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# **TESTING PRINCIPLES FROM COGNITIVE BEHAVIOR THERAPY FOR PREVENTING STRESS-RELATED ILL HEALTH AMONG NEWLY REGISTERED NURSES**

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# Testing principles from cognitive behavior therapy for preventing stress-related ill health among newly registered nurses

## THESIS FOR DOCTORAL DEGREE (Ph.D.)

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## ABSTRACT

Transitioning from education to working life is a challenging endeavor and newly registered nurses are one professional group that report high levels of symptoms of stress-related ill health. Transition-to-practice programs that are developed to support newly registered nurses' professional adjustment have not been found to be effective in preventing these experiences. Previous research has shown that the development of symptoms of stress-related ill health among newly registered nurses may be modeled as a sequential-developmental process where initial levels of stress develop into symptoms of stress-related ill health through engagement in avoidance strategies when faced with challenging situations. It has been suggested that transition-to-practice programs could be strengthened by adding an element that focuses on proactive behaviors. In contrast to avoidance behaviors, engagement in proactive behaviors when faced with challenging situations at work is expected to contribute to the development of the socialization processes task mastery, role clarity, and social acceptance. The availability of these recourses is assumed to decrease the risk of situations being perceived as unpredictable, uncontrollable, and socially risky. Over time, this is expected to reduce the activation of the stress response and the risk of developing symptoms of stress-related ill health.

Building on these previous lines of research, the general aim of this thesis was to investigate the possibility of preventing symptoms of stress-related ill health among newly registered nurses by supporting engagement in proactive behaviors. The overall hypothesis was that increased engagement in proactive behaviors would contribute to the development of the socialization processes, which, in turn, would mediate a reduction of experiences of stress and the risk of developing symptoms of stress-related ill health. The work was developed based on research from the fields of nursing, occupational health, stress, and organizational socialization, as well as theory and practice from cognitive behavior therapy. The methods of the four papers included in the thesis were designed based on guidelines of intervention development that suggest a stepwise procedure from the development of a theoretical understanding of the problem and a model of change, through feasibility testing, to the evaluation of effects.

In **Study I**, using an intensive longitudinal study design with 14 consecutive weeks of data collections and a sample of 264 newly registered nurses, we found that over the first three months in the profession higher levels of the socialization processes were related to lower levels of stress. Week-by-week, increased levels of the socialization processes were related to decreased experiences of stress. Similarly, in **Study II**, using a longitudinal study design with yearly data collections during the first three years in the profession and a sample of 1210 newly registered nurses, we found that higher levels of the socialization processes one year after professional entry were related to lower levels of symptoms of stress-related ill health (i.e. burnout), concurrently. Furthermore, increasing levels of the socialization processes during the first three years in the profession were related to decreasing levels of symptoms of burnout during the same period. In **Study III**, we analyzed newly registered nurses'

engagement in proactive behaviors using principles from learning theory and data from interviews with 12 newly registered nurses. We interpreted the newly registered nurses' reports to indicate that they engaged in proactive behaviors when they experienced uncertainty in combination with social support and a perceived ability to execute the given proactive behavior, and that engagement in proactive behaviors was reinforced by increased experiences of task mastery, role clarity, and social acceptance, and reduced experiences of stress. However, in the presence of fear in relation to making a mistake, not living up to role expectations, and not being accepted by peers, proactive behaviors were avoided. We developed an intervention to support engagement in proactive behaviors (by reducing engagement in avoidance behaviors and increasing engagement in leisure activities) using the behavior change techniques systematic exposure, reinforcing approach behaviors, and action planning. Using a non-randomized experimental design with one study condition and a sample of 65 newly registered nurses, we concluded that it would be feasible to evaluate the effect of the intervention as an add-on to a transition-to-practice program for newly registered nurses. Finally, in **Study IV**, we evaluated the effect of the intervention in a randomized parallel group trial with an active control and a sample of 238 newly registered nurses based on differences in change over time as well as differences in means following the end of the intervention. We found support for a small effect of the intervention on newly registered nurses' experiences of stress and a small to medium effect on avoidance of proactive behaviors, in line with the study hypothesis. However, the results of different types of analysis were inconclusive. No statistically significant effects of the intervention could be confirmed for engagement in energizing leisure activities or task mastery, social acceptance, and role clarity. In conclusion, the findings suggest that transition-to-practice programs may benefit from adding an intervention that specifically addresses newly registered nurses' experiences of stress and avoidance of proactive behaviors to further support them as they adjust to their new professional role.



## LIST OF SCIENTIFIC PAPERS

- I. **Frögéli, E.**, Rudman, A, Gustavsson P. (2019). The relationship between task mastery, role clarity, social acceptance, and stress: an intensive longitudinal study with a sample of newly registered nurses. *International Journal of Nursing Studies*, 91, 60-69.
- II. **Frögéli, E.**, Rudman, A., Lövgren, M., Gustavsson, P. (2019). Problems with task mastery, social acceptance, and role clarity explain nurses' symptoms of burnout during the first professional years: a longitudinal study. *WORK: A Journal of Prevention, Assessment, and Rehabilitation*, 62, 573-584.
- III. **Frögéli, E.**, Rudman A., Ljótsson, B., Gustavsson, P. (2018). Preventing stress-related ill health among newly registered nurses by supporting engagement in proactive behaviors: development and feasibility testing of a behavior change intervention. *Pilot and Feasibility Studies*, 4:28.
- IV. **Frögéli, E.**, Rudman A., Ljótsson, B., Gustavsson, P. Preventing stress-related ill health among newly registered nurses by supporting engagement in proactive behaviors using cognitive behavior therapy – a randomized controlled trial. Manuscript.

## LIST OF ADDITIONAL PUBLICATIONS

Additional publications related to the work presented in the thesis<sup>1</sup>.

**Frögéli, E.**, Djordjevic, A., Rudman, A., Livheim, F., Gustavsson, P. (2016). A randomized controlled pilot trial of acceptance and commitment training (ACT) for preventing stress-related ill health among future nurses. *Anxiety Stress Coping* 29 (2), 202-218.

**Frögéli, E.**, Högman, N., Aurell, J., Rudman, A., Dahlgren, A., Gustavsson, P. (2017). An intensive prospective study of newly registered nurses' experiences of entering the profession during 2015. Report B2017:3. Karolinska Institutet, Stockholm.

**Frögéli, E.**, Aurell, J., Högman, N., Rudman, A., Dahlgren, A., Gustavsson, P. (2017). An intensive prospective study of newly registered nurses' experiences of entering the profession during 2016. Report B2017:4. Karolinska Institutet, Stockholm.

**Frögéli, E.**, Rudman, A., Ljótsson, B., Gustavsson, P. (2017). Interventionsmanual. Att främja proaktivitet och förebygga stressrelaterad ohälsa bland nya sjuksköterskor. Rapport C2017:1. Karolinska Institutet, Stockholm.

**Frögéli, E.**, Rudman, A., Gustavsson, P. (2018). Preventing stress-related ill health among future nurses: Effects over 3 years. *International Journal of Stress Management*. DOI: 10.1037/str0000110.

Gustavsson, P., **Frögéli, E.**, Dahlgren, A., Lövgren, M., Rudman, A. (2015). Nya sjuksköterskors exponering för höga arbetskrav, låg kontroll och lågt stöd under sina första tre år i yrkeslivet. Rapport 2015:1. Karolinska Institutet, Stockholm.

Gustavsson, P., **Frögéli, E.**, Rudman, A. (2017). Säker, motiverad och skicklig. Forskningsbaserad intervention för att stimulera hälsa, arbetsengagemang och kompetens hos nya sjuksköterskor. Vetenskaplig slutrapport till AFA Försäkring (Dnr 14007). Rapport 2017:6. Karolinska Institutet, Stockholm.

Gustavsson, P., Aurell, J., Jenner, B., **Frögéli, E.**, Annas, P., Rudman, A. (2018). Psykosociala arbetsmiljörisker för sjuksköterskor under de fem första åren i yrket: Longitudinell utveckling och förekomst av upprepade samt långvarig exponering. Rapport B2018:1. Karolinska Institutet, Stockholm.

Gustavsson, P., Agrenius, B., Hedberg, J., Jenner, B., von Rüdiger, N., Annas, P., **Frögéli, E.**, Rudman, A. (2018). Nya professionella: Bakgrund, design, förankring och rekrytering. Rapport C2018:2. Karolinska Institutet, Stockholm.

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<sup>1</sup> These reports and additional publications from the research group are available at <https://ki.se/cns/petter-gustavssons-forskargrupp>

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## LIST OF ABBREVIATIONS

SEQ	Stress and Energy Questionnaire
QPS-Nordic	General Questionnaire for Psychological and Social Factors at Work
NSFS	Needs Satisfaction and Frustration Scale
SWEBO	Scale of Work Engagement and Burnout
URL	Uniform Resource Locator
OBS	Observed data
IMP	Imputed data
EX	Experimental group
ITT	Intention-to-treat
ES	Efficacy subset
ID	Identification



# **1 INTRODUCTION**

Central to the way we interact with our environment is our ability to interpret a situation as a threat (or, more generally, a challenge) and mobilize resources through activation of the stress response. This evaluation is assumed to be based on the perceived demands in relation to the resources that are available to manage the demands (McEwen & Gianaros, 2011).

## **1.1 THE STRESS RESPONSE**

The stress response refers to a set of physiological, behavioral, and emotional adaptations in situations where there is a perceived or anticipated threat or challenge. The purpose of the response is to support effective management of the situation to avoid harmful outcomes. Processes within the brain (notably, the hippocampus, the amygdala, and parts of the prefrontal cortex) are central to these adaptations that are promoted by neurotransmitters, cytokines, and hormones operating nonlinearly within the hypothalamic-pituitary-adrenal axis, the autonomic nervous system, the metabolic system, and the immune system. These allodynamic adaptations, referred to as allostasis, enable effective management of acute challenges while maintaining homeostasis (McEwen et al., 2015; McEwen & Gianaros, 2011).

## **1.2 STRESS-RELATED ILL HEALTH**

Allostatic load, on the other hand, refers to the damaging effects of repeated or prolonged activation of the stress response on the different physiological systems involved in the response, including dysregulation of the nonlinear interactions. Specifically, repeated or prolonged activation of the stress response has been related to detrimental effects on brain plasticity (notably in the amygdala, hippocampus, and prefrontal cortex) as well as metabolic-, immune-, and cardiovascular pathophysiology. Allostatic load has been related to symptoms such as fatigue, exhaustion, cognitive impairments, lowered immunity, shortness of breath, muscle ache, and gastrointestinal pain, as well as loss of motivation, feelings of self-doubt, and cynicism (McEwen et al., 2015; McEwen & Gianaros, 2011).

## **1.3 STRESS-RELATED ILL HEALTH IN THE OCCUPATIONAL CONTEXT**

The negative effects of repeated or prolonged activation of the stress response have been recognized in relation to certain work conditions (S. Cohen, Janicki-Deverts, & Miller, 2007). In line with the general stress research, in the occupational context, the availability of demands and resources has been identified to affect the development of symptoms of stress-related ill health (Bakker & Demerouti, 2007; Karasek & Theorell, 1990). Accordingly, results of a series of meta-analyses have shown demands at work, including pressing work, night work, long working weeks, and noise to be related to an increased risk for cardiovascular diseases (Kivimaki & Steptoe, 2018; Theorell et al., 2016). In addition, demands, conflicts, bullying, and long working hours have been related to an increased risk of depressive symptoms (Theorell et al., 2015). Similarly, demands and bullying at work have been related to an increased risk of sleep disturbances (Linton et al., 2015). Finally,

demands, including high workloads, have been related to an increased risk of developing symptoms of burnout (Aronsson et al., 2017; Bakker & Demerouti, 2007).

Contrary to this, social support, control, and justice at work have been related to a reduced risk of sleep disturbances (Linton et al., 2015). However, lack of decision latitude, support, work justice, and skill discretion have been related to increased risks of depressive symptoms and cardiovascular diseases (Theorell et al., 2015). Finally, lack of support from managers and coworkers and lack of job security have been related to an increased risk of developing symptoms of burnout (Aronsson et al., 2017).

These hazardous working conditions are, more or less, characterized by unpredictability, uncontrollability, and the risk of social disapproval, qualities that have been recognized to activate the stress response (Adolphs, 2013; Sapolsky, 2007). Certain events in working life are particularly tainted by these qualities and are thus associated with an increased risk of prolonged or repeated activation of the stress response that may eventually lead to the development of symptoms of stress-related ill health. Examples of such events are reorganizations, downsizing, and onboarding. The period of transitioning from study to working life has been recognized as particularly challenging (Bauer, Bodner, Erdogan, Truxillo, & Tucker, 2007).

#### **1.4 STRESS AMONG NEW PROFESSIONALS**

Experiences of new professionals transitioning from study to working life are studied within the framework of organizational socialization (Wanberg, 2012). In line with stress research, at the foundation of organizational socialization research is the assumption that new professionals experience stress because they are exposed to situations that are characterized by unpredictability and uncontrollability, and are perceived as socially risky (Ellis et al., 2015; Saks & Gruman, 2012). As stated by Ashford and Black (1996, p. 200), the new professional situation is “unfamiliar, troubling events can occur, and the new entrant can experience high levels of uncertainty regarding what is appropriate and how to respond”.

Many new professionals are troubled by experiences of stress (Ellis et al., 2015; Wanberg, 2012). In fact, the construct of burnout was initially defined based on experiences of new professionals as they entered working life (Cherniss, 1980; Schaufeli & Enzmann, 1998). In Sweden, public health data show that young adults make up the population group that experiences the highest level of stress (The Public Health Agency of Sweden, 2016). One important explanatory factor for sick leave due to stress reactions among young adults is conditions of working life (Försäkringskassan, 2014).

Consistent with the stress models, it has been suggested that the primary goal of new professionals is to develop resources to manage the challenges of the new profession. Specifically, they are motivated to develop a sense of competence and control, predictability and meaningfulness, and social belonging (Ashforth & Saks, 2002). This is highlighted in the definition of organizational socialization, that is “the process through which individuals acquire the knowledge, skills, attitudes, and behaviors required to adapt to a new role”



(Wanberg, 2012, p. 3). Within this framework, resources are operationalized as mediators of new professionals' adaptation and they are referred to as adjustment indicators or socialization processes (Ellis et al., 2015; Saks & Gruman, 2012). According to the results of a meta-analysis, the socialization processes (i.e. resources) task mastery, role clarity, and social acceptance are particularly important for new professionals' successful management of the demands of their new profession, and are related to performance, job satisfaction, organizational commitment, intentions to remain in the profession, and turnover (Bauer et al., 2007).

New professionals need to organize impressions, learn structures, responsibilities, and routines, get to know new colleagues and establish collaborations, as well as learn new techniques and skills to be able to perform assigned tasks. Task mastery refers to the experiences of being able to manage tasks effectively and is expected to affect the degree to which situations in the new profession are perceived as controllable (Bandura, 1997). Role clarity refers to the newcomers' knowledge of what is expected within their new professional role as well as what level of influence they may exert, and is expected to affect the degree to which situations in the new profession are perceived as predictable (Kammeyer-Mueller & Wanberg, 2003). Finally, social acceptance refers to the new professionals' inclusion into their new group of colleagues and their experiences of social support, and is expected to affect the degree to which new professionals experience social risks (Kammeyer-Mueller & Wanberg, 2003).

