HEALTH BEHAVIOUR, NURSING SELF-EFFICACY AND ENGAGEMENT AMONG NURSING STUDENTS – A LONGITUDINAL COHORT STUDY

Malin Bruce

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ABSTRACT

Nursing students represent one of the largest groups of students in higher education in Sweden. Their future occupation as registered nurses requires professional competencies including working on health promotion. However, nurses are frequently recognised as an occupational group with a high risk of impaired health due to stress in the working environment. Therefore, the higher educational institutions providing nursing education have an important role to play in the health and health resources of nursing students during the academic years preparing them for working life. The overall aim of the thesis was to describe and investigate the health behaviour, nursing self-efficacy and student engagement during higher education and in subgroups of nursing students, and further to elucidate health resources important to positive health development. The four papers included in this thesis are based on selected quantitative data from the prospective longitudinal cohort study, the Longitudinal Analyses of Nursing Education (the LANE study) collected by annual questionnaires. In Study I the aim was to examine the psychometric properties of the Nursing Self-Efficacy scale (NSE) (n=1,314). The NSE scale showed various problems with targeting and lack of invariance according to the underlying dimension. The model fit was, however, acceptable after removing two items and rescoring into fewer response categories. In Study II the aim was to investigate prospectively the levels of engagement of nursing students during education and to determine whether there are differences between subgroups of students. The student engagement, both active (AE) and emotional engagement (EE), was followed during the years of education and studied in subgroups of students (n=1,334). The AE increased and EE decreased (marginally) during nursing studies and differences were to be found regarding age, gender, prior assistant nurse education or not, self rated health (SRH) and higher educational organisation. In Study III the aim was to investigate the SRH and health behaviour in a nationwide sample of first year nursing students (n=1,622) and to investigate whether these differ according to subgroups of students. The SRH was good or somewhat good for most first year nursing students, but their health behaviour differed according to the studied subgroups. In Study IV the aim was to describe prospectively the SRH and health behaviour of nursing students (n=1,291) in a nationwide sample, and to examine variables associated with a good SRH during the final year of education. The self-rated health was good or somewhat good for the majority, but the mean value decreased slightly among nursing students over the course of time. Health behaviour showed diverse trends during the years of study (better, worse and stable). Good SRH (the highest response category) in the final year was associated with high level of EE, high level of NSE, good sleep quality and not having problems with study stress, headache and backache. This thesis demonstrates that the levels of SRH, health behaviour and student engagement of nursing students change during the years of higher education and that there are differences to be found in subgroups of students. Improvements in nursing education could already be made, during the first year of education, to obtain a healthy student environment, as well as the students’ positive health resources, i.e. their emotional engagement and nursing self-efficacy.

Keywords: Health behaviour, nursing self-efficacy, nursing student, self-rated health, student engagement.
LIST OF PUBLICATIONS

This doctoral thesis is based on the following studies, referred to in the text by their Roman numerals:

I. Hagquist, C., Bruce, M. & Gustavsson, P.
   Using the Rasch model in nursing research: An introduction and illustrative example.

II. Bruce, M., Omne-Pontén, M. & Gustavsson, P.
    Active- and emotional student engagement. A nationwide, prospective, longitudinal study of Swedish nursing students.
    *International Journal of Nursing Education Scholarship, 2010: 11.*

III. Bruce, M., Gustavsson, P. & Omne-Pontén, M.
    Health and differences in health behaviour among first-year nursing students – a nationwide study.
    *Submitted.*

IV. Bruce, M. & Omne-Pontén, M.
    Factors important for good self-rated health during the final year of higher education – a nationwide longitudinal study among Swedish nursing students.
    *Manuscript.*
CONTENTS

Abstract ........................................................................................................................................... 1
List of publications ........................................................................................................................... 1
Abbreviations .................................................................................................................................... 1
Preface .............................................................................................................................................. 1
1 Introduction ...................................................................................................................................... 2
2 Background ..................................................................................................................................... 3
  2.1 Health in higher educational environment .............................................................................. 3
      2.1.1 Educational environment in Sweden .............................................................................. 3
      2.1.2 Healthy higher educational environment ................................................................... 3
      2.1.3 Prepared for health in a health care working environment ........................................ 5
  2.2 The Nursing occupation .......................................................................................................... 5
      2.2.1 Health of nurses ........................................................................................................... 5
      2.2.2 Nurses in Sweden ........................................................................................................ 7
      2.2.3 Nursing education in Sweden ..................................................................................... 7
  2.3 Health among students in higher education ............................................................................ 8
      2.3.1 Health .......................................................................................................................... 8
      2.3.2 Self-rated health .......................................................................................................... 8
      2.3.3 Psychological health .................................................................................................... 9
      2.3.4 Physiological health ................................................................................................... 10
      2.3.5 Health behaviour ....................................................................................................... 10
      2.3.6 Factors influencing health and health behaviour ....................................................... 11
  2.4 Theoretical framework ........................................................................................................... 12
      2.4.1 Positive psychological health ..................................................................................... 12
      2.4.2 Engagement ............................................................................................................... 13
      2.4.3 Self-efficacy .............................................................................................................. 15
3 Aims ................................................................................................................................................ 17
4 Methods and material .................................................................................................................... 18
  4.1 Design of LANE ..................................................................................................................... 18
  4.2 Participants and response rates on LANE .............................................................................. 18
      4.2.1 Participants and response rates in this thesis ............................................................... 18
  4.3 Data collection - questions and instruments ........................................................................... 20
      4.3.1 Self-rated health .......................................................................................................... 21
      4.3.1 Student engagement .................................................................................................. 21
      4.3.2 Nursing Self-Efficacy scale ....................................................................................... 22
  4.4 Data analysis ............................................................................................................................ 23
5 Ethical considerations .................................................................................................................... 26
6 Results ............................................................................................................................................. 27
  6.1 Self-rated health and health behaviour during studies .......................................................... 27
  6.2 Student engagement of nursing students ............................................................................. 29
  6.3 Determinants of self-rated health ......................................................................................... 29
      6.3.1 Validation of the nursing self-efficacy instrument ....................................................... 30
      6.3.2 Variables associated with good SRH ....................................................................... 31
7 Discussion ...................................................................................................................................... 32
  7.1 Main findings .......................................................................................................................... 32
  7.2 General discussion ................................................................................................................... 32
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE</td>
<td>Active Engagement</td>
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<tr>
<td>ANOVA</td>
<td>Analysis Of Variance</td>
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<td>CFI</td>
<td>Comparative Fit Index</td>
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<td>CI</td>
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<td>EE</td>
<td>Emotional Engagement</td>
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<td>HPU</td>
<td>Health Promoting University</td>
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<td>ICC</td>
<td>Item Characteristic Curve</td>
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<td>LANE</td>
<td>Longitudinal Analyses of Nursing Education</td>
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<td>NSE</td>
<td>Nursing Self-Efficacy</td>
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<td>OR</td>
<td>Odds Ratio</td>
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<td>RMSEA</td>
<td>Root Mean Square Error of Approximation</td>
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<td>SRH</td>
<td>Self-Rated Health</td>
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<td>SRMR</td>
<td>Standardized Root Mean Square Residual</td>
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<td>WHO</td>
<td>World Health Organization</td>
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PREFACE

I started my own higher educational studies in the subject of Political Science and became interested in issues regarding social inequalities in health in society. To fill the gap in my knowledge of health care I later undertook nursing education. During my nursing studies I was surprised by the wide differences in higher education regarding the two different subjects and the academic environment, in Nursing and Political Science. My nursing studies were integrated with research, but offered few opportunities to shape the education for myself; it was highly regulated by theoretical courses, clinical parts and different kinds of examinations and professional skills, compared with my studies in Political Science. I then started to wonder whether and how nursing education is beneficial to nursing students’ own health and health behaviour, since I found the nursing studies to be more stressful than my previous education in Political Science. In addition, nursing education showed little interest in students’ health and provided few opportunities to reflect on how to understand and improve one’s own health.

A few years later and with greater knowledge following studies in Public Health and still with an interest in health among students in higher education, I was given the opportunity to start on the LANE project as a postgraduate student in the National Post Graduate School in Health Care Sciences, Karolinska Institutet. There I had the opportunity to study the reflections described above from my own nursing education by investigating different aspects of nursing students’ health and health behaviour. I also saw a lack of studies describing aspects of positive human functioning among university students, since health, both psychological and physiological, is traditionally described by prevalence and absence of health complaints, depression and poor health behaviour.

My research education has now come to an end. I am glad to have had the opportunity to have created and met different challenges in my research education to achieve knowledge in widely differing scientific areas. And although it was sometimes very frustrating, time-consuming and resulted in a change of course for my thesis, it was true research education. The articles and manuscripts included have differing natures and approaches. I truly hope that the reading of my thesis will not be impaired of this, at the first glance, diverse work on health in the higher educational environment.

Stockholm, May 2010

Malin Bruce
1 INTRODUCTION

The European Union has recognised that some professions have strong associations with mental distress, such as occupations in human service, for example health care, education and social work (European Foundation for the Improvement of Living and Working Conditions, 2005). Additionally, occupational stress has been found to be one of the major work-related health problems (Woo and Postolache, 2008). Occupational stress has also been assumed to arise from social arrangements that are partially determined by the organisations of work (Cooper, 1998). A recent review indicates the main sources of workplace stress and lack of well-being appears to be lack of control and autonomy in the workplace, unmanageable workloads, a long-hours culture, lack of work-life balance, and above all, an inappropriate management style (Cooper, 2009). Similar factors were found in a Swedish study where employees in health care reported high levels of mental ill-health, depression and the burnout syndrome as consequences of major reorganisations and downsizing in the health care sector (Hertting, 2003). The nursing profession has widely been recognised as a profession susceptible to the risk of mental distress and impaired health in working life (Sveinsdottir et al., 2006, Verhaeghe et al., 2008). In European studies in the early 2000s, levels of occupational stress among nurses, together with managers and teachers at work were reported to be high (Smith et al., 2000, Hertting, 2003, Broberg, 2002, Tennant, 2001).

In addition, nursing education programs and nursing students have been examined with respect to students reporting high amount of stress. Stress during the years of education have been found to be related to both clinical and theoretical sources such as regular and educational assessment and frequently changing clinical environments (Jones and Johnston, 1997, Jones and Johnston, 2000, Timmins and Kalischer, 2002). Newly qualified nurses have reported stress regarding the beginning of the professional career and first employment (Watson et al., 2009, Deary et al., 2003). Watson and colleagues (2009) found newly registered nurses having higher level of stress than nursing students, which was higher among females than male nurses at the start of professional work and was associated with psychological distress of life-events and self-esteem. However, a decrease in psychological distress during the first four years in the profession was found, and after these years the level was comparable with that among nursing students. The consequences for nursing students and newly registered nurses health are nevertheless evident. It is therefore suggested that nursing students and nurses are suggested to need support such as mentorship and supervisors. In addition, both nursing students and nurses need to be encouraged to use such supportive resources to reduce their experiences of psychological distress.

Higher education aims to support the learning and development of students, but their health experiences regarding their educational environment, compared with students’ working environment, might impact on students’ learning and health outcomes, which are also important to the students’ later professional life. The rationale for the thesis has been to investigate aspects of nursing students’ health during the years of higher education and to elucidate health resources important to a positive health development. The work consists of studies examining factors influencing health, health behaviour and health resources of nursing students and the development of these factors during the years of education.
2 BACKGROUND

2.1 HEALTH IN HIGHER EDUCATIONAL ENVIRONMENT

2.1.1 Educational environment in Sweden

The interest of health among employees is covered by the Work Environment Act (AML, 1977:1160). Students’ health in higher education has also been included since 1991, although few studies and limited national information are available concerning higher educational students’ health, in comparison with other public health areas such as the school and working environment. Students in higher education might not be considered as a group in society having impaired health, although they constitute like school children, a large group that develops mentally from learning and operates in a kind of working environment. In addition, there are few studies concerned with the higher educational environment as a working environment which is of interest in its own right.

The WHO has drawn attention to this domain and in 1998 established the concept of “Health Promoting Universities” (HPU), forming a framework of guidelines (Tsouros et al., 1998). However, to the author’s knowledge, neither has a Swedish national network been adopted for HPU, nor has a single higher educational organisation adopted it. Internationally, there are examples of universities using the HPU strategies with good health outcomes for both students and staff (Stock and Kramer, 2002, Tian et al., 2003, Whitehead, 2004, Crouch et al., 2006). The aims of a HPU are to protect the health and well-being of students, staff and the wider community through effective and innovative policies and practices. Another goal is to increase teaching and research capacity towards health promotion activities and, finally, to develop concerted health promotion alliances and outreach facilities with the surrounding community (Tsouros et al., 1998). Another, earlier, framework through WHO is the “Health Promoting Hospitals” (HPH) arena, in which students in clinical practice can meet, since many hospitals in Sweden are included in HPH (Swedish National Institute of Public Health, 2004:33). In addition, HPU and HPH are in line with the Swedish Health Care Act, and it has been declared by the Swedish Government (Prop. 2002/03:35., 2002), that people’s health should be considered in all decision-taking in society. Both WHO frameworks are useful to consider when the health of students is in focus for higher educational organisations.

2.1.2 Healthy higher educational environment

The aim of higher education is to educate students in skills for future professional life, but also to contribute to personal development. The educational environment could have an impact on students’ health and health behaviour during their time in education, but also on their future health in their professional lives. For students, it is suggested that starting on a university education entails aspects of challenges, demands and stressors, both positive as well as negative, when they try to adapt to the higher educational environment (Andersson, 2009, Robotham, 2008), a new environment which probably has an impact on both psychological and physical health (Hall et al., 2006). Together with these new-found responsibilities, new workloads and new supporting networks, students also have greater freedom and control over their lives.
with greater opportunities for healthy, as well as risky, health behaviour (Steptoe et al., 2002, von Ah et al., 2004). Students in higher education might therefore be vulnerable to this stress, which could contribute to impaired health. Feeling well as a student is also important for the learning process and academic achievement (Tsouros et al., 1998).

A relatively new and growing approach to examining students’ health in their educational environment is to study their health resources as important variables associated with impaired health or stable health later on in professional life. A Finnish study examined university students’ achievements and the strategies used to cope with challenging situations during higher education and how this would impact on burnout and work engagement 10 to 17 years later (Salmela-Aro et al., 2009). The result showed that academic achievement and social strategies increased during studies which further predicted high level of work engagement and low level of work burnout in early career also up to 17 years later in professional life.

Studies from a research group in Portugal have found academic resources associated with both engagement and burnout among psychology students (Figueira et al., 2010, Castanheira et al., 2010). Their findings showed students to be satisfied with their role clarity and peer social support, but that they experienced high emotional academic demands and low institutional support (in areas such as personal and career development), which was found to determine high burnout and low engagement levels. The research agrees that models and concepts from the domain of occupational health psychology domain are useful when studying the well-being of students in higher education.

Health among students in higher education has been examined from different aspects, in general with self-rated health and health behaviour (Steptoe and Wardle, 2001, von Bothmer and Fridlund, 2005, Mikolajczyk et al., 2008, Gilkey et al., 2010), in relation to sense of coherence (von Bothmer and Fridlund, 2003), as well as comparisons across nations (Steptoe et al., 2002, Haase et al., 2004) and during years of education (Alpar et al., 2008, Racette et al., 2008). Other studies focusing on students’ health outcomes in specific subjects such as nursing and medicine, because these students commonly report high prevalence of stress related to ill-health, such as headache, stomach ache, backache and sleep problems (Najem et al., 1995, Kevern et al., 1999, Videman et al., 2005) and depression (Dahlin et al., 2005, Christensson et al., 2010).

Health in students in relation to major organisational changes have also been studied, such as the major reorganisation of nursing education in England (Project 2000) (Whitehead, 2002, Lindop, 1999) and curricular changes such as the Bologna process (Pinto, 2010). Studies have also examined students’ transition to university (Lu, 1994) as well as from university (Schuldt Haard et al., 2008), since these periods can be critical periods for students and are experienced as especially stressful. Divergent results have been found in comparing health among students in higher education and health in their working peers: students having better health (Pascarella and Terenzini, 2005), or having worse health (Vaez et al., 2006, Vaez et al., 2004b). However, some of the previous studies examining the health of students in higher education have small sample sizes, are limited to one or a few universities and are conducted among students
in general, not all are in a specific subject and do not always use a theoretical framework to describe health in the higher educational environment. However, in comparison with other studied groups in the area of public health, there can still be considered to be few studies examining higher educational students’ health.

2.1.3 Prepared for health in a health care working environment

Nursing students learn and develop professional qualities during their education in order to be a “good nurse” (Björkström, 2005). This means working in line with theoretical knowledge, with humanistic values where the patient is treated as a unique person and having high quality in health care work (Fagermoen, 1997, Manninen, 1998). Studies have shown that nursing students’ view of what a “good nurse” and “good nursing” are changes during the years of education years, from an idealistic view as a newcomer to a task-oriented view at the end (Pilhammar Andersson, 1993). In addition, health care workers have been described as having had a troubled conscience when they feel that they cannot provide the good care they wish and believe it is their duty to give. Studies have reported that experiences of distress emerge when health care workers face a situation with contradictory demands, are hindered from taking action, or act in a way that they consider to be wrong or not good enough (Dahlqvist et al., 2009, Sorlie et al., 2004). This ‘stress of conscience’ could also be experienced by nursing students, when they are taking part during placements in the care of patients who are very ill or dying.

