connectedness was linked to life satisfaction in our study since intimacy was found to be one of the representative tasks among university students¹⁷⁰ and also that satisfaction with intimate relationship was proven to be strongly associated with level of life satisfaction¹⁷¹.

4.3 Perceived Academic Pressure

Perceived academic pressure was positively correlated with HSCL scores and negatively with life satisfaction in the univariate analyses and the strength of the correlation with HSCL scores is twice as strong as that of life satisfaction. In the multiple regression models, after all the study variables have been controlled for, it only predicts HSCL scores, which means that greater academic pressure is uniquely linked to heightened psychological distress for both male and female students.

This result is in alignment with the findings from existing literature (see section of literature review on “Academic Pressure”) that academic pressure - which is a form of chronic stress - has an apparent impact on the psychological distress levels in students.

Moreover, female students reported higher perceived academic pressure compared to their male counterparts ($t=4.69$, $p\leq.001$). This finding, combined with women’s greater sensitivity to chronic stress (as discussed earlier in “Gender”), may account at least partly for the higher level of psychological distress reported by women.

4.4 Personality

In our multiple linear regression models, personality and perceived self efficacy together gained predictive power by .23 for HSCL and .12 (females)/ .20(males) for Life Satisfaction, which

means that personality attributes explain 23% of the variances of psychological distress and 12%/20% of life satisfaction in our sample. The large amount of empirical data on personality all point to the fact that personality plays a pivotal role in the selection and outcome of stressful events by influencing the way these situations are perceived, appraised and handled. So, it is not surprising that personality predicts psychological well-being to a certain extent as indicated in our results.

The broad personality trait neuroticism is the most powerful predictor for psychological distress and decreased life satisfaction for both men and women in all the analyses. This finding is in alignment with numerous previous studies (see literature review section) which have shown that neuroticism is an important potential factor associated with elevated stress exposure, more frequent stressful life events, greater sensitivity to stress genesis¹⁷²⁻¹⁷⁴ and proneness to depression in response to stressors¹⁷⁵. Moreover, a neurotic person tends to appraise situations negatively and perceive them to be more threatening^{172;176} in addition to having lower perceived self-efficacy as shown in our results which indicated a high significant correlation between perceived self-efficacy and neuroticism (see Table 8a & 8b). Consequently, a neurotic person would easily feel overwhelmed because firstly, the environmental threats are perceived to be more menacing and secondly, a neurotic person would less likely to feel that he/she has the capability to cope with the perceived stress.

Furthermore, it has been suggested that neuroticism manifests itself differently depending on whether it is the anxiety or the depressive aspect that is being expressed. The anxiety and vulnerability aspects of the trait are related to sensitivity to stress, which leads to increased mental distress; whereas the depression aspect is linked to negative affective experiences and loss of purposefulness leading to a passive existence which ultimately render life unsatisfying¹²⁹.

Openness was correlated positively to HSCL scores and negatively to Life Satisfaction for women, but not for men in both univariate and multivariate analyses while there was no significant difference in the degree of openness reported by females and males from our data (see Table 6). In other words, female students who are more creative, inventive and unconventional

tend to experience higher psychological distress and lower life satisfaction compared to their male counterparts.

Why is the trait openness linked to the levels of psychological distress and life satisfaction in women and not in men? Openness was shown to be associated with more intense positive as well as negative emotional states¹⁷⁷. If it had been the explanation here, we would probably have seen positive correlations of openness with both HSCL scores and life satisfaction but it is not the case since it is associated to increased mental distress and decreased subjective well-being. Thus, we should explore other possible explanations: since openness to experience has been shown to be linked to sensation seeking behaviours¹⁷⁸ and sensation seeking is related to risk taking behaviours¹⁷⁹, which may, in different extent, lead to situations which overtax one's competency and consequently result in elevated level of stress¹⁸⁰. If this propensity is compounded with women's significantly greater reactivity to stress¹⁶⁶ (as it has been discussed earlier), it follows that the trait openness should also be linked to female psychological distress. In addition, external situational factors may also play a role. It was discussed earlier that women in particular, are subject to certain gender specific chronic strains such as role expectation¹⁶⁷ and the female reactivity to chronic strains was shown to be much stronger than men's (see earlier section on "Gender"). Now, let's say if suppression of creative impulses were present in a woman's environment as one of the gender related strains, it could firstly, create additional barriers to overcome thereby elevating the level of stress and secondly, it could stifle women's creativity, rendering the need to achieve certain cognitive goals such as self-actualization (which is one of the levels in Maslov's hierarchy of needs¹⁸¹) unfulfilled. D. Ealy, PhD writes, "Many studies have shown us that a young girl's ideas are frequently discounted by her peers and teachers. In response, she stifles her creativity...perhaps the most insidious and common manifestation of repressed creativity in women is depression."¹⁸². This imposition of gender related chronic strain, coupled by women's greater sensitivity to such type of strain, would likely augment the level of psychological distress and compromise life satisfaction in women who have an unconventional and creative disposition. Yet, these plausible explanations for the association of openness with mental distress in women will remain hypotheses until they can be verified by further empirical social and psychological research.

Conscientiousness was negatively correlated with HSCL scores and positively with life satisfaction in the univariate analyses but its association with psychological distress disappeared for women in the multivariate analysis. In men, not only does conscientiousness predict lower mental distress in the linear regression model, it also mediates the association between amotivation and HSCL scores (see subsequent discussion on “Amotivation”).

Conscientiousness might contribute to mental well-being indirectly by the rewards or favorable consequences that result from its ethical and diligent nature. For example, a conscientious person may obtain better grades in school and even faster promotion at work; consequently, subjective well-being is enhanced by these favorable outcomes while psychological distress diminished. However, a study on Norwegian medical students indicated that conscientiousness predicted perceived medical school stress, which seems to contradict the results of this study. It is possible that conscientiousness poses different influences on perceived stress for medical students due to the apparent differences in workload, academic requirements and the nature of medical studies. Moreover, unlike the Norwegian study on medical students which was a longitudinal study, the current study is a cross-sectional study which analyzes the correlations between the variables at baseline. Nonetheless, it will be very interesting to examine the long term effects of conscientiousness on the mental health of Norwegian students from various areas and levels of studies in future research using longitudinal design.

Agreeableness did not show any association with either dependent variable for both sexes in the univariate and multivariate analyses despite it has been shown to be associated with increased life satisfaction. It has been suggested that agreeableness, along with conscientiousness, could increase the frequency of positive experiences in social situations, and this, in turn, can favorably affect subjective well-being¹⁷⁷. However, our current findings only support this theory in terms of conscientiousness but not agreeableness, which leads to the question, would it be possible that the disposition of being friendly and warm is not particularly rewarding in terms of reducing mental distress and promoting life satisfaction in a university setting? However, this hypothesis will have to be validated by further investigation since it is beyond the scope of the current study.

Extraversion was correlated inversely with HSCL scores and positively with life satisfaction only in the univariate analyses, but all of these correlations were nullified when other study variables were controlled. As discussed earlier, the trait extraversion is generally known to be positively associated with subjective well-being as well as lower levels of anxiety and depression, owing to its happy facets and relationship building capability (see earlier literature review on “Extraversion”). So, the data from our analyses are in alignment with the findings from previous research, but only before the other variables were controlled. The associations between extraversion and mental well-being were absorbed by other variables once they were entered in to the regression model. Further investigation revealed that in the NEO-PI-R version of big five model (called Revised NEO Personality Inventory which consists of 240 items), extraversion has six subscales which are warmth, gregariousness, assertiveness, activity, excitement seeking and positive emotions; among which only warmth, gregariousness and positive emotions were found to predict psychological well-being, and not the assertive or excitement seeking aspect¹²⁹. Then, the review of the 20-item big five questionnaire which was used in our study revealed that only 50% of the questions pertaining to the personality dimension extraversion correspond to these three factors of the NEO-PI-R that have positive contributions to mental well-being, while the other 50% corresponds to the assertive aspect of the trait. Hence, a possible explanation for why extraversion does not predict HSCL scores and life satisfaction significantly in this study could be because the power of association was reduced compared to other studies which used a more elaborate questionnaire since only half of questions regarding extraversion in this study correspond to the mental health promoting sub-traits NEO-PI-R inventory. Moreover, extraversion correlated considerably with perceived self-efficacy especially for men and inversely with social loneliness for both sexes according to our data (see Table. 6). The fact that these correlations were absorbed by other social and personality variables in the linear regression model may suggest that extraversion is correlated to psychological well-being primarily through reduction of social loneliness (from its outgoing nature) and perceived self-efficacy.