#### **1.4.1 Stress among newly registered nurses**

One group of professionals that report particularly high levels of stress as they transition into their new profession is newly registered nurses. One in five newly registered nurses report symptoms of stress-related ill health during their first years in the profession according to data from a national sample in Sweden (Rudman & Gustavsson, 2011). Similarly, nearly every second new nurse reported such experiences in a range of studies conducted in Canada (Boamah & Laschinger, 2016; Laschinger, Grau, Finegan, & Wilk, 2010).

##### *1.4.1.1 Relationship between the socialization processes and stress among newly registered nurses*

Qualitative research suggests that the socialization processes are of importance for newly registered nurses' experiences of stress. Already in the 1970s, it was recognized that newly registered nurses experience stress in relation to fulfilling role requirements (Kramer, 1974). More recently, newly registered nurses' experiences as they transition into the profession have been captured in the transition shock model (Duchscher, 2009). In line with the organizational socialization framework and the processes task mastery and role clarity, Duchscher (2009) described experiences of stress among newly registered nurses as related to unrealistic expectations of performance and a perceived lack of competence and training, as well as a perceived inability to maintain clinical practice intentions and standards learned in school. Furthermore, in relation to social acceptance, Duchscher (2009) described stress

among newly registered nurses as related to interactions with colleagues, specifically insufficient support and fear of social disapproval.

These findings are supported in other research. In relation to role clarity and task mastery, newly registered nurses have reported that being required to move out of the newcomer role too quickly was a key cause of stress (Arrowsmith, Lau - Walker, Norman, & Maben, 2016; Gardiner & Sheen, 2016; Halpin, Terry, & Curzio, 2017; Pellico, Brewer, & Kovner, 2009; Ten Hoeve, Kunnen, Brouwer, & Roodbol, 2018). Specifically, the nurses expressed that they experienced that they were expected to be able to manage a full patient load from the start and that they were not given a chance to develop task mastery (Pellico et al., 2009).

Furthermore, the results of two systematic reviews confirmed the suggestion that newly registered nurses experience stress due to perceiving that they lack the skills and knowledge needed to adequately perform patient care (Arrowsmith et al., 2016; Gardiner & Sheen, 2016) and that they are afraid of making mistakes and not being able to answer questions (Arrowsmith et al., 2016; Gardiner & Sheen, 2016). In addition, being responsible for the safety and care of patients suffering from (increasingly) complex conditions was similarly recognized to contribute to experiences of stress among newly registered nurses (Arrowsmith et al., 2016; Gardiner & Sheen, 2016; Halpin et al., 2017; Ten Hoeve et al., 2018).

In relation to social acceptance, newly registered nurses have expressed that they experience stress as they perceive colleagues to be unsupportive (Gardiner & Sheen, 2016; Ten Hoeve et al., 2018), unavailable (Gardiner & Sheen, 2016; Halpin et al., 2017), and even mean and hostile (Gardiner & Sheen, 2016; Halpin et al., 2017; Pellico et al., 2009). Furthermore, the importance of social acceptance was identified in another systematic review where newly registered nurses reported that a sense of belonging was one of the key factors that facilitated transition from education to clinical practice (van Rooyen, Jordan, Ten Ham-Baloyi, & Caka, 2018). Similarly, care situations have been recognized to be particularly challenging if newly registered nurses' experience that colleagues do not acknowledge their need for help, or if they feel ignored or not taken seriously (Stern, Ramstrand, Nystrom, Hagiwara, & Palmer, 2017). In addition, newly registered nurses experience stress in relation to having to manage critical and aggressive patients (Ten Hoeve et al., 2018).

Finally, focusing on the prevalence of these issues, the degree to which newly registered nurses reported that they did not experience optimal levels of the socialization processes was analyzed in a nationally representative sample of newly registered nurses in Sweden (Gustavsson, Aurell, et al., 2018). A low level of task mastery and a low level of role clarity were reported by approximately 40% of the newly registered nurses during the first five years in practice. Social acceptance was represented by the experience of having support from management. The proportion of the newly registered nurses who reported a high lack of support from their closest manager was approximately 35% over the five years of study.

#### *1.4.1.2 Consequences of stress-related ill health among newly registered nurses*

Newly registered nurses who experience high levels of stress and symptoms of stress-related ill health also report lower levels of satisfaction with their work (Laschinger, 2012; Laschinger et al., 2016), and greater preoccupation with thoughts about leaving the nursing profession (Flinkman, Laine, Leino-Kilpi, Hasselhorn, & Salanterä, 2008; Rudman & Gustavsson, 2011). According to data from Statistics Sweden (Statistics Sweden, 2017), five out of ten Swedish nurses who had chosen to leave the nursing profession for another occupation between the years of 2013 and 2016 stated that the working situation with its high demands and experiences of stress was their reason for leaving.

Turnover among newly registered nurses has been recognized as a major cause for concern for health care organizations worldwide as it reduces the strength of the nursing workforce (Institute of Medicine, 2011; WHO, 2006, 2013). Importantly, it does not only reduce the number of staff members available to provide health care in the short run, but it also reduces the availability of competence over time, as novice nurses who leave the profession do not develop into senior and experienced nurses. Lack of staff and competence are risk factors that have been associated with reduced quality of care and patient safety (Socialstyrelsen, 2018b). In Sweden, prognoses suggest that there will be a lack of nurses until at least the year 2035 due to the growing population (Socialstyrelsen, 2018a).

Furthermore, experiences of stress-related ill health at professional entry have long-lasting consequences. Longitudinal analyses show that newly registered nurses who reported symptoms of burnout as they entered the profession report higher levels of depressive symptoms five years into the profession than nurses who did not experience symptoms of burnout as they entered the profession, corrected for ongoing symptoms. In addition, they experience more problems with concentration and decision making, are less confident in their professional skills, and worry more about occupational risks. They also report more sleeping problems and lower levels of positive emotions including happiness, generosity, and inspiration (Arborelius, Rudman, & Gustavsson, 2017).

### **1.5 PREVENTION OF STRESS-RELATED ILL HEALTH AMONG NEW PROFESSIONALS**

In Sweden, employers are compelled by law to provide employees with working conditions that do not put their health at risk (Arbetsmiljöverket, 2015). The American National Institute of Mental Health defines prevention as “Interventions that occur prior to the onset of a disorder that are intended to prevent or reduce the risk for the disorder” (O’Connell, Boat, and Warner (2009), p. xxvii). Preventative efforts for reducing the risk of symptoms of stress-related ill health among employees as they enter a new professional role (note, not necessarily as they transition from study to professional life) have typically involved making structural changes in the work situation, including working time and schedules, as well as providing education to managers (Holman, Johnson, & O’Connor, 2018). However, according to the results of a meta-analysis, such organizational interventions have not been found to be

effective (Richardson & Rothstein, 2008), although qualitative evaluations provide some support for their effect (Holman et al., 2018).

Within organizational socialization research, a lot of attention has been devoted to identifying strategies for supporting new professionals as they enter the profession. Organizational socialization strategies refer to “organization-initiated activities, programs, events, and experiences that are specifically designed to facilitate newcomers’ learning, adjustment, and socialization into a job, role, work group, and organization so that they can become effective of the organization” (Saks and Gruman (2012), p. 28-29). That is, strategies to reduce organizational level demands and increase organizational level resources with the purpose of increasing the socialization processes task mastery, role clarity, and social acceptance. They typically include communication practices (e.g. providing written information about the role and tasks to be performed, and the possibility for two-way communication, e.g. via a meeting with a human-resources representative), training practices (i.e. planned efforts to facilitate the development of skills), and organized opportunities for social interactions (Klein & Polin, 2012).

The results of two meta-analyses based on observational data indicate that formal socialization programs improve retention, job satisfaction, and organizational commitment (Bauer et al., 2007; Saks, Uggerslev, & Fassina, 2007). As socialization programs occur at professional entry, they are a suitable arena for addressing experiences of stress among new professionals (Ellis et al., 2015). However, although it is greatly recognized that the period of transitioning into a new profession is stressful, preventing experiences of stress or the development of symptoms of stress-related ill health has not been a primary aim of organizational socialization programs (Ashford & Nurmohamed, 2012; Bauer et al., 2007; Ellis et al., 2015; Saks & Gruman, 2012).

### **1.5.1 Prevention of stress-related ill health among newly registered nurses**

Issues surrounding the professional establishment of newly registered nurses have been debated in health care settings and in the nursing literature for years (Hickerson, Taylor, & Terhaar, 2016; Kramer, 1974; Missen, McKenna, Beauchamp, & Larkins, 2016; Pellico et al., 2009; Pennbrant, Nilsson, Ohlen, & Rudman, 2013; Phillips, Esterman, & Kenny, 2015). The need to intervene and facilitate the professional adaptation of newly registered nurses has been recognized internationally (Institute of Medicine, 2011; Mirsch, 2016; Voldbjerg, Gronkjaer, Sorensen, & Hall, 2016; Voldbjerg, Gronkjaer, Wiechula, & Sorensen, 2017). In 2011, the American National Academy of Sciences Institute of Medicine published a report stressing the need of a strengthened nurse work force and recommended implementing and critically evaluating formal socialization programs for newly registered nurses in all health settings (Institute of Medicine, 2011). In line with organizational socialization programs, these programs for newly registered nurses, typically referred to as transition-to-practice programs, were defined as “planned, comprehensive periods of time during which nursing graduates can acquire the knowledge and skills to deliver safe, quality care that meets defined (organization or professional society) standards of practice” (p. 6).

No standards for the content of such transition-to-practice programs are available (Brown, Poppe, Kaminetzky, Wipf, & Woods, 2015; Rush, Adamack, Gordon, Lilly, & Janke, 2013). However, best-practice recommendations suggest that they should include a defined resources person or preceptor, mentorship, and peer support opportunities (Larsen et al., 2018; Rush et al., 2013). In addition, the programs should preferably be 12 months long, include educational sessions with case studies, and allow newly registered nurses to gain clinical experience from different clinical areas (Larsen et al., 2018).

A number of recent systematic reviews suggest that transition-to-practice programs are effective in improving retention of newly registered nurses (Ackerson & Stiles, 2018; Letourneau & Fater, 2015; Missen, McKenna, & Beauchamp, 2014; Rush et al., 2013; Van Camp & Chappy, 2017), job satisfaction (Mellor, Gregoric, Atkinson, & Greenhill, 2017; Missen et al., 2014), learning and performance (Mellor et al., 2017), confidence (Edwards, Hawker, Carrier, & Rees, 2015; Missen et al., 2014), and social belonging (a construct closely related to social acceptance) (Missen et al., 2014). However, although preventing or reducing experiences of stress is often identified as a key aim of transition-to-practice programs (Baumann, Hunsberger, Crea-Arsenio, & Akhtar-Danesh, 2018; Edwards et al., 2015; Letourneau & Fater, 2015; Phillips et al., 2015), the typical program does not focus on those experiences (Larsen et al., 2018; Rush et al., 2013). As an exception, Altier and Krsek (2006) presented a transition-to-practice program that included a focus on stress management. However, no details on this additional component were presented in the study, and the effect of the program on experiences of stress was not evaluated.

That said, it is not surprising that transition-to-practice programs have not been found to be effective in reducing experiences of stress or symptoms of stress-related ill health among newly registered nurses. One large study suggested that newly registered nurses who are given the possibility to participate in a program report less stress than newly registered nurses who are not given this opportunity (Spector et al., 2015). However, when results from ten years of investigations of the effect of one commonly used transition-to-practice program (including the best-practice components) were summarized, the analysis showed that the program was not effective in reducing experiences of stress (Goode, Lynn, McElroy, Bednash, & Murray, 2013). Furthermore, a systematic review of the effects of different programs found only low quality evidence for the effect of transition-to-practice programs on experiences of stress (Edwards et al., 2015).

## **1.6 A BEHAVIORAL MODEL OF STRESS-RELATED ILL HEALTH**

Interventions that are based on a thorough understanding of the target problem and have an explicit model of how to bring about change are more effective than interventions with no explicit theory (Prestwich et al., 2014). Recognizing the need for more effective strategies for supporting new professionals as they enter the profession, it has been suggested that new professionals' behaviors in relation to the job demands and experiences of stress should be given more attention (Bauer & Erdogan, 2012; Ellis et al., 2015; Nifadkar, Tsui, & Ashforth, 2012).

In addition to the demands and resources available in the organization, the way in which individuals respond to demands at work has been identified as a key component in the development of stress-related ill health (Maslach, Schaufeli, & Leiter, 2001; Schaufeli & Enzmann, 1998). Behavioral avoidance to escape or avoid perceived threats is an essential adaptation of the stress response (Koole, 2009; Kryptos, Effting, Kindt, & Beckers, 2015). However, excessive avoidance of stressful experiences has been highlighted as a key factor of psychological distress (Chawla & Ostafin, 2007; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). To name a few examples, avoidance of feared situations or objects such as snakes, dogs, heights, water, airplanes, and elevators is central to the development and maintenance of conditions of specific phobias. Avoidance of social situations is central to social phobia, and avoidance of internal experiences (e.g. beating of the heart, gastrointestinal sensations, and dizziness) is central to panic disorder (American Psychiatric Association, 2013). Importantly, in humans, the mere thought of a feared situation or object is enough to elicit the stress response and accompanying avoidance behaviors (Adolphs, 2013; Sapolsky, 2007). This is clear in the case of post-traumatic stress disorder where avoidance of memories or thoughts of stressful experiences is key (American Psychiatric Association, 2013).

Within occupational health research, the role of avoidance behaviors in relation to demands and stress experienced at work has been particularly acknowledged in the case of burnout (Maslach et al., 2001; Schaufeli & Enzmann, 1998). Burnout is defined as a “persistent, negative, work-related state of mind in ‘normal’ individuals that is primarily characterized by exhaustion, which is accompanied by distress, a sense of reduced effectiveness, decreased motivation, and the development of dysfunctional attitudes and behaviors at work” (Schaufeli & Enzmann, 1998, p. 36). In line with the symptoms of allostatic load (McEwen et al., 2015; McEwen & Gianaros, 2011), affected individuals typically experience a range of affective, cognitive, physical, behavioral, and emotional symptoms that include, but are not limited to, anxiety, depressed mood, sense of failure, inability to concentrate, headaches, hyperactivity, procrastination, and loss of zeal (Schaufeli & Enzmann, 1998).

When experiencing stress in relation to one's demands at work, engagement in avoidance behaviors is proposed to contribute to a negative spiral that drives the development of the symptoms of burnout (Maslach et al., 2001; Schaufeli & Enzmann, 1998). Specifically, as individuals engage in avoidance behaviors, demands are not mastered and resources such as knowledge, skills, or social support are not developed. Consequently, the next time a similar situation is encountered, it will be perceived as equally demanding and re-activate the stress response. Over time, repeated activation of the stress response may increase the risk of developing symptoms of stress-related ill health through allostatic load (McEwen et al., 2015; McEwen & Gianaros, 2011). On the contrary, active engagement in demanding situations may result in successful management of demands and foster the development of resources that reduce the degree to which different situations at work are perceived as challenging and activate the stress response. Thus, active management of challenging demands is suggested to contribute to reduce the risk of developing symptoms of stress-related ill health over time (McEwen & Gianaros, 2011; Schaufeli & Enzmann, 1998).