Besides the stress described above, students face the registered nurses practical and emotional job characteristics and working tasks in patient care during their clinical placements. In addition, nursing students face rapid and frequent changes in the working environment of nurses and the consequences of these changes for nurses, such as frequently changing colleagues, supervisors, tasks, working hours and workplaces. The higher educational institutions providing nursing education could be considered to have an important role to play in preparing students in their professional skills and for the required competencies. The educational environment could foster health consciousness among students, and subsequently during their careers (Stark et al., 2005, Tsouros et al., 1998). For higher educational institutions providing nursing education, this also means guiding the students on how to handle their future professional role in a changing working environment, in order to stay healthy.

2.2 THE NURSING OCCUPATION

2.2.1 Health of nurses

The nursing occupation is considered to be an emotionally demanding job, and this contributes to stress and the daily stress of nurses’ work (Demerouti et al., 2000, Mann and Cowburn, 2005, Garrosa et al., 2008). Malinauskiene and colleagues recently investigated psychological distress among nurses in Lithuania and found prevalence estimates of about 25% of the studied nurses (2009). Other researchers describe the specific stress among health care workers and nurses as a stress of conscience (Glasberg et al., 2008, Juthberg et al., 2007). Burnout is a specific kind of occupational stress that results from demanding and emotionally charged relationships between caregivers and their patients (Maslach et al., 2001). The relationships between the
professionals and the patients may be associated with strong feelings, such as being emphatic, which also means understanding, being aware and sensitive, as well as taking distance to reflect and concentrate on oneself (Stiefel, 2008). This reveals another aspect of the nursing occupation, which could contribute to internal stressors while working with emotional demanding patients and situations.

According to the cognitive stress model of Lazarus and Folkman (1984) the appraisal (positive or negative) of an event or the way in which an individual evaluates a situation may be more important to employee well-being than the actual presence of stressors. When nurses define changes in the working environment negatively, impaired health might occur, both psychological and physical, for example producing increasing distress due to greater demands, decreasing decision latitude and musculoskeletal disorders (Verhaeghe et al., 2008, Verhaeghe et al., 2006, Bourbonnais et al., 2005, Lipscomb et al., 2004). On the other hand, when the working environment is interpreted positively, job engagement and job resources could grow and stimulate well-being at work (Laschinger et al., 2006, Montgomery, 1997).

The previously described organisational changes in the health care field have resulted in expanded working tasks and responsibilities for nurses, which also require a person to adapt to new conditions, where poor ability to handle these new work-related demands could contribute to stress. The health of nurses is therefore mainly studied in a context of stress research in combination with personal resources (such as coping) and job resources (such as competence). In addition, newly graduated nurses seem to be particularly prone to stress, also associated with lack of competence (Burnard et al., 2008, Chang et al., 2005, Watson et al., 2009). Psychosocial well-being among nurses has also been found to vary according to different areas of practice such as psychiatric, medical and surgical wards and intensive care units (Verhaeghe et al., 2008, Tummers et al., 2002). Further, the availability and frequent use of job resources, such as job control and supervisor support, are most successful when they match the work setting and nurses are considered as a heterogeneous study population (Verhaeghe et al., 2008).

Higher age and a strong sense of coherence as personal characteristics have been found to serve as resources, protecting nurses against the development of mental health problems, such as burnout (Malinauskiene et al., 2009). With increased interest in positive psychology (Seligman and Csikszentmihalyi, 2000) more aspects of personal resources important to prevent burnout are studied among nurses, e.g. self-efficacy (Cherniss, 1993), optimism (Browning et al., 2006) and self-esteem (Sundin, 2009). Further, a hardy personality and coping as resources play a relevant role in decreasing vulnerability to burnout (Garrosa et al., 2010). Nurses having these personal resources have been found to solve workplace problems and to seek social support followed by successful coping to achieve goals, and this improves their professional self-efficacy (Garrosa et al., 2010).

In addition, nurses are considered to have an active role to play in health promoting work with patients, who need to have attention paid to disease prevention and health maintenance. Jin and Lee (Jin and Lee, 2010) showed in their study that mental health professionals, trained to care for others, often neglect the need for personal self-care
and do not apply to themselves the techniques prescribed for their patients. Nurses’ own suffering, when their health is impaired, could impact on their ability to work in a health promoting way with patients. How successful their health-promoting approach is or is not among patients is very much dependent on how nurses care for themselves (Purcell et al., 2006).

2.2.2 Nurses in Sweden

The previously mentioned changes in the health care sector in Sweden during the 1990s in order to improve efficiency have been recognised as important to the health of health care workers (Hertting, 2003). The lack of interaction between these structural changes and the health care workers, had caused staff not to feel personally involved, leading to anxiety and lack of trust (Axelsson, 2000). As well as restructurings in the working environment, e.g. with downsizing, an increasing number of patients per nurse, high care technology, lengths of stay in hospital has decreased to 6 days in Sweden (The National Board of Health and Welfare., 2009). Except for Denmark, this is the shortest time for hospital stay in Europe (The National Board of Health and Welfare., 2009). However, this reduction in length of stay in hospital may contribute to stress among health care workers, not only nurses, since the same amount of work often has to be done, but in a shorter time. In Sweden, nurses working in health care constitute a large occupational group. Between 2008 and 2023 the new supply of labour of nurses in Sweden is estimated at 11% and the education of nurses will be adjusted to this requirement according to National Board of Health and Welfare. The future role of the health care work force in Sweden is described as one of health promotion (The National Board of Health and Welfare., 2009).

The work of Swedish nurses could furthermore be described in subjective terms reported by nurses working in the health care context. One example is the findings from a recent qualitative study describing how Swedish registered nurses experience their daily work, with a balance that oscillated between strain and stimulation, an ideal day full of stimulation or a day filled with strain (Hallin and Danielson, 2007). Further, the oscillation appeared to be related to the various daily experiences the nurses had, such as time available for each patient, their ability to promote quality of care, team work skills and having the skills necessary to be independent.

2.2.3 Nursing education in Sweden

In 2002 and at the start of the LANE study, about 329,000 students in Sweden were enrolled in higher education, and a majority of them (60%) were female students (OECD, 2008). In Sweden nursing education is one of the largest programs of higher education, in terms of both numbers of students and numbers of institutions. Nursing education in Sweden has been a three-year university programme since 1993, with 120 credits (now 180 under the Bologna process) and lead to a bachelor’s degree. The nursing education has historically undergone large changes related to academic process (Fagerberg, 1998, Löfmark, 2000, Björkström, 2005, Schüldt-Håård, 2009). Today, nursing education in Sweden is still facing new demands due to large and general expansion in higher education between 1990 and 2001 supported by the Swedish Government to increase competence in society (Swedish National Agency for Higher Education., 2003), the Bologna process, and the results of frequent validation of

The development of professional skills starts during the years of education, but is not completed for the time of graduation, and the time spent in education and how well the students manage to develop in their professional role have therefore been the object of previous studies. Research on Swedish nursing students’ experiences of professional development has focused on development during clinical parts of education (Lofmark et al., 2008), or in elderly care (Fagerberg, 1998) or describing nursing students’ professional awareness in relation to academic education (Bjorkstrom et al., 2006).

### 2.3 HEALTH AMONG STUDENTS IN HIGHER EDUCATION

#### 2.3.1 Health

To simplify and give a brief description of definitions of health, two standpoints could be identified: a disease perspective or a holistic perspective. The definition of health by WHO: “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity” is considered to combine these two perspectives. There is criticism of the almost unreachable level of health encapsulated by the word ‘complete’, but it depends how one chooses to interpret the definition, as a vision or in a literal sense. An individual’s health is influenced by normal functions (biological and mental) according to different ages in human life where the body and mind change, but also as a consequence of illness and disease, as well as in relation to the environment and culture. Health is also influenced by an individual’s own choices to live life in a more or less healthy way. The definition of health by WHO (WHO, 1948) has guided the work in this thesis, although no aspects of social well-being have been considered.

Health is mainly examined and discussed with the focus on negative outcomes. Some reasons for this focus are more historical, such as having a biomedical and illness-linked tradition, but there are also modern ones, due to limited resources. Another explanation for using the negative health outcome in studies could relate to the lack of evidence-based methods for examining positive health outcomes, such as health-promoting interventions (Orth-Gomér, 2008). Those who have more health complaints and negative health outcomes therefore receive more attention and are more often described in public health and in research. However, most people “know” what health is for themselves, but in order to recognise, understand, diagnose, treat, compare and promote the health of others it is meaningful to define and categorise health. In this study health, both positive and negative, is studied in a higher educational setting.

#### 2.3.2 Self-rated health

Self-rated health is a person’s overall perception of his or her own health status. In studies examining individuals’ health, the subjective and self-reported global health question, self-rated health (SRH), is one of the most commonly used measures. This single measure is often used in prospective studies (Singh-Manoux et al., 2007, Froom
et al., 2004) and has been recommended by WHO for health measures (de Bruin et al., 1996). SRH is also proposed as being close to and capturing health as defined by WHO above. SRH is usually measured by asking one question, such as “How would you summarise your state of health?”, “How would you summarise your state of health at present?” or “How would you summarise your state of health in comparison to people the same age as you?”. The number of response categories could vary between three and five. Studies have also demonstrated good test-retest reliability for SRH (Lundberg and Manderbacka, 1996). Although SRH is a subjective measure, it has been found to be a strong predictor for future SRH, morbidity, mortality (Idler and Benyamini, 1997, Idler, 1979, Krause and Jay, 1994), and different types of health behaviour such as physical activity (Södergren, 2009), smoking, not eating vegetables and obesity and underweight (Manderbacka et al., 1999). SRH has been suggested as being a predictor of future SRH (Hasson et al., 2006, Bailis et al., 2003, Leinonen et al., 2001).

Studies among university students and SRH are often conducted from a gender perspective and show inconsistent results, female students rating SRH lower than male students (Vaez et al., 2004b, Love et al., 2009), but also with no gender differences in SRH (Mikolajczyk et al., 2008). Differences in ratings according to gender have suggested that males interpret health more in terms of physical health, whereas females rate it more in psychological terms (Denton et al., 2004). SRH has recently been found to decrease in last year of nursing education and during the first year in nursing occupation, but recover after one year in profession, at least for younger nurses (Hasson et al., 2010).

2.3.3 Psychological health

The transition to academic life for university students and often a new social situation make them particularly prone to stress and risk-taking behaviour (Misra et al., 2000, Andersson, 2009, Hall et al., 2006). Stress influences health both directly, with its physiological effect, and indirectly through its altered health behaviour. How a person is influenced by stress and can handle it is described as coping. Coping could be defined as a response aimed at diminishing the physical, emotional and psychological burden that is linked to stressful life events and daily hassles (Snyder and Dinoff, 1999). Health research suggest that emotional health is a wider concern for students than physical health and that students rate it lower than the general population (Stewart-Brown et al., 2000, Roberts et al., 2000). In the early 2000’s psychological health variables were considered to have attracted limited attention in the academic performance literature (McKenzie and Schweitzer, 2001). Today, the number of studies that have examined mental illness and psychiatric disorders among university students has increased both internationally (Wardle et al., 2004, Eisenberg et al., 2007) and in Sweden (Christensson et al., 2010, Dahlin and Runeson, 2007). Watson and colleagues (2008) studied stress and burnout among nursing students in Hong Kong and found increasing levels of stress, burnout and morbidity over time, and that stress is strongly predicted by emotionally oriented coping. Blanco and colleagues found prevalence rates of 50% for psychiatric disorders in the 19-25 age groups (2008). Previous studies among university students showed no differences in their psychological well-being in comparison with non-university respondents (Hankin et al., 1998). Reversed and similar results have been found among Swedish university students, rating quality of
life lower than non-university respondents (Vaez et al., 2004a). Psychological health is most studied in terms of negative health, but some studies do examine positive aspects of psychological health among nursing students (Ni et al., 2009). A Finnish study which examined self-esteem during higher education showed an increase over time, but also that it was a predictor for being in permanent employment and having a better salary at the start of professional life (Salmela-Aro and Nurmi, 2007). These results are in line with Llorens and colleagues (2007), who examined university students’ task resources, efficacy beliefs and engagement and found reciprocal relationships for these positive health variables.

2.3.4 Physiological health

Physiological health is mainly defined as common bodily functions and absence of pain. Symptoms regarding pain in the head, stomach, neck and back are often used as measures of physical health. But physical health could also be studied on the basis of numbers of illness symptoms or diseases. According to WHO, multiple recurrent complaints such as headache, stomach ache, backache, feeling low, irritable or bad-tempered, feeling nervous, difficulty in getting to sleep and feeling dizzy represent a significantly heavier burden on daily functional ability and well-being than single symptoms (2006). Having physical health could mean having body-related functions in shape, such as not having high blood pressure, not having problems with pain in head, stomach or back. These functions could be disturbed when a student does not cope well with academic tasks or is in a study environment that is not supportive. Problems with headache, stomach ache or back ache could be associated with students’ study environment with heavy demands for example in periods of academic assessments, where students not prioritise sleep, healthy food and exercise (Steptoe et al., 1996, Robotham, 2008). Instead students might over eat or not eat enough (Nojomi and Najamabadi, 2006), drink alcohol (Andersson, 2009, Ham and Hope, 2003) or smoke (Smith and Leggat, 2007) to deal with stress reactions.

2.3.5 Health behaviour

In most studies health behaviour is characterised by the public health parameters exercise, food intake, drug abuse (alcohol, tobacco and others) and body mass index. This means the way one chooses to live one’s life in relation to norms, culture and personal choice. Health behaviour could benefit general health, all dimensions, for the individual, but the opposite could also apply: the general health status of a person has an impact on and influences the choice of positive or negative health behaviour. Large European cross-sectional studies (Steptoe et al., 2002, Stock and Kramer, 2002) and follow-up studies on the health behaviour of students unfortunately show a lack of improvement with regard to negative health behaviour over a ten-year period (Steptoe et al., 2002). A recently performed cross-sectional study among German university students (n=1,262) showed results with poor healthy eating habits, exercise and smoking behaviour (Keller et al., 2008). These first-year students in the subjects of medicine, law and education also had multiple health-risk forms of behaviour, almost 70% of them having two or three types of risk behaviour. Similar findings have been found among nursing students (Purcell et al., 2006), with high prevalence of smoking (above 20%) even after an intervention study (Rapp et al., 2006), and smoking has been found to be common among nursing students (Durma and Ustun, 2006). Nursing students have also reported sleep difficulties (Kernan et al., 2008) and decline in
exercise over time (Hui, 2002). Improvements in nursing students’ health behaviour have been reported, Shriver and Scott-Stiles (2000), found in their two-year longitudinal study that health behaviour (regular meal intake and exercise) improved among nursing students (n=71), but not among non-nursing students (n=83). In addition, a health-promoting intervention study among nursing students (n=67) showed positive results, with an overall increase in health behaviour in general, as well as more specifically for exercise and eating habits (Stark et al., 2005).

2.3.6 Factors influencing health and health behaviour

Contextual, social and individual variables could impact on students’ health and health behaviour in higher educational environment. The background, prior experiences and ability of students have been suggested as being important with regard to how they perceive the education they are undergoing and in the results they achieve (Kapborg and Fischbein, 2002). These variables are considered also to be of importance to the health outcomes of students in higher education. Attention is therefore paid in this thesis to the individual variables: age, gender and having previously been assistant nurse.

Starting nursing studies, as well as another program at the university, fosters stress concerning new study loads, perhaps just having left home, having to study and pass courses and financial worries. But nursing students have been recognised as also having stressors from the theory-practice gap, poor relationships with clinical staff and encountering very ill and dying patients (Jones and Johnston, 2000, Timmins and Kaliszer, 2002, Evans and Kelly, 2004, Watson et al., 2008).

In addition, nursing students are considered to act as future health promoters and influence the health-promoting behaviour of their clients (Carter and Kulbok, 2002, Stark et al., 2005, Lawrence and Schank, 1993). During these intensive study years, the nursing students have to become familiar with their future health-promoting role.