Moreover, our linear regression models revealed that female students are more sensitive to certain psychosocial variables most notably, in addition to openness, amotivation and perceived efficacy, all of which only predict HSCL scores and life satisfaction in women in our linear regression models.

4.5 Perceived Self-Efficacy

Perceived self efficacy (PSE) was correlated negatively with HSCL scores and positively with life satisfaction in the univariate analyses, which means that greater PSE was associated with lower psychological distress and better life satisfaction, a finding that is in alignment with past studies (see literature review on “PSE”). It has been demonstrated that higher perceived problem solving abilities predict lower perception of stress¹²¹; therefore, PSE may lower psychological distress through the primary coping mechanism, through which one actively appraises a situation before initiating problem-solving actions (i.e. the secondary coping mechanism) in the face of stressors^{183;184}. This explanation is even more plausible considering perceived self-efficacy also entails upper frontal neuron function¹⁸⁵ which is capable of modifying the initial stimulus appraisal process. Therefore, PSE may reduce psychological stress by altering the perception of imminent stress rendering them less threatening and overwhelming.

In the multivariate analyses, the correlations between PSE to HSCL scores and life satisfaction were significant only for the female group and not the male. Among the study variables, PSE was most strongly correlated with neuroticism and women reported substantially higher neuroticism scores than did men (see Table. 6). The fact that PSE still showed significant correlations with psychological distress and life satisfaction for women even after neuroticism had been controlled for indicates that it is a unique predictor of psychological well-being for women. In other words, whether female students believe they could deal with challenging situations is linked significantly to their levels of mental distress and life satisfaction.

4.6 Academic Motivation

Intrinsic motivation showed a positive correlation with life satisfaction for both genders in the univariate analyses; and in the multiple regression analyses, it maintained its positive correlation

with life satisfaction in women, whereas in men, the association approached level of significance ($p=0.06$). These findings are in line with previous studies which indicated that intrinsic motivation is linked to better life satisfaction⁹². However, contrary to previous investigation, it had no association with psychological distress in this study.

Extrinsic motivation was positively correlated with HSCL scores for women but only in the univariate analyses. No association with either dependent variable was observed when other variables were controlled.

The results on the amotivation from this study are similar to the findings from past research that it has been shown to have negative influences on mental well-being. From our data, amotivation was correlated positively with HSCL scores and negatively with life satisfaction in the univariate analysis. It means that the more unmotivated a student is, the more distress and less life satisfaction he/she will likely experience. In the multivariate analyses, it only predicts psychological distress and life satisfaction only for women; whereas in men, its correlations with the dependent variables were nullified, with its association with HSCL scores mediated by conscientiousness when personality factors were entered into the regression model (see Table 9).

It appeared that amotivation was linked negatively to student mental well-being, but its association with psychological distress was mediated by conscientiousness in males but not in females. In other words, male students could somehow compensate for the aversive psychological setbacks of being unmotivated by working more diligently and being more disciplined. Research has shown that men have a greater tendency to utilize problem-based- while women tend to use emotional-based-coping¹⁶⁶. The former coping strategy is directed towards dealing directly with stress inducing situations whereas the later is used to moderate the negative associated affects or emotions. The strategy engaged by the individual in turn influences the appraisal of stress, the intensity of reaction¹⁸⁶ and the situational outcome. Failure to deal with the stressor effectively may exacerbate the problem, creating a vicious cycle. In a university setting, it could mean that men tend to tackle stressful situations by being more industrious and tenacious whereas women tend to direct more energy to deal with the associated emotions, or in this case of amotivation, the lack of enthusiasm in pursuing academic studies. These different

coping strategies engaged by men and women may provide in part a plausible explanation for the mediating effect of conscientiousness on amotivation for men.

4.7 Demographic Variables

According to the multiple regression models, age predict HSCL scores for men but not for women – which means that older male students experienced higher psychological distress after all the variables were adjusted.

Relationship status was linked to lower HSCL scores and higher life satisfaction only for women in the univariate analyses, but had no correlation with either mental health indices in both sexes after the variables had been adjusted. This finding suggests that the presence of a significant other was associated with mental well being in women but the associations were “drowned out” or absorbed when all other relevant variables were controlled.

Upon examining the correlations of all the study variables to relationship status, it is unsurprising yet noteworthy that a rather strong correlation existed between emotional loneliness and relationship status. As discussed in an earlier section, emotional loneliness was significantly associated with HSCL scores and Life Satisfaction for both sexes. This observation suggests that it was the quality of the intimate relationship and the provision of adequate emotional support; not the mere presence of a partner, that is linked to lower level of psychological distress and better life satisfaction. This suggestion is supported by empirical evidence which indicates that it is the supportive quality of the partnership, and not the partnership itself, which modulate the negative effects of stress^{187;188}. For instance, among distressed married medical students, perceived support from one’s partner had significant influence on reducing the level of depression^{188;189}.

Therefore, while relationship status had a more substantial influence on psychological distress and life satisfaction in women, its effect disappeared when other study variables were controlled, suggesting that the mere presence of a partner in the absence of an emotionally supportive milieu is an inadequate condition to predict psychological well-being.

Contrary to previous findings⁶⁵, having childcare responsibility was not found to be significantly associated with psychological distress or life satisfaction in our sample. It is quite surprising because one would expect the extra time, work and efforts required to look after dependent children would add to the stress of a university student resulting in negative psychological outcomes. Nevertheless, it will be interesting to explore the long term effects of childcare responsibility on students through longitudinal study since the cross-sectional nature of this study only captured the influence of childcare responsibility at baseline.

* * *

Since one of the implications of the current findings involves the enhancement of psychological assessment through recognition of the associations between psychosocial characteristics and mental health indices, a practical illustration which includes the description of a high risk and a low risk profile is constructed based on the findings of this study:

<u>High Risk Profile</u>	<u>Low Risk Profile</u>
<ul style="list-style-type: none"> -Female student 	<ul style="list-style-type: none"> -Young Male student
<ul style="list-style-type: none"> -High level of neuroticism 	<ul style="list-style-type: none"> -Emotionally stable
<ul style="list-style-type: none"> -Low perceived self-efficacy 	<ul style="list-style-type: none"> -Conscientious
<ul style="list-style-type: none"> -Experiences high academic pressure 	<ul style="list-style-type: none"> -Does not feel pressured
<ul style="list-style-type: none"> -Creative, unconventional, adventurous 	<ul style="list-style-type: none"> by course work
<ul style="list-style-type: none"> -Socially and emotionally lonely 	<ul style="list-style-type: none"> -Has satisfying social & emotional
<ul style="list-style-type: none"> Unmotivated 	<ul style="list-style-type: none"> relationships

The illustrated profiles apparently represent extreme cases that were constructed based on the empirical findings of this study; nonetheless, it provides an example of how the knowledge derived from this research may be applied and utilized by educators or psychotherapists through critical appraisal of a student’s psychosocial profile.

4.8 Strengths and Limitations

The results of this study were derived from a large comprehensive sample which significantly enhanced the statistical power of the analyses. Moreover, the data for the variables included in this study were collected using mostly validated and standardized instruments which strengthened the reliability of the collected data. The multiple linear regression analysis performed by split gender also revealed the unique contribution of the psychosocial variables to psychological well-being for both males and females. These analyses offer a clearer delineation of the pattern of associations between the selected psychosocial variables and psychological distress/life satisfaction across genders.

Several limitations concerning the study deserve mention: firstly, causal relationship cannot be concluded among the study variables due to the cross-sectional nature of this investigation. Secondly, international students were not included in this study but they represent a group of students who are particularly vulnerable to mental distress from being away from home while studying in an unfamiliar environment. There has also been an increasing number of international students on campus, so this group is beginning to account for a considerable proportion of the student population and therefore deserves appropriate attention. Thirdly, the response rate of the study was quite low which may have affected the results. For example, it is likely that those who were more conscientious might be more inclined to return the questionnaire, or those who are severely depressed might not have the energy to respond, etc. Thus, selection bias due to attrition cannot be eliminated from the current study.