In addition to behavioral responses at work, the negative effect of repeated or prolonged activation of the stress response on health is dependent on engagement in, or avoidance of, leisure activities that contribute to recovery following activation of the stress response. Maintaining a stable sleep pattern and engaging in regular physical activity, social interactions, as well as interests or hobbies are expected to reduce the negative impact of repeated or prolonged activation of the stress response on health (Dhabhar, 2014; Kivimaki & Steptoe, 2018; McEwen & Gianaros, 2011; Schaufeli & Enzmann, 1998). However, engagement in such recovery-promoting behaviors has been found to decrease in relation to prolonged or repeated activation of the stress response. Over time, this may increase the risk of stress-related ill health (Dhabhar, 2014; Kivimaki & Steptoe, 2018; McEwen & Gianaros, 2011; Schaufeli & Enzmann, 1998).

The behavioral model of stress-related ill health has been confirmed among newly registered nurses as they encounter the demands of their new professional role (Gustavsson, Hallsten, & Rudman, 2010). That is, stress-related ill health among newly registered nurses may be modeled as a sequential-developmental process where symptoms develop progressively from initial levels of perceived stress and exhaustion through engagement in avoidance strategies in relation to demands at work.

### **1.6.1 Proactive behaviors**

That notion that the way in which individuals respond to demands at work is a key component in the development of stress-related ill health is interesting considering new professionals' engagement in a class of behaviors referred to as proactive behaviors. New professionals' engagement in proactive behaviors has been recognized to facilitate their transition into the new profession and management of demands (Ashford & Nurmohamed, 2012; Ellis et al., 2015). Examples of proactive behaviors are behaviors such as monitoring and imitating the actions of experienced colleagues, practicing new skills (Cooper-Thomas & Burke, 2012), and asking for information and feedback on ones' performance and role fulfillment (Bauer et al., 2007). The most studied form of proactive behavior is information seeking. New professionals may seek task information about how to execute a given task, role information about the responsibilities that come with one's professional role, social information about the social culture and one's co-workers, organizational information about the organizational structure and policies, and performance information about how one is performing. Information is typically sought from supervisors, friends, experienced co-workers, mentors, and in documents (Morrison & Vancouver, 2000). According to the results of a meta-analysis based on observational data and a systematic review, engagement in proactive behaviors is related to role clarity and social acceptance (Bauer et al., 2007), as well as task mastery and group integration (a construct related to social acceptance) (Kammeyer-Mueller & Wanberg, 2003).

Among newly registered nurses, qualitative evaluations have suggested that behaviors such as asking questions, actively engaging in new situations, seeking and organizing information, and imitating the behaviors of experienced colleagues facilitate learning and reduce

experiences of stress (Chen, Chen, Lee, Chang, & Yeh, 2017; Lengetti et al., 2018; Lima, Jordan, Kinney, Hamilton, & Newall, 2016; Mellor & Gregoric, 2016; Regan et al., 2017; Tong & Epeneter, 2018). Asking questions has been recognized as the most important strategy used by newly registered nurses to reduce their experiences of stress (Lima, Jordan, et al., 2016). Focusing on the most important things and delegating tasks are other strategies that have been suggested to reduce stress among newly registered nurses (Mellor & Gregoric, 2016).

However, although new professionals' engagement in proactive behaviors is assumed to facilitate their management of demands at work, it cannot be taken for granted (Nifadkar et al., 2012). If new professionals perceive engaging in proactive behaviors to be associated with increased risks of aversive events, they have been found to avoid engaging in such behaviors. Specifically, proactive behaviors have been found to be avoided when they are perceived as entailing performance risks (e.g. making mistakes or losing one's face), role related risks (e.g. not being able to fulfill one's role responsibilities as proactive behaviors are time consuming and require effort), and finally social risks (e.g. being viewed as either pushy, or weak, uncertain, and clueless by experienced colleagues). Proactive behaviors may also be perceived as entailing social risks if they result in an increased workload for colleagues (Cooper-Thomas & Burke, 2012; Ellis, Nifadkar, Bauer, & Erdogan, 2017; Nifadkar et al., 2012).

Social risks and the risk of being perceived as incompetent or being ridiculed by experienced colleagues have been shown to inhibit newly registered nurses from asking direct questions (Malouf & West, 2011; Mellor & Gregoric, 2016; Regan et al., 2017; Tong & Epeneter, 2018). Furthermore, newly registered nurses have been found to avoid admitting that they are not comfortable performing a task that they are not familiar with (Duchscher, 2009; Tong & Epeneter, 2018). Fear of making mistakes and being perceived as incompetent have also been found to limit newly registered nurses' engagement in evidence based practice behaviors (Jackson, 2016). Furthermore, making a mistake or in other ways being exposed as incompetent, not being able to provide safe care, not fulfilling role responsibilities, and not being accepted by peers have been found to motivate newly registered nurses to engage in a range of behaviors with the primary purpose being to avoid these outcomes (Duchscher, 2009). Finally, experiences of fatigue and exhaustion have been suggested to further inhibit engagement in proactive behaviors (Bolino, Valcea, & Harvey, 2010; Sonnentag, 2003).

In summary, engagement in proactive behaviors is suggested to contribute to the development of task mastery, role clarity, and social acceptance. The development of these socialization processes is suggested to facilitate management of demands at work and reduce experiences of stress. Over time, reduced activation of the stress response is expected to reduce the risk of developing symptoms of stress-related ill health. Thus, engagement in proactive behaviors may prevent experiences of stress in the short-run, and the risk of developing symptoms of stress-related ill health over time. However, in line with general principles of stress, fear, and avoidance, engagement in proactive behaviors are sometimes



avoided. Building on the behavioral-model of stress-related ill health, it may be hypothesized that avoidance of proactive behaviors increases the risk of repeated or prolonged activation of the stress response as situations are not managed, and resources such as task mastery, role clarity, and social acceptance (i.e. the socialization processes) are not developed. Thus, over time, avoidance of proactive behaviors may be expected to increase the risk of developing symptoms of stress-related ill health. In summary, it may be hypothesized that symptoms of stress-related ill health among newly registered nurses could be prevented by supporting engagement in proactive behaviors. However, the available research on strategies for increasing new professionals' engagement in proactive behaviors as they transition into their new profession is limited, and more research has been requested (Ashford & Nurmohamed, 2012; Cooper-Thomas & Burke, 2012; Ellis et al., 2015; Nifadkar et al., 2012).

## **1.7 GENERAL AIM OF THE THESIS**

The general aim of this thesis was to investigate the possibility of preventing symptoms of stress-related ill health among newly registered nurses by supporting engagement in proactive behaviors. The overall hypothesis was that increased engagement in proactive behaviors would contribute to the development of the socialization processes task mastery, role clarity, and social acceptance, which, in turn, would mediate a reduction of experiences of stress and the risk of developing symptoms of stress-related ill health.

## **1.8 THEORETICAL FRAMEWORKS**

In addition to the previously presented research from the fields of stress, occupational health, organizational socialization, and nursing, the work in the thesis was informed by research on strategies for behavior change as well as research concerning the process of developing interventions.

### **1.8.1 Cognitive behavior therapy**

Cognitive behavior therapy is a psychosocial intervention for behavior change that focuses on the bidirectional influences of individuals' behaviors, thoughts, and emotions, and the surrounding context. Within cognitive behavior therapy, behavior change interventions are based on an understanding of how the behaviors are learnt and maintained, which sheds light on how they may be changed (Drossel, Rummel, & Fisher, 2009; O'Donohue, 2009; Ramnerö & Törneke, 2008).

Cognitive behavioral interventions focusing on supporting employees who experience symptoms of stress-related ill health to engage in the active management of job demands have been found to be effective according to results of a meta-analysis (Richardson & Rothstein, 2008). Similarly, a series of reviews have found support for the effect of programs based on the same principles for reducing or preventing symptoms of stress-related ill health among experienced nurses (Marine, Ruotsalainen, Serra, & Verbeek, 2009; Ruotsalainen, Serra, Marine, & Verbeek, 2008; Ruotsalainen, Verbeek, Marine, & Serra, 2015; van Wyk & Pillay-Van Wyk, 2010). This indicates a potential to use principles from cognitive behavior

therapy to support newly registered nurses' engagement in proactive behaviors to manage demands and challenges in the new profession. As it has been suggested that engagement in proactive behaviors is affected by fear of aversive events and fatigue, the behavior change techniques systematic exposure and reinforcing approach behaviors seem potentially suitable.

#### *1.8.1.1 Systematic exposure*

Theories of fear learning suggest that fear in relation to specific situations may be learnt through direct experience, observation, or instruction. As a consequence of this learning, the situation will elicit an expectation of an aversive outcome. This expectation will evoke avoidance behaviors as part of the adaptive fear response. Avoidance behaviors are maintained dependent on instrumental learning, that is, by the non-occurrence of the aversive event following engagement in the avoidance response, or by the reduction of fear due to engagement in an escape response. As a consequence of this learning, knowledge that engagement in the avoidance response inhibits the aversive outcome is acquired and that, if the avoidance response is not performed, the aversive event will be realized (Krypotos et al., 2015).

From this follows that avoidance behaviors may be changed by intentionally approaching the feared situations. If an individual intentionally engages in a previously avoided situation and notices that the feared consequences are not realized, the learnt avoidance behaviors begin to reduce and safety memories (i.e. memories of benevolent experiences in previously feared situations) are acquired (Krypotos et al., 2015). This is the theoretical foundation of the behavior change technique known as systematic exposure. The goal of the technique is to enhance the consolidation and retrievability of inhibitory learning (i.e. learning of safety memories in relation to a feared situation). The basic premise of the technique is that the individual is supported in encountering the feared stimulus without engaging in any avoidance behaviors. The inhibitory learning seems to be facilitated by experiences that violate expectancies (i.e. an expected aversive event is not realized), when one encounters multiple feared stimuli without the expected aversive event, and when one omits safety signals (i.e. signals of the absence of the feared stimulus) as well as avoidance behaviors. Accessibility and retrievability of the learned inhibitory associations are facilitated by conducting the exposure training in the context in which the feared stimulus is expected to be encountered (Craske et al., 2008).

#### *1.8.1.2 Reinforcing approach behaviors*

Theories of reduced behavioral engagement suggest that this occurs when individuals' actions are less likely to lead to positive consequences and more likely to lead to negative consequences (Kanter, Baruch, & Gaynor, 2006; Martell, Addis, & Jacobson, 2001). For example, engaging in physical activities and hobbies may not be as rewarding if one is preoccupied by thoughts of job demands, as they might be if one is not bothered by such thoughts. In addition, activation of the stress response inhibits sleep and may result in experiences of frustration and increased stress in relation to not being able to fall asleep. As a

consequence, avoidance behavior patterns are developed, in a similar vein as previously mentioned, to avoid the expected aversive outcome. As active engagement in health-promoting behaviors is reduced, increasingly fewer such behaviors are met with positive consequences and this further reduces individuals' engagement in health-promoting behaviors and increases the risk of stress-related ill health.

Behavioral activation is a behavior change model that was developed for use in the treatment of clinical depression (Martell et al., 2001). According to this model, depression develops when people's actions are more likely to be met by aversive than appetitive consequences and people thus come to restrict their behavioral repertoire. As a consequence, engagement in behaviors that are followed by appetitive consequences is also restricted. By using a behavior change technique referred to as reinforcing approach behaviors, people may come to re-engage in behaviors that are followed by appetitive consequences. It is assumed that the positive consequences that follow on actively engaging in valued behaviors will facilitate further engagement in the future and break the spiral of passivity and avoidance (Martell et al., 2001). As the goal of this behavior change technique is to increase activity in areas of passivity and avoidance, it may also be useful for supporting engagement in behaviors to increase recovery and reduce the negative impact of activation of the stress response (McEwen & Gianaros, 2011). Typical strategies to achieve this behavior change include scheduling gradually increasing engagement in activities, problem solving, and skills training (Kanter et al., 2006).

#### *1.8.1.3 Action planning*

Implementation of both behavior change techniques (i.e. systematic exposure and reinforcing approach behaviors) is facilitated by the use of structured goal setting techniques (Gollwitzer, 1999). The benefit of goal setting is that, when behavior change is planned in advance, goal-directed behaviors can be initiated immediately once the opportunity arises. Action plans (or implementation intentions) specify when, where, and how a behavior is to be engaged in. They facilitate behavior change through a number of processes. First of all, by specifying when and where a behavior is to be engaged in, a mental representation of this situation is activated. This activation makes it easier to detect the situation (i.e. opportunity for behavior change) once it is present, thereby increasing the chance of behavior change. Second, the in-advance selection of a goal-directed behavior links the behavior to the situation. Thus, once the situation is present, the behavior is activated and engaged in more easily, almost automatically. Basically, the idea of action plans is to place the engagement in goal-directed behaviors under the control of situational cues in the environment, reducing the demands on intentional processes. It has been suggested that implementation intentions are particularly important when it comes to increasing engagement in behaviors that are costly in the short-term but rewarding over time (Gollwitzer, 1999).

### 1.8.2 Guidelines for the development of interventions

The work in the four studies of the thesis was developed based on guidelines for the development of interventions. There are a number of guidelines available with highly overlapping contents (e.g., Craig et al., 2013, Mrazek and Haggerty, 1994, Stormont, Reinke, and Herman, 2009, and Tebes, Kaufman, Connell, Crusto, and Thai, 2014). A summarized description of the suggested research process is presented in Figure 1 and outlined below.

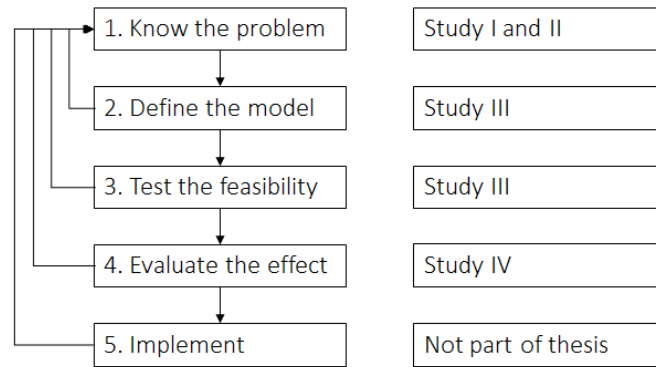


Figure 1. The recommended stepwise procedure for the development of interventions.

A thorough understanding of the target problem is imperative for the development of effective interventions. Therefore, in the first phase, the target of the intervention should be identified including the developmental trajectory as well as risk and protective factors. In this thesis, this first phase is addressed in Study I and II.

Next, a model that specifies the mechanisms through which the intervention is assumed to affect the problem should be identified or developed. Interventions that are based on an explicit theory of the mechanisms of change have been found to be more effective than interventions with no such theory. This second phase is addressed in Study III of the thesis.

In the third phase, a preliminary trial should be conducted. The purpose of a preliminary trial is to investigate the feasibility of conducting a study to evaluate the effect of the intervention and to identify any flaws in the study design that could confound the results of the effect evaluation. This third phase is addressed in Study III of the thesis.

The fourth phase is when the efficacy and effectiveness of the intervention should be evaluated. In effect evaluation trials, using a study design in which participants are randomly allocated to one of more conditions is the most effective design to prevent the risk that selection effects bias the results of the study and exaggerate effects. In this thesis, this fourth step is addressed in Study IV.