Swedish students in general have a high mean age in an international comparison (OECD, 2008). Nursing students in Sweden range in age between 20 years, coming directly from upper secondary school, to those having long experience from the world of work and entering into higher education in middle age. Studies show that older nursing students might already have manifest health behaviour on entering higher education and not be influenced by normative behaviour at universities, such as heavy drinking (Ham and Hope, 2003) or smoking (Baron-Epel et al., 2004, Suzuki et al., 2005). Mature nursing students enter nursing studies with different needs and are highly motivated, but tend to lose more if they fail in studies and could experience the transition to the world of work more stressful than younger students. Stark and colleagues (2005) found older students having more overall health behaviour and health responsibility than younger students. On the other hand, in a study of nursing students in Hong Kong, most were young and the results indicated that the younger the student, the more they exercised and the better the stress management they showed (Hui, 2002). Being an older student in higher education could also cause the student more stress because of family circumstances, role changes, working tasks and demands from nursing education (McEwan and Goldenberg, 1999). These older, mainly female, nursing students also have to cope with multiple role demands and it seems that nursing education does not have flexible and well organised student-centred programmes of education for different needs of students (Kevern and Webb, 2004).
Generally, research on students’ health examined from a gender perspective shows that female students report higher levels of stress and consequently more health problems, despite a better health behaviour than male students (Vaez and Laflamme, 2002, von Bothmer and Fridlund, 2005, Hall et al., 2006), although the comparisons may be biased by different classifications and measurements of health behaviour. Among nursing students, gender has been found to be related to some forms of health behaviour, as well as being unrelated (Hui, 2002, Belloc et al., 1971). For example, female nursing students have reported more stress than male students (Watson et al., 2009).

Since many of the nursing students in Sweden have undergone assistant nurse education prior to starting nursing education, and this was a requirement for admission until 1993, this could also be an interesting variable to study with respect to health outcome. Having received assistant nurse education could be assumed to be a health-strengthening factor, which may contribute to less experiences of stress related to studies, clinical practice, clinical assignments and future nursing occupation. However, Rapley and colleagues (2006) studied assistant nurses’ undertaken nursing education in Australia and found their transition to nursing studies to be particularly stressful. On the other hand, they experienced faster transition from novice to advanced beginner as registered nurses and did not feel a lack of confidence, base on previous knowledge in health care. Although few studies have described these transitions for students with a prior assistant nurse education, their results appear to be consistent. Studies have mainly found beneficial findings for these students such as being in a comfort zone, previous clinical issues, faster transition, appreciated recognition for their previous accomplishments and valued affirmation of their unique access challenges. However, some negative aspects for these students have also been described, such as experiencing culture shock and loss of their hands-on and bedside nursing role (Brennan and McSherry, 2007, Melrose and Gordon, 2008, Rapley et al., 2006). It is therefore interesting to examine whether students having previous knowledge in caring sciences differ from other students with regard to their own health behaviour during nursing studies.

There are other variables that could be considered to influence the health outcome of nursing students in higher education which need to be mentioned, despite not having been studied in detail in this thesis. Studies on the health of university students have investigated the impact of having, for example, chronic diseases such as depression (Deary et al., 2003), financial worries (Jones and Johnston, 1997, Timmins and Kalischer, 2002), personality (Garrosa et al., 2008, Garrosa et al., 2010, Watson et al., 2008), self-esteem (Ni et al., 2009), social support (Malinauskiene et al., 2009) and study-family balance (Rozmus et al., 2005).

2.4 THEORETICAL FRAMEWORK

This thesis was designed to investigate health and health behaviour, but also aspects of nursing students’ positive psychological health and positive human behaviour or functioning during the years of higher education. A brief summary of positive psychology and theories adopted is therefore given below.

2.4.1 Positive psychological health

A relative new direction of psychology known as positive psychology is receiving increasing attention in research. This dimension has grown for many reasons, some of
those mentioned being a lunge towards the positive after decades with a negative and disease focus and the fact that the absence of negative aspects of psychological health does not mean the presence of positive aspects (these need not be the same) (Compton, 2005). A definition of positive psychology is: “the scientific study of optimal human functioning. It aims to discover and promote factors that allow individuals, communities, and societies to thrive and flourish” (Sheldon and King, 2001). A concept important to psychological health is well-being, often used interchangeably with health in general, as well as in positive psychology. Well-being, for some researchers in the field of positive psychology, is more equal to happiness (a hedonic perspective), but for others a concept alongside happiness, which also includes meaningfulness in life (a eudaimonic perspective) (Compton, 2005, Snyder and Lopez, 2002). Having a high level of well-being has been shown to be important for creativity, resistance to physical diseases and social relationships (Keyes and Lopez, 2002).

Historically and clinically, well-being and positive functioning have been studied as the absence of negative feelings, stated above, and emotions are measured on scales regarding depression, distress, anxiety or substance use, for example (Keyes, 1998). Today the psychological tradition operationalises and examines well-being as the subjective evaluation of life through satisfaction and affect (Diener and Ryan, 2009) or personal functioning (Ryff and Keyes, 1995). According to this approach, emotional well-being is more the presence of more positive than negative perceived attributes and more positive than negative feelings (Keyes, 1998). Despite there being a distinction between public and private life, well-being as a positive functioning phenomenon is often seen as something private (Keyes, 1998). In this thesis well-being as a concept has not been specifically studied and the term ‘health’ is therefore preferred. However, some operational aspects of positive psychological health are used and described below.

2.4.2 Engagement

From a health psychological perspective, student engagement and activity are indicators of students’ positive or optimal functioning or behaviour (Shernoff et al., 2003) and are studied here as positive health outcomes among students. Engagement in education is important for health and successful studies, and these are thought to affect each other in a positive way (Llorens et al., 2007). In addition, student engagement is generally considered to be a good predictor of learning and personal development (Carini et al., 2006, Appleton et al., 2006). Most of previous research on student engagement (both emotional and active engagement) or motivation has traditionally been undertaken from a higher educational perspective by using a pedagogic perspective: how educational practices influence student engagement, for example. Studies within that framework have examined student engagement and motivation and learning: in general among students (Pascarella and Terenzini, 2005), during a specific course (Furze and Pearcey, 1999), during the first year of higher education (Hu and Kuh, 2002), during different semesters (Nilsson and Warren Stomberg, 2008), and in relation to gender (Pajares and Valiante, 2002).

The conceptualisation of student engagement and description of its positive mediating effect on behavioural, health and academic success is presented by other researchers (Kuh et al., 2008, Carini et al., 2006, Schaufeli et al., 2002b). Several studies have shown that seniors were more engaged than first-year students in good educational practices (Ofori, 2000, NSSE, 2000). However, in a study among nursing students, it
was found that many students who were positively motivated in the first year lost their enthusiasm and engagement over the years of vocationally oriented education (Braten and Olaussen, 2005). Moreover, first-year students and students undecided about their majors were more likely to be disengaged than students in other majors and in pre-vocational fields (Hu and Kuh, 2002). Low engagement (disengagement) could be a concern for first year undergraduates in particular, as it could lead to withdrawal from studies, generate more disengagement in the subsequent years and reduce the likelihood of engaging with the institution beyond graduation (Krause, 2005). According to Appleton and colleagues (2006) the examination of student engagement is fundamental to improving learning outcomes, especially for those students at risk of educational failure. Previous academic performance is shown to be important to desired university performance and outcome (McKenzie and Schweitzer, 2001). The challenge for higher education is therefore to provide engagement opportunities for students, especially among those not familiar with the academic environment as claimed by Krause (2005). Today, engagement research is still closely associated with negative health outcome in the world of work, but there is a growing field of studies that consider engagement and its relationship to positive health outcome and health resources (Salanova et al., 2009, Schaufeli et al., 2006, Salmela-Aro and Nurmi, 2007), not limited solely to employees’ health.

2.4.2.1 Emotional engagement

In a recent theory, engagement refers to a persistent and pervasive affective-cognitive state, or a study-related state of mind, characterised by vigour, dedication and absorption (Schaufeli et al., 2002b). Engagement has been described as the reported above, first in theories regarding burnout in professional life, but also as a state of high energy, strong involvement and efficacy with work, an endpoint of a continuum, with burnout at the other endpoint (Leiter and Maslach, 1998). In this framework students’ engagement, here referred to as emotional engagement, could be seen as a positive state of fulfilment for students in the higher educational setting, whereas student burnout may be considered to be an erosion of academic engagement in line with the engagement theory suggested by Schaufeli and colleagues (2002). Academic performance has been related to engagement and found to be negatively related to burnout (Schaufeli et al., 2002b). Specifically, results show that those students who performed better have felt less exhausted and less cynical, have experienced more efficacy and vigour, and have reported being more dedicated and absorbed. (Demerouti et al., 2001). Schaufeli and Bakker (2004) considered engagement and burnout to opposites and they should be measured separately. Both concepts could therefore be important to study when psychological health is examined, including a positive psychological state, to increase understanding of energetic and motivational human processes (Schaufeli and Bakker, 2004). The definition of engagement, as an anti pole of burnout, follows a general theoretical trend in social science where human strengths and optional functioning are more in focus rather than weakness and malfunctioning (Seligman and Csikszentmihalyi, 2000).

2.4.2.2 Active engagement

In this thesis, learning ability or students' active learning, here called active engagement, is considered important for a positive health outcome and is considered to have a reciprocal relationship with emotional engagement. Active engagement is stimulated by high levels of energy and involvement in one’s studies, resulting in active behaviour in class and learning situations. Active engagement in higher education is useful to study, in order to capture the students’ response to teaching and their learning
environment (Cowman, 1996). However, student engagement may also be seen as a characteristic of the student where the diversity of students in terms of age, gender, ethnicity, ability and socio-economic status increases the likelihood that any given educational experience will not have the same impact on all of them (Pascarella and Terenzini, 2005). Their review further shows that the students’ levels of academic and social integration are important to commitment and completing education. “The National Survey of Student Engagement” (NSSE) in the United States, whose surveys aim to examine institutions and student success initiatives, has inspired research in this area. The NSSE survey is designed to obtain information from colleges and universities nationwide about student participation in programmes and activities that institutions provide for their learning and personal development (NSSE, 2000).

Several studies have been generated from the NSSE database. Some results from their studies, but also from others, show that the length of the period of enrolment could be an important factor for students’ engagement, such as their active engagement. A study by Patrick and colleagues, for example, found that the classroom social environment is an important factor for active student engagement (Patrick et al., 2007). Moreover, other studies have shown contradictory results according to gender and active student engagement, for example women at single-sex colleges show higher levels of student engagement than women at co-educational institutions (Umbach et al., 2003). Male students are more likely to be either disengaged or highly engaged compared with female students (Hu and Kuh, 2002). Studies show that smaller class sizes result in higher active engagement, and this might occur because students exhibit increased social behaviour and the student-teacher relationships benefit (Finn et al., 2003, Ahlfeldt et al., 2005, Hu and Kuh, 2002, Gibbs et al., 1997).

2.4.3 Self-efficacy

Self-efficacy is defined as: people’s judgements of their capabilities to organise and execute courses of action required to attain to produce given attainments (Bandura, 1997). According to Bandura, perceived self-efficacy is an individual’s belief that he or she is capable of achieving a goal. Self-efficacy beliefs have been shown to be important for positive functioning, performance, health behaviour, future health and effective health changes (Bandura, 1977, Bandura, 1997, Bandura, 2001a). Measures of self-efficacy focus on performance capabilities rather than on personal qualities, such as physical or psychological characteristics (Zimmerman, 2000) is being better predicted by people’s belief in their capability to do whatever is needed to succeed than by the importance of the behaviour. Even if self-efficacy is seen as a domain-specific measure, the generalised form of self-efficacy might, according to Bandura, act as a resource factor in coping with stressful situations (Bandura, 1986).

Studies have shown that self-efficacy could have moderate effects on occupational stress. Stressors have a less negative impact on individuals characterised by high self-efficacy (Jex and Bliese, 1999, Bandura, 1997). Individuals with moderate to high self-efficacy tend to engage more frequently in task-related activities and persist longer in coping efforts, which leads to mastery experiences and further gains in self-efficacy.

Research in the field of professional self-efficacy (Cherniss, 1993) or occupational self-efficacy (Bandura, 1997) has historically been dominated by questions regarding career choice and professional development. A definition of professional efficacy is professionals’ beliefs on their ability to permit work-role specific tasks. For nurses,
professional self-efficacy could mean how competent they would feel when it comes to handling medical technical equipment, drug administration and advising patients for example.

Study of self-efficacy among students has found that it influences academic motivation, learning and achievement (Bandura, 1997, Zimmerman, 2000, Pajares and Valiante, 2002). Further, self-efficacy is important for student engagement in the classroom, where high self-efficacy results in higher engagement in the form of motivation and performance (Linnenbrink and Pintrich, 2003). Studies among nursing students have found high self-efficacy significantly predicting better health behaviour (von Ah et al., 2004, Clement et al., 1995). Students with less sense of efficacy are at greater risk of dropping out of education (Bandura, 1997). Educational interventions, aimed at strengthening students’ self-efficacy, has shown effect on students’ interpersonal skills, well-being, stress management and ability to solve problems (Jones and Johnston, 2000).

The developmental sources of self-efficacy beliefs are: mastery experience (results of earlier performance), vicarious experience (effects produced by modelling the actions of others), social persuasions (convincing social messages from others) and physiological states (like acceptable levels of anxiety, stress, fatigue and the experience of positive mood states in training and learning situations) (Bandura, 1997). In nursing education, both clinical and theoretical moments are developed to stimulate the nursing students’ professional self-efficacy and to minimise the students’ experiences of insecurity, fear, and stress in different learning situations. Examples could be: prior succeeded educational tasks (mastery experiences), the studying of peers or supervisors acting (vicarious experiences), positive comments given by a skilled and qualified nurse (verbal persuasion) and experiencing stress/or feelings of anger, fear or happiness (physiological states). Success raises self-efficacy and failure lowers it, but once a strong sense of self-efficacy is developed a failure may not have high impact (Bandura, 1986).
3 AIMS

The overall aim of the thesis was to describe and investigate the health behaviour, nursing self-efficacy and student engagement during higher education and in subgroups of nursing students, and further to elucidate health resources important to positive health development. The specific objectives were:

- To investigate self-rated health and health behaviour in a nationwide sample Swedish first-year nursing students, and to investigate whether these differ between subgroups of students (Study III).

- To investigate prospectively the levels of engagement of nursing students during education and to determine whether there are differences between subgroups of students (Study II).

- To describe prospectively the self-rated health and health behaviour of nursing students in a nationwide sample (Study IV).

- To examine the psychometric properties of the Nursing Self-Efficacy scale (Study I). To examine this and other variables associated with a good self-rated health during the final year of education (Study IV).
4 METHODS AND MATERIAL

4.1 DESIGN OF LANE

The study “Longitudinal Analyses of Nursing Education” (LANE) started in autumn 2002 at the former Department of Nursing at Karolinska Institutet, with two cohorts of nursing students: EX2002 (students in the final year, in the sixth semester) and EX2004 (students in the first year, second semester with expected graduation in autumn 2004) in nursing education. In 2006 a third cohort (EX2006) containing students in the final year of nursing education were added to the LANE study, also with aim of following nurses prospectively in working life. This nationwide longitudinal survey followed the nursing students and later on registered nurses through annual questionnaires until 2010 (Gustavsson et al., 2007, Rudman et al., 2010). The overall aim of the LANE study was to investigate and longitudinally study nursing students’ and nurses’ health and career paths. In the LANE study different questions and instruments were used regarding aspects of health, student life and future nursing occupation. Some of these questions and instruments derived from other large and similar projects. Other questions and single items were developed specifically for the LANE study by the research group. The first LANE questionnaire was pilot-tested in a smaller version (not complete version) in spring 2001 among nursing students at Karolinska Institutet. The work with the final version of the questionnaire was guided by the pilot test as well as some nurses invited to make comments on the completion of the questionnaire, since it consists of a large number of questions.

4.2 PARTICIPANTS AND RESPONSE RATES ON LANE

All the 26 higher educational institutions providing nursing education in Sweden were invited to participate. In this thesis, two were excluded because they did not provide enough information about participating nursing students, so that a proper sample or data collection was not possible for these two. In this thesis only nursing students from the EX2004 cohort with students enrolled in the first year of nursing education in 2002 were included and followed throughout their education. Of 2,281 possible nursing students invited to participate, 1,655 (73%) were included and formed the cohort used for the purpose of studies I-IV (Figure 1). The 1,655 first-year nursing students included in the first questionnaire in 2002 formed the EX2004 cohort (100%). The demographic characteristics of the included nursing students are shown in Table 1. There were no statistically significant differences in attrition due to age, but men were less likely to participate (65% men, 74% women) in the EX2004 cohort. The response rate varied between the participating educational organisations, from 46% to 86% in the EX2004 cohort. The second questionnaire, in Year 2, included 1,524 (92%) nursing students. The third questionnaire included 1,379 (83%) nursing students.

4.2.1 Participants and response rates in this thesis

In Study I 1,314 (79%) nursing students were included, those who responded to the Nursing Self-Efficacy scale (NSE scale) year 3 at the end of education. Study II included 1,334 (81%) nursing students and constituted students having responded to all three questionnaires and the dependent variable student engagement (both active and emotional student engagement). Study III included 1,622 (98%) first-year nursing
students, who were those having responded to the demographic questions regarding age, gender, previous assistant nurse education and the self-rated health (SRH) question. In Study IV 1,291 (78%) nursing students were included and were those who had responded to the three questionnaires and had no missing values regarding age, gender, previous assistant nurse education and the dependent variable SRH. For an overview of sample and numbers of nursing students included in each study, see Figure 1.

Figure 1. Flowchart of the study sample in Study I-IV.