Moreover, this study was done at the University of Oslo in Norway, so the findings may not be applicable to other countries or beyond the university student population because it is uncertain whether the relationships between psychosocial variables and psychological well-being found in this study is a result of environmental rewards specific to a sociocultural context or to universal biological systems. Even though the findings from this study had been replicated by previous studies which suggests the universality of certain associations, previous research that is found in the literature was originated primarily from countries in Europe, North America and Australia,

etc. and findings from other parts of the world are scarce in comparison. Nevertheless, that having said, one may be still be able to generalize some of the relationships, such as those between social variables and psychological distress/life satisfaction, to other populations since the subjective feeling of loneliness is a universal experience which transcends age, gender, race and social class¹¹⁰.

In addition, the instrument used to assess social and emotional loneliness in the study does not distinguish between chronic and transient type of loneliness. Loneliness that is persistent is more a cause of concern than the transient kind because loneliness that is temporary is normative and can be due to situational factors such as relocation and can probably be overcome once new relationships are established; chronic loneliness, on the other hand, may be experienced in so many situations for such a long period of time that it may assume the enduring quality of a personal trait¹¹⁰. Thus these two types of loneliness may have different associations with mental distress but the instrument used in the present study did not distinguish between the two.

5. Recommendations

University services and faculty can make a difference to the mental well being and psychological functioning of university students in a number of ways. First and foremost, it is important recognize the actual or potential problems faced by the students and consequently, take appropriate actions to help them overcome the challenge.

Currently, the demand for psychological counseling from Norwegian university students is so high that it has exceeded the capacity of the Student Service, which has been receiving insufficient and limited funding from the Government (Aftenposten May 5, 2008). While previously, it was a concern that university students were not seeking psychological help even when needed either because of the stigma attached to using psychological health service or they were unaware of the service available; today, they are being turned away as more and more Norwegian students are seeking psychological help. In light of this recent phenomenon, it is all the more important to take preventative approach to promote student mental well-being by

implementing appropriate curricular or extracurricular strategies before more serious problems emerge.

Certain psychosocial attributes such as conscientiousness and motivation can be modified. The following recommendations are made based on the results of our study:

The data derived this study have demonstrated the importance of social relationships in promoting psychological well-being; hence, psychosocial interventions could be implemented to promote student connection on campus. Efforts such as hosting and encouraging students to participate in social events may help them achieve a more balanced personal life and also foster connection to other students. The consequent social relatedness and integration that are developed may buffer them against the negative effects resulting from academic pressure and thereby, reduce their levels of depression and anxiety¹⁹⁰. Sometimes, students are not cognizant of the involvement of loneliness in their mental functioning¹¹⁰ so it is essential that such social problems be addressed as part of the intervention. In addition, social skills counseling was proven to be effective in some students and may increase the students' self confidence and their sense of social competency which is important in coping with loneliness positively because studies showed that college students, who are confident in their own social competency tend to engage in relationship building activities (such as initiating social contacts) in the face of loneliness; whereas those who are unsure of their social skills dealt with lonely feelings more ineffectively using diversion or sensually-oriented tactics such as overworking, using illicit drugs or indulge in sexual promiscuity¹¹⁰. Therefore, it is important to give students guidance on how to cope with loneliness positively and constructively.

Moreover, since academic pressure is a significant correlate of psychological distress as revealed by this study and previous research, students may benefit from stress management workshops which can help improve their coping strategies.

Furthermore, there is evidence from our data that intrinsic motivation is associated with greater life satisfaction. Hence, it may be worthwhile to invest in developing strategies that aim to enhance the internalization and integration of motivation in students by promoting their level of

competence¹⁹¹ and encouraging their sense of autonomy¹⁹² since intrinsically motivation can be cultivated more readily if students feel they are capable of controlling the outcome of their education (for instance, by working hard) and consequently reaching their academic goals; or if they are genuinely interested in a subject instead of merely studying mechanically to obtain high marks.

In addition, amotivation was shown to be associated with psychological distress and negatively with life satisfaction. Amotivation could result from the belief that one lacks the sufficient internal resources to achieve one's goals, and such frustration might lead to passivity or total inaction which could consequently spiral into morbid depression. If it is case, improvement of perceived self-efficacy may help unmotivated students to restore their motivation by resolving the issue of self doubt on one's coping abilities. Perceived self-efficacy was also shown to be linked to mental well-being in our results, thus, workshops that help students improve problem solving skills and self confidence may help reduce perceived or actual stress level and at the same time, enhance academic motivation.

With regards to personality, the trait that can potentially be manipulated in an educational setting is conscientiousness, which is associated with psychological well being. Hence, it may be beneficial to remind students of the importance of hard work and perseverance in their academic pursuit. In addition, psychologists and counselors should be informed and aware of the associations of psychosocial characteristics to mental distress, such that psychometric screening can be utilized especially in cases where high risk psychosocial profile is detected.

In summary, academic support at the micro and macro policy level should be the critical area for intervention in order to optimize and improve mental well-being among university students, and a proactive approach will in turn help students enjoy a productive and satisfying university career as well as promote success in various domains in their personal and academic lives.

6. Future Research

This study is part of the larger HELT project which aims to assess the health and welfare among the students at UiO after the institutional reform that started in 2003 and a wealth of information can potentially be derived from the valuable data collected from this comprehensive, large scale survey. The current study focuses on Norwegian students, but it has been shown that the number of international students is on the rise in Norway so it will be important to study the psychosocial correlates for this expanding population as well. Longitudinal studies on the collected data could potentially clarify a number of issues that are beyond the scope of the current cross-sectional study. Firstly, it will be of particular interest to study the relationships between psychosocial variables and adaptation to stress by examining long-term outcomes. For example, personality traits such as conscientiousness was linked to increased level of stress in previous research on Norwegian medical students but was related to positive mental outcomes in this study, so, it will be interesting to see what the effects conscientiousness has on perceived stress or psychological distress two years after the commencement of the reform. Longitudinal study can also explore possible long term impact of certain demographic variables such as childcare responsibility on mental health among university students since it was quite surprising that the results did not show any correlation between childcare responsibility and the mental health indices in our study.

Secondly, this study has revealed certain intriguing gender divergences among the study variables such as the exclusive association of openness with both psychological distress and life satisfaction in female students. Future qualitative or quantitative studies that explore the pathways or mechanisms of these sex specific associations may uncover the underlying reasons behind the observed gender differences. Since the study of psychosocial variables is a complex subject matter because of the interactive effects of various factors, future studies involving trait-combinations will be helpful in explaining the interplay of individual characters and mental health in a more comprehensive manner.

Thirdly, each of the broad domains of the five factor model consists of a number of sub-traits that are more narrowly defined. Further examination of these lower order subscales may yield useful explanations for certain observations in this study such as the absence of association between extraversion and mental well-being which was found to exist in previous studies (refer to literature review on “extraversion”).

Furthermore, the roles of emotional and social loneliness warrant further investigation because Weiss proposed that social loneliness is linked to depression while emotional loneliness is related to anxiety⁹⁹. This hypothesis has been reexamined and contradictory evidences were found¹⁰². As discussed earlier, social and emotional loneliness exhibited differential associations with psychological distress and life satisfaction especially for men; thus, further exploratory research may be able to unravel the roles of these social variables in relation to student mental health.

Lastly, it will be equally important to carry out prospective studies in order to determine if mental well being can be enhanced by the proposed recommendations in universities or colleges. Since some of the recommendations are based on hypotheses derived from the results of this study, it will be crucial to critically evaluate the effectiveness of the proposed interventions.

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7. Conclusion

This cross-sectional study confirmed previous findings that females report higher level of psychological distress compared to their male counterparts and no gender difference was found in the level of life satisfaction in this study. The results suggest that the preponderance of female anxiety and depression may be due partly to the higher level of perceived stress, higher degree of neuroticism and greater reactivity to stress in women. While some variables such as neuroticism, social and emotional loneliness significantly predict mental well-being in both male and female students in the multiple linear regression models; other psychosocial variables showed notable gender divergences.