Finally, in the last phase of the development process, the goal is to facilitate large-scale dissemination, implementation, and evaluation of the intervention in the community. Implementation of the intervention was not part of the thesis. At each step in the procedure, information may be fed-back to previous steps.

## **2 AIMS OF STUDIES**

### **2.1 STUDY I**

The aim of Study I was to prospectively investigate in situ how episodes of increased or decreased levels of role clarity, task mastery, and social acceptance relate to concurrent experiences of stress during the first three months after professional entry in a sample of newly registered nurses.

### **2.2 STUDY II**

The aim of Study II was to investigate the relations between role clarity, task mastery, and social acceptance and symptoms of burnout the first year after professional entry, as well as the relations between changes in role clarity, task mastery, and social acceptance and changes in symptoms of burnout during the first three years after professional entry in a sample of newly registered nurses.

### **2.3 STUDY III**

The aim of Study III was twofold. The first aim was to understand newly registered nurses' engagement in, and avoidance of, proactive behaviors, including their relationship to the socialization processes and stress, and develop a behavior change model and intervention. The second aim of Study III was to investigate the feasibility of conducting an evaluation of the effect of the intervention.

### **2.4 STUDY IV**

The aim of Study IV was to evaluate the effect of the intervention in a randomized controlled trial with an active control condition.

### 3 SUMMARY OF STUDIES

All studies in this thesis were conducted in accordance to the Declaration of Helsinki's ethical principles for medical research involving human subjects (World Medical Association, 2014). Ethical approval for all studies was received from the Research Ethics Committee at Karolinska Institutet, Sweden (Study I, III, IV Dnr 2014/1531-31/5, Study II Dnr KI 01-045; 2006/973-32).

#### 3.1 STUDY I

Adhering to the guidelines for the development of interventions, in order to develop knowledge about factors affecting newly registered nurses' experiences of stress, the primary aim of Study I was to prospectively investigate in situ how episodes of increased or decreased levels of role clarity, task mastery, and social acceptance relate to concurrent experiences of stress during the first three months after professional entry in a sample of newly registered nurses. Although it is assumed that the socialization processes affect new professionals' experiences of stress, little prospective data is available on the actual effects (Bauer & Erdogan, 2012; Ellis et al., 2015; Saks & Gruman, 2012).

In addition, with Study I we also aimed to contribute to the understanding of the developmental trajectories of the socialization processes and stress during the first three months in the nursing profession. It has been suggested that this period is particularly critical for learning the social and technical aspects that are required to be an efficient member of a new organization and establish the professional role (Saks & Gruman, 2012).

Most research within the organizational socialization framework has been conducted based on cross-sectional data or longitudinal data with a limited number of data collections over an extended period of time. According to a meta-analysis, the mean number of data collections in longitudinal studies in organizational socialization research was 2.9. The first round of data was typically collected one week after professional entry with the second round of data typically being collected 5.5 months later (range 1-12 months). The mean time period between data collection two and three was 4.42 months (Bauer et al., 2007). Furthermore, in most studies, data on the predictor variable is measured at one point in time and data on the outcome variable at a separate point in time (Vancouver & Warren, 2012).

Problems with this typical design have been debated. Firstly, respondents' ability to recollect and correctly report on past events over such an extended period of time may be limited (Beal & Weiss, 2003; Bolger, Davis, & Rafaeli, 2003). Secondly, there is a lack of empirically validated benchmarks for specific points in time, and regarding what frequency data should be collected to properly represent organizational socialization (Ashforth, 2012). Thirdly, such periodic surveys may be susceptible to single events that may cause a responder to answer in a way during a particular point in time that happens to be an outlier in relation to other points in time. If the frequency of data collection is low, the outlier will not be detected (Ashforth, 2012). It has been recognized that the intensity of data collections is particularly important in organizational socialization research to represent the dynamic nature of the processes

involved (Beal & Weiss, 2003). Because of these limitations with the traditional methods, more sophisticated longitudinal designs have been requested for the field to progress (Ashforth, 2012).

### 3.1.1 Study design and participants

We used an intensive longitudinal study design to investigate the short-term relations between the socialization processes role clarity, task mastery, and social acceptance, and experiences of stress, as well as the respective developmental trajectories. Data was collected weekly over a period of 14 consecutive weeks after professional entry in two cohorts of newly registered nurses. Participants (n = 264) were newly registered nurses recruited during the last semester of their Bachelor's degree in nursing. The characteristics of the study participants for the total sample as well as per cohort are presented in Table 1.

Table 1. Characteristics of participants of Study I.

Variable	All (n = 264)	Cohort 1 (n = 160)	Cohort 2 (n = 104)
Age (M, Min-Max)	27.75 (22-51)	27.31 (22-48)	28.42 (22-51)
Gender (Female/Male)	230/33	143/17	87/16
Worked on clinical ward of first employment position alongside nursing education (n Yes/No)	60/204	39/121	21/83
Worked on clinical ward of first employment position prior to nursing education (n Yes/No)	15/249	8/152	7/97
Believe that education program prepared them for nursing profession (1 = Do not agree at all; 7 = Fully agree; M (SD))	4.89 (1.28)	4.91 (1.26)	4.87 (1.30)
Self-rated health (1 = Very bad; 7 = Very good; M (SD))	5.93 (0.98)	5.86 (1.02)	6.04 (0.91)

Note: n = number of study participants, M = mean, SD = standard deviation.

### 3.1.2 Data collection

Data was collected using self-report measures in a digital survey (Artologik). Surveys were sent to participants' registered e-mails weekly at the same day and time each week. The e-mail included an individualized URL through which the participants were directed to the

survey questions. A reminder e-mail including the URL was sent to participants who did not respond to the survey within four days of receiving it. Each survey was active for a week.

### **3.1.3 Measures**

#### *3.1.3.1 Experiences of stress*

Experiences of stress were measured using the Stress and Energy Questionnaire (SEQ; Hadzibajramovic, Ahlborg, Grimby-Ekman, and Lundgren-Nilsson, 2015; Kjellberg and Iwanowski, 1989). The questionnaire includes six adjective statements asking about responders' experiences of stress while at work during the last week. The items are responded to using a six-point Likert scale ranging from 'Not at all' to 'Very much'. The scale score is represented by the mean rating of the items. A higher value represents a higher level of stress. The mean and standard deviation at baseline were 3.69 and 0.97 respectively, and the internal consistency (between-persons) reliability was 0.96.

#### *3.1.3.2 Role clarity*

Role clarity was measured using three items from the General Questionnaire for Psychological and Social Factors at Work (QPS-Nordic; Dallner et al. 2000; Wannstrom, Peterson, Asberg, Nygren, and Gustavsson, 2009a, 2009b). Items ask about respondents' experiences in relation to their professional role. The items are responded to using a five-point Likert scale ranging from 'Very often or always' to 'Very seldom or never'. The scale score is represented by the mean rating of the items. A higher value represents a higher level of role clarity. The mean and standard deviation at baseline were 3.47 and 0.83 respectively, and the internal consistency (between-persons) reliability was 0.94.

#### *3.1.3.3 Task mastery*

Task mastery was measured using two items from the Needs Satisfaction and Frustration Scale (NSFS; Aurell et al., 2015; Longo, Gunz, Curtis, and Farsides, 2016). Items ask about experiences of mastering tasks at work. The items are responded to using a five-point Likert scale ranging from 'Very often or always' to 'Very seldom or never'. The scale scores are represented by the mean rating of the items. A higher value represents a higher level of task mastery. The mean and standard deviation at baseline were 3.64 and 0.87 respectively, and the internal consistency (between-persons) reliability was 0.88.

#### *3.1.3.4 Social acceptance*

Social acceptance was measured using two items from the NSFS (Aurell et al., 2015; Longo et al., 2016). Items asked about experiences of experiencing support from and connectedness with the colleagues and management at work. The items are responded to using a five-point Likert scale ranging from 'Very often or always' to 'Very seldom or never'. The scale scores are represented by the mean rating of the items. A higher value represents a higher level of social acceptance. The mean and standard deviation at baseline were 4.22 and 0.82



respectively, and the internal consistency (between-persons) reliability was 0.89. The content of the items of all measures included in Study I is presented in Table 1 in the Appendix.

### **3.1.4 Analysis**

Intensive longitudinal study design is one example of a design that resolves some of the limitations of the traditional longitudinal design. Intensive longitudinal designs add the possibility of obtaining reliable person-level information, estimate within-person change over time, individual differences in change over time, as well as conducting causal analyses of within-person change over time and individual differences in such changes. In other words, it is possible to elucidate participants' average (or typical) experience over the period of organizational socialization, as well as how participants differ in these average experiences. Furthermore, it is possible to clarify the rate of change of a particular individuals' experiences (i.e. how experiences change over time), as well as how individuals differ in their rates of change. Finally, it is possible to elucidate the processes that explain (and, in some designs, cause) changes in individuals' experiences, as well as how these processes differ in different individuals (Bolger et al., 2003; Bolger & Laurenceau, 2013).

In Study I, we conducted analyses based on the longitudinal multilevel model of change (Singer & Willett, 2003) adapted for intensive longitudinal data (Bolger et al., 2003; Bolger & Laurenceau, 2013). Firstly, to investigate the developmental trajectories of the socialization processes and experiences of stress, we conducted linear growth curve models. A statistically significant fixed effect of time was interpreted as indicating a development of the variables for the typical study participant over the time period of the study. A statistically significant random effect of time was used to compute a range of the individual slopes including 95% of the sample.

Secondly, to investigate how episodes of higher or lower levels of task mastery, role clarity, and social acceptance related to concurrent levels of stress, we conducted multilevel regressions with between- and within-person versions of task mastery, role clarity, and social acceptance as predictors (Bolger & Laurenceau, 2013). A statistically significant effect of the between-person versions of the process variables was interpreted as indicating that general levels of the process variables were related to stress. Finally, a statistically significant effect of the within-person versions of the process variables were interpreted as indicating that changes in the process variables affected levels of stress. The analyses were run in Mplus version 8 with maximum likelihood estimation.

#### *3.1.4.1 Handling of missing data*

The potential impact of missingness on the longitudinal models was evaluated by comparing levels of stress at week one to response vs. non-response at week two, and so on. When analyzing linear growth models, data is stacked (i.e. arranged vertically) and no individuals are dropped from the dataset because of missing data (Heck, Thomas, & Tabata, 2014). Thus, all subjects reporting data during the period of the study were included in the analysis, regardless of the number of data collections they responded to.

### **3.1.5 Results**

The response rates ranged from 92.5% (week 1) to 72.7% (week 12). Level of stress at week one did not predict response vs. non-response at week two, and so on during the full study. Gender and age did not predict the total number of weeks responded to by study participants.

The analyses of developmental trajectories showed that the typical newly registered nurse experienced a statistically significant decrease in experienced of stress of 0.13 units per month during the first three months of clinical practice. The slopes of 95 percent of the newly registered nurses varied within 1.18 units of the slope of the typical nurse indicating that there were considerable individual differences in the rate of change.

Furthermore, the analyses showed that the typical nurse experienced a statistically significant increase in role clarity and task mastery of 0.08 and 0.05 units per month, respectively. However, social acceptance decreased by 0.08 units per month for the typical nurse in the study and the change was statistically significant.

There were statistically significant individual differences in the rate of change for all three processes and the range of the slope was most pronounced for social acceptance (95% of slopes varied within 0.72 units of the typical slope for role clarity, within 0.44 units for task mastery, and within 0.86 units for social acceptance).

The analyses of the between-person versions of the socialization processes showed that participants who generally scored higher on task mastery, role clarity, and social acceptance reported lower levels of stress. The between-person parameter estimates were  $-0.77$  ( $p < 0.001$ ),  $-0.60$  ( $p < 0.001$ ), and  $-0.57$  ( $p < 0.001$ ). Finally, the analyses of the relations between weekly deviations in the socialization processes (within-person) and experiences of stress showed that, on occasions when newly registered nurses experienced higher levels of task mastery, role clarity, and social acceptance, they experienced lower levels of stress. The within-person parameter estimates were  $-0.40$  ( $p < 0.001$ ),  $-0.34$  ( $p < 0.001$ ), and  $-0.33$  ( $p < 0.001$ ), respectively.

### **3.1.6 Conclusion and contribution towards the general aim of the thesis**

Building on organizational socialization research, in Study I we investigated the relationships between the socialization variables task mastery, role clarity, and social acceptance, and newly registered nurses' experiences of stress during their first three months of clinical practice. It has previously been suggested that the development of the socialization processes affect new professionals' experiences of stress (Saks & Gruman, 2012), however, these relationships have not been investigated using an intensive longitudinal design. We also investigated the developmental trajectories of each variable as this knowledge has similarly been lacking.

In line with expectations, we found that weekly changes in the socialization processes were related to concurrent changes in experiences of stress. This suggests that an intervention targeting the development of socialization processes may have an effect on experiences of

stress. We also found that a positive development in socialization processes during the first three months following professional entry cannot be taken for granted as there were considerable individual differences in their rates of change.

Working towards the general aim of developing an intervention for preventing stress-related ill health among newly registered nurses, Study I contributed by developing knowledge about factors affecting newly registered nurses' experiences of stress. The results suggest that the socialization processes are suitable targets for an intervention seeking to prevent experiences of stress among newly registered nurses, and that there is room for improvement with regard to the development of these processes.

## **3.2 STUDY II**

To further our knowledge of the relationship between the socialization processes and newly registered nurses' experiences of stress, the aim of Study II was to investigate the relationships between the socialization processes and symptoms of burnout during the first year after professional entry, as well as the relationships between changes in the socialization processes and changes in symptoms of burnout during the first three years after professional entry in a sample of newly registered nurses. Few studies have prospectively investigated these relationships (Bauer & Erdogan, 2012; Ellis et al., 2015; Saks & Gruman, 2012). As suggested by the behavioral model of stress-related ill health and the concept of allostatic load, symptoms of burnout develop progressively over an extended period of time (Gustavsson et al., 2010; Maslach et al., 2001; Schaufeli & Enzmann, 1998). The symptoms are often not apparent for a long time (Schaufeli & Enzmann, 1998). Longitudinal studies investigating the effects of prolonged exposure to challenges at work on the development of symptoms of stress-related ill health have been requested (SBU, 2014).

### **3.2.1 Study design and participants**

We used a longitudinal study design to investigate the long-term relationships between the socialization processes role clarity, task mastery, and social acceptance, and symptoms of burnout. Data was collected yearly for three years following professional entry. Participants (n = 1210) were newly registered nurses recruited during their last semester of their Bachelor's degree in nursing. The characteristics of the study participants are presented in Table 2.

Table 2. Characteristics of participants of Study II.

Variable	All (n = 1210)
Age (M, Min-Max)	30.13 (21-54)
Gender (Female/Male)	1080/130
Worked at clinical ward of first employment position alongside nursing education (n Yes/No)	N.A
Worked at clinical ward of first employment position prior to nursing education (n Yes/No)	645/562*
Believe that education prepared them for the nursing profession (1 = Do not agree at all; 7 = Fully agree; M (SD))	3.69 (1.64)
Self-rated health (1 = Bad; 5 = Good; M (SD))	4.33 (0.76)

Note: n = number of study participants, M = mean, SD = standard deviation. \* Prior experience of work in health care – not necessarily prior to the nursing education.