The first (n=1,655), second (n=1,524) and third (n=1,379) year nursing students included in the EX2004 cohort and their demographic characteristics are shown in Table 1. The majority of nursing students were women (89%) and the mean age was 28 years. More than half of them (60%) had working experiences of health care in previous nursing education and 46% of the students had previous nurse assistant education.
### Table 1. Characteristics for nursing students responding to the three questionnaires

<table>
<thead>
<tr>
<th></th>
<th>Year 1 (1,655)</th>
<th>Year 2 (1,524)</th>
<th>Year 3 (1,379)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Internal dropout</td>
<td>Frequency</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>(percent)</td>
<td></td>
</tr>
<tr>
<td>≤ 30</td>
<td>1082 (66)</td>
<td>6 (0.4)</td>
<td>993 (65.2)</td>
</tr>
<tr>
<td>≥ 31</td>
<td>567 (34)</td>
<td>10 (0.6)</td>
<td>525 (34.4)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>1469 (89)</td>
<td>10 (0.6)</td>
<td>1351 (88.6)</td>
</tr>
<tr>
<td>male</td>
<td>176 (11)</td>
<td>9 (0.6)</td>
<td>164 (10.8)</td>
</tr>
<tr>
<td>Living conditions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>alone</td>
<td>448 (28)</td>
<td>29 (1.8)</td>
<td>417 (27.4)</td>
</tr>
<tr>
<td>together with partner/family</td>
<td>1178 (72)</td>
<td>32 (1.9)</td>
<td>1094 (71.8)</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>641 (40)</td>
<td>35 (2.1)</td>
<td>606 (39.8)</td>
</tr>
<tr>
<td>no</td>
<td>979 (60)</td>
<td>31 (1.9)</td>
<td>910 (59.7)</td>
</tr>
<tr>
<td>Social class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working class</td>
<td>665 (41)</td>
<td>31 (1.9)</td>
<td>616 (40.4)</td>
</tr>
<tr>
<td>Middle class</td>
<td>775 (48)</td>
<td>31 (1.9)</td>
<td>709 (46.5)</td>
</tr>
<tr>
<td>Upper middle class and higher</td>
<td>115 (7)</td>
<td>104 (6.8)</td>
<td>104 (6.8)</td>
</tr>
<tr>
<td>Undetermined</td>
<td>69 (4)</td>
<td>64 (4.2)</td>
<td>60 (4.4)</td>
</tr>
<tr>
<td>Previous assistant nurse education</td>
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<td></td>
</tr>
<tr>
<td>yes</td>
<td>749 (46)</td>
<td>11 (0.7)</td>
<td>694 (45.5)</td>
</tr>
<tr>
<td>no</td>
<td>895 (54)</td>
<td>83 (5.6)</td>
<td>819 (53.7)</td>
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<tr>
<td>Working experience from health care sector</td>
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<td></td>
<td></td>
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<tr>
<td>yes</td>
<td>989 (60)</td>
<td>12 (0.7)</td>
<td>916 (60.1)</td>
</tr>
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<td>no</td>
<td>654 (40)</td>
<td>96 (6.2)</td>
<td>596 (39.1)</td>
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<td>Previous higher education</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>409 (25)</td>
<td>14 (0.8)</td>
<td>371 (24.3)</td>
</tr>
<tr>
<td>no</td>
<td>1232 (75)</td>
<td>1140 (74.8)</td>
<td>1021 (74.0)</td>
</tr>
<tr>
<td>Working regularly during semester</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>677 (41)</td>
<td>8 (0.5)</td>
<td>629 (41.3)</td>
</tr>
<tr>
<td>yes, half-time or less</td>
<td>929 (56)</td>
<td>831 (54.5)</td>
<td>621 (45.0)</td>
</tr>
<tr>
<td>yes, more than half-time</td>
<td>41 (3)</td>
<td>45 (3.0)</td>
<td>46 (3.3)</td>
</tr>
</tbody>
</table>

#### 4.3 DATA COLLECTION - QUESTIONS AND INSTRUMENTS

A member of the LANE research team visited all higher educational institutions providing nursing education, in order to inform the students concerned about the project and to obtain student rosters. Initially, the questionnaires were distributed by the visiting researcher to all students present at the information meeting, and mailed to those who were absent. The procedure changed a third of the way into the data collection period when the questionnaire instead was mailed to all prospective participants after the researcher’s information visit. Non-responders were reminded three times: with a new copy of questionnaire after three to six weeks, and by a phone call after nine weeks. The three questionnaires used in Study I-IV included questions regarding demographic characteristics, more extensive in the first one, continued by
sections containing questions and instruments regarding their studies, physical, psychological and social health, health complaints and illness, financial situation and questions about filling in the questionnaire. Questions and instruments which are used in the and how they are categorised before analyses are presented in Appendix (Study I-IV).

4.3.1 Self-rated health

Self-rated health (SRH) is a frequently used single item measure, which is considered to capture the general and subjective health of an individual and has shown good test-retest reliability (Manderbacka and Lundberg, 1996, Svedberg et al., 2006, Hasson et al., 2006). In the LANE questionnaires, the SRH question was included (see Appendix). The question was dichotomised before use to study whether there were any differences in those students having good or poor SRH in subgroups of students (Study II and III). To study individual, health behavioural and higher educational variables and their possible associations with good SRH in the last year of nursing education, the highest (only good) SRH response category was included in one category and the rest in the other category (less than good SRH, Study IV). Furthermore, the mean value of SRH was calculated in Study IV in order to study differences in levels of SRH during study years.

4.3.1 Student engagement

4.3.1.1 Emotional engagement

Student engagement has been used in a health context in thesis, not as usual in a pedagogic or higher educational context, considered as important for learning ability and academic achievement (Pascarella and Terenzini, 2005). Engagement has been described as a state of high energy, strong involvement and efficacy with work, an endpoint of a continuum, with burnout at the other endpoint (Leiter and Maslach, 1998). In addition, academic performance has been found to be negatively related to burnout and positively related to engagement (Schaufeli et al., 2002b). Student burnout is considered to be an erosion of academic engagement (Schaufeli et al., 2002b). In accordance with stress theory and the previously mentioned burnout theory, the Oldenburg Burnout Inventory (OLBI) (Demerouti et al., 2000) was chosen and used in the questionnaires. The OLBI is an instrument that captures the continuum from a positive to a negative health with symptoms of health such as energy and involvement to negative health with loss of energy/exhaustion and disengagement equating to ill health. OLBI has been shown to have satisfactory psychometric properties (Demerouti et al., 2000, Halbesleben and Buckley, 2004, Peterson et al., 2008) and was developed to measure burnout with two dimensions: exhaustion and disengagement, as well as measuring engagement with energy and involvement.

From the OLBI, four items measuring positive emotional engagement were used: “I find my studies a real challenge”, “It never gets boring to study; I’ll always learn something new”, “I’ll become more engaged the further my studies continue” and “Usually the studies make me happy and alert”. The response categories to the items were scored on a four-point Likert-type scale ranging from “Never” (scored as 1) to “Often” (scored as 4). The minimum score for the EE scale is 4, and the maximum
score is 16. In Study II the four items taken from OLBI were evaluated and tested as a scale using the Confirmatory Factor Analytic procedure proposed by Jöreskog (Jöreskog, 2004), and indicated a good fit for a three-item scale, after the item “I find my studies a real challenge” was excluded. The EE scale was further used in Study II and IV.

4.3.1.2 Active engagement

Active engagement items were obtained from the Swedish National Agency for Higher Education (Swedish National Agency for Higher Education., 2002). The Swedish National Agency for Higher Education, in their questionnaire used an “active learning” scale from the American National Survey for Student Engagement study (NSSE, 2000) and its operationalisation of aspects of active learning. Three items were included from the 22 original items used in the “active engagement scale” (active learning), as a consequence of having different included numbers of items in the different LANE questionnaires. The items were: Have you this semester... “asked questions in class?”, “spontaneously contributed to discussion in class?” , ”come unprepared to class?”. The response categories to the items were scored on a four-point Likert-type scale ranging from “Does not apply at all” (scored as 1) to “Applies completely” (scored as 4). The minimum score for the AE scale is 3 and the maximum score is 12. The reasons for including only three items in the longitudinal analysis were the limited numbers of items included in the second and third questionnaire compared to the first questionnaire. In Study II the active engagement (AE) scale was tested with Confirmatory Factor Analytic procedure proposed by Jöreskog (Jöreskog, 2004). The result showed a good model fit with only the first two items mentioned above, which formed the AE scale subsequently used in Study II and IV.

4.3.2 Nursing Self-Efficacy scale

Data from nursing students’ perceived capability to perform nursing specific tasks and competences, here defined as “Nursing Self-Efficacy” (NSE), were collected by using the NSE scale developed by the research group measured in the final year (Year 3) (Table 2). The development of the nine items was done using the self-efficacy theory according to Bandura (1997) and his instrument guide (Bandura, 2001b). The scale development was guided by three competence areas important to the nursing profession: “nursing theory and practice”, “research, development and education” and “leadership”. These competence areas are described in documents and directives used in higher educational institutions providing nursing education: the Higher Education Ordinance (SFS, 1998:531) and from the National Board of Health and Welfare (National Board of Health and Welfare, 1995:15). The items are guided by one question: “How do you think you will handle the following working task or situations in your work as a registered nurse?” and each item has eleven response categories (1-11 points). The response category “No, I can’t do it” gives 1 point, the categories in the middle “Maybe I can do it” gives 5 points and the last category “I’m quite sure I can do it” gives 11 points (0-100%). The instrument was only pilot-tested to a limited extent on some registered nurses, nursing students and nursing researchers (convenience sample), and minor changes were made based on their remarks. The NSE scale was also checked in the language laboratory by Statistics Sweden before it was used in the LANE study.
According to the results of psychometric properties examined in the Study I, further use of the NSE in Study I and Study IV included seven items and seven response categories. Item 4 and Item 9 were deleted from the scale and the first five response categories collapsed into one according to the Rasch analysis. Therefore, in Study IV the minimum score used was 7 and the maximum score was 49, but the scale was dichotomised before use, see Appendix.

Table 2. Items included in the original version of Nursing Self-Efficacy Scale

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Handle and superintend medical equipment</td>
</tr>
<tr>
<td>2</td>
<td>Instruct patients and give individual information appropriate for their special needs</td>
</tr>
<tr>
<td>3</td>
<td>Identify and analyse the care needs of patients and the resources required</td>
</tr>
<tr>
<td>4</td>
<td>Document the different steps in the care process in the nursing record</td>
</tr>
<tr>
<td>5</td>
<td>Manage the work of a group of assistant nurses</td>
</tr>
<tr>
<td>6</td>
<td>Reorganise work fast when unforeseeable situations appear</td>
</tr>
<tr>
<td>7</td>
<td>Keep yourself informed about new research within your own area</td>
</tr>
<tr>
<td>8</td>
<td>Take a stand in ethical conflicts arising over the care of patients</td>
</tr>
<tr>
<td>9</td>
<td>Get advice from experienced colleagues when feeling insecure about working tasks</td>
</tr>
</tbody>
</table>

4.4 DATA ANALYSIS

Quantitative analyses were used in all four studies. Descriptive and analytic data analyses were used in Study I-IV according to the characteristics of the used variables and scale levels. The statistical analyses were conducted using RUMM 2020 (Andrich et al., 2004) (Study I), LISREL version 8.54 (Jöreskog, 2004)(Study II) and Statistical Package for Social Science for Windows (SPSS) versions 12.0, 16.0 and 17.0 (Study II, III and IV, respectively). An overview of statistical methods used to analyse data in Study I-IV is presented in Table 3. A p-value less than 0.05 was considered statistically significant.

Table 3. Overview of statistical methods used in the different studies

<table>
<thead>
<tr>
<th>Function</th>
<th>Statistical method</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>To evaluate the psychometric properties of a unidimensional scale and to transform ordinal raw scores to interval scores</td>
<td>Rasch (invariance, item functioning, targeting, DIF, multidimensionality and response dependence)</td>
<td>I</td>
</tr>
<tr>
<td>To test the null hypothesis of no differences in means of two independent groups</td>
<td>Student’s t-test (unpaired)</td>
<td>I</td>
</tr>
<tr>
<td>To evaluate the psychometric properties of a scale</td>
<td>Confirmatory Factor Analysis (CFA)(SRMR, RMSEA, CFI)</td>
<td>II</td>
</tr>
<tr>
<td>To test differences in mean value in, during time and group/time of three or more related groups</td>
<td>Repeated measurement analysis of variance (ANOVA) (overall time, group and group by time-effect)</td>
<td>II</td>
</tr>
<tr>
<td>To investigate which independent variables have a strong association with a binary dependent variable</td>
<td>Logistic regression (both univariable and multivariable)</td>
<td>III, IV</td>
</tr>
<tr>
<td>To examine the relationship between two indexes</td>
<td>Correlation</td>
<td>II</td>
</tr>
<tr>
<td>To assess the degree of associations between two variables (non-parametric test)</td>
<td>Pearson chi-square</td>
<td>II, III</td>
</tr>
</tbody>
</table>
In Study I Rasch analyses were used to evaluate the psychometric properties of the NSE scale developed by the research group to study the nursing students’ self-reported and self-rated professional competence in the last year of nursing education. It was considered a proper method to use, since the properties of the newly developed NSE scale could be tested in an extensive way. Rasch analysis provides broad and detailed information of validity and reliability related to persons, items and rating scales (Bond and Fox, 2001, Wilson, 2005). Further, the unidimensionality of the concept (here nursing competence) against a theoretical model is examined and the invariance of the scale is tested. Another reason for choosing this method was that it also converts data from an ordinal scale level into data at interval level. Rasch analysis uses multiple and different tests when the properties of the scale are tested. In Study I the following parameters were investigated: the internal scale validity (fit of items to the model, with Item Characteristic Curves, ICC), targeting (a function of the item and person locations on the latent trait), persons’ response validity (fit of a persons’ responses to the model), person separation index (spread of persons on the scale, such as a reliability measure) and Different Item Functioning (DIF) (item does not favour any subgroup of persons, such as an age or gender group). Depending on the software used for analysing data, different terms are used when reporting the results. In Study I, RUMM 2020 was used due to its rich graphic illustrations of the studied test, which enriches the interpretation.

In Study II the psychometric properties of the two scales active engagement (AE) and emotional engagement (EE) were tested by Confirmatory Factor Analysis (CFA) following a procedure suggested by Jöreskog (Jöreskog, 1993; 2004). The goodness of fit of the model was evaluated with cut-off criteria (Hu and Bentler, 1999, Hu and Bentler, 1998): for the comparative fit index (CFI) a cut-off below 0.95, the root mean squared error of approximation (RMSEA) a value below 0.06, and for the standardized root mean squared residual (SRMR) a value below 0.08 were considered as an acceptable model fit. Mean values for both scales (AE and EE) for all three study years were calculated. Longitudinal analysis and comparison of differences in means of AE and EE were made in seven groups, during time and group by time effect respectively and were examined using a univariate repeated-measures approach of Analysis of Variance (ANOVA) (Weinfurt, 2000).

In Study III a comparison of the first-year nursing students’ health and health behaviour and its associations with age, gender and having an assistant nurse education prior to the nursing education were made using Pearson’s Chi-square. In order to study what health behaviour had the strongest associations with the dependent variables of age
(young and old), gender (female and male) and having a previous assistant nurse education (yes and no), bivariate logistic regression analyses were applied (Hair et al., 1998). Univariable logistic regression, analysing each covariate (independent variable), separately with the dependent variable, was first used. Thereafter, multivariable logistic regression was used to analyse all covariates together to detect variables having the strongest association or highest odds ratios (OR) with the dependent variable (adjusted for age, gender and having a previous assistant nurse education, respectively).

In Study IV a comparison of differences in health behaviour (frequencies) of the nursing students from Year 1 to Year 3 was made using the McNemar test. The Friedman Chi-square was used to detect any differences in the mean value of SRH, longitudinally. To investigate the associations between having a good SRH in the last year in nursing education and some individual, health behavioural and higher educational variables, logistic regression models were used. The independent variables tested for associations with good SRH were individual variables from the first year: age, gender and having a previous assistant nurse education. Further, health behaviour variables from year one were also tested: sleep quality, exercise, healthy eating habits, alcohol consumption, smoking, stress regarding studies, future occupation and stress regarding the future and stress-related physical symptoms such as headache, backache and stomach ache. Finally, higher educational variables from the third and last year were analysed: nursing self-efficacy, active and emotional student engagement and higher educational institution. First, all independent variables were analysed with univariable logistic regression (unadjusted) to test each one’s association with good SRH. Thereafter, the statistically significant individual and health behavioural variables were adjusted for good SRH year 1 and analysed with multivariable logistic regression (Model 1). Finally, the significant variables from Model 1 were analysed together with the significant higher educational variables from Year 3 (also adjusted for good SRH year 1; Model 2).
5 ETHICAL CONSIDERATIONS

Written consent was obtained from the students. In the attached cover letter their participation in LANE study was declared voluntary. Further, it was stated that the administration of the questionnaires would be confidential and that only a study number would be used in further analysis. In addition, no individual analyses would be undertaken, only analyses on group level, so that no single nursing student could be recognised.