This study has revealed the pattern of associations of the selected emotional, motivational, social and personality factors with psychological stress and level of life satisfaction, and the knowledge of these relations may be useful in developing identification and evaluation tools for psychological assessment as well as in designing intra- or extracurricular programs to improve the psychological functioning of university students. Moreover, academic pressure was shown to be a unique predictor of psychological distress in our multivariate analyses and this finding could have certain implications in the field of education. Furthermore, examining anxiety and depression from a broader perspective of core psychosocial factors may also allow opportunities to advance educational strategies and psychotherapeutic interventions through approaches that target the variables that represent fundamental human needs and individual characteristics. However, the direction of associations and the underlying mechanisms of some of the correlations remain to be elucidated through further research. Apart from mental distress, this study has also uncovered a number of correlates of mental wellness (e.g. conscientiousness and intrinsic motivation) which is an important area to explore since positive psychology is associated with optimal psychological functioning across a wide spectrum of life domains including education. In addition, the important correlations of social integration and interpersonal connectedness with psychological well-being should be emphasized and active social involvement should be promoted.

The results of this study serve to fill in the gaps regarding the correlates of mental health among Norwegian university students from various areas and levels of studies. Hopefully this information will help educators and health service personnel to implement appropriate services to improve the overall psychological well-being of our students.

Reference List

- (1) Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006; 3(11):e442.
- (2) World Health Organization. Ten Statistical Highlights in Global Public Health. *World Health Statistics* 2007. In press 2007.
- (3) World Health Organization. Investing in health research and development. Report of the Ad Hoc Committee on Health Research Relating to Future Intervention Options. Geneva 1996.
- (4) Surtees PG, Wainwright NW, Luben RN, Wareham NJ, Bingham SA, Khaw KT. Psychological distress, major depressive disorder, and risk of stroke. *Neurology* 2008; 70(10):788-794.
- (5) Sandanger I, Nygard JF, Ingebrigtsen G, Sorensen T, Dalgard OS. Prevalence, incidence and age at onset of psychiatric disorders in Norway. *Soc Psychiatry Psychiatr Epidemiol* 1999; 34(11):570-579.
- (6) Kessler RC, Abelson J, Demler O, Escobar JI, Gibbon M, Guyer ME et al. Clinical calibration of DSM-IV diagnoses in the World Mental Health (WMH) version of the World Health Organization (WHO) Composite International Diagnostic Interview (WMHCIDI). *Int J Methods Psychiatr Res* 2004; 13(2):122-139.
- (7) Kadison R. Getting an edge--use of stimulants and antidepressants in college. *N Engl J Med* 2005; 353(11):1089-1091.
- (8) Osberg TM. A business case for increasing college mental health services. *Behavioral Health Management* 2004; 24(5):33-36.
- (9) Furr SR, Westefeld JS, McConnell GN, Jenkins JM. Suicide and depression among college students: A decade later. *Professional Psychology: Research and Practice* 2001; 32:97-100.
- (10) Adlaf EM, Gliksman L, Demers A, Newton-Taylor B. The prevalence of elevated psychological distress among Canadian undergraduates: findings from the 1998 Canadian Campus Survey. *J Am Coll Health* 2001; 50(2):67-72.
- (11) Phippen M. The 1993/4 survey of counseling services in further and higher education. *Association for Student Counselling* 1995;25-36.
- (12) Rana R, Smith E, Walking J. Degrees of disturbance: The new agenda, the impact of increasing levels of psychological disturbance amongst students in higher education. *Association for University and College Counselling* 1999.

- (13) Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med* 2006; 81(4):354-373.
- (14) SSB. Statistics Norway. 2006.
Ref Type: Report
- (15) Seligman ME, Csikszentmihalyi M. Positive psychology. An introduction. *Am Psychol* 2000; 55(1):5-14.
- (16) Myers DG. *The pursuit of happiness*. New York: Morrow; 1992.
- (17) Flay BR. Positive youth development requires comprehensive health promotion programs. *Am J Health Behav* 2002; 26(6):407-424.
- (18) Keyes C.L.M. Complete mental health: An agenda for the 21th century. In C.Keyes & J.Haidt (Eds.), *Flourishing: Positive psychology and the life well-lived*. Washington, DC: American Psychological Association; 2003.
- (19) Aspinwall LG, Staudinger UM. *A psychology of human strengths: Some central issues of an emerging field, Fundamental questiona and future directions for a postive psychology*. Washington, DC: American Psychological Association; 2008.
- (20) Greenberger E, Chen C. Perceived family relationships and depressed mood in early an dlate adolescence: A comparison of European and Asian Americans. *Developmental Psychology* 1996; 32:707-716.
- (21) Mikhail A. Stress: a psychophysiological conception. *J Human Stress* 1981; 7(2):9-15.
- (22) Lazarus RS. *Patterns of adjustment*. 3rd ed. New York: McGraw-Hill; 1976.
- (23) Stanley N, Manthorpe J. Responding to students' mental health needs: Impermeable systems and diverse users. *J of Mental Health* 10[1], 41-52. 2001.
Ref Type: Journal (Full)
- (24) Svanum S, Zody ZB. Psychopathology and college grades. *Journal of Counseling Psychology* 48[1], 72-76. 2001.
Ref Type: Journal (Full)
- (25) Kringlen E, Torgersen S, Cramer V. A Norwegian psychiatric epidemiological study. *Am J Psychiatry* 2001; 158(7):1091-1098.
- (26) Mogård R, Olsen R, Daae C, Rosvold E. HELse- og Trivsel blant studenter ved Universitetet i Oslo, Foreløpig rapport. *Studentsamskipnaden i Oslo* 2004.
- (27) Olsen R, Rosvold E, Mogård R, Kvalem I, Daae C. HELse- og Trivsel blant studenter ved Universitetet i Oslo, Foreløpig rapport. *Studenthelsetjenesten ved Universitetet i Oslo* 2006.

- (28) Nerdrum P, Rustøen T, Rønnestad MH. Student psychological distress: A psychometric study of 1750 Norwegian 1st-year undergraduate students. *Scandinavian J of Educ Research* 50[1], 95-109. 2006.
Ref Type: Journal (Full)
- (29) Firth J. Levels and sources of stress in medical students. *Br Med J (Clin Res Ed)* 1986; 292(6529):1177-1180.
- (30) Kjeldstadli K, Tyssen R, Finset A, Hem E, Gude T, Gronvold NT et al. Life satisfaction and resilience in medical school--a six-year longitudinal, nationwide and comparative study. *BMC Med Educ* 2006; 6:48.
- (31) Simpson PL, Schumaker JF, Dorahy MJ, Shrestha SN. Depression and life satisfaction in Nepal and Australia. *J Soc Psychol* 1996; 136(6):783-790.
- (32) Wardle J, Steptoe A, Gulis G, Sartory G, Sek H, Todorova I et al. Depression, perceived control, and life satisfaction in university students from Central-Eastern and Western Europe. *Int J Behav Med* 2004; 11(1):27-36.
- (33) Lazarus RS. Coping theory and research: past, present, and future. *Psychosom Med* 1993; 55(3):234-247.
- (34) Lazarus RS, Folkman S. *Stress, appraisal and coping*. New York: Springer; 1984.
- (35) Andrews FM, Withey SB. *Social indicators of well-being: America's perception of life quality*. New York: Plenum; 1976.
- (36) Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. *Arch Gen Psychiatry* 1994; 51(1):8-19.
- (37) Robins LN, Helzer JE, Weissman MM, Orvaschel H, Gruenberg E, Burke JD Jr et al. Lifetime prevalence of specific psychiatric disorders in three sites. *Arch Gen Psychiatry* 1984; 41:949-958.
- (38) Wells JE, Bushnell JA, Hornblow AR, Joyce PR, Oakley-Browne MA. Christchurch Psychiatric Epidemiology Study, Part I: Methodology and lifetime prevalence for specific psychiatric disorders. *Aust N Z J Psychiatry* 1989; 23(3):315-326.
- (39) Bijl RV, Ravelli A, van ZG. Prevalence of psychiatric disorder in the general population: results of The Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Soc Psychiatry Psychiatr Epidemiol* 1998; 33(12):587-595.
- (40) Jylha P, Isometsa E. The relationship of neuroticism and extraversion to symptoms of anxiety and depression in the general population. *Depress Anxiety* 2006; 23(5):281-289.