### 3.2.2 Data collection

Data was collected using a pen-and-paper survey that was sent to participants via regular mail one, two, and three years following their transition into the nursing profession. Participants who had not responded to the questionnaire after three and six weeks were sent a reminder. The data collection was managed by Statistics Sweden.

### 3.2.3 Measures

#### 3.2.3.1 *Symptoms of burnout*

Symptoms of burnout were measured using the Scale of Work Engagement and Burnout (SWEBO; Hultell and Gustavsson, 2010, 2011). The questionnaire includes nine adjective statements asking about experiences of exhaustion, disengagement, and inattentiveness at work during the last two weeks. The items are responded to using a four-point Likert scale ranging from 'Not at all' to 'All of the time'. The scale score is represented by the mean rating of the items. A higher value represents a higher level of symptoms of burnout. The mean and standard deviation at baseline were 1.67 and 0.51 respectively, and the reliability (Cronbach's alpha) was 0.89.

### *3.2.3.2 Role clarity*

Role clarity was measured using the three items from the QPS-Nordic (Dallner et al., 2000; Wannstrom et al., 2009a, 2009b) that were also used in Study I. The mean and standard deviation at baseline in Study II were 3.96 and 0.71 respectively, and the reliability (Cronbach's alpha) was 0.80.

### *3.2.3.3 Task mastery*

Task mastery was similarly measured using three items from QPS-Nordic (Dallner et al., 2000; Wannstrom et al., 2009a, 2009b). Items ask about experiences of mastering tasks at work. The items are responded to using a five-point Likert scale ranging from 'Very often or always' to 'Very seldom or never'. The scale scores are represented by the mean rating of the items. A higher value represents a higher level of task mastery. The mean and standard deviation at baseline were 3.95 and 0.62 respectively, and the reliability (Cronbach's alpha) was 0.79.

### *3.2.3.4 Social acceptance*

Social acceptance was measured using six items asking about experiences of support from management and three items asking about experienced of support from co-workers, all from the QPS-Nordic (Dallner et al., 2000; Wannstrom et al., 2009a, 2009b). The items are responded to using a five-point Likert scale ranging from 'Very often or always' to 'Very seldom or never'. The scale scores are represented by the mean rating of the items. A higher value represents a higher level of social acceptance. In Study II, the mean and standard deviation of the items relating to management at baseline were 3.17 and 0.95 respectively, and the reliability (Cronbach's alpha) was 0.90. The mean and standard deviation of the items relating to the co-workers at baseline were 4.07 and 0.66 respectively, and the reliability (Cronbach's alpha) was 0.63. The content of the items of all measures included in Study II is presented in Table 1 in the Appendix.

## **3.2.4 Analysis**

To investigate the longitudinal trajectory of the development of symptoms of burnout, we used a linear latent growth model with yearly values of subscales of the SWEBO measure as indicators for a latent burnout factor (Preacher, Wichman, MacCallum, & Briggs, 2008). We estimated fixed effects for the intercept and the slope (i.e. change in symptoms of burnout over time), as well as random effects for the variance and covariance of the intercept and the slope.

To estimate the cross-sectional relationships of achieved levels of the task mastery, role clarity, social acceptance, and symptoms of burnout one year into the profession, as well as the relationships between changes in the socialization processes from year one to year two as well as year three and changes in symptoms of burnout during the same time, we added time-variant predictors to the latent growth model. The analyses were conducted in Mplus version 7.1 using full information maximum likelihood estimation.

#### 3.2.4.1 *Handling of missing data*

The potential impact of missingness on the longitudinal model was evaluated by comparing levels of symptoms of burnout and the socialization processes at one measurement wave with attrition at the following wave. Missing data was imputed using multiple imputation (Enders, 2010) in Mplus 7.1. All variables included in the model were included in the imputation procedure.

#### 3.2.5 **Results**

The response rates over the three years were 92.1%, 80.0%, and 77.4%. No significant associations were found indicating that symptoms of burnout, task mastery, role clarity, or co-worker support predicted attrition over time. However, lower levels of leadership support two years after graduation predicted attrition at the last data collection ( $r = 0.070$ ;  $p = 0.038$ ).

The linear latent growth model of symptoms of burnout showed that newly registered nurses experienced a statistically significant increase in symptoms of burnout over the first three years of clinical practice (slope = 0.027,  $p = 0.009$ ). The results of the analyses with the time-variant predictors added to the model showed that higher levels of task mastery, role clarity, and social acceptance one year into the nursing profession were related to lower levels of symptoms of burnout. The standardized parameter estimates were -0.35 ( $p < 0.001$ ), -0.09 ( $p < 0.05$ ), -0.23 ( $p < 0.001$ ), and -0.12 ( $p < 0.001$ ), for task mastery, role clarity, leadership support, and co-worker support, respectively.

In addition, increasing levels of task mastery, role clarity, and social acceptance during the first two years in the profession were related to decreasing levels of symptoms of burnout during the first two years in the profession. The standardized parameter estimates were -0.23 ( $p < 0.001$ ), -0.22 ( $p < 0.001$ ), -0.17 ( $p < 0.001$ ), and -0.10 ( $p < 0.01$ ) for task mastery, role clarity, leadership support, and co-worker support, respectively.

Finally, increasing levels of task mastery and social acceptance during the first three years in the profession were related to decreasing levels of symptoms of burnout during the first three years in the profession. The standardized parameter estimates were -0.23 ( $p < 0.001$ ), -0.16 ( $p < 0.001$ ), and -0.09 ( $p < 0.05$ ) for task mastery, leadership support, and co-worker support, respectively. Change in role clarity from year one to year three was not related to change in symptoms of burnout during the same period.

#### 3.2.6 **Conclusion and contribution towards the general aim of the thesis**

Building on the results of Study I, in Study II, we investigated the relations between the development of the socialization processes and newly registered nurses' symptoms of burnout. Few studies have prospectively investigated these relationships (Bauer & Erdogan, 2012; Ellis et al., 2015; Saks & Gruman, 2012). In Study I, we showed that the development of the socialization processes was related to experiences of stress week-by-week. From occupational health- and stress research, it is expected that such prolonged or repeated activation of the stress response will result in symptoms of stress-related ill health, including

symptoms of burnout (Dhabhar, 2014; Gustavsson et al., 2010; Maslach et al., 2001; McEwen et al., 2015; McEwen & Gianaros, 2011; Schaufeli & Enzmann, 1998).

In line with expectations, we found that newly registered nurses experienced an increase in symptoms of burnout over the first three years following professional entry. Furthermore, we found that achieved levels of task mastery, role clarity, and social acceptance one year following professional entry were related to concurrent symptoms of burnout. In addition, we found that change in the socialization processes over the first two and three years in the profession were related to changes in symptoms of burnout during the same periods of time. Task mastery and leadership support were the strongest explanatory variables, suggesting that supporting the development of these processes may be particularly important.

Towards the general aim of developing an intervention for preventing stress-related ill health among newly registered nurses, Study II contributed by developing knowledge about factors affecting newly registered nurses' experiences of stress-related ill health. The results support the conclusion from Study I that the socialization processes are suitable targets for a preventative intervention. The finding that symptoms of burnout increase among newly registered nurses during the first three years of practice further highlight the need of a preventative intervention.

### **3.3 STUDY III**

Having concluded that the development of the socialization processes is related to experiences of stress and symptoms of burnout, and thus suitable targets of an intervention aiming to prevent stress-related ill health among newly registered nurses, in Study III, we moved on in the stepwise procedure of developing an intervention to the stages of developing a model and testing the feasibility of conducting an effect evaluation. Thus, the aim of Study III was twofold.

#### *3.3.1.1 Develop a model of behavior change*

Building on organizational socialization research, newly registered nurses' engagement in proactive behaviors is expected to contribute to the development of the socialization processes (Bauer et al., 2007; Kammeyer-Mueller & Wanberg, 2003). However, during certain circumstances, newly registered nurses have been recognized to avoid enacting proactive behaviors (Duchscher, 2009; Jackson, 2016; Malouf & West, 2011; Mellor & Gregoric, 2016; Regan et al., 2017; Tong & Epeneter, 2018). According to the behavioral model of stress-related ill health, such avoidance of proactive behaviors may be assumed to inhibit the management of demands at work and the development of task mastery, role clarity, and social acceptance, and thereby increase experiences of stress and the risk of developing symptoms of stress-related ill health (Gustavsson et al., 2010; Maslach et al., 2001; Schaufeli & Enzmann, 1998).

However, a thorough understanding of how proactive behaviors and avoidance behaviors are learnt and maintained is lacking. In addition, the available research on strategies for increasing new professionals' engagement in proactive behaviors is limited (Ashford &

Nurmohamed, 2012; Cooper-Thomas & Burke, 2012; Ellis et al., 2015; Nifadkar et al., 2012). Thus, the first aim of Study III was to understand newly registered nurses' engagement in, and avoidance of, proactive behaviors.

In addition, it has been suggested that engagement in proactive behaviors is further inhibited due to fatigue or exhaustion (Bolino et al., 2010; Sonnentag, 2003). Engagement in leisure activities in the areas of exercise, socializing, and interests, as well as maintaining a stable sleep, is expected to protect against the development of fatigue and exhaustion (Dhabhar, 2014; McEwen & Gianaros, 2011). Thus, Study III also aimed to understand newly registered nurses' engagement in energizing leisure activities. The goal was to develop a model and intervention designed to prevent symptoms of stress-related ill health among newly registered nurses by increasing engagement in proactive behaviors.

#### *3.3.1.2 Test the feasibility of conducting an effect evaluation*

Challenges in relation to conducting trials for evaluating effects of interventions have been recognized within prevention research, as well as organizational socialization research (Tebes et al., 2014; Vancouver & Warren, 2012). Because of this, it is recommended that a feasibility trial is included in the development of an intervention to identify and amend problems in the design to reduce the risk of conducting a type-II error in the later effect evaluation (Abbott, 2014; Craig et al., 2013; Thabane et al., 2010). Devoting time to the development and feasibility testing of an intervention as opposed to primarily focusing on the effect evaluation is expected to result in stronger interventions that are easier to evaluate, as well as interventions that are more likely to be implemented, and more worthy of being implemented (Craig et al., 2013). In line with these recommendations, the second aim of Study III was to investigate the feasibility of conducting a trial to test the effect of the intervention as an add-on to a transition-to-practice program for newly registered nurses. The feasibility objectives of Study III included recruitment, randomization, data collection and analysis, participation, acceptability, and deliverability of the intervention.

### **3.3.2 Study design and participants**

#### *3.3.2.1 Develop a model of behavior change*

To understand newly registered nurses' engagement in, and avoidance of, proactive behaviors, and to be able to develop a model for the intervention, we conducted interviews with newly registered nurses ( $n = 12$ ) focusing on their engagement in and avoidance of proactive behaviors, as well as their engagement in leisure activities. Participants were all in their first year of professional work in different geographical regions and hospitals in Sweden. They had different clinical specialties.

#### *3.3.2.2 Testing the feasibility of conducting an effect evaluation*

To test the feasibility of conducting an effect evaluation of the intervention, we used a non-randomized experimental design with one study condition. Data was collected one and four weeks prior to the intervention, as well as one and five weeks after the intervention.



Participants (n = 65) were newly registered nurses participating in a transition-to-practice program. The characteristics of the study participants in the interviews as well as the feasibility trial are presented in Table 3.

Table 3. Characteristics of participants of Study III.

Variable	Interviews (n = 12)	Feasibility (n = 65)
Age (M, Min-Max)	24.08 (22-26)	25.95 (22-45)
Gender (Female/Male)	10/2	56/9
Worked at clinical ward of first employment position alongside nursing education (n Yes/No)	9/N.A*	11/54
Worked at clinical ward of first employment position prior to nursing education (n Yes/No)	6/6**	7/58
Believe that education prepared for nursing profession (1 = Do not agree at all; 7 = Fully agree; M (SD))	N.A	3.23 (1.26)
Self-rated health (1 = Very bad; 7 = Very good; M (SD))	N.A	6.06 (0.89)

Notes: n = number of study participants, M = mean, SD = standard deviation. \* 3 = missing information – we do not know if they did or did not work in health care alongside their nursing studies. \*\* Prior experience of work in health care – not necessarily the place where they were working at the time of the interview

### 3.3.3 Data collection

#### 3.3.3.1 *Develop a model of behavior change*

The interviews were semi-structured, individual, face-to-face, and about 60 minutes long. They were recorded using the Olympus digital voice recorded WS-833 and transcribed verbatim prior to analysis.

#### 3.3.3.2 *Test the feasibility of conducting an effect evaluation*

Data for the feasibility trial was collected using self-report measures in the digital survey (Artologik), which was also used in Study I. Surveys were sent to participants' registered e-mails monthly for four months at the same day and time for each occasion. The e-mail included an individualized URL through which the participants were directed to the survey

questions. A reminder e-mail including the URL was sent to participants who did not respond to the survey within seven days of receiving it. The measures included in the feasibility trial are presented below.

### **3.3.4 Measures**

#### *3.3.4.1 Experiences of stress*

Experiences of stress were measured using the six items from the SEQ (Hadzibajramovic et al., 2015; Kjellberg & Iwanowski, 1989), which were also used in Study I. In Study III, the mean and standard deviation at baseline were 3.75 and 0.87 respectively, and the reliability (Cronbach's alpha) was 0.87.

#### *3.3.4.2 Role clarity*

Role clarity was measured using the three items from the QPS-Nordic (Dallner et al., 2000; Wannstrom et al., 2009a, 2009b), which were also used in Studies I and II. The mean and standard deviation at baseline in Study III were 3.88 and 0.60 respectively, and the reliability (Cronbach's alpha) was 0.77.

#### *3.3.4.3 Task mastery*

Task mastery was measured using the two items from the NSFS (Aurell et al., 2015; Longo et al., 2016), which were also used in Study I. The mean and standard deviation at baseline in Study III were 3.60 and 0.74 respectively, and the reliability (Cronbach's alpha) was 0.68.

#### *3.3.4.4 Social acceptance*

Social acceptance was measured using the two items from the NSFS (Aurell et al., 2015; Longo et al., 2016), which were also used in Study I. The mean and standard deviation at baseline in Study III were 4.09 and 0.82 respectively, and the reliability (Cronbach's alpha) was 0.70.

#### *3.3.4.5 Proactivity*

To measure newly registered nurses' engagement in proactive behaviors, we developed four items inspired by a scale to measure students' agentic engagement (Reeves, 2013). The items ask about engagement in behaviors such as asking for feedback or help to learn specific tasks. The items are responded to using a five-point Likert scale ranging from 'Very often or always' to 'Very seldom or never'. The scale score is represented by the mean rating of the items. A higher value represents a higher level of proactivity. The mean and standard deviation at baseline were 3.15 and 0.67 respectively, and the reliability (Cronbach's alpha) was 0.50.

#### *3.3.4.6 Avoidance of proactivity*

To measure newly registered nurses' avoidance of proactive behaviors, we developed two items based on statements from the interviews conducted as part of developing the model of

the intervention. The items ask how often the newly registered nurses' avoided asking for help with task or avoided asking questions because they believed that they were expected to possess the knowledge themselves. The items are responded to using a five-point Likert scale ranging from 'Very often or always' to 'Very seldom or never'. The scale score is represented by the mean rating of the items. A higher value represents a higher level of avoidance of proactive behaviors. The mean and standard deviation at baseline were 1.96 and 0.80 respectively, and the reliability (Cronbach's alpha) was 0.73.