The LANE study and the present four studies were approved by the regional Research Ethics Committee at Karolinska Institutet (Dnr 01-45) and by supplementary ethical approval (Dnr 04-587).
6 RESULTS

The main findings in Study I-IV are summarised and presented in the following order: health and health behaviour of nursing students, student engagement of nursing students and determinants of good self-rated health in the final year of nursing studies.

6.1 SELF-RATED HEALTH AND HEALTH BEHAVIOUR DURING STUDIES

The self-rated health (SRH) was found to be good or somewhat good for most of the nursing students throughout their education (Table 4) (Study IV). The results nevertheless showed a statistically significant decrease in mean level of SRH, although there was a small change from 4.48 (Year 1) to 4.36 (Year 3) (Study IV). In addition, the nursing students’ health behaviour from the first year was found to be positive for healthy eating habits, having a regular intake of meals and having good sleep quality (Study III). Health behaviour that could be considered less positive were stress regarding nursing studies, smoking, high-risk alcohol consumption and problems with headache, stomach ache and backache.

Table 4. Self-rated health (SRH) during nursing studies (n=1,291)

<table>
<thead>
<tr>
<th>SRH</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good (5p)</td>
<td>770</td>
<td>661</td>
<td>669</td>
</tr>
<tr>
<td>Somewhat good (4p)</td>
<td>407</td>
<td>493</td>
<td>473</td>
</tr>
<tr>
<td>Neither good nor poor (3p)</td>
<td>85</td>
<td>95</td>
<td>104</td>
</tr>
<tr>
<td>Somewhat poor (2p)</td>
<td>24</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Poor (1p)</td>
<td>5</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

The health behaviour of first-year nursing students was also found to be different in subgroups of students regarding age, gender and having an assistant nurse education prior to nursing education (Study III). Younger nursing students (age 30 years or less) were more likely to exercise more often and having good sleep quality than older students (age 31 years or more). However, younger nursing students were more likely to have higher-risk alcohol consumption (becoming drunk more than twice a month), less healthy eating habits, more problems with stomach ache and more problems with stress regarding their future than older students. Female students were more likely to have problems with headache, stomach ache and stress regarding nursing studies than male nursing students. On the other hand, male students were more likely to have poor healthy eating habits, poor sleep quality and higher-risk alcohol consumption than female nursing students. Having been an assistant nurse before starting nursing education was found to be associated with lower-risk alcohol consumption than students without this previous education.

The longitudinal analysis of the health behaviour showed diverse results (Table 5, Study IV). Health behaviour that increased was: exercise, stopping smoking and having fewer problems with backache. In contrast, some behaviour increased: having problems with headache, stomach ache, stress regarding their future and impaired sleep quality.
Additionally, some behaviour was stable over the years: experiencing stress regarding studies, having healthy eating habits, not experiencing stress regarding choice of occupation and to not having high-risk alcohol consumption (Study IV).

Table 5. Differences in nursing students’ health behaviour from year one to year three (n=1,291)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Year 1 frequency</th>
<th>Year 3 frequency</th>
<th>McNemar Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(percent)</td>
<td>(percent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>good</td>
<td>1056(82)</td>
<td>1008(78)</td>
<td>10.240</td>
<td>0.001</td>
</tr>
<tr>
<td>poor</td>
<td>230(18.1)</td>
<td>280(22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating habits</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>healthy</td>
<td>1055(82)</td>
<td>1081(84)</td>
<td>3.189</td>
<td>0.074</td>
</tr>
<tr>
<td>unhealthy</td>
<td>229(18)</td>
<td>201(16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk consumption of alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>207(17)</td>
<td>166(15)</td>
<td>8.127</td>
<td>0.004</td>
</tr>
<tr>
<td>no</td>
<td>987(83)</td>
<td>960(85)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>340(26)</td>
<td>242(19)</td>
<td>50.586</td>
<td>0.000</td>
</tr>
<tr>
<td>no</td>
<td>946(74)</td>
<td>1041(81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>916(71)</td>
<td>868(69)</td>
<td>1.225</td>
<td>0.268</td>
</tr>
<tr>
<td>no</td>
<td>370(29)</td>
<td>386(31)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>268(21)</td>
<td>265(21)</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>no</td>
<td>1018(79)</td>
<td>995(77)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Future stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>399(31)</td>
<td>692(55)</td>
<td>112.511</td>
<td>0.000</td>
</tr>
<tr>
<td>no</td>
<td>886(69)</td>
<td>568(45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>685(53)</td>
<td>923(73)</td>
<td>125.939</td>
<td>0.000</td>
</tr>
<tr>
<td>no</td>
<td>598(47)</td>
<td>350(27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stomach ache</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>567(44)</td>
<td>629(51)</td>
<td>10.756</td>
<td>0.001</td>
</tr>
<tr>
<td>no</td>
<td>706(56)</td>
<td>615(49)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backache</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>617(48)</td>
<td>566(45)</td>
<td>5.247</td>
<td>0.022</td>
</tr>
<tr>
<td>no</td>
<td>659(52)</td>
<td>684(55)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>720(56)</td>
<td>845(66)</td>
<td>41.320</td>
<td>0.000</td>
</tr>
<tr>
<td>no</td>
<td>571(44)</td>
<td>434(34)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.2 STUDENT ENGAGEMENT OF NURSING STUDENTS

The nursing students’ engagement, both emotional engagement (EE) and active engagement (AE), were examined in Study II. Their alpha values were calculated and ranged from 0.64 to 0.72. The stability correlations for the AE scales across the three years ranged from 0.55 to 0.62. The stability correlations for the EE scales across the three years ranged from 0.45 to 0.58. The students developed more active engagement during their study years (F=587; η=0.33; p=0.001), but became marginally less changed or almost unchanged in their emotional engagement (F=43.8; η=0.006; p=0.001). The mean levels of the items from each scale (AE and EE) for each year, their alpha values and correlation matrix are shown in (Table 6).

Table 6. Mean (SD), Chronbach’s alpha and correlations of AE and EE indexes during three years

<table>
<thead>
<tr>
<th>Index</th>
<th>Mean (SD)</th>
<th>Alpha</th>
<th>AE Y1</th>
<th>AE Y2</th>
<th>AE Y3</th>
<th>EE Y1</th>
<th>EE Y2</th>
<th>EE Y3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE Y1</td>
<td>2.21 (0.73)</td>
<td>0.65</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE Y2</td>
<td>2.79 (0.80)</td>
<td>0.64</td>
<td>0.62**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AE Y3</td>
<td>2.83 (0.79)</td>
<td>0.66</td>
<td>0.55**</td>
<td>0.62**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE Y1</td>
<td>2.73 (0.56)</td>
<td>0.69</td>
<td>0.11**</td>
<td>0.12**</td>
<td>0.11**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE Y2</td>
<td>2.69 (0.56)</td>
<td>0.71</td>
<td>0.07**</td>
<td>0.14**</td>
<td>0.14**</td>
<td>0.53**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>EE Y3</td>
<td>2.60 (0.59)</td>
<td>0.72</td>
<td>0.08**</td>
<td>0.14**</td>
<td>0.19**</td>
<td>0.45**</td>
<td>0.58**</td>
<td>1</td>
</tr>
</tbody>
</table>

AE= Active Engagement, EE= Emotional Engagement, Y1= Year 1 etc.

Differences in mean values of AE and EE in subgroups of students and over time was tested according to higher educational institution, class size, age, gender, having prior assistant nurse education, study experiences and SRH. The results showed significant main effects on AE for age, gender and having assistant nurse education, whereas older, male and students with previous assistant nurse education performed higher levels of AE.

Having higher EE level throughout the whole education was statistically significant for older and female students, respectively. Having good SRH was found to give higher level of EE during nursing studies. The mean level of EE decreased among students attending university colleges, but remained stable for students attending universities. Thus, the results indicated a somewhat decreasing or stable level of EE and an increase in AE during nursing studies. Differences in level of AE and EE were found for both age and gender.

6.3 DETERMINANTS OF SELF-RATED HEALTH

In Study IV, individual and higher educational variables were analysed together with the dependent variable good SRH (highest response category). One of the used variables in Study IV, nursing self-efficacy, has not been previously validated since the instrument used was developed for the LANE study. Thus, prior to showing the results from the analyses using the variable nursing self-efficacy, the results from the validation of the instrument for this variable, performed in Study I, is presented below. Thereafter, the results from the multivariable logistic model are presented.
First the associations between having a good SRH (dependent variable) last year in nursing education and some individual, health behavioural and higher educational variables (independent variables), were investigated using univariable logistic regression. Higher educational variables from third year in education were analysed using univariable logistic regression in order to study their associations with good SRH. Based on these results, the statistically significant individual and health behavioural variables were adjusted for good SRH Year 1 and analysed with good SRH last year using multivariable logistic regression (Model 1). Finally, the significant variables from Model 1 were analysed together with the significant higher educational variables from Year 3 and with good SRH last year in nursing education using multivariable logistic regression (adjusted for good SRH Year 1; Model 2).

6.3.1 Validation of the nursing self-efficacy instrument

The psychometric properties of the NSE scale were examined in Study I. The original NSE scale had nine items with eleven response categories. The result showed that the person separation index, which is comparable with Cronbach’s alpha, was 0.894, indicating the scale worked as intended to separate the persons. Mistargeting (skewed distribution regarding high values) was found, since the majority of the students had a high level of nursing self-efficacy or professional competence. The location of the items compared to the persons showed misfit: too few items and lack of items capturing a high competence level and too many high scoring persons. The ICC graphs (function of the item-and person-locations on the latent construct) for NSE scale showed problems with six of nine items, although the item values (the observed ones) were found graphically to be fairly close to the expected values. The response categories were also analysed and two items had twisted categories (4 and 9). After the first the first five categories had been rescored into one new one, resulting in seven response categories, the problems with item fit still remained. This resulted in removing Item 4 and 9 from the scale.

The seven item scale showed better targeting, although the problem with person location remained. Person separation index for the seven item scale was 0.882. Some misfit to the model was nevertheless found, but item fit showed that the item operated in the right direction. To test how well the item worked among different subgroups of nursing students, Differential Item Functioning (DIF) was tested with ANOVA. Differences were found for gender and age: males scored higher than females on item 1 and 6, hence females scored higher on Item 3 than males. Younger nursing students scored higher on Item 1 than older students.

Additionally, the suggested seven item scale with seven response categories (7-49 points) from Study I were used in Study IV and frequencies in the different response categories are shown in Table 7. The number of included respondents differed from the inclusion criteria in Study IV (n=1,291) according to missing values (n=64) on the NSE scale. The mean value was 35.6. The responses were skewed to the highest values, indicating lack of items capturing these students’ competence levels and the fact that most nursing students in the last year have high NSE. Hence, a cut-off located with guidance from the mean value and standard deviations could be misleading. Therefore, the choice to dichotomise the NSE with a more restrictive dichotomisation of low NSE
(7-28p) and high NSE (29-49 p) was made. Additional and later complementary reliability analysis on the NSE scale with Chronbach’s alpha score showed .87, indicating a good internal consistency.

Table 7. Properties of responses (valid percent) in seven categories for seven items (n=1,227)

<table>
<thead>
<tr>
<th>Item label</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.9</td>
<td>6.7</td>
<td>4.9</td>
<td>12.0</td>
<td>24.7</td>
<td>28.6</td>
<td>20.2</td>
</tr>
<tr>
<td>2</td>
<td>1.2</td>
<td>2.9</td>
<td>3.7</td>
<td>10.7</td>
<td>22.1</td>
<td>35.7</td>
<td>23.7</td>
</tr>
<tr>
<td>3</td>
<td>1.0</td>
<td>2.6</td>
<td>4.2</td>
<td>14.5</td>
<td>24.0</td>
<td>32.5</td>
<td>21.1</td>
</tr>
<tr>
<td>5</td>
<td>3.3</td>
<td>6.6</td>
<td>7.6</td>
<td>14.9</td>
<td>26.5</td>
<td>25.7</td>
<td>15.4</td>
</tr>
<tr>
<td>6</td>
<td>4.0</td>
<td>7.2</td>
<td>8.7</td>
<td>15.5</td>
<td>26.4</td>
<td>24.1</td>
<td>14.1</td>
</tr>
<tr>
<td>7</td>
<td>3.9</td>
<td>7.2</td>
<td>8.9</td>
<td>17.4</td>
<td>26.7</td>
<td>25.2</td>
<td>10.6</td>
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<tr>
<td>8</td>
<td>2.7</td>
<td>4.1</td>
<td>6.7</td>
<td>13.4</td>
<td>28.0</td>
<td>29.7</td>
<td>15.3</td>
</tr>
</tbody>
</table>

6.3.2 Variables associated with good SRH

The result of the univariable logistic regression showed that nine health behavioural variables from Year 1 (good sleep quality, healthy eating habits, exercise, no stress regarding studies, occupation or the future, no headache, backache or stomach ache) showed association with good SRH in the final year of nursing education. The univariable logistic regression analyses with the higher educational variables, measured in Year 3, showed high nursing self-efficacy and high emotional student engagement to be significant and associated with good SRH. In the final Model 2, significant variables from Model 1 were analysed together with the two higher educational variables high NSE and high EE (also adjusted for good SRH in Year 1). The results showed that having high EE Year 3 (OR 1.9), having high NSE Year 3 (OR 1.7), having good sleep quality in Year 1 (OR 1.6), low experiences of stress regarding studies in Year 1 (OR 1.6), not having headache in Year 1 (OR 1.5) and not having backache in Year 1 (OR 1.4) determined good SRH last year in nursing studies (Table 8).

Table 8. Variables associated with good SRH final year in nursing studies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adj. OR</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>High emotional engagement (Year 3)</td>
<td>1.94</td>
<td>1.47-2.57</td>
<td>0.000</td>
</tr>
<tr>
<td>High nursing self-efficacy (Year 3)</td>
<td>1.74</td>
<td>1.22-2.47</td>
<td>0.002</td>
</tr>
<tr>
<td>Good sleep quality (Year 1)</td>
<td>1.64</td>
<td>1.13-2.36</td>
<td>0.009</td>
</tr>
<tr>
<td>No stress related to studies (Year 1)</td>
<td>1.59</td>
<td>1.19-2.13</td>
<td>0.002</td>
</tr>
<tr>
<td>No headache (Year 1)</td>
<td>1.49</td>
<td>1.15-1.95</td>
<td>0.003</td>
</tr>
<tr>
<td>No backache (Year 1)</td>
<td>1.37</td>
<td>1.05-1.78</td>
<td>0.021</td>
</tr>
</tbody>
</table>

Adjusted for good SRH year 1 in nursing education
7 DISCUSSION

This thesis aims to provide more knowledge of nursing students’ health, health behaviour and positive functioning during higher education. First, a short summary of the main findings is given. Thereafter, the findings from the studies are discussed together in the following way. Beginning, health behaviour, student engagement and self-rated health (SRH) are discussed in subgroups and during educational years. The discussion follows with variables associated with good SRH last year in education and health during nursing studies. Finally, some methodological aspects are discussed.

7.1 MAIN FINDINGS

The nursing students’ overall and self-rated health (SRH) and some aspects of their health behaviour in this study were found to be generally good. However, their SRH decreased slightly and their health behaviour showed diverse development: some health behaviour was impaired during the years of education (headache, stress regarding their future, stomach ache), while health behaviour such as prevalence of smoking and exercise changed for the better. In addition, some aspects of behaviour were more stable throughout the years, such as experiencing stress related to studies and occupation, healthy eating habits, problems with backache, quality of sleep and alcohol consumption. Student engagement was studied longitudinally and among subgroups of nursing students using two scales, active engagement (AE) and emotional engagement (EE). Differences in students’ engagement regarding age, gender, prior nurse assistant education, higher educational institution and SRH were found. The EE decreased marginally and was more stable during the years in higher education. In contrast, AE increased during the years in higher education. Determinants of good SRH (highest response category) in the last year of nursing education were high EE (Year 3), high nursing self-efficacy (NSE) (Year 3), good sleep quality (Year 1), no or low level of stress regarding studies (Year 1), not having headache (Year 1) and not having problems with backache (Year 1). The validation of the psychometric properties of the NSE scale showed some problems, but a revised NSE scale with seven items and seven response categories performed better. With the psychometric problems elucidated, the instrument could nevertheless be used, preferably to identify low scoring students, but improvement of the scale is proposed.