- (41) Blazer DG, Kessler RC, McGonagle KA, Swartz MS. The prevalence and distribution of major depression in a national community sample: the National Comorbidity Survey. *Am J Psychiatry* 1994; 151(7):979-986.
- (42) Kessler RC, Berglund P, Demler O, Jin R, Koretz D, Merikangas KR et al. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *JAMA* 2003; 289(23):3095-3105.
- (43) Regier DA, Farmer ME, Rae DS, Myers JK, Kramer M, Robins LN et al. One-month prevalence of mental disorders in the United States and sociodemographic characteristics: the Epidemiologic Catchment Area study. *Acta Psychiatr Scand* 1993; 88(1):35-47.
- (44) Regier DA, Boyd JH, Burke JD, Jr., Rae DS, Myers JK, Kramer M et al. One-month prevalence of mental disorders in the United States. Based on five Epidemiologic Catchment Area sites. *Arch Gen Psychiatry* 1988; 45(11):977-986.
- (45) Tyssen R, Dolatowski FC, Røvik JO, Thorkildsen RF, Ekeberg O, Hem E et al. Personality traits and types predict medical school stress: a six-year longitudinal and nationwide study. *Med Educ* 2007; 41:781-787.
- (46) Vitaliano PP, Maiuro RD, Russo J, Mitchell ES. Medical student distress: A longitudinal study. *J Nerv Ment Dis* 1989; 177:70-76.
- (47) Richman JA, Flaherty JA. Gender differences in medical student distress: contributions of prior socialization and current role-related stress. *Soc Sci Med* 1990; 30:777-787.
- (48) Lloyd C, Gartrell NK. Sex differences in medical student mental health. *Am J Psychiatry* 1981; 138:1346-51.
- (49) Camp DL, Hollingsworth MA, Zaccaro DJ, Cariaga-Lo LD, Richards BF. Does a problem-based learning curriculum affect depression in medical students? *Acad Med* 1994; 69(10 Suppl):S25-S27.
- (50) ESSON-MOLLER E, LARSSON H, UDDENBERG CE, WHITE G. Individual traits and morbidity in a Swedish rural population. *Acta Psychiatr Neurol Scand Suppl* 1956; 100:1-160.
- (51) Bijl RV, van ZG, Ravelli A, de RC, Langendoen Y. The Netherlands Mental Health Survey and Incidence Study (NEMESIS): objectives and design. *Soc Psychiatry Psychiatr Epidemiol* 1998; 33(12):581-586.
- (52) Bland RC. Epidemiology of psychiatric disorders in Edmonton: phenomenology and comorbidity. Introduction. *Acta Psychiatr Scand Suppl* 1994; 376:5-6.
- (53) Rosenthal BS, Schreiner AC. Prevalence of psychological symptoms among undergraduate students in an ethnically diverse urban public college. *J Am Coll Health* 2000; 49(1):12-18.

- (54) Sandanger I, Nygard JF, Sorensen T, Dalgard OS. Return of depressed men: changes in distribution of depression and symptom cases in Norway between 1990 and 2001. *J Affect Disord* 2007; 100(1-3):153-162.
- (55) Tyssen R, Vaglum P, Gronvold NT, Ekeberg O. Factors in medical school that predict postgraduate mental health problems in need of treatment. A nationwide and longitudinal study. *Med Educ* 2001; 35(2):110-120.
- (56) Hong SM, Giannakopoulos E. Effects of age, sex, and university status on life-satisfaction. *Psychol Rep* 1994; 74(1):99-103.
- (57) Michalos AC. Global report on student well-being. Life satisfaction and happiness 1991; 1.
- (58) Acock AC, Hurlbert JS. Social networks, marital status, and well-being. *Social Networks* 1993; 15(3):309-334.
- (59) Glenn ND, Weaver CN. The contribution of marital happiness to global happiness. *J of Marriage and the Family* 1981; 43(2):161-168.
- (60) Mastekaasa A. Marital status and subjective well-being: A changing relationship? *Social Indicators Research* 1993; 29(3):249-276.
- (61) Wood W, Rhodes N, Whelan M. Sex differences in positive well-being: A consideration of emotional style and marital status. *Psychological Bulletin* 1989; 106(2):249-264.
- (62) Paul E, Poole A, Jakubowyc N. Intimacy development and romantic status: Implications for adjustment to the college transition. Jan/Feb, 1998. *J College student Development* 1998.
- (63) Gulløy E, Opdahl S, Øyangen I. Living conditions and consumption among students in 1998. 1998. Norway, Statistics Norway.
Ref Type: Report
- (64) Omigbodun OO, Odukogbe AT, Omigbodun AO, Yusuf OB, Bella TT, Olayemi O. Stressors and psychological symptoms in students of medicine and allied health professions in Nigeria. *Soc Psychiatry Psychiatr Epidemiol* 2006; 41(5):415-421.
- (65) Rosal MC, Ockene IS, Ockene JK, Barrett SV, Ma Y, Hebert JR. A longitudinal study of students' depression at one medical school. *Acad Med* 1997; 72(6):542-546.
- (66) Morrison J, Moffat K. More on medical student stress. *Med Educ* 2001; 35(7):617-618.
- (67) Tucker B, Jones S, Mandy A, Gupta R. Physiotherapy students' sources of stress, perceived course difficulty, and paid employment: comparison between Western Australia and United Kingdom. *Physiother Theory Pract* 2006; 22(6):317-328.

- (68) Collins H, Foote D. Managing stress in veterinary students. *J Vet Med Educ* 2005; 32(2):170-172.
- (69) Toews JA, Lockyer JM, Dobson DJ, Simpson E, Brownell AK, Brenneis F et al. Analysis of stress levels among medical students, residents, and graduate students at four Canadian schools of medicine. *Acad Med* 1997; 72(11):997-1002.
- (70) Vitaliano PP, Russo J, Carr JE, Heerwagen JH. Medical school pressures and their relationship to anxiety. *J Nerv Ment Dis* 1984; 172(12):730-736.
- (71) Notman MT, Salt P, Nadelson CC. Stress and adaptation in medical students: who is most vulnerable? *Compr Psychiatry* 1984; 25(3):355-366.
- (72) Nicholl H, Timmins F. Programme-related stressors among part-time undergraduate nursing students. *J Adv Nurs* 2005; 50(1):93-100.
- (73) Mosley TH, Jr., Perrin SG, Neral SM, Dubbert PM, Grothues CA, Pinto BM. Stress, coping, and well-being among third-year medical students. *Acad Med* 1994; 69(9):765-767.
- (74) Vitaliano PP, Maiuro RD, Mitchell E, Russo J. Perceived stress in medical school: resistors, persistors, adaptors and maladaptors. *Soc Sci Med* 1989; 28(12):1321-1329.
- (75) Hamarat E, Thompson D, Zabucky KM, Steele D, Matheny KB, Aysan F. Perceived stress and coping resource availability as predictors of life satisfaction in young, middle-aged, and older adults. *Exp Aging Res* 2001; 27(2):181-196.
- (76) Chang EC. Does dispositional optimism moderate the relation between perceived stress and psychological well being? A preliminary investigation. *Personality and Individual Differences* 1998; 25:233-240.
- (77) Hammen C, Davila J, Brown G, Ellicott A, Gitlin M. Psychiatric history and stress: predictors of severity of unipolar depression. *J Abnorm Psychol* 1992; 101(1):45-52.
- (78) McGonagle KA, Kessler RC. Chronic stress, acute stress, and depressive symptoms. *Am J Community Psychol* 1990; 18(5):681-706.
- (79) Vallerand RJ, Bissonette R. Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *J Pers* 1992; 60:599-620.
- (80) Ryan RM, Frederick C. On energy, personality, and health: subjective vitality as a dynamic reflection of well-being. *J Pers* 1997; 65(3):529-565.
- (81) Ryan RM, Deci EL. Intrinsic and extrinsic motivations: Classic definitions and new directions. *Comtemp Educ Psychol* 2000; 25:54-67.