#### *3.3.4.7 Leisure activities*

To measure newly registered nurses' engagement in leisure activities, we developed three items asking about engagement in physical exercise, activities with friends and family, and personal interests or hobbies during the last month. The items were responded to using a five-point Likert scale ranging from 'Daily' to 'Never'. In Study III, we only included the items as separate items. The content of the items of all measures included in the feasibility trial of Study III is presented in Table 1 in the Appendix.

### **3.3.5 Analysis**

#### *3.3.5.1 Develop a model of behavior change*

Within cognitive behavior therapy, interventions are based on an understanding of how the behaviors are learnt and maintained. This understanding is gained through analysis of the events preceding the behavior (i.e. the antecedents of the behaviors) and the events following on the behavior (i.e. the consequences of the behavior). Antecedents of behaviors (e.g. thoughts, emotions or situational factors) function as signals indicating that certain consequences may be expected if engaging in a certain behavior. Consequences follow on the behavior and may produce changes in the rate of the behavior over time (i.e. increase or decrease the likelihood of engaging in the behavior in the future). The presentation of something appetitive or the termination of something aversive following engagement in a behavior is expected to function as a reinforcing consequence maintaining or increasing the rate of the behavior. Contrary, the presentation of something aversive or the termination of something appetitive following engagement in a behavior is expected to reduce the rate of the behavior. This behavioral analysis is called functional analysis and has its theoretical foundation in classic-, instrumental-, and social learning theory. The understanding of how behaviors are learnt and maintained sheds light on how they may be changed (Drossel et al., 2009; O'Donohue, 2009; Ramnerö & Törneke, 2008).

To develop a model of behavior change, we analyzed the antecedents and consequences of newly registered nurses' engagement in, and avoidance of, proactive behaviors. In addition, we analyzed the newly registered nurses' engagement in leisure activities using the same principles. Based on the analysis, behavior change goals and suitable behavior change techniques were identified for the intervention.

#### *3.3.5.2 Test the feasibility of conducting an effect evaluation*

To investigate the feasibility of conducting a trial to test the effect of the intervention as part of a transition-to-practice program for newly registered nurses, we investigated the feasibility of recruiting and randomizing participants as well as collecting and analyzing data.

Furthermore, we investigated the participants level of participation, acceptability of the intervention, as well as the deliverability of the intervention as defined by the manual. We defined a feasibility criterion for each objective.

Feasibility of recruitment was evaluated based on the percentage of the invited newly registered nurses who decided to participate in the study. Feasibility of randomization was evaluated by randomizing the study participants to two groups of equal size using simple randomization and investigating the risk of selection bias using independent sample *t*-tests.

The feasibility of collecting data was evaluated based on the percentage of the surveys that were successfully distributed in time, as well as participants' response rate. The feasibility of conducting analyses of effects was evaluated based on investigations of the reliability of the scales (Cronbach's alpha and mean inter-item correlation) and their sensitivity to change (intra-class correlation).

Feasibility of participation and acceptability of the intervention was evaluated based on level of participation as well as participants' acceptability ratings of each session. Finally, feasibility of delivering the intervention as intended by the manual was evaluated based on any deviations that had to be made to fit the schedule.

#### *3.3.5.3 Handling of missing data*

Attrition analyses were conducted by comparing the study variables at baseline between participants who responded at the data collection following the intervention and those who did not using independent *t*-tests. Potential effects of age and gender on the baseline data were further evaluated.

### **3.3.6 Results**

#### *3.3.6.1 Develop a model of behavior change*

The analysis of the interviews suggested that newly registered nurses engaged in proactive behaviors when they experienced uncertainty in combination with the perceiving colleagues as supportive and willing to help, as well as when perceiving oneself as capable of executing the proactive behavior. Furthermore, we interpreted the reports in the interviews to indicate that engagement in proactive behaviors led to increased experiences of task mastery, role clarity, and social acceptance, which reduced perceived risks in relation to making mistakes, not fulfilling role responsibilities, and not being accepted by peers. This in turn reduced experiences of stress and facilitated future engagement in proactive behaviors. As a result of the analysis, a model was specified in which engagement in proactive behaviors was defined as an engine in a positive spiral of decreasing experiences of stress, as presented in Figure 2.

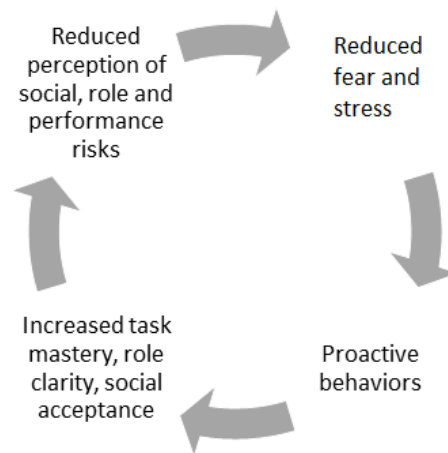


Figure 2. Positive spiral of engagement in proactive behaviors. Reprinted with permission.

However, the analysis also suggested that, when perceiving risks in relation to ones' performance, role fulfillment, or social status, newly registered nurses tended to avoid engaging in proactive behaviors. For example, they avoided asking for help when in need, or avoided delegating tasks to assistant nurses. We interpreted the reports in the interviews to indicate that engagement in avoidance behaviors reduced immediate experiences of fear and stress as the perceived risks were avoided, but resulted in increased fear and stress over time. As a result of the analysis, a model was specified in which avoidance behaviors resulted in an inhibited development of the socialization processes (i.e. skills were not developed, professional roles were blurred, and relationships were not strengthened), increased perception of risks, and increased experiences of stress. The model is presented in Figure 3.

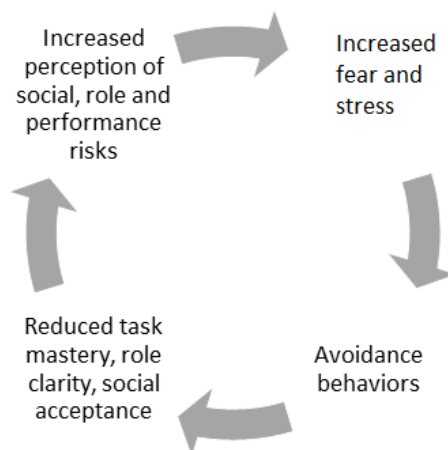
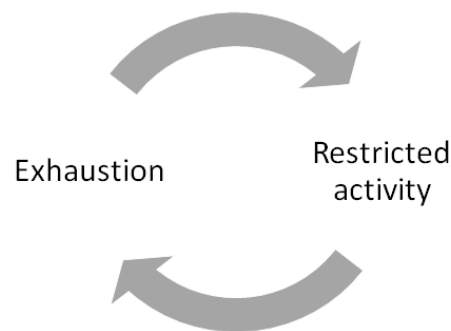


Figure 3. Negative spiral of avoidance of proactive behaviors. Reprinted with permission.

Finally, the analysis of the newly registered nurses' leisure activities suggested that activities such as physical exercise, spending time with friends and family, and engaging in hobbies or interests were typically not prioritized during the first months after professional entry. Instead, many of the newly registered nurses reported spending excessive amounts of their

time away from work in bed or in front of the television. These behaviors were typically motivated by feelings of exhaustion and factors related to shift work. The relationship between exhaustion and engagement in energizing leisure activities is presented in Figure 4.



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Figure 4. Negative spiral of restricted engagement in leisure activities. Reprinted with permission.

Based on the analysis, it was suggested that an intervention aiming to support newly registered nurses' engagement in proactive behaviors could prevent experiences of stress, and that the effect would be mediated through the development of the socialization processes task mastery, role clarity, and social acceptance. Reducing engagement in avoidance behaviors and increasing engagement in energizing leisure activities were identified as key behavior change goals. Systematic exposure, reinforcing approach behaviors, and goal setting were identified as suitable behavior change techniques. A 2 × 2-hour intervention was developed to be used as an add-on to an existing transition-to-practice program.

#### 3.3.6.2 *Test the feasibility of conducting an effect evaluation*

The results of the feasibility study conducted as part of Study III showed that the feasibility criteria were met as regards recruitment, data collection, analysis, participation, and acceptability. Sixty-five (79.3%) out of 82 newly registered nurses invited to the study chose to participate. All surveys were administered as planned and 72.3% of the study participants responded to the data collection after the intervention. Responders at post-intervention reported a statistically significant lower level of avoidance of proactive behaviors one week prior to the intervention as compared to non-responders at post-intervention ( $t(53) = 2.424, p = 0.019$ ). There were no differences between responders and non-responders in any of the other study variables at the data collection before the intervention. Age did not predict levels of the outcomes at the data collection before the intervention. However, females reported a statistically significant lower level of engagement in avoidance behaviors prior to the intervention than males ( $t(53) = -2.642, p = 0.011$ ).

With the exception of the measure of proactivity, the measures were considered appropriate for evaluation of the effect of the intervention as indicated by measures of reliability (Cronbach's alpha ranged between 0.68-0.87 excluding the measure of proactivity [alpha =

0.50], mean inter-item correlations ranged between 0.52-0.58 excluding proactivity [mean inter-item correlation = 0.21]), and sensitivity to change (intra-class correlations ranged between 0.43-0.63). Fifty-four (83.1%) of the study participants fully participated in the intervention. Finally, between 84-96% of the participants believed that the work in the intervention was relevant to them as individuals as well as relevant for nurses in general. Overall satisfaction with the intervention was rated by 94% for the first session and 76% for the second session.

However, the feasibility criteria were not met for randomization and deliverability of the intervention as indicated by the manual. It was not possible to randomize participants using simple randomization. Nurses from the same clinical ward had to be allocated to different groups to avoid problems of staffing. However, analyses of differences between the groups indicated that this restriction in the randomization procedure did not introduce a selection bias. Finally, it was not possible to deliver the intervention during the time frame of the two sessions without rushing through the material.

### **3.3.7 Conclusion and contribution towards the general aim of the thesis**

In Studies I and II, we concluded that the socialization processes were suitable targets for an intervention seeking to prevent stress-related ill health among newly registered nurses. In Study III we moved on to the stage of developing a model of change focusing on newly registered nurses' engagement in proactive behaviors as this is assumed to contribute to the development of the socialization processes. Knowledge concerning how these behaviors are learnt and maintained has been lacking. In addition, previous research on strategies for increasing new professionals' engagement in proactive behaviors is limited (Ashford & Nurmohamed, 2012; Cooper-Thomas & Burke, 2012; Ellis et al., 2015; Nifadkar et al., 2012).

In line with previous research, we found that newly registered nurses avoid engaging in proactive behaviors when perceiving risks of aversive events. We interpreted the reports from the interviewees to indicate that these avoidance behaviors were maintained as they resulted in reduced fear and stress in the short-term. However, over time, they resulted in increased experiences of stress as they inhibited the management of demands at work and the development of the socialization processes. Based on these findings, we developed a behavior change model, identified suitable behavior change techniques, and designed an intervention.

In addition, in Study III we also conducted a trial to test the feasibility of evaluating the effect of the intervention. We found that, with some amendments of the study design, it would be feasible to test the effect of the intervention as an add-on to a transition-to-practice program. Specifically, the nurses' clinical placements would have to be considered in the process of randomization and the time of the intervention would have to be extended with a third session to fit the content of the intervention. In addition, it was suggested that a qualitative evaluation of the effect of the intervention should be added to the design as the psychometric properties

of all of the measures were not fully satisfactory, and the response rate after the end of the intervention was only just on the limit.

Towards the general aim of developing an intervention for preventing stress-related ill health among newly registered nurses, Study III contributed by developing knowledge about how newly registered nurses' engagement in, and avoidance of, proactive behaviors are learnt and maintained, and how it may be changed. The results suggest that systematic exposure, reinforcing approach behaviors, and action planning are suitable behavior change techniques to include in the intervention. In addition, although there are some challenges with conducting an effect evaluation of the intervention as part of a transition-to-practice program, the results of the feasibility trial suggest that it is possible.

### **3.4 STUDY IV**

Finally, the aim of Study IV was to evaluate the effect of the intervention. In effect evaluation trials, using a study design in which participants are randomly allocated to one or more conditions is the most effective design to prevent the risk that selection effects bias the results of the study and exaggerate effects (Craig et al., 2013). The hypotheses of Study IV were that, after the intervention, experimental group participants would experience lower levels of stress than control participants. In addition, they would be more engaged in energizing leisure activities and less engaged in avoidance behaviors. Finally, they would experience higher levels of task mastery, role clarity, and social acceptance than the control participants.

#### **3.4.1 Study design and participants**

We conducted a randomized parallel group trial to evaluate the effect of the intervention compared to an active control condition. Participants (n = 238) were newly registered nurses participating in a transition-to-practice program. The characteristics of the study participants are presented in Table 4.

##### *3.4.1.1 The experimental and control interventions*

The experimental intervention consisted of three sessions of three hours each (i.e. nine hours in total). There were approximately 10 newly registered nurses in each group. The content of the experimental intervention was standardized and described in a manual that was used in all sessions<sup>2</sup>. A summary of the content of the experimental intervention is included as a supplementary material to Study IV.

The effect of participating in the experimental intervention was compared to the effect of participating in the activities of the transition-to-practice program for the same amount of time. The sessions of the control intervention focused on subjects such as patient care

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<sup>2</sup> The full manual of the experimental intervention is available at <https://ki.se/cns/petter-gustavssons-forskargrupp>. Frögéli, E., Rudman, A., Ljótsson, B., Gustavsson, P., 2017. Interventionsmanual. Att främja proaktivitet och förebygga stressrelaterad ohälsa bland nya sjuksköterskor. Rapport C 2017:1. Karolinska Institutet, Stockholm.



(nutrition, wound treatment etc.), communication skills, team management, and the role, rights, and responsibilities of nurses.

Table 4. Characteristics of participants of Study IV.

Variable	All (n = 238)	EXP (n = 129)	Control (n = 109)
Age (M, Min-Max)	27.5 (21-54)	27.8 (22-54)	27.2 (21-52)
Gender (Female/Male)	203/35	106/23	97/12
Worked at clinical ward of first employment position alongside nursing education (n Yes/No)	55/237	24/129	31/108
Worked at clinical ward of first employment position prior to nursing education (n Yes/No)	8/237	4/129	4/108
Believe that education prepared for nursing profession (1 = Do not agree at all; 7 = Fully agree; M (SD))	4.61 (1.20)	4.69 (1.29)	4.51 (1.08)
Self-rated health (1 = Very bad; 7 = Very good; M (SD))	5.49 (1.18)	5.51 (1.22)	5.48 (1.15)

Note: n = number of study participants, M = mean, SD = standard deviation.

### 3.4.2 Data collection

Data were collected using self-report measures in a digital survey (Artologik). Surveys were sent to participants' registered e-mail twice, two weeks prior to the experimental intervention and one week after the experimental intervention. The e-mail included an individualized URL through which the participants were directed to the survey questions. A reminder e-mail including the URL was sent to participants who did not respond to the survey within four and seven days of receiving it.

### 3.4.3 Measures

#### 3.4.3.1 Experiences of stress

Experiences of stress were measured using the SEQ (Hadzibajramovic et al., 2015; Kjellberg & Iwanowski, 1989) that was also used in Studies I and III. However, in Study IV, only two of the original six items were included together with a third item asking about experiences of frustration, as psychometric evaluations favored this solution. The mean and standard

deviation at baseline in Study IV were 3.83 and 1.15 respectively, and the reliability (Cronbach's alpha) was 0.87.