7.2 GENERAL DISCUSSION

Nursing students in Sweden comprise a large and heterogeneous group. Higher educational institutions giving nursing education, as well as the health care organisation, have faced a number of changes over recent decades which bring new demands and challenges for individuals studying or working in these settings. The nursing occupation has been recognised as having high workloads and high emotional demands; it is nonetheless a popular occupation, with nearly 5000 nursing students admitted annually (Swedish National Agency for Higher Education, 2010). Health among registered nurses in their professional life has been well studied using quantitative and qualitative approaches and often from a stress perspective, for example among newly registered nurses (Watson et al., 2009), in terms of differing workplaces (Peterson et al., 2008, Chang et al., 2005) and during organisational restructuring.
There are also studies describing health in nursing students, mostly regarding stress, where prevalence rates of more than 50% of the students suffering from affective distress have been found (Jones and Johnston, 1997, Gibbons et al., 2008, Gibbons et al., 2009, Pryjmachuk and Richards, 2007). Investigations concerning nursing students’ health behaviour in general have found this to be relatively good (Al-Kandari and Vidal, 2007, Can et al., 2008). However, in Sweden there are few studies and those that exist are often limited to one university or university college examining the situation of nursing students, such as their competence (Björkström, 2005), learning during clinical practice (Löfmark, 2000) and their choice of future work areas (Fagerberg, 1998). To the author’s knowledge, there are few Swedish studies examining nursing students’ general health and health behaviour, from either a cross-sectional or a longitudinal perspective. In comparison with the number of studies in other public health areas, such as health in school or working environment, health in the higher educational environment is neglected. In addition, there are not many studies that consider the study environment as a working environment which is of interest per se.

### 7.2.1 Health behaviour in the first year in subgroups of nursing students

The examined nursing students differ in relation to demographic characteristics such as age (varying between 20 and 52 years) and gender (89% female), and almost half of them had assistant nurse education prior to nursing education. In addition, some higher education related variables have been further studied in relation to the students’ health: studying at a university or in a university college, having a small or large class size and having or not having prior higher education before starting nursing education. Health behaviour, student engagement and SRH were therefore studied not only in general, but also in relation to these individual and higher educational variables.

The age variable from start of education was dichotomised into younger age (20-30 years) and older age (31-52 years) in accordance with the nursing students’ mean age of 28 years. Younger nursing students had a higher-risk alcohol consumption than older students (25% compared to 3%), experienced more stress regarding their future (36% compared to 25%), had poorer healthy eating habits (23% compared to 12%) and had more problems with stomach ache (50% compared to 37%) than older students in the first year of education. These findings were also confirmed in the logistic regression analyses. These differences in health behaviour regarding the age of the nursing could be explained by younger students experiencing the transition to higher educational studies as more stressful. First-year students in general have been found to experience stress in handling the new higher educational demands and the new social situation (Robotham, 2008). The transition to higher education, moving away from home and acquiring a new social network can introduce an additional stressor for younger students in particular. Younger nursing students experienced more stress regarding the future and regarding their choice of occupation than older students did (25% compared to 17%). This could be explained by younger students having less life experiences and having doubts over their choice of occupation. This newly found freedom to control their own health behaviour could contribute to younger students testing new behaviour
such as drinking and smoking, which other studies also have reported (Andersson, 2009, Robotham, 2008, Vaez, 2004).

However, older nursing students were more likely to have poor exercise behaviour and sleep quality than younger students in the first year of education, which could be explained by also having non-academic responsibilities (e.g., having a family) which make them more susceptible to the pressures of time and workload in higher education. Findings from a study examining nurses’ level of job demands and work-home interference showed that the higher the demands the job the higher the level of work-home interference, and it is suggested that this has an impact on and impairs the nurses’ general health (van der Heijden, 2008). Studies have shown that older nursing students exercised less than younger students (Hui, 2002). The most common explanation for this difference in exercise regarding students’ age is the study-family conflict as described above. Due to the family situation, the needs of the family are prioritised over one’s own health behaviour, such as exercise (Stark et al., 2005, Al-Kandari and Vidal, 2007). Physical exercise has been found in general to decline with to age (Leslie et al., 2001). Although these older and mature students have been found to have low attrition rates and good academic performance (Ofori, 2000, Kevern et al., 1999), it is suggested that the needs of this group of older students have to be considered by redesigning of the curriculum to allow integration of their family and student lives (Kevern and Webb, 2004).

Differences in health behaviour were also found among first-year nursing students according to gender, female students having more problems with headache than male students (56% compared to 33%), more problems with stomach ache (47% compared to 28%) and experiencing more stress regarding studies (74% compared to 61%). On the other hand, male nursing students had higher-risk alcohol consumption than female students (56% compared to 33%), poorer quality of sleep (23% compared to 18%) and less healthy eating habits (24% compared to 18%). These findings were also confirmed in the logistic regression analyses. These findings regarding gender differences in health behaviour are in line with other studies among nursing students, showing female students having more headache, stomach ache and stress related to studies than male students (Pender, 1987, Hui, 2002, von Ah et al., 2004). The findings match those from von Bothmer and Fridlund (2005), who showed in their cross-sectional study Swedish female university students showed a higher degree of headache (63% to 41% for male), stomach ache (44% for female compared to 25% for male) and stress (71% for female compared to 49% for male students). In addition, studies have found male nursing students to have better exercise behaviour and better interpersonal relations than female nursing students (Al-Kandari and Vidal, 2007, von Ah et al., 2004, Riordan and Washburn, 1997). Male students, not limited to the nursing programme, have been found to have higher-risk alcohol consumption than female students (von Bothmer and Fridlund, 2005, Vaez and Laflamme, 2002), poorer quality of sleep (Hsiao et al., 2005, Tsai, 2004) and unhealthy eating habits (von Bothmer and Fridlund, 2005).

Students having assistant nurse education prior to nursing studies were found to have lower-risk alcohol consumption than students without this previous education (11% compared to 24%), less stress regarding the future (28% compared to 36%) and less stress regarding occupational choice (19% compared to 25%). However, only lower-
risk alcohol consumption remained statistically significant in the multivariable logistic regression analysis. Nevertheless, few, if any, studies appear to have described the possible benefit on health behaviour during nursing studies when the students have prior assistant nurse education. Brennan and McSherry (2007) found nursing students who had previously worked as health-care assistants to experience less stress regarding clinical placement, since they were more willingly accepted, a resource to others and respected by staff. Rapley and Davidson (2006) found in their study on assistant nurses that they experienced a lesser “reality shock” on going from studies to professional life. These nurses also had a faster transition from novice to advanced beginner, and the majority of them did not feel a lack of confidence thanks to their previous knowledge of health care.

7.2.2 Health behaviour during nursing studies

Health behaviour among nursing students showed diverse results from the first to the third and last years in education. Aspects of health behaviour developing favourably were a decrease in prevalence of smoking (from 26% to 19%) and an increase in exercise (from 56% to 66%). Stable progress was found during the study years of study for having low stress regarding occupational choice (about 20%), healthy eating habits (above 80%), experience of stress regarding studies (about 70%), problems with back ache (above 50%), high-risk alcohol consumption (about 15%) and having poor quality of sleep (about 20%). Aspects of health behaviour among the nursing students that worsened were headache (from 53% to 73%), stress regarding their future (from 31% to 55%) and problems with stomach ache (from 44% to 51%). These findings correspond to other studies following nursing students’ health behaviour longitudinally, with students about to graduate having better health responsibility than first-year students (Al-Kandari and Vidal, 2007) and having a better level of exercise (Shriver and Scott-Stiles, 2000, Irazusta et al., 2008). However, studies have found contradictory results, with some behaviour becoming less healthy, such as stress experiences and tiredness (Vaez, 2004), weight gain, poorer exercise behaviour and eating habits (Racette et al., 2008).

Among the studied health behaviour that improved, the prevalence of smoking is important. The prevalence of smoking decreased from 26% in the first year to 19% in the final year, and no differences were found in the studied subgroups (age, gender and previous work as assistant nurse) examined in the first year of education. Smoking is a well-known risk factor for impaired health and strongly correlated with other poor health behaviour among students such as poor eating habits and high alcohol consumption (Kevern and Webb, 2004, Carroll et al., 2006). In addition, even if the prevalence of smoking decreased in nursing students it could still be considered to be high. After higher education in health care has been undertaken and evidence-based facts related to disease/illness prevention have been learned about, this could be interpreted as meaning that work still has to be done among nursing students to further reduce smoking.

More than 70% of the nursing students experienced a high level of stress regarding nursing studies during the years of education. Stress among nursing students has been found to be a global concern (Burnard et al., 2008). One explanation could be that an
equal number of stressors are met each semester, such as both theoretical and practical assignments and financial circumstances. Nursing students face each semester anew and different kinds of circumstances such as new clinical placements (different care units) contribute to new caring situations regarding patients with new diagnosis and caring needs previously not met. In addition, there are the expectations of new supervisors at a clinic, as well as changing teachers in the theoretical parts and having study demands adjusted to competence levels to be acquired in the semester concerned. The stable level of stress regarding studies could therefore be interpreted according to the changing stressors described.

These changing study-related demands could also have contributed to the fairly high numbers of students having problems with headache and stomach ache and the increase in these problems during the years of study. According to earlier research, headache and stomach ache are strongly correlated with impaired health and stress (Bicakci et al., 2008, Bicakci et al., 2007). During the same time the students improved their exercise behaviour, and the impact of physical activity might have hindered an additional increase in stress regarding studies since physical activity has been found to have a stress-reducing effect (Kull, 2002).

Students experienced more stress regarding their future, which could be considered as a normal development when educational studies are coming to the end. This finding is in line with Vaez (Vaez, 2004), who in her study on Swedish students in general also showed an increase in stress and doubts regarding the future.

The findings from this thesis show that there are some aspects of health behaviours that require more attention than others, such as the experience of stress throughout the education. Both organisations providing nursing education and the individual nursing student could be responsible for a positive health outcome of nursing studies. It has been suggested, for example, that nursing education could improve students’ health in courses. This could be done by integrating health behaviour known to relieve impairment into health for patients and adding reflections and practical exercises concerning the nursing students’ own behaviour to the teaching (Kernan and Wheat, 2008). Nursing students, on the other hand, should be encouraged to take responsibility for their own health behaviour. Kernan and Wheat (2008) suggests that the students’ awareness of improved health behaviour will provide advantages in handling study-related demands such as stress. They further suggest that an early identification and effective treatment of health concerns best can be provided through the combined effort of faculty and student support professionals.

### 7.2.3 Student engagement in subgroups and during nursing studies

Student engagement levels, both active engagement (AE) and emotional engagement (EE), were examined as indicators of students’ positive or optimal functioning or behaviour in the academic life in nursing education, in seven subgroups of students and the findings showed diverse results. Having a higher level of AE was found for students who were older and male and for students having previous assistant nurse education prior to their nursing studies. Learning activities that nursing students experience as challenging and relevant, and that allow students to feel in control of their learning and
confident in their ability could give intrinsic satisfaction. This has been discussed to be important for further interest and further engagement among university students (Llorens et al., 2007, Schaufeli et al., 2002a). Male nursing students, older students and those students with previous assistant nurse education could indicate by their higher level of AE that, taking part in discussions and asking questions in class are relevant learning activities for them and a positive way used to cope with the academic demands.

Higher emotional engagement levels were found for students being older and for female students. Student engagement was in this thesis used as an indicator of positive behaviour (or optimal functioning). Among factors that also reflects optimal functioning, the experience of positive emotions is often included. According to Fredrickson (2001), positive emotions are considered to be means of achieving psychological growth and well-being. Although not directly tested (with regard to the effect of positive emotions), the result may suggest that the female and older nursing students have more positive emotions regarding their nursing studies in comparison with the other studied groups.

However, these findings, showing individual differences in student engagement (AE and EE), regarding age, gender and having assistant nurse education, agree with those of Pascarella and Terenzini (2005). They suggest in their review concerning how college affects students, that student engagement is more influenced individual characteristics such as age and gender than by educational characteristics, such as teaching methods and size of class. It has been suggested that the results are inconsistent for the effect of gender on student engagement (Hu and Kuh, 2002). The effect of age on student engagement shows older students being more engaged, and this is explained by older students performing better academically than younger students, which also explains their higher engagement in studies (Ofori, 2000, Salamonson et al., 2009).

Student engagement, AE and EE, showed diverse results when the mean levels were studied during the years of study. AE increased and EE decreased slightly or could be considered more stable during the years of education. These findings were unexpected, since this is not in line with work on engagement theory, where AE and EE are considered to develop together and show a reciprocal relationship. Moreover, in Study IV, variables important for a good SRH were examined. AE was not found to be statistically significantly associated with SRH, but EE was. The increase in AE during nursing studies might show students becoming integrated and more involved in their education and courses, which is in line with other studies that interpret student engagement as a learning outcome more than as a health outcome (NSSE, 2000, Ahlfeldt et al., 2005, Ofori, 2000). Since our findings also showed a statistically significant decrease in SRH during the years of study, these diverse findings for the development of AE and EE during nursing studies could be understood as a consequence of reduced general health, but how this result might be interpreted needs further examinations.

One surprising finding was the interaction effect found for emotional engagement and higher educational institution and time. Students studying at a university college were found to have a decreasing trend in EE during their years in nursing education in
comparison with students enrolled in universities, who had a stable level of EE throughout. However, this trend was not found among AE. It has been suggested that observed differences found between higher educational organisations represent something else, such as the characteristics of the students (Pascarella and Terenzini, 2005). A further explanation might be that nursing students attending universities have a higher grade point average (GPA) as it is an admission requirement, and that higher emotional engagement is stimulated by a higher GPA. These differences might also mirror organisational differences, which could reflect the previously mentioned expansion of higher education in Sweden, where universities could have managed the expansion better. This might have contributed to students’ higher EE when enrolled at universities. A recent report from LANE cohort EX2006 compared the quality evaluations from the National Agency for Higher Education (2006) on the higher educational institutions, and evaluations from the cohort including nursing students’ ratings of being satisfied and occupationally prepared from the institutions providing nursing education (Hasson et al., 2007). The result showed a discrepancy between the ratings by the authority of the quality of nursing education institutions and the ratings by the nursing students of being satisfied and prepared from their nursing education. However, further evaluation is needed of how the different higher educational institutions examined in this thesis have managed to achieve student engagement among the nursing students.

7.2.4 Self-rated health in the first year of education and in subgroups of students

Most of the nursing students reported good or quite good SRH in the first year of nursing studies (about 90%), which supports the findings of other studies among Swedish students in higher education showing most students SRH to be good or somewhat good (Love et al., 2009, Vaez and Laflamme, 2002). The dichotomised SRH in the first year of nursing education did not show any differences for any studied subgroups in relation to age, gender and having previous assistant nurse education. The finding regarding no differences in gender, contradicts the findings of Vaez and Laflamme (2002) and by Löve and colleagues (2009) who showed female students scoring lower general SRH than male students. However, no gender a difference in SRH among students has also been reported (Mikolajczyk et al., 2008). It is suggested that this gender difference in SRH depends on different ways to interpreting health. Males have been found to interpret health more in terms of physical health while females interpret their health more in psychological terms (Denton et al., 2004). In our study, the non-finding of gender different could be explained by our choice of having dichotomised the response categories in SRH question, which could lead to loss of information. However, in the univariable logistic regression male gender is more likely to have determined good SRH (the highest response category) than female gender, but this did not remain significant in the multivariable analysis, where other health behavioural and higher educational variables showed stronger associations. According to the literature describing SRH its predictors, demographic variables, have been found to have less impact than in the case of psychological and physiological complaints (Singh-Manoux et al., 2006).
7.2.5 Self-rated health during nursing studies

SRH was studied to capture the nursing students’ overall and subjective health. Most of the students reported having good or somewhat good SRH during the years of study (90%-88%), which is in line with previous Swedish studies. However, the mean value of SRH slightly decreased during the years in nursing education, from year one to the third and last year (statistically significant). This finding is confirmed by the findings from the study by Hasson and colleagues (Hasson et al., 2010), who also studied nursing students from another cohort in the LANE study. They showed a decrease from last year of nursing education to three years in the nursing profession as registered nurses, and this was found in particular among older students, although it was a small decrease. Hasson and colleagues suggest that this decrease in SRH could be explained by older nursing students showing a normal decrease in SRH according to age and the initial decrease for young nursing students vanishing after one year in profession. Their findings are in line with earlier studies showing SRH to be stable over time (Bailis et al., 2003, Leinonen et al., 2001).

However, another aspect regarding the nursing students’ decreasing mean value of SRH was the larger decrease in SRH seen from Year 1 to Year 2 (statistically significant), compared to Year 2 to Year 3 (not statistically significant). This was found to be an interesting phenomenon, which requires further examination with regard to what happens from Year 1 to Year 2 among nursing students. A recent qualitative and longitudinal study among Swedish nursing students examining their paths through nursing education described how students feel in the third semester (Lilja Andersson, 2007), which could be mirrored as the semester having most impact for the LANE nursing students ratings of SRH from the second year. For the students in the qualitative study, their third semester consists of a longer period of theoretical studies between two clinical periods (Lilja Andersson, 2007). The students in the study describe this longer period in the educational settings in terms of having contributed to distancing from their future nursing profession and describe this distancing as having contributed to their forgetting their practical and clinical knowledge. This contributed to students starting to feel doubtful about their ability to meet the clinical demands. The students realised, for example, the importance of managing drug administration and dosage calculation, where one mistake could harm or kill a patient. The nursing students in the third semester in this qualitative study showed weariness and doubt. The nursing students in the studied LANE cohort and the results presented in the present thesis, with a statistically significant decrease in SRH from the first to second year, might reflect this phenomenon.