- (82) Fairchild A, Horst SJ, Finney SJ, Barron KE. Evaluating existing and new validity evidence for the Academic Motivation Scale. *Contemp Educ Psychol* 2005; 30:331-358.
- (83) Harter S. Effectance motivation reconsidered: Toward a developmental model. *Human Development* 1[661], 669. 1978.
Ref Type: Journal (Full)
- (84) Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol* 2000; 55(1):68-78.
- (85) Csikszentmihalyi M, Rathunde K. The measurement of flow in everyday life: toward a theory of emergent motivation. *Nebr Symp Motiv* 1992; 40:57-97.
- (86) Motivation. Wikipedia . 2008.
Ref Type: Internet Communication
- (87) Deci EL, Ryan RM. A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.). *Nebraska Symposium on Motivation* ed. Lincoln: University of Nebraska Press; 1991.
- (88) Sheldon KM, Ryan RM, Rawsthorne L, Ilardi B. Trait self and true self: Cross-role variation in the Big Five traits and its relations with authenticity and subjective well-being. *J Personality and Social Psychology* 1997; 73:1380-1393.
- (89) Nix G, Ryan RM, Manly JB, Deci EL. Revitalization through self-regulation: The effects of autonomous and controlled motivation on happiness and vitality. *J Experimental Social Psychology* 1999; 35:266-284.
- (90) Deci EL, Ryan RM. Human autonomy: The basis for true self-esteem. In M.Kernis (Ed.), *Efficacy, agency, and self esteem*. New York: Plenum; 1995.
- (91) Ryan RM, Deci EL, Grolnick WS. Autonomy, relatedness, and the self: Their relation to development and psychopathology. In D. Cicchetti & D.J.Cohen (Eds.), *Developmental psychopathology: Theory and methods*. New York: Wiley; 1995.
- (92) Khramtsova I, Saarnio D, Gordeeva T, Williams K. Happiness, Life Satisfaction, and Depression in College Students: Relations with Students Behaviors and Attitudes. *American Journal of Psychological Research* 2007; 3(1).
- (93) Deci EL. *Intrinsic motivation*. New York: Plenum; 1975.
- (94) Bandura A. *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall; 1986.
- (95) Seligman ME. *Helplessness*. San Francisco: Freeman; 1975.

- (96) Antonovsky A. Unraveling the mystery of health: How people manage stress and stay well. pp.19. San Francisco: Jossey-Bass; 1987.
- (97) Baumeister RF, Leary MR. The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychol Bull* 1995; 117(3):497-529.
- (98) Salem DA, Bogat GA, Reid C. Mutual help goes on-line. *J Community Psychol* 1997; 25:189-207.
- (99) Weiss RA. Loneliness, the experience of emotional and social isolation. Cambridge MA: MIT Press; 1975.
- (100) Peplau LA, Perlman D. Perspectives on loneliness: *A sourcebook of current theory, research and therapy*, pp. 1-18, 238-252, 291-309. New York: Wiley; 1982.
- (101) Shaver PR, Brennan KA. Measures of Depression and Loneliness. In J.P. Robinson, P.R. Shaver & L.S. Wrightsman (Eds.). *Measures of Personality and Social Psychological Attitudes*. San Diego: Scademic Press; 1991.
- (102) DiTommaso E, Spinner B. Social and Emotional Loneliness: A reexamination of Weiss' typology of loneliness. *Pers Individ Dif* 1997; 22(3):417-427.
- (103) Bovier PA, Chamot E, Perneger TV. Perceived stress, internal resources, and social support as determinants of mental health among young adults. *Qual Life Res* 2004; 13(1):161-170.
- (104) Caron J, Latimer E, Tousignant M. Predictors of psychological distress in low-income populations of Montreal. *Can J Public Health* 2007; 98 Suppl 1:S35-S44.
- (105) Lapsley D, Rice K, FitzGerald D. Adolescent attachment, identity, and adjustment to college: Implications for the continuity of adaptation hypothesis. *J Counseling and Development* 1990; 68:561-565.
- (106) BrackG, Gay MF, Matheny KB. Relationships between attachment and coping resources among late adolescents. *J College student Development* 1993; 34:212-215.
- (107) Armsden GC, Greenberg MT. The Inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological well-being in adolescence. *J Youth and Adolescence* 1987; 16:427-454.
- (108) Antonovsky A. Unraveling the mystery of health: How people manage stress and stay well. San Francisco: Jossey-Bass; 1987.
- (109) Lima MC, Domingues MS, Cerqueira AT. [Prevalence and risk factors of common mental disorders among medical students]. *Rev Saude Publica* 2006; 40(6):1035-1041.
- (110) Heinrich L, Gullone E. The clinical significance fo loneliness: A literature review. *Clin Psych Rev* 2005; 26(6):695-718.

- (111) Furukawa T. Depressive symptoms among international exchange students, and their predictors. *Acta Psychiatr Scand* 1997; 96(4):242-246.
- (112) Jackson J, Cochran SD. Loneliness and psychological distress. *J Psychol* 1991; 125(3):257-262.
- (113) Schwarzer R. Self-efficacy: Thought control of action. (Eds.). Washington DC: Hemisphere; 1992.
- (114) Antonovsky A. Health, stress, and coping. San Francisco: Jossey-Bass; 1979.
- (115) Antonovsky A. The structure and properties of the Sense of Coherence Scale. *Soc Sci Med* 1993; 36:725-733.
- (116) Bernstein J, Carmel S. Gender differences over time in medical school stressors, anxiety, and the sense of coherence. *Sex Roles* 1991; 24:335-344.
- (117) Carstens JA, Spangenberg JJ. Major depression: A breakdown in sense of coherence? *Psych Reports* 1997; 80:1211-1220.
- (118) Pallant JF, Lae L. Sense of coherence, well-being, coping and personality factors: Further evaluation of the sense of coherence scale. *Personality and Individual Differences* 2002; 33:39-48.
- (119) Endler NS, Macrodimitris SD, Kocovski NL. Controllability in cognitive and interpersonal tasks: is control good for you? *Pers Individ Dif* [29], 951-962. 2000. Ref Type: Journal (Full)
- (120) Steptoe A, Tsuda A, Tanaka Y, Wardle J. Depressive symptoms, socio-economic background, sense of control, and cultural factors in university students from 23 countries. *Int.J Behav.Med* 14[2], 97-107. 2007. Ref Type: Journal (Full)
- (121) Largo-Wight E, Peterson PM, Chen WW. Perceived problem solving, stress, and health among college students. *Am J Health Behav* 2005; 29(4):360-370.
- (122) Trzcinski E, Holst E. Initial Predictors of Life Satisfaction in Early Adulthood (Discussion Paper). German Institute for Economic Research 2006.
- (123) Ptacek JT, Gross S. Coping as an individual difference variable. In G.R. Pierce, B. Lakey, I.G. Sarason & B.R. Sarason (Eds.) *Sourcebook of social support and personality* (pp.69-91). New York: Plenum Press; 1997.
- (124) Linn BS, Zeppa R. Stress in junior medical students: relationship to personality and performance. *J Med Educ* 1984; 59(1):7-12.

- (125) Beck AT. Cognitive therapy of depression: new perspectives. In *Treatment of Depression: Old Controversies and New Approaches*, ed. PJ Clayton, JE Barrett, pp. 265-90. New York: Raven; 1983.
- (126) Diener E. Personality and subjective well-being. In D. Kahneman, E. Diener & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 213-229). New York: Russell Sage; 1999.
- (127) Goldberg LR. An alternative "description of personality": The big-five factor structure. *J Personality and Social Psychology* 1990; 59:1216-1229.
- (128) John OP. The "Big Five" factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L.A. Pervin (Ed.), *Handbook of personality. Theory and research*. New York: Guilford Press; 1990.
- (129) Schimmack U, Oishi S, Furr RM, Funder DC. Personality and life satisfaction: a facet-level analysis. *Pers Soc Psychol Bull* 2004; 30(8):1062-1075.
- (130) McDonald D. Evolution, the five-factor model and levels of personality. *J Pers* 1995; 63:526-567.
- (131) Headey B, Wearing A. Personality, life events, and subjective well-being: toward a dynamic equilibrium model. *Journal of Personality and Social Psychology* 1989; 57:731-739.
- (132) Vollrath M. Personality and hassles among university students: A three-year longitudinal study. *Eur J Pers* 2000; 14:199-215.
- (133) Vollrath M, Knoch D, Cassano L. Personality, risky health behavior, and perceived susceptibility to health risks. *Eur J Pers* 1999; 13:39-50.
- (134) Asendorpf JB. Personality effects on social relationships. *J Pers Soc Psychol* 1998; 74(6):1531-1544.
- (135) McCrae RR, Costa PT, Jr. Personality trait structure as a human universal. *Am Psychol* 1997; 52(5):509-516.
- (136) Izard CE, Libero DZ, Putnam P, Haynes OM. Stability of emotion experiences and their relations to traits of personality. *J Pers Soc Psychol* 1993; 64(5):847-860.
- (137) Watson D, Clark LA. On traits and temperament: General and specific factors of emotional experience and their relation to the five-factor model. *J Pers* 1992; 60:441-476.
- (138) Emmons RA, Diener E. Personality correlates of subjective well-being. *Pers Soc Psychol Bull* 1985; 11:89-97.