#### *3.4.3.2 Role clarity*

Role clarity was measured using the three items from QPS-Nordic (Dallner et al., 2000; Wannstrom et al., 2009a, 2009b) as in the previous studies. In Study IV, the mean and standard deviation at baseline were 3.73 and 0.67 respectively, and the reliability (Cronbach's alpha) was 0.75.

#### *3.4.3.3 Task mastery*

Task mastery was measured using the two items from the NSFS (Aurell et al., 2015; Longo et al., 2016), as in Studies I and III. The mean and standard deviation at baseline in Study IV were 3.41 and 0.75 respectively, and the reliability (Cronbach's alpha) was 0.50.

#### *3.4.3.4 Social acceptance*

Social acceptance was measured using the two items from the NSFS (Aurell et al., 2015; Longo et al., 2016) as in Studies I and III. The mean and standard deviation at baseline in Study IV were 3.83 and 0.87 respectively, and the reliability (Cronbach's alpha) was 0.68.

#### *3.4.3.5 Proactivity*

To measure newly registered nurses' engagement in proactive behaviors, we used the four items asking about engagement in behaviors such as asking for feedback and help to learn specific tasks, which were developed inspired by a scale from Reeves (2013). Unfortunately, the scale had to be excluded from Study IV as psychometric evaluations could not support its validity.

#### *3.4.3.6 Avoidance of proactivity*

To measure newly registered nurses' avoidance of proactive behaviors, we used the two items that were also used in Study III asking about how often the newly registered nurses avoided asking for help with tasks or avoided asking questions because they believed that they were expected to possess the knowledge themselves. In Study IV, the mean and standard deviation at baseline were 1.94 and 0.92 respectively, and the reliability (Cronbach's alpha) was 0.84.

#### *3.4.3.7 Leisure activities*

To measure newly registered nurses' engagement in leisure activities, we used the three items asking about engagement in physical exercise, activities with friends and family, and personal interests or hobbies during the last month that were also used in Study III. In Study IV, we computed a scale score represented by the mean of the three items. A higher value represents a higher level of engagement in leisure activities. The mean and standard deviation at baseline were 2.92 and 0.77 respectively, and the reliability (Cronbach's alpha) was 0.59. The content of the items is presented in Table 1 in the Appendix.

### 3.4.4 Analysis

In line with reporting guidelines of randomized parallel group trials, we evaluated the effect of the experimental intervention based on analyses of differences between the groups in change over time, as well as a difference between the groups in mean levels after the end of the experimental intervention (Moher et al., 2010).

#### 3.4.4.1 *Analysis of difference in change over time*

We evaluated differences between the experiment and control group in change over time from baseline to follow-up using multilevel model analysis (Fitzmaurice, Laird, & Ware, 2011). We estimated fixed effects for group, time, and their interaction (group by time), and a random effect for the intercept. The fixed effect for time indicated the change from baseline to the end of the study in the control group. Change over time within the experimental group was investigated by summarizing the separate estimates of time and group by time. The standard error of this estimate was calculated as the square root of the sum of the variance of time, the variance of group by time, and the covariance of the two, and used to determine the statistical significance of the change within the experimental group over the period of study. The analyses were conducted in R using restricted maximum likelihood estimation. A statistically significant group by time interaction in the hypothesized direction was interpreted as an indication of an effect of the experimental intervention.

#### 3.4.4.2 *Analysis of difference between means after the experimental intervention*

Differences between the experiment and control group in mean levels at the end of the experimental intervention were evaluated using independent sample *t*-tests in SPSS 23.0. The size of the effect was evaluated using Cohen's *d* with pooled standard deviations from baseline. A difference between the groups in the size of 0.2 standard deviations is considered a small effect, 0.5 standard deviations is considered a medium effect, and 0.8 standard deviations is considered a large effect (J. Cohen, 1988).

#### 3.4.4.3 *Grouping variables*

In line with recommendations for prevention trials, we evaluated the effects of the experimental intervention according to the intention-to-treat principle as well as the efficacy subset principle. The results of analyses based on the intention-to-treat principle, in which all subjects are included according to randomization, is assumed to represent the effectiveness of the experimental intervention. This is the effect that would be expected of the experimental intervention in a real life setting where participation would naturally differ (Lachin, 2000). The results of analyses based on the efficacy subset principle, in which a predefined subsample of the participants are included based on their adherence to the experimental intervention, is assumed to represent the efficacy of the experimental intervention (Gottfredson et al., 2015; Gross & Fogg, 2004; Montori & Guyatt, 2001). In Study IV, the efficacy subset included those experimental group participants who participated in all three

sessions of the experimental intervention and reported that they had completed four or five of the five homework assignments.

#### *3.4.4.4 Handling of missing data*

Attrition analyses were conducted by comparing the study variables at baseline between participants who responded at follow-up and those who did not using independent *t*-tests. Missing data were imputed using multiple imputation (Enders, 2010). In the imputation procedure, all outcome variables at baseline and follow-up were included together with baseline measures of constructs assumed to be of importance for the adaptation of new professionals (i.e. emotional experiences, self-efficacy, fit perception, and autonomy), participation in the experimental intervention, sex, age, study cohort, and commitment to home-work assignments.

### **3.4.5 Results**

After the end of the experimental intervention, 76.9% of the study sample responded to the data collection. These attrition analyses revealed no differences in baseline data between responders and non-responders.

#### *3.4.5.1 Differences in change over time*

According to the analyses of change, the control group participants experienced a statistically significant increase in experiences of stress during the period of the study ( $t(194.13) = 1.98, p = 0.049$ ;  $t(194.33) = 1.97, p = 0.050$ ). In contrast to this, in line with expectations from a preventative intervention, the level of experiences of stress in the experimental group remained stable during the period of the study ( $t(147.24) = -0.12, p = 0.907$ ;  $t(145.49) = -0.20, p = 0.844$ ). However, the difference in change between the groups as indicated by the estimate of group by time was not statistically significant. These results were found for both principles of analysis, that is, looking at the intention-to-treat as well as the efficacy subset sample.

According to the results concerning avoidance of proactive behaviors, the analyses of change indicated that the control group experienced an increase in avoidance of proactive behaviors, whereas the experimental group remained stable, in line with the study hypothesis. However, neither the control groups' change over time, or the difference in change over time between the two groups was statistically significant. These results were found for both principles of analysis.

None of the groups experienced a statistically significant change in engagement in leisure activities, task mastery, or social acceptance during the period of the study, and the differences in change between the groups were not statistically significant. As for the previous outcomes, these results were found for both principles of analysis.

Looking at change in role clarity, the control group participants experienced a statistically significant increase over the period of the study ( $t(207.55) = 3.26, p = 0.001$ ;  $t(208.20) =$

3.23,  $p = 0.002$ ), whereas the experimental group participants remained stable, in contrast to the study hypothesis. The difference in change between the groups was found to be statistically significant using the intention-to-treat principle of analysis ( $t(181.53) = 2.44$ ,  $p = 0.016$ ). However, according to the analysis conducted with the efficacy subset, the difference in change over time between the groups was not statistically significant.

#### *3.4.5.2 Differences between groups at the end of the experimental intervention*

According to analyses of difference in mean levels after the experimental intervention, in line with the study hypothesis, the newly registered nurses who participated in the experimental intervention reported a statistically significant lower level of stress than the control participants, according to the efficacy subset analysis based on observed data ( $t(148) = -1.99$ ,  $p = 0.049$ ). The size of the effect was 0.31, indicating a small effect. The remaining analyses (i.e. intention-to-treat analysis for observed data as well as intention-to-treat and efficacy subset analyses for imputed data) supported this finding as indicated by between-group differences ( $d = 0.24-0.29$ ) favoring an effect of the experimental intervention. However, these differences were not found to be statistically significant.

In addition, in line with the study hypothesis, the experimental group participants reported a lower level of avoidance behaviors as compared to the control participants after having participated in the experimental intervention. This effect was confirmed in all four types of between-group comparisons ( $t(175) = -2.27$ ,  $p = 0.024$ ;  $t(146) = -2.25$ ,  $p = 0.026$ ;  $t(178.13) = -2.15$ ,  $p = 0.033$ ,  $t(152.09) = -2.15$ ,  $p = 0.030$ ). The size of the effect ranged between 0.34 and 0.37 indicating a small to medium effect.

Differences between the groups at the end of the experimental intervention in engagement in leisure activities and social acceptance were all in the hypothesized direction. Differences in task mastery were in the hypothesized direction for the efficacy subset analyses, but not the intention-to-treat analyses. However, none of the differences reached the level of statistical significance.

Finally, in contrast to the study hypothesis, the control group reported a higher level of role clarity at the end of the study period than the experimental group. The effect was statistically significant ( $t(181) = -2.24$ ,  $p = 0.026$ ;  $t(150) = -1.94$ ,  $p = 0.054$ ;  $t(190.14) = -2.59$ ,  $p = 0.010$ ;  $t(152.09) = -2.45$ ,  $p = 0.020$ ) and small to medium in size ( $d = 0.29-0.40$ ). In Figure 5, the means at baseline and after the experimental intervention are presented.

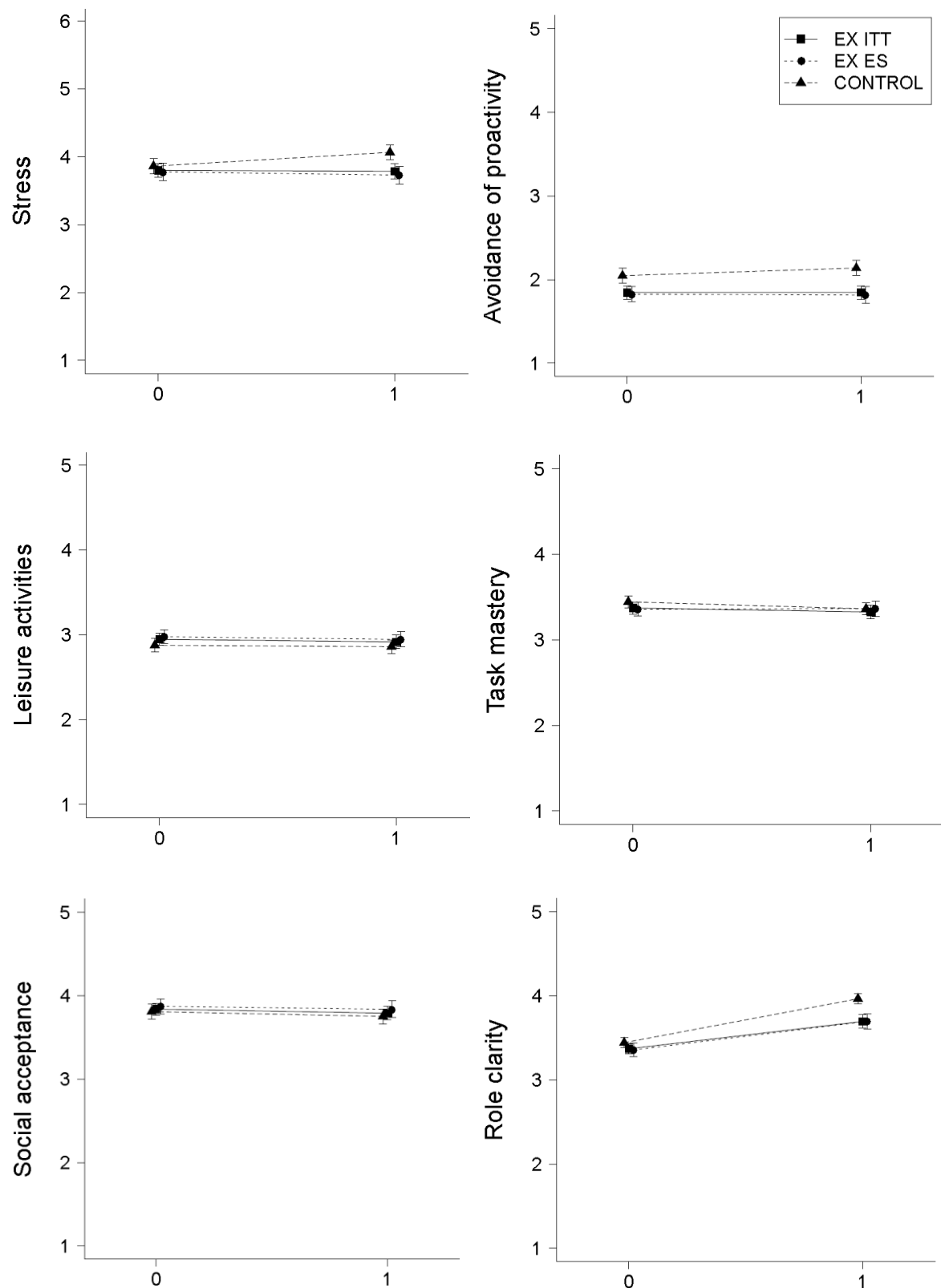


Figure 5. Means and standard errors at baseline (0) and the end of the experimental intervention (1). Imputed data. Note: EX ITT = Experimental group based on intention-to-treat principle of analysis, EX ES = Experimental group based on efficacy subset principle of analysis, CONTROL = Control group.

### 3.4.5.3 Additional analyses

To advance our understanding of the effects of the experimental intervention, a number of additional investigations have been conducted that are not included in Study IV. First, because of the conflicting findings on the main outcome, the analyses of differences in change over time and mean differences between groups after the end of the experimental intervention were re-run on each of the three stress-items separately. Second, effect of engagement in the experimental intervention were investigated using a within-group design. Finally, experiences of participating in the experimental intervention were investigated through interviews with 26 of the newly registered nurses who participated in the experimental intervention.

*Item-analysis of the effect of the experimental intervention.* The measure of stress included three items asking about experiences of being stressed, pressured, and frustrated. Considering that symptoms of stress-related ill health is expected to develop over time (e.g. Gustavsson et al., 2010, Schaufeli and Enzmann, 1998, and McEwen and Gianaros, 2011), the three items could be hypothesized to represent different stages in a progression towards stress-related ill health.

The analysis of differences in change over time conducted based on both the intention-to-treat and the efficacy subset principles indicated that the participants in the control group experienced a statistically significant increase in frustration during the period of the study. Contrary, the participants in the experimental group did not experience such an increase. The difference in change over time between the groups did almost reach the level of statistical significance according to the intention-to-treat analysis. There were no differences in change over time between the groups in the stressed-item or the pressured-item. This result suggests that the experimental intervention prevented a development from initial experiences of stress towards symptoms of stress-related ill health, in line with the study hypothesis. The results are presented in the Appendix, Table 2.

The differences in mean levels after the end of the experimental intervention were in favor of a preventative effect of the experimental intervention on experiences of being stressed, pressured, and frustrated, according to the intention-to-treat and efficacy subset analyses. However, the differences between the groups were not statistically significant. The size of the differences ranged between 0.17 and 0.29. The results are presented in the Appendix, Table 3 and 4.