7.2.6 Health resources important for SRH in the last year of nursing education

In this thesis the students’ overall positive health outcome in the final year of nursing education was examined in terms of having good SRH. SRH has been suggested to capture the WHO definition of health (1948) and is a frequently used subjective measure of an individual’s self-rated health (Burstrom and Fredlund, 2001, Idler and Benyamini, 1997). A resource is defined in this thesis as those objects, personal characteristics, conditions, or energies that are valued by the individual or that serve as
a means for attainment of these objects, personal characteristics, conditions or energies (Hobfoll, 1989). The findings concerning variables associated with having good SRH in nursing education were aspects related to both higher education and health behaviour, considered here as important resources for attaining health.

The student engagement variables, active engagement (AE) and emotional engagement (EE), are considered as higher educational variables, since they capture the interaction between the individual’s affective and cognitive interpretation of his or her education and the learning environment. AE and EE measured in the third and last year of nursing education showed diverse results in association with good SRH. AE was not associated with good SRH in the last year. However, EE proved to be the variable having the strongest association with good SRH among all the studied variables. This finding confirms the results from Study II, where the mean value of EE for students having good SRH was higher than that of those having poor SRH. Having good SRH and high emotional student engagement appears closely connected. For students it means that they can be active and answer questions and discuss in class (AE), even if they have poorer SRH. On the other hand, the students cannot be emotionally engaged and feel dedicated to their studies when they have poorer SRH, since EE is considered to be a more affective-cognitive state than AE.

Having a high nursing self-efficacy (NSE) was also found to determine good SRH. Other studies have previously shown that learning experiences on outcome expectations such as academic success was largely mediated by self-efficacy (Schaub & Tokar, 2005). Other studies have found self-efficacy during higher education to be important for students’ professional development during the first year in the profession (Saks, 1995). In addition, high NSE was shown in this thesis to be of importance for the nursing students’ good SRH in the last year of nursing studies. Both levels of NSE and EE are considered to be stimulated directly or indirectly from the learning environment, the teachers and from the supervisors in the clinical setting. The more students practise and receive feedback on their assignments, their analysis or problem solving, the more engaged they should become (Hu and Kuh, 2002). NSE could develop in four different ways according to social cognitive theory (Bandura, 1997). The first is mastery experiences, where study-related successes build a robust belief in one’s NSE, while failures lower it. Another is through vicarious experiences provided by role models, such as teachers, supervisors in the clinical setting and peers. Verbal persuasion, convincing social messages from others, is the third way in which to gain the development of NSE. The last way is the students’ own emotional and somatic states when they judge their professional capabilities in training and learning situations.

Studies have found engagement and self-efficacy to be positive variables important for coping with stress-related demands in professional life, to avoid negative outcomes such as the development of burnout (Schaufeli and Enzman, 1998). A study among employees of work engagement by Schaufeli and Salanova (Schaufeli and Salanova, 2007) indicates that engagement is rather related to health (psychological and physiological), high performance, intrinsic motivation and self-efficacy. A positive-gain spiral of resources, academic task, engagement and self-efficacy, for handling educational demands has also been found among students in higher education (Llorens et al., 2007, Salanova et al., 2003). That is to say, the more task resources the students...
perceived for completion of the task, the higher their levels of efficacy beliefs and the higher their levels of vigour and dedication three weeks later were found to be (Llorens et al., 2007). In addition, levels of student engagement and self-efficacy experienced during higher educational studies have also been found to be important to a future healthy professional life (Salmela-Aro and Nurmi, 2007, Pinto, 2010). However, no analyses were done in this study to elucidate a causal relationship among the studied variables EE, NSE and SRH, since they are seen here as contributing variables for ‘a spiral of gain’; high engagement stimulates increase in NSE and higher NSE in turn stimulates student engagement, leading to improved health and so on. It might therefore be suggested that EE and NSE could be useful to examine during higher education, together with students’ stress experiences and course validations. By doing so, a more nuanced description of which years, semesters or courses contribute to an increase as well as a decrease in levels of these both health resources, also important to their academic success with nursing studies.

Some of the studied health behavioural variables were found to be associated with good last-year SRH. These variables were having good quality of sleep, experiencing low or no stress regarding studies, not having problems with headache or backache, all variables from the first year of nursing education. Those nursing students having a good sleep quality were more likely to have good SRH than students having poor sleep quality. This finding indicates that sleep is something important when health resources among nursing students during education are supported, especially at the beginning of nursing education. Sleep quality among first year students has been found to be poor in comparison with higher-grade students and male students have been found to have better quality of sleep than female students (Tsai, 2004). Interestingly recent studies have shown that nursing students have limited knowledge of sleep physiology, how to recover sleep disturbance in the care of patients and that sleep was not prioritised in clinical situations in clinical placements (McIntosh and MacMillan, 2009a, McIntosh and MacMillan, 2009b). In addition, experiencing no or low stress regarding studies in the first year of nursing education was found to be associated with having good SRH in the final year. This agrees with previous research, which has found students’ stress to be salient predictor of self-rated health (Damush et al., 1997, Hemenover and Dienstbier, 1998).

To summarise, high EE, high NSE and having good health behaviour (e.g. good quality of sleep) were shown to be health resources important to having good SRH. These findings indicate the suggested ‘spiral of gain’, where these positive variables influence each other in a reciprocal relationship and develop when the student manages his or her study-related demands, leading to lower levels of stress experiences according to the theory proposed by Schaufeli and Enzman (1998). High levels of emotional engagement as well as high professional competence in the subject of nursing are positive learning outcomes from nursing studies, but also contribute resources to the students’ health outcome, good SRH.

7.2.7 Healthy nursing education and healthy nursing occupation

The studied group of nursing students formed a heterogeneous group, as indicated earlier. Most of them nevertheless reported having good or somewhat good self-rated
health (about 90%) throughout their nursing education. In addition, some of the studied health behaviour was also good for the majority (about 80%), such as having healthy eating habits, having good quality of sleep, not smoking, not having high-risk alcohol consumption and not experiencing stress regarding occupation. There is, however, room for improvement regarding the level of nursing students’ experiences of stress related to studies and the stress-related symptoms considering experience of headache, stomach ache and backache. The development patterns of students’ active engagement (AE) and emotional engagement (EE) differed. AE increased and EE was more stable during the years of study. Many nursing students experienced high active and emotional student engagement, yet substantial number of students have low levels during their studies. In order to stay healthy during nursing education, the findings indicate having the following health resources as being most important: having a high level of emotional engagement, having a high level of nursing-self-efficacy, good sleep quality, having low levels of stress related to studies, and not having problems with headache or stomach ache.

A recent study from the United Kingdom (Jiang et al., 2009) examined if medical education had a negative influence on students’ health behaviour in comparison with students in other majors. Their findings did not, however, show any statistically significant differences between students from different faculties, except for medical students having lower prevalence of smoking. The question whether students’ health behaviour could benefit from higher educational studies nevertheless needs further investigation. There is, however, no simple answer, at least not according to the findings presented in this thesis. The positive findings might indicate such an impact, whereas stable negative or negative health behaviour, such as poor sleeping quality and high stress level according to nursing studies could indicate the opposite, but reasons for behaviour change have not been explicitly studied. Recently, Swedish studies among students in general have shown comparable findings for the development of health behaviour during higher educational years (Love et al., 2009, Vaez, 2004), which might allow it to be suggested that nursing students do not have better health behaviour than other students in higher education in Sweden.

In this thesis, the health behavioural variables from the first year, quality of sleep, study stress, headache and backache, were found to be associated with last-year good SRH. When studying or working with nursing students’ health promotion it is suggested that this should be guided by the students’ self-reported general health as well as their different needs for improvements in health behaviour according to age, gender and previous education as assistant nurse. The health promotion should also take into account the different health resources, such as emotional engagement and nursing self-efficacy, which the findings in this thesis suggest. These findings confirm suggestions made earlier of the importance for nursing education already to work with and integrate students’ own health behaviour in curricula, in courses and educational tasks, from the first year of nursing education. However, whether this health promoting work will succeed or not greatly depends on nursing students’ own psychological health, since students with better psychological health have more positive feelings towards health behaviour, as recently was shown in a Australian cross-sectional study (Moyle et al., 2010).
Higher educational institutions providing nursing education also have an important role, in preparing students for a changing professional life. To educate, not only with a focus on the content of the nursing programme during nursing studies, but also with the aim of informing about how to handle nursing tasks and stay professional in a changing professional life. However, preparing students for their future professional lives as registered nurses during nursing studies may require different qualifications than created today, as discussed by Hallin and Danielsson (Hallin and Danielsson, 2007). In this thesis, it is suggested that the higher educational environment should be considered as the start of the nursing students’ working environment. This being so, it is suggested that there should be more focus on how to gain health resources during study years.

When planning courses and academic tasks (theoretical and clinical), the different health needs of the students should therefore be considered. One way to do so is to introduce Health Promoting Universities (HPU) (Tsouros et al., 1998) in Sweden. The framework of HPU can contribute to an increase in attention on students’ health and the importance of having a healthy educational environment. Furthermore, it could help to fill the gap in the present-day lack of regular, general and national information concerning health among Swedish university students.

Nursing students ought to be more conscious of their own health and health behaviour and aware of the importance of having healthy behaviour to stay healthy in the nursing profession. Healthy behaviour as a nursing student would not only be beneficial during the period of nursing studies, but may also lay a foundation for a career as a healthy registered nurse.

7.3 METHODOLOGICAL CONSIDERATIONS

There are some strengths and limitations that need to be further discussed, which have not been mentioned in previous sections, but are important to the interpretation of the findings. Some methodological concerns are the result of choices made by the research group, while others are more related to the respondents. Major strengths of the studies included (I-IV) are the prospectively longitudinal cohort design, the large nationwide sample of nursing students and the wide variety of questions included and instruments used in the questionnaires. The response rate was also considered good for the studied cohort (83% in the last year of education). Limitations of the included studies (I-IV) are related to design, data collection, the choice of included variables in the questionnaires, analyses and confounding factors, overestimation of the findings regarding non-participants, drop-outs, and the use of the Nursing Self-Efficacy scale.

7.3.1 Design, data collection and included variables

Various individual questions and instruments from questionnaires have been used to respond to the research questions and aims identified in this thesis. Thus, one of the methodological aspects concerns validity, both internal and external. Some of these aspects are discussed below. The longitudinal and nationwide design of the LANE study allows study of long-term health effects during the whole of nursing education and subsequently in working life as a registered nurse. Annual postal questionnaires were used to collect data, which has been suggested as a proper method when a large sample size is used (Edwards et al., 2002). The results in this thesis rely on self-
reported measures. Self-rating could be considered to be prone to problems relating to response bias and respondents answering in a socially desirable manner. The response rate for the LANE study and the first cohort was 73% (n=1,655), and the response rate was high during the study years, at 85%. These response rates were considered acceptable (Polit and Tanto Beck, 2008). Analysis with the accessible population (n=2,281) and the included nursing students in EX2004 has shown that there were no differences in mean age (28 years), but there was a difference in gender, with 65% of the male nursing students being included compared with 74% of the female students (Gustavsson et al., 2007). This gender aspect therefore has to be considered when interpreting the findings, such as male students having higher levels of active engagement, which might be explained by the more engaged male students being included in the LANE study. The findings concerning age could, however, be suggested as being quite representative of nursing students enrolled in the first year of nursing studies in 2002 in Sweden. In addition, the LANE study is the only study considering nursing students’ health with a nationwide sample.

In this thesis, the number of participating nursing educational organisations was 24 out of 26. However, in this work the focus was on studying health-related variables at group level based on individuals, not organisations, even though the differences in relation to having studied at university or university college were examined as one organisational variable. It might nevertheless have been interesting to study differences between all the included organisations. However, there are limited questions concerning higher educational organisations in the LANE questionnaires and in this thesis. Questions concerning, for example, the educational level of the teachers, the quality of theoretical courses and clinical placements could have influenced the organisational differences found, and have not been examined. However, it would not have feasible for the students to answer such questions. It is nevertheless recommended that the possible impact of these organisational variables on the students’ health should be examined in further studies.

Other questions not being possible to study because they were not included in all three questionnaires were variables such as weight, measured only in the first questionnaire, and healthy eating habits, smoking, alcohol and drug consumption, which were only measured in the first and last questionnaires during nursing studies. This choice of including or excluding variables limited the options for analysing health behaviour changes from Year 1 to Year 2, as well as the change in weight during nursing education.

Another limitation discussed in the different studies (II-IV) is the information concerning the students’ academic grade and how it might have influenced the examined SRH and health resources. The reason why this issue was not considered was that a specific question regarding grade had not been included in the questionnaires used in the LANE study. Only one question concerning having a study grant was asked, and although academic achievement (a pass) is required to obtain this funding, not all students make use of this option. However, it is difficult to measure academic success through grades, because courses examine in different ways and some nursing educational institutions might have held semester examinations, with grades given at the end of the semester. It is difficult to compare academic success or grades during
nursing studies nationally as well as internationally and this is not a problem limited to nursing education.

The choice in this thesis to use single items and how they capture the construct of interest in comparison with a scale or instrument could be discussed. For example, the stress experiences of the nursing students were measured in terms of hassles and daily stressors, as suggested by Kanner and colleagues (Kanner et al., 1981), not with a single stress instrument. The choice in favour of doing so is in line with the framework used, examining more positive aspects of health, and global single questions regarding experiencing stress and stress symptoms were accordingly considered to be suitable. If a more negative framework had been chosen in studying health, other questions and whole instruments from the LANE questionnaires considering, for example, demands, depression and personality would have been used.

The outcome variable SRH used has been considered to be reliable, reproducible and consistent with other measures of health (Ware et al., 1981, Idler and Benyamini, 1997) and to capture the global WHO health definition and its different aspects of health. In addition, the findings reported in this study are in line with other studies that have used SRH as an outcome measure among students (Vaez, 2004, Steptoe and Wardle, 2001). The SRH question is frequently used and treated as an interval scale (Bailis et al., 2003, Hasson et al., 2006, Svedberg et al., 2006), and was also used in this thesis (Study IV) to study mean levels during the years of study, although the scale level could also be considered ordinal. The SRH variable, used in studies II-IV, was also treated as a binary variable and dichotomised before analysis and use in the logistic regressions. Again, this was a choice made according to the interest of studying those students considered to have good health. However, dichotomising the studied SRH variable before use could contribute to loss of information as well as loss of variance (MacCallum et al., 2002).

The choice of other cut-offs used should be mentioned. The age variable was dichotomised before use (Study I-IV) into young and old age, with a cut-off at 30, which was done in relation to the mean level of 28 in the sample. It would have been possible to create more than two age groups, since very young (19-24) students might differ in health compared to students aged between 25 and 30 (The National Board of Health and Welfare., 2009). The categorisation of the size of the higher educational institution in the included studies (I-IV) followed the Swedish National Board of Higher Education guidelines from 2002 concerning universities and university colleges (Swedish National Agency for Higher Education., 2002). Before use of the NSE scale (Study IV), the total sum of score was calculated for each nursing student and dichotomised. NSE was dichotomised into low value (17% of students) and high value (83% of students). This cut-off made in accordance with results from Study I, which showed that the scale worked better in capturing low scoring students (having enough items for a certain level of the construct). However, a higher chosen cut-off, above the mean value, might have been more in line with analysing a positive outcome of NSE and SRH (Study IV).
7.3.2 Drop-outs and internal drop-outs

The results in this thesis rely on self-reported measures. Self-ratings could be considered to be subject to problems with response bias and the respondents answering in a socially desirable manner (Polit and Tanto Beck, 2008). Most of the studied variables showed low levels of internal drop-out, except for the variable concerning high alcohol consumption (8%) mainly due to students not consuming alcohol at all (Study III-IV). However, the problem with missing values could be discussed in terms of having excessively sensitive questions or the questions not being relevant to the participants. In Study IV only students who had responded to the SRH question three times were included (n=1,291). Analyses with non-participants did not show statistically significant differences in the studied variables age, gender, previous assistant nurse education, self-rated health, active and emotional engagement and most of the studied health-behaviour. However, the non-participants had a higher prevalence of smoking, poorer eating habits, and experienced more stress regarding their occupational choice and their future, and the risk of underestimating these findings in Study IV has to be borne in mind, such as a “healthier student effect”.

However, the findings regarding students’ health behaviour and SRH, are considered comparable with other study results concerning higher educational students’ health behaviour and SRH (Vaez, 2004, Love et al., 2009), even if a comparison may be biased due to different classification of SRH and used SRH measure has to be considered. Generally, the numbers of non-participants were not that high and the number of missing values was low, and the same questions and scales were used in studies I-IV taken from the questionnaires, which might contribute to more reliable findings.