- (139) John OP, Srivastava S. The big five trait taxonomy: History, measurement, and theoretical perspectives. In L.A. Pervin & O.P. John (Eds.), *Handbook of personality. Theory and Research* (2nd Ed., pp. 102-138). New York: Guildford Press; 1999.
- (140) Clark LA, Watson D. General affective dispositions in physical and psychological health. In C.R.Snyder & D.R.Sorsyth (Eds.), *Handbook of social and clinical psychology: The health perspective* (pp.221-245). New York: Pergamon Press; 1991.
- (141) Clark LA, Watson D. Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *J Abnorm Psychol* 1991; 100:316-336.
- (142) Watson D, Clark LA. Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin* 1984; 96:465-490.
- (143) Eysenck HJ, Eysenck MW. *Personality and individual differences*. New York: Plenum Press; 1985.
- (144) Spielberger C. Anxiety: state-trait-process. In C.D. Spielberger & J.G. Sarason (Eds.), *Stress and anxiety* (pp.115-141). New York: Wiley & Sons; 1975.
- (145) Schimmack U, Diener E, Oishi S. Life-satisfaction is a momentary judgment and a stable personality characteristic: the use of chronically accessible and stable sources. *J Pers* 2002; 70(3):345-384.
- (146) Ramanaiah NV, Detwiler FR, Byravan A. Life satisfaction and the five-factor model of personality. *Psychol Rep* 1997; 80(3 Pt 2):1208-1210.
- (147) Nordal G. *The academic career: A Longitudinal Study of Motivational and Psychosocial Predictors of Persistence and Performance - Cand.psychol. thesis*. Department of Psychology, University of Oslo 2007.
- (148) Derogatis LR, Lipman RS, Rickels K, Uhlenhuth EH, Covi L. The Hopkins Symptom Checklist (HSCL). A measure of primary symptom dimensions. *Mod Probl Pharmacopsychiatry* 1974; 7(0):79-110.
- (149) Diener E, Emmons RA, Larsen RJ, Griffin S. The Satisfaction With Life Scale. *J Pers Assess* 1985; 49(1):71-75.
- (150) Sandanger I, Moum T, Ingebrigtsen G, Dalgard OS, Sorensen T, Bruusgaard D. Concordance between symptom screening and diagnostic procedure: the Hopkins Symptom Checklist-25 and the Composite International Diagnostic Interview I. *Soc Psychiatry Psychiatr Epidemiol* 1998; 33(7):345-354.
- (151) Tousignant M, Denis G, Lachapelle R. Some considerations concerning the validity and use of the health opinion survey. *J Health Soc Behav* 1974; 15:241-252.
- (152) Sandanger I. *The Composite International Diagnostic Interview for psychiatric diagnoses as an expounding instrument in the Norwegian Community Diagnosis*

Project: mental health and physical illness. *Int J Methods Psychiatr Res* 1993;(3):137-142.

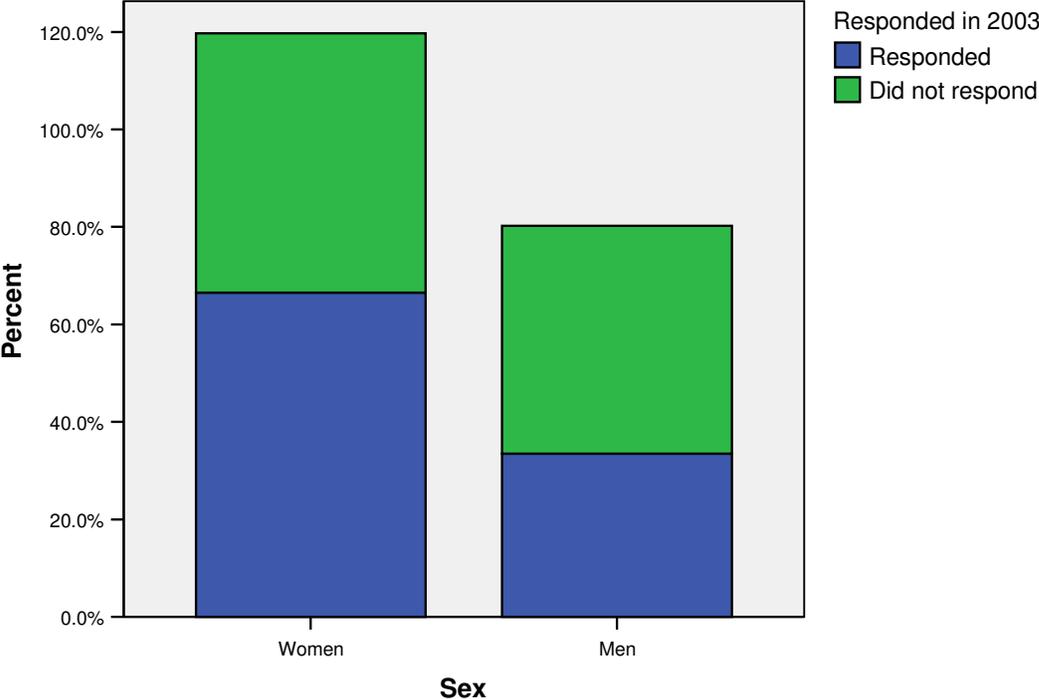
- (153) Salkind M. The assessment of drugs in general practice. *Br J Pharmacol* 1976; 3(Suppl i):69-72.
- (154) Winokur A, Guthrie MB, Rickels K, Nael S. Extent of agreement between patient and physician ratings of emotional distress. *Psychosomatics* 1982; 23:1136-1145.
- (155) Rickels K, Garcia CR, Lipman RS, Derogatis LR, Fisher EL. The Hopkins Symptom Checklist. Assessing emotional distress in obstetric-gynecologic practice. *Prim Care* 1976; 3(4):751-764.
- (156) Hough RL, Landsverk JA, Jacobson GF. The use of psychiatric screening scales to detect depression in primary care patients. In: Attkisson CC, Zich JM (Eds) *Depression in primary care: Screening and detection*. New York: Routledge; 1990.
- (157) Sandanger I, Moum T, Ingebrigtsen G, Sorensen T, Dalgard OS, Bruusgaard D. The meaning and significance of caseness: the Hopkins Symptom Checklist-25 and the Composite International Diagnostic Interview. II. *Soc Psychiatry Psychiatr Epidemiol* 1999; 34(1):53-59.
- (158) Shin DC, Johnson DM. Avowed happiness as an overall assessment of the quality of life. *Social Indicators Research* 5, 475-492. 1978.
Ref Type: Journal (Full)
- (159) Diener E. Subjective well-being. *Psychological Bulletin* 95, 542-575. 1984.
Ref Type: Journal (Full)
- (160) Pavot W, Diener E, Colvin CR, Sandvik E. Further validation of the Satisfaction with Life Scale: evidence for the cross-method convergence of well-being measures. *J Pers Assess* 1991; 57(1):149-161.
- (161) Vallerand RJ, Pelletier LG, Blais MR, Briere NM, Senecal C, Vallieres EF. The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement* 1992; 52:1003-1017.
- (162) Schwarzer R, Jerusalem M. General Self-Efficacy Scale. In J. Weinman, S. Wright & M. Johnston, *Measures in health psychology: A user's portfolio. Casual and control beliefs* (pp.35-37). Windsor, UK: Nfer-Nelson; 1995.
- (163) Hammen C. Stress and depression. *Annu Rev Clin Psychol* 2005; 1:293-319.
- (164) Supe AN. A study of stress in medical students at Seth GS, Medical College. *J Postgrad Med* 1998; 44:1-6.

- (165) Guthrie EA, Black D, Shaw CM, Hamilton J, Creed FH, Tomenson B. Embarking upon a medical career: psychological morbidity in first year medical student. *Med Educ* 1995; 29:337-341.
- (166) Nolen-Hoeksema S, Larson J, Grayson C. Explaining the gender difference in depressive symptoms. *J Pers Soc Psychol* 1999; 77(5):1061-1072.
- (167) Spangler DL, Simons AD, Monroe SM, Thase ME. Gender differences in cognitive diathesis-stress domain match: implications for differential pathways to depression. *J Abnorm Psychol* 1996; 105(4):653-657.
- (168) Van OJ, Jones PB. Early risk factors and adult person--environment relationships in affective disorder. *Psychol Med* 1999; 29(5):1055-1067.
- (169) Weiss RA. The provisions of social relationships. In: Z.Rubin, Editor, *Dooing unto others*. Eaglewood Cliffs, NJ: Prentice Hall; 1974.
- (170) Cantor N, Harlow RE. Personality and Intelligence. Social intelligence and personality: Flexible life task pursuit. In R. J. Sternberg, & P. Ruzgis (Eds.). (pp.137-168). New York: Cambridge University Press; 1994.
- (171) Emmons RA, Diener E. Factors predicting satisfaction judgments: A comparative examination. *Social Indicators Research* 2008; 16:157-167.
- (172) Kendler KS, Gardner CO. Personality and the experience of environmental adversity. *Psychol Med* 2008; 33:1193-202.
- (173) Fergusson DM, Horwood LJ. Vulnerability to life events exposure. *Psychol Med* 1987; 17:739-749.
- (174) Poulton RG, Andrews G. Personality as a cause of adverse life events. *Acta Psychiatr Scand* 1992; 85:35-38.
- (175) Kendler KS, Karkowski-Shuman L. Stressful life events and genetic liability to major depression: genetic control of exposure to the environment? *Psychol Med* 1997; 27(3):539-547.
- (176) Kendler KS, Kessler RC, Walters EE, MacLean C, Neale MC, Heath AC et al. Stressful life events, genetic liability, and onset of an episode of major depression in women. *Am J Psychiatry* 1995; 152(6):833-842.
- (177) DeNeve KM, Cooper H. The happy personality: A meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin* 1998; 124(2):197-229.
- (178) Zuckerman M, Kuhlman DM, Camac C. What lies beyond E and N? Factor analyses of scales believed to measure basic dimensions fo personality. *J Pers Soc Psychol* 1988; 54:96-107.

- (179) Horvath P, Zuckerman M. Sensation seeking, risk appraisal, and risky behavior. *Pers Individ Dif* 1993; 14:41-52.
- (180) Semmer N. Individual differences, work stress and health. In M.J. Schabracq, J.A.M. Winnubst & C.L. Cooper (Eds.), *Handbook of work and health psychology* (pp. 51-86). Chichester: Wiley; 1996.
- (181) Maslow AH. A Theory of Human Motivation *Psychological Review*. *Psych Rev* 1943; 50:370-396.
- (182) Ealy CD. *Woman's Book of Creativity*, quoted in "Depression, Women and Creativity" by D.Eby. Celestial Arts; 2000.
- (183) Simoni PS, Paterson JJ. Hardiness, coping, and burnout in the nursing workplace. *J Prof Nurs* 1997; 13(3):178-185.
- (184) Levesque L, Gendron C, Vezina J, Hebert R, Ducharme F, Lavoie JP et al. The process of a group intervention for caregivers of demented persons living at home: conceptual framework, components, and characteristics. *Aging Ment Health* 2002; 6(3):239-247.
- (185) O'Reily RC, Munakata Y. *Computational Explorations in Cognitive Neuroscence*. (pp.379-410). Massachusetts: Brandford; 2000.
- (186) Lazarus RS. Theory-based stress measurement. *Psychological Inquiry* 1990; 1(1):3-13.
- (187) Coombs RH. The effect of marital status on stress in medical school. *Am J Psychiatry* 1982; 139:1490-93.
- (188) Katz J, Monnier J, Libet J, Shaw D, Beach SR. Individual and crossover effects of stress on adjustment in medical student marriages. *J Marital Fam Ther* 2000; 26(3):341-351.
- (189) Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983; 24:385-96.
- (190) Hafen M, Jr., Reisbig AM, White MB, Rush BR. Predictors of depression and anxiety in first-year veterinary students: a preliminary report. *J Vet Med Educ* 2006; 33(3):432-440.
- (191) Vallerand RJ. Toward a hierarchical model of intrinsic and extrinsic motivation. In M.P. Zanna (Eds), *Advances in experimental social psychology* (Vol.29, pp. 271-360). San Diego, CA: Academic Press; 1997.
- (192) Kuhl J, Fuhrmann A. Decomposing self-regulation and self-control. In J. Heckhausen & C. Dweck (Eds.), *Motivation and self-regulation across the life-span* (pp. 15-49). New York: Cambridge University Press; 1998.

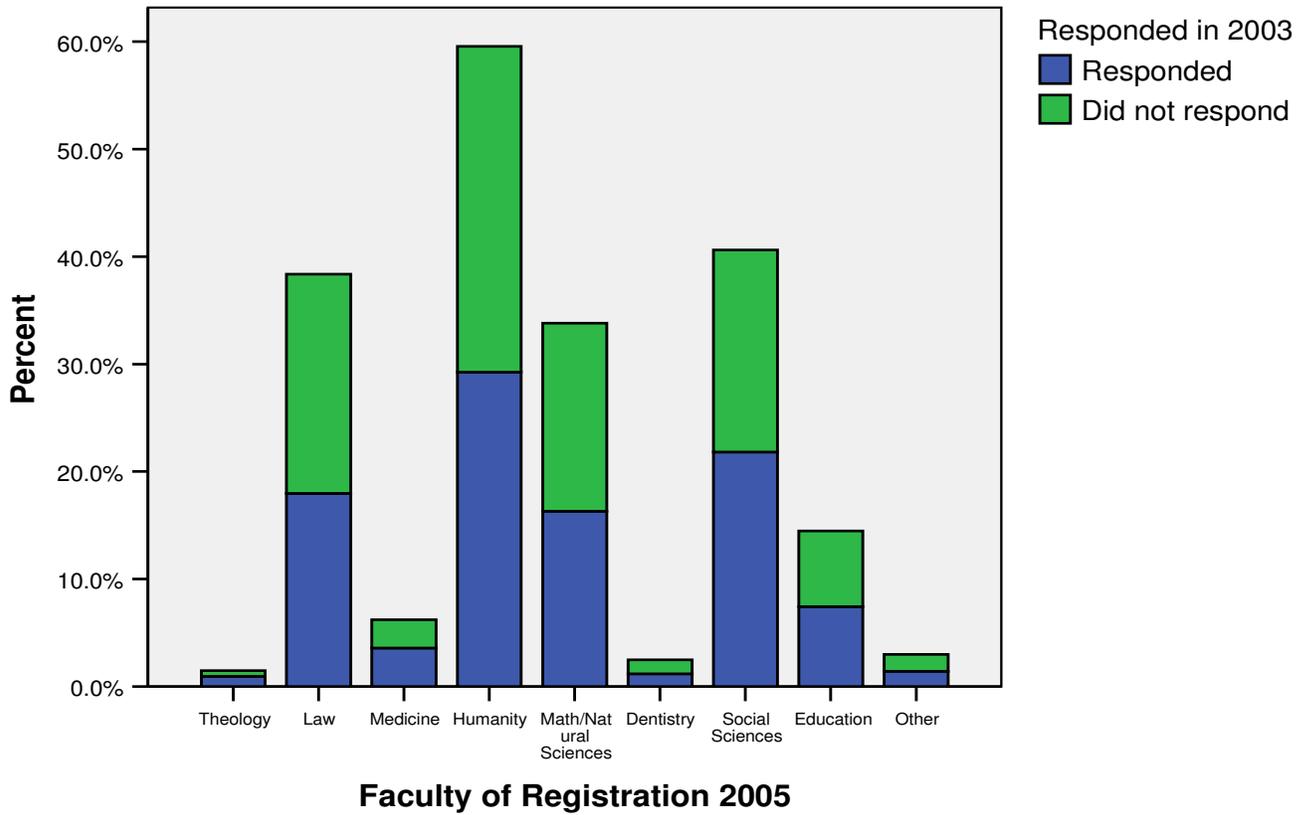
Appendix A

Non-respondents and Respondents by Gender



Appendix B

Non-respondents and Respondents by Faculty



Appendix C: HELT Questionnaire (Available only in hard copy)