7.3.3 Confounding factors and analyses

A confounder is a variable that is related to both the outcome variable and to one or more of the other independent variables. Age, for example, is often a confounding variable, having an impact on more examined variables. In this thesis, different variables have been included in the multivariable logistic regression to adjust for their impact to avoid problems with confounding factors (studies III-IV). Age, gender and previous assistant nurse education were all considered as dependent variables, but were included respectively in the multivariable logistic analyses to control for their impact (Study III). In Study IV individual and health behavioural variables from the first year were analysed separately from higher educational variables in the multivariate logistic regression, to first study these variables associations with last-year good SRH, adjusted for first-year good SRH, since studies have previously shown SRH to be a strong predictor of future SRH (Idler and Benyamini, 1997). Concerning the chosen framework, examining variables’ associations with positive SRH, the independent variables were limited to individual, health behavioural and higher educational variables. However, there are other variables which it is suggested could be studied in further work with determinants of SRH. Variables such as personality, financial circumstances and family-life balance might be important variables influencing outcome of SRH and may be studied from a negative health perspective. In this thesis, using a positive SRH approach, a choice was therefore made not to include them so that
they competed with the studied individual, health behavioural and higher educational variables, although their impact must be considered.

7.3.1 Use of the Nursing Self-Efficacy scale

7.3.1.1 An extensive validation

The findings from the Rasch analysis showed various kinds of psychometric problems in the scale. However, the Rasch analysis is not based on one analysis; it consists merely of analyses that together present a nuanced picture of the properties of the scale. Therefore, the findings from Study I should be considered as a whole and further use of the NSE scale should be discussed. Further improvements and extended development of the scale is suggested, depending on the problems elucidated. The revised scale of seven items and seven response categories showed acceptable fit. The problem with targeting, a few items capturing high levels of NSE and many students responding with high values, nevertheless remained and it is therefore that the scale works better for low-scoring students. Because of the relatively high mean value of 36, the NSE variable in Study IV was dichotomised before use into high (29-49) and low (7-28). In this way, the suggested use of the scale for low-scoring students was considered.

Most scales used to measure nursing competence in questionnaires are, however, not validated with such rigorous psychometric methods as Rasch analysis; instead they apply classical test theory and use Factor analysis and Chronbach’s alpha (Squier, 1981, Clark et al., 2004). Knowledge concerning validation of nursing competence using Rasch analysis is therefore needed. Additionally, this could contribute to the ongoing debate concerning classical or modern test theory (Wilcox, 1998), but from a nursing perspective. A comparison of the properties tested in Rasch analysis and those tested by Factor analysis of the NSE instrument would have provided useful information in this area.

7.3.1.1 Further work with the NSE scale

The scale development was in accordance with self-efficacy theory (Bandura, 1997), and the requirements from the National Board of Health and Welfare to construct items capturing the students’ competence. Considering the problems with high-scoring students and a few difficult items, improvements to the scale have been suggested. However, measuring the nursing students’ self-rated ability to perform nursing specific skills in the last year and in the last semester, perhaps only weeks from being registered nurses, might pose a challenge since it is both fundamental and required under legislation to become a registered nurse. The right items or questions have to be provided, and at the right level, and the problems of receiving socially desirable answers therefore need to be borne in mind. However, they could be considered to have answered in a socially desirable way, which might have contributed to their high level of professional competence. Other studies measuring students’ competence have discussed similar problems (Epstein and Hundert, 2002, Squier, 1981).

However, this was not evaluated in Study I, because only quantitative methods were used, although it is recommended that a combination of methodological approaches should be used when an instrument’s quality is investigated (AERA, et al., 1999).
recent study by Schüldt-Häård and colleagues (2008) studied NSE in the EX2002 cohort with a combined quantitative and qualitative method first-year registered nurses professional competence (NSE). Their findings showed that the professional competencies for which the nurses displayed the highest NSE were not entirely the same as those they regarded as the most critical competencies for mastery of their professional role. This finding confirms the need to consider improvement of the NSE scale guided by qualitative data to capture the nursing students’ own descriptions of professional competencies. Finally, nursing students’ professional competence is usually examined by teachers or supervisors in practical assessments or at clinic, together with students’ own ratings. Therefore, this self-reported NSE by the student could be used as a complement to ordinary evaluation of students’ competencies, as well as being seen as an indicator of their psychological health.

7.3.1.2 The use of Nursing Self-Efficacy variable in this thesis

Psychometric validation with the Rasch method of the NSE scale could be considered to be a strict method, and its findings should be interpreted with this in mind (Study I). The consequences of this contributed to more restrictive use of the variable in the analyses in this thesis (Study IV). However, NSE is used in this thesis as a powerful variable when studying the students’ psychological health as well as the learning outcome from nursing education. Measurement of the NSE might be particularly useful to capture students with low NSE, since students having low NSE were found less likely to have good SRH. Earlier analysis (not included in this thesis, but presented at the half-time seminar) did show statistically significant association concerning high NSE in the final year (dependent variable) and high student engagement and having prior experiences from health care (independent variables). However, further and planned analysis with NSE as an outcome variable is suggested, as well as validation of the scale with classical test theory as suggested above.
8 CONCLUSIONS

Aspects of health and health behaviour among nursing students have been studied in this thesis. Self-rated health (SRH) was good for most of the students, but their health behaviour and engagement showed diverse results depending on age, gender and having previous assistant nurse education, as well as during time in the higher educational environment. There are health resources which could be identified as being of importance for a positive health outcome in the final year of nursing studies, such as having high emotional engagement, high nursing self-efficacy, good sleep quality, low study-related stress, no headache and no backache. As a result of this thesis, nursing students’ own health during their years in the higher educational environment requires greater attention. Since their health and health resources differ among student subgroups and over time, some students are more vulnerable in dealing with demands and stress in nursing studies. Further, their health experiences during nursing studies could be seen as a start to their health careers as registered nurses. When this is recognised:

- Nursing students’ differences in demographic and previous experiences in health care could be considered when educational organisations support students’ health resources.
- Nursing students’ health behaviour could be prioritised from the first year of the educational environment with respect to differences regarding age, gender and previous assistant nurse education.
- Nursing students’ awareness of their own health and health behaviour could be integrated into courses on patient care and health promotion, as this is suggested as benefitting their own health as well as their future role as health promoters.
- The health outcome of nursing students at the end of higher education would benefit if more attention was given to students’ health resources, such as student engagement, nursing self-efficacy and health behaviour.
9  FUTURE RESEARCH

Future research could expand this work by investigating health behaviour in subgroups during educational years and by studying more factors of importance for students answering good SRH, by examining variables important also for the social health, such as having close relationships and experiencing positive life-events.

This study showed the importance of having health resources such as high emotional engagement and high nursing self-efficacy. It would therefore be interesting to perform an intervention study at one higher educational institution providing the nursing programme with the aim to strengthen the nursing students’ health resources. This could be investigated by introducing a mentor programme between nursing students and registered nurses and by introducing a more individual-based nursing programme in the curricula in order to see whether this supports personal and educational health resources.

In addition, implementation of the Health Promoting University (HPU) framework in Swedish higher educational organisations would provide ways of evaluating the health of students and teachers before and after such a health promoting reorganisation.
Avhandlingens titel är ”Hälsobeteende, sjuksköterskespecifik professionell tilltro och engagemang bland sjuksköterskestudenter – en longitudinal kohortstudie”


Syftet med föreliggande avhandling var att beskriva och undersöka självskattad hälsa, hälsobeteende, sjuksköterskespecifik professionell tilltro och studentengagemang bland sjuksköterskestudenter under utbildningstiden och i relation till undergrupper av studenter. Vidare var syftet att belysa hälsoresurser som kan vara av betydelse för en positiv hälsoutveckling under studietiden.

Studiepopulationen för den här avhandlingen baserar sig på data från en kohort från den nationella longitudinala LUST-studien (Longitudinell Undersökning av Sjuksköterskors Tillvaro). Deltagarna i den aktuella kohorten bestod av närmare 2281 sjuksköterskestudenter, som hösten 2002 gick i termin två på sjuksköterskeprogrammet. Antalet studenter som valde att delta i studien var 1655 (73%), vilket var de som svarade på den första enkäten, är två 1524 (67%) studenter och det tredje och sista utbildningsåret 1379 (60%) studenter. De inkluderade sjuksköterskestudenterna var inskrivna vid 24 olika utbildningsorter och besvarade en årlig enkät med frågor rörande demografi, studierna, fysisk-, psykisk- och social hälsa under sina tre utbildningsår.

Studie 1 är en valideringsstudie av ett instrument, vilket utvecklades av forskargruppen för att mäta sjuksköterskestudentens egenbedömda tilltro till sin sjuksköterske-
kompetens med nio påståenden och elva svarskategorier. Olika aspekter av instrumentets egenskaper undersöks med hjälp av Raschmetoden, en statistisk testmetod. Instrumentet visade på en del brister när det gällde bland annat att differenta svårighetsgraden mellan de enskilda påståendena och det fångade inte en tillräckligt hög nivå av kompetens, vilket visade sig i form av en takeffekt, ett stort antal studenter svarade de högsta svarskategorierna på flera påståenden. Vidare uppvisade några av de nio undersökta påståendena en avvikelse mot det underliggande begreppet (sjukköterskespecifik professionell tilltro) och hade omkastade svarskategorier, vilket innebar att instrumentet reviderades. Ett instrument med sju påståenden och sju svarsalternativ visade sig passa bättre mot mätmodellens krav på mättegningskaper hos instrumentet.

I Studie II undersöktades vad som händer med sjukköterskestudenternas studentengagemang, både det aktiva engagemanget och det emotionella engagemanget; nivå, variation i subgrupper av sjukköterskestudenter och förändring över tid. Resultatet visade att det aktiva engagemanget ökade, medan det emotionella engagemanget minskade något och var mer stabilt under studieåren. Skillnader i nivåer i studentengagemang visade sig i undergrupper av studenter relatert till: ålder, kön, underrättningsskeutbildning, självskattad hälsa och utbildningsorganisation. Manliga, äldre och studenter med en tidigare underrättningsskeutbildning hade högre nivå av aktivt engagemang. Det emotionella engagemanget var högre för kvinnliga, äldre, för de studenter som avgav en god självskattad hälsa och för de som var inskrivna vid ett universitet.


I Studie IV undersökte sjukköterskestudenternas självskattade hälsa och hälsobeteende över tid och vilka hälsor- och utbildningsrelaterade faktorer som kunde ha ett samband med en god självskattad hälsa sista året i sjukköterskeutbildningen. Resultaten visade en liten nedgång i självskattad hälsa under utbildningsåren, men majoriteten av studenterna angav en god eller ganska god självskattad hälsa. Hälssobeteendet förändrades i olika riktningar: positivt för motion och rökning, negativt för huvudvärk, framtidssstress och magont samt stabila nivåer under studieårer för sömnkvalitet, hälsosamma matvanor, alkoholvanor, studie- och yrkesstress och
ryggont. Att ha en god självskattad hälsa i sista året på sjuksköterskeutbildningen visade sig ha ett samband med utbildningsrelaterade hälsosurser (emotionellt engagemang och sjuksköterskespecifik professionell tilltro), men också med individuella hälsosurser (god sömnkvalitet, låg studiestress, inte besväras av huvudvärk eller ryggont).

Denna avhandling visar att den självskattade subjektiva hälsan är god för de flesta sjuksköterskestudenter under utbildningstiden, även om en liten minskning kan ses över tid. Däremot är bilden av deras hälsobeteende inte lika entydig, utan visar olika tendenser. Studentengagemanget (aktivt och emotionellt), som här studerats som en positiv hälsosurs, skiljde sig generellt i nivå över tid, men också i relation till undergrupper av studenter. Hälsosurser som är betydelsefulla för ett positivt hälsoutfall av sjuksköterskeutbildningen är att ha ett högt emotionellt engagemang för studierna, en hög tilltro till sin professionella kompetens, en god sömnkvalitet, låg studiestress och att inte besväras av huvud- eller ryggvärk. Sjuksköterskeutbildningen kan uppmärksamma och stödja studenternas hälsobehov och hälsosurser redan tidigt i utbildningen, eftersom ca 70% av alla sjuksköterskestudenter upplever ganska eller mycket studiestress redan under första året och den nivån kvarstår under hela utbildningstiden.

Detta är stor, nationell och longitudinell studie bland sjuksköterskestudenter som visar hur de mår under utbildningstiden, deras positiva hälsosurser och behovet av att se utbildningstiden och utbildningsmiljön som starten på deras egen hälsokarriär som legitimerade sjuksköterskor.
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59


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<table>
<thead>
<tr>
<th>Variables</th>
<th>Original item</th>
<th>Response scale</th>
<th>Coded as</th>
<th>Note</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-rated health (SRH)</td>
<td>How do you rate your general health?</td>
<td>Good, Somewhat good, Neither good nor poor, Somewhat poor, Poor</td>
<td>Good</td>
<td>good/somewhat good</td>
<td>II, III</td>
</tr>
<tr>
<td>Age</td>
<td>In which year were you born?</td>
<td>Write figures</td>
<td>Younger age</td>
<td>20-30 years</td>
<td>I-IV</td>
</tr>
<tr>
<td>Gender</td>
<td>Are you female or male?</td>
<td>Female/Male</td>
<td>Female/Male</td>
<td></td>
<td>I-IV</td>
</tr>
<tr>
<td>Assistant nurse (AN)</td>
<td>Were you a trained AN before starting nursing education?</td>
<td>Yes/No</td>
<td>Yes/No</td>
<td></td>
<td>I-IV</td>
</tr>
<tr>
<td>Previous higher education (HE)</td>
<td>Do you have experience from HE and if so how many study credits (p)?</td>
<td>No/credits</td>
<td>No, 1-40p, 41-80p, ≥80p</td>
<td></td>
<td>II</td>
</tr>
<tr>
<td>Sleep quality (SQ)</td>
<td>I rate my quality of sleep as...</td>
<td>Good, Somewhat good, Neither good nor poor, Somewhat poor, Poor</td>
<td>Good</td>
<td>Good/somewhat good</td>
<td>III-IV</td>
</tr>
<tr>
<td>Exercise</td>
<td>How often do you exercise or practise some sport?</td>
<td>Daily, Several times a week, At least once a week, Less than once a week</td>
<td>Yes</td>
<td>Several times a week/ daily</td>
<td>III-IV</td>
</tr>
<tr>
<td>Healthy eating habits (HEH)</td>
<td>Do you think your eating habits are healthy?</td>
<td>Yes/No</td>
<td>Yes/No</td>
<td></td>
<td>III-IV</td>
</tr>
<tr>
<td>Breakfast, lunch, dinner?</td>
<td>Do you have a regular intake of meals on weekdays</td>
<td>Yes/No</td>
<td>Yes/No</td>
<td></td>
<td>III</td>
</tr>
<tr>
<td>Alcohol</td>
<td>How often do you binge drink?</td>
<td>Never, Once a month, 2-4 times a month, 2-3 times a week, 4 times a week</td>
<td>Yes</td>
<td>2-4 times a month/ 2-3 times a week/ 4 times a week</td>
<td>III-IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>Never/ once a month</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>Do you smoke?</td>
<td>Yes, regularly, Yes, occasionally or sometimes, Stopped smoking, Never smoked</td>
<td>Yes</td>
<td>Smoke occasionally/ smoke</td>
<td>III-IV</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----</td>
<td>------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Headache, stomach ache or backache</td>
<td>During the past four weeks are you have been bothered by these health complaints?</td>
<td>Headache, stomach ache, backache</td>
<td>No</td>
<td>Never smoked/ stopped smoking</td>
<td>III-IV</td>
</tr>
<tr>
<td>Stress caused by studies, occupation or the future</td>
<td>Consider your situation, how is it at present and to what extent do you experience stress regarding...</td>
<td>Very stressed, Quite stressed, Not especially, Not at all</td>
<td>Yes</td>
<td>Quite stressed/ very stressed</td>
<td>III-IV</td>
</tr>
<tr>
<td>Nursing self-efficacy (NSE)</td>
<td>How do you think you will handle the following working task or situations in your work as a registered nurse?</td>
<td>1-7 points (7 items)</td>
<td>No</td>
<td>Not at all/ not especially</td>
<td>I, IV</td>
</tr>
<tr>
<td>Active engagement</td>
<td>How often have you this semester...</td>
<td>Always, Often, Seldom, Never (2 item)</td>
<td>Low</td>
<td>≤ 28 (of 49)</td>
<td>II, IV</td>
</tr>
<tr>
<td>Emotional engagement</td>
<td>There follow some statements on what it might be like to study to become a nurse...</td>
<td>Applies completely, Reasonably well, Does not apply well, Does not apply at all (1-4 points)</td>
<td>High</td>
<td>Applies completely/ reasonably well</td>
<td>II, IV</td>
</tr>
<tr>
<td>Higher educational institution (HEI)</td>
<td>In which university or university college are you enrolled?</td>
<td>Name of HEI</td>
<td>Low</td>
<td>Does not apply well/ does not apply at all</td>
<td>II, IV</td>
</tr>
<tr>
<td></td>
<td>Name of HEI</td>
<td></td>
<td>University</td>
<td>University/ large university college</td>
<td>II, IV</td>
</tr>
<tr>
<td></td>
<td>Name of HEI</td>
<td></td>
<td>University college</td>
<td>Quite small university college/ small university college</td>
<td>II, IV</td>
</tr>
</tbody>
</table>