*Analysis of the effect of engagement in the experimental intervention using a within-group design<sup>3</sup>.* The effect of engagement in the experimental intervention on each outcome was evaluated using a series of separate regression models with a within-group design (i.e. the experimental group and the control group were combined into one). Engagement was

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<sup>3</sup> Bring, A, Zachrisson, E. (2019). Engagera flera. En studie om effekten av engagemang i en preventiv stressintervention för nyexaminerade sjuksköterskor. Karolinska Institutet. Thesis for Bachelor's degree

operationalized based on participation in the sessions (scale 0-3) and the number of completed homework assignments (scale 0-5). Data at follow-up was used as the dependent variable and baseline data as well as engagement (either level of participation or completed homework assignments) were used as predictor variables. The time points of baseline and follow-up were adjusted based on participation in the experimental intervention (i.e. as the newly registered nurses in the control group participated in the experimental intervention following the experimental group). With this model, the estimate of the engagement measure is to be interpreted as the effect of engagement on change in the outcome from baseline to the end of the experimental intervention.

The results of the analyses showed that adherence to homework assignments was a statistically significant predictor of a reduction in levels of stress during the period of the study (standardized beta = -0.15,  $p = 0.039$ ). Furthermore, they showed that adherence to homework assignments as well as participation in the experimental intervention were statistically significant predictors of an increase in levels of social acceptance during the period of the study (standardized beta of homework assignments = 0.16,  $p = 0.027$ ; standardized beta of participation = 0.14,  $p = 0.036$ ).

*Qualitative evaluation.* As the feasibility trial indicated that the evaluation of the experimental intervention would benefit from the addition of a qualitative component, 26 participants in the experimental intervention were recruited at the end of the last session of the experimental intervention to participate in individual interviews. The interviews were conducted over the telephone a few weeks after the experimental intervention by Ann Rudman. They were semi-structured, lasted for 10-20 minutes, recorded using Olympus digital voice recorder WS-833, and transcribed verbatim prior to analysis. A qualitative analysis of these data based on the principle of thematic analysis (Braun & Clarke, 2006) is under preparation and thus the results cannot be included in this thesis. However, a brief summary of data from the interviews concerning the newly registered nurses' experiences of participating in the experimental intervention, their thoughts about the value of the experimental intervention for newly registered nurses in general, their perception of the suitability of the experimental intervention as an add-on to the transition-to-practice program, as well as their experiences of engaging in leisure activities and changing avoidance behaviors is presented below. Quotes are presented in relation to the results.

All 26 interviewees believed that it had been a good experience to participate in the experimental intervention. Specifically, they reported that it had been valuable to get a chance to consider their situation from another perspective, exchange experiences with others in the same position, and learn that their individual experiences were common and normal. Furthermore, they appreciated the experimental intervention's focus on preventing symptoms of stress-related ill health and the homework exercises that were included in the experimental intervention.

*"It was really, really good! I think that it is good when you are new to talk to people in the same situation". ID 07*



*"I think that it was good that she talked about symptoms of stress and stress-related ill health, and so on. And to learn what you can do about it". ID 37*

Furthermore, they believed that the experimental intervention would be of value to newly registered nurses in general. One out of three believed that the experimental intervention could contribute to an increased understanding of personal experiences among newly registered nurses, while the vast majority (20/26) believed that it could contribute to increased knowledge of strategies to increase well-being. Similarly, about one in four stated that the opportunity to talk to other newly registered nurses about their experiences, and to hear that it is normal to feel insecure in the new professional role, was a valuable addition of the experimental intervention.

*"I believe that, getting an understanding of all of this that you, well, the stress, and explanations of..., I think that can mean a lot. But also that you were given specific information concerning what you can do about it, and that the focus was taken away from all of the small things that you cannot do much about, to the things that you can have an impact on, I think that can mean a lot". ID 01*

*"I think the value is that, a lot of people have the same thoughts and feelings and experiences in relation to their first period [in the profession], and that you can be there to support each other". ID 12*

Most interviewees (23/26) reported that the experimental intervention added an important component to the remaining components of the transition-to-practice program. One in three stated that they believed that it was good that the need of an intervention targeting stress and related challenges was recognized.

*"I think it adds a breadth of content. [...] We are taught many things and [the experimental intervention] adds the part of how it is, how you are supposed to cope with it, how you are supposed to keep believing that it is fun". ID 02*

*"I believe that [the experimental intervention] stood out from the rest, because it addressed a subject that is not included in the other components". ID 18*

Most interviewees (24/26) thought that the experimental intervention could have included one or more additional sessions. One-third suggested that an additional session after a period of time would be valuable. It was recognized that such a session could contribute with a reminder of behavior change goals, which was expected to facilitate maintenance of behavior change. Furthermore, it was suggested that such an addition could provide an opportunity to evaluate individual changes over time. One person believed that the third session in which the work from the previous two sessions was repeated and evaluated had been unnecessary. Two more believed that the content of the experimental intervention was already known to them, but recognized that it was still valuable to others.

*“I believe that it would have been nice with an additional session the following term. [...] It would not have to be much, just one session to follow-up, to avoid forgetting everything. [...] To be reminded”. ID 02*

*“I remember that I thought at the end of the last session that I wanted more, that I wanted it to continue”. ID 07*

The homework assignments were recognized as important for behavior changes in relation to leisure activities. All but six of the respondents gave examples of behavior changes in relation to the experimental intervention. Five acknowledged that they had changed their behavior during the intervention period but that they had not managed to maintain the new behavior afterwards. Being tired was the most common reason for not engaging in leisure activities.

*“It got so concrete [with the homework assignments and specific goals for behavior change] so you booked that date with a friend and you had a workout, you took that walk before work. And then I started to notice the great impact that it had [...] I realized that this is what gives me energy. Just realizing that, I think that will make a whole difference to my career”. ID 03*

*“It worked well for a while but then it happens that you fall back into old habits [...] even though it [engaging in activities] was great because I did get a lot more energy”. ID 09*

Finally, most interviewees (19/26) reported that they, in relation to the experimental intervention, had made efforts to reduce their engagement in avoidance behaviors and increase their engagement in proactive behaviors in line with the homework assignments. One person stated that s/he had not been able to identify any avoidance of proactive behaviors. Other obstacles to engaging in proactive behaviors were time pressure, fear of making a mistake, and organizational factors including lack of staff and culture.

*“Well, like when you are supposed to do something that you have never done before, first you get scared. You don’t want to make a mistake, and you think that you could perhaps postpone it, have someone else do it who knows how to... But then, I thought that I can at least look up how you’re supposed to do it, before I decide not to. Well, so I did and I read the information and it didn’t look that difficult [...] And so it didn’t feel as difficult anymore. Then I asked a colleague, just to know if there was something in particular you should think about, and I got some specific tips [...] And so I did it and of course it felt really good afterwards”. ID 01*

*“...now [...] when I ask a colleague to help me, I stay in the room to observe when my colleague draws the [blood] sample, so I can learn from it. Before I used to be so ashamed of asking for help that I didn’t stay in the room. I just asked someone to do it for me, not to show me how to do it. And it is quite the difference. You know, “Do this for me” is not the same thing as “Help me learn*

*how to do this”. [...] There are still challenges, but I believe that it is much easier to deal with them [...] and it feels really good when I do”. ID 35*

### **3.4.6 Conclusion and contribution towards the general aim of the thesis**

In Studies I-III, it was suggested that an intervention aiming to support newly registered nurses' engagement in proactive behaviors by reducing their engagement in avoidance behaviors and increasing their engagement in energizing leisure activities could prevent experiences of stress and that the effect would be mediated through the development of the socialization processes task mastery, role clarity, and social acceptance. Furthermore, it was concluded that it would be feasible to evaluate the effect of the intervention as an add-on to a transition-to-practice program using a randomized parallel group design.

In Study IV, we evaluated the effect of the experimental intervention in a randomized controlled trial. We found support for a small preventative effect of the experimental intervention on experiences of stress, however, the results of different analyses were inconclusive. Similarly, the analyses provided support for a small to medium effect of the experimental intervention on engagement in avoidance of proactive behaviors, but again, the results of different analyses were inconclusive. Moreover, there were no effects of the experimental intervention on engagement in leisure activities, task mastery, or social acceptance. The control group participants experienced a more positive development of role clarity than the experimental group participants.

According to the results of additional analyses (not included in Study IV), there was a statistically significant difference between the groups in change over time in experiences of frustration indicating a preventative effect of the experimental intervention. Furthermore, within-group analyses showed that there was an effect of adherence to homework assignments on experiences of stress, as well as adherence to homework assignments and participation in the experimental intervention on social acceptance. Finally, qualitative data from interviews with participants in the experimental intervention suggested that they were positive about the experimental intervention, perceived that it had been of value for them as individuals, and that it would be valuable for newly registered nurses in general.

Study IV was the last in line towards the general aim of developing an experimental intervention for preventing symptoms of stress-related ill health among newly registered nurses by supporting engagement in proactive behaviors. In summary, the results suggest that it is possible to address newly registered nurses' experiences of stress using a behavior change intervention based on theory and practice from cognitive behavior therapy. Furthermore, they suggest that the experimental intervention has a small effect on newly registered nurses' experiences of stress and a small to medium effect avoidance of proactive behaviors, although the results of different methods of analysis were conflicting.

## 4 DISCUSSION

The general aim of this thesis was to investigate the possibility of preventing symptoms of stress-related ill health among newly registered nurses by supporting engagement in proactive behaviors. The overall hypothesis was that increased engagement in proactive behaviors would contribute to the development of the socialization processes task mastery, role clarity, and social acceptance, which, in turn, would mediate a reduction of experiences of stress and the risk of developing symptoms of stress-related ill health. An experimental intervention was developed based on research from the fields of nursing, occupational health, stress, and organizational socialization, as well as theory and practice from cognitive behavior therapy. The work in the four papers of the thesis was developed based on guidelines for the development of interventions. Accordingly, first, the target of the intervention should be identified including the developmental trajectory as well as risk and protective factors. In this thesis, this first phase is addressed in Studies I and II. Next, a model that specifies the mechanisms through which the intervention is assumed to affect the problem should be identified or developed. This second phase is addressed in Study III of the thesis. Third, a preliminary trial should be conducted to reduce the risk that flaws in the study design confound the effect evaluation. This third phase was also addressed in Study III of the thesis. And finally, the efficacy and effectiveness of the intervention should be evaluated. In this thesis, the effect evaluation was addressed in Study IV.

### 4.1 SUMMARY OF MAIN FINDINGS

In Study I, we found that weekly changes in the socialization processes task mastery, role clarity, and social acceptance were related to concurrent changes in experiences of stress. That is, on occasions when the newly registered nurses experienced higher levels of task mastery, role clarity, and social acceptance than their own mean levels, they experienced lower levels of stress. We also found that there were considerable individual differences in the rates of change of the socialization processes during the first three months following professional entry.

In Study II, in line with the results of Study I, we found that higher levels of task mastery, role clarity, and social acceptance one year following professional entry were related to lower levels of symptoms of burnout, concurrently. In addition, increasing levels of the socialization processes over the first two and three years following professional entry were related to decreasing levels of symptoms of burnout during the same periods of time. Task mastery and leadership support were the strongest explanatory variables, suggesting that supporting the development of these processes may be particularly important.

In Study III, using principles from learning theory, we analyzed newly registered nurses' engagement in, and avoidance of, proactive behaviors as well as energizing leisure activities. We interpreted the data to indicate that when newly registered nurses engage in proactive behaviors, they experience increased task mastery, role clarity, and social acceptance. However, data also indicated that the newly registered nurses avoided engaging in proactive

behaviors when perceiving risks of aversive events and that these avoidance behaviors were maintained as they resulted in reduced fear and stress in the short-term. It was suggested that, over time, the avoidance of proactive behaviors resulted in increased experiences of stress as they inhibited the management of demands at work as well as the development of the socialization processes. Furthermore, we found that the newly registered nurses had cut down on energizing leisure activities following professional entry. Based on the analysis, we developed a behavior change model. Specifically, the key behavior change goals of the intervention were to reduce avoidance of proactive behaviors and increase engagement in energizing leisure-activities. The behavior change techniques systematic exposure, reinforcing approach behaviors, and action planning were identified as suitable and an intervention was designed.

In Study III we also conducted a trial to test the feasibility of evaluating the effect of the intervention as part of a transition-to-practice program for newly registered nurses. The results showed that, with regard to recruitment, data collection, analysis, participation, and acceptability, it would be feasible to conduct an evaluation of the effect of the intervention as part of a transition-to-practice program for newly registered nurses. However, they showed that the nurses' clinical placements would have to be considered in the process of randomization, and that the time of the intervention would have to be extended to fit the content of the intervention. In addition, although the feasibility criterion was fulfilled, the psychometric properties of all of the measures were not fully satisfactory, and the response rate after the end of the intervention was only just on the limit. Therefore, it was suggested that a qualitative evaluation of the effect of the intervention should be added to the design.

Finally, we evaluated the effect of the experimental intervention using a randomized parallel group design with an active control condition. According to the analyses, the control group participants experienced a statistically significant increase in experiences of stress during the period of the study whereas the level of experiences of stress in the experimental group remained stable during the period of the study. The difference in change over time between the groups was not statistically significant but the difference in mean levels after the end of the experimental intervention provided support for a small preventative effect of the experimental intervention. Similarly, the analyses of change in avoidance of proactive behaviors indicated that the control group experienced an increase in avoidance of proactive behaviors, whereas the experimental group remained stable, in line with the study hypothesis, but neither the control groups' change over time, or the difference in change over time between the two groups was found to be statistically significant. However, differences in mean levels of avoidance of proactive behaviors after the experimental intervention provided support for a small to medium effect of the experimental intervention. There were no effects of the experimental intervention on engagement in leisure activities, task mastery, social acceptance, or role clarity. The control group participants experienced a more positive development of role clarity than the experimental group participants.

Additional analyses showed that participation in the experimental intervention prevented an increase in experiences of frustration. In addition, engagement in the experimental intervention as indicated by level of participation and adherence in homework assignments predicted a higher level of social acceptance and a lower level of stress. Finally, qualitative data from interviews with nurses who participated in the experimental intervention suggested that they perceived that the experimental intervention had been of value for them as individuals, and that they believed that it would be valuable for newly registered nurses in general. The homework assignments were recognized as facilitating behavior changes in relation to leisure activities, avoidance behaviors, and proactive behaviors. However, they acknowledged that their behavior changes were not always maintained after the end of the experimental intervention. More sessions of the experimental intervention, as well as an additional follow-up session after an extended period of time, were requested to support maintenance of effects.

## **4.2 DISCUSSION OF THE MAIN FINDINGS**

In the following section, the main findings are discussed in relation to previous research according to the stepwise procedure presented in the guidelines for the development of interventions (Figure 1). After the discussion of the main findings, a general discussion of the overall aim follows.

### **4.2.1 Know the problem**

The period of transitioning from education to a new profession is filled with situations that are characterized by unpredictability, uncontrollability, and social risks and thus activate the stress response (Ellis et al., 2015; Saks & Gruman, 2012). Consistent with occupational health- (Bakker & Demerouti, 2007; Karasek & Theorell, 1990) and stress research (McEwen et al., 2015; McEwen & Gianaros, 2011), within organizational socialization research, it is assumed that the primary goal of new professionals is to develop resources that will facilitate the management of these challenging situations (Ashforth & Saks, 2002). The socialization processes task mastery, role clarity, and social acceptance have been suggested to be particularly important for new professionals' adaptation and management of challenges (Bauer et al., 2007). Specifically, it is assumed that, with the passage of time following professional entry, experiences of the socialization processes will increase and experiences of stress will decrease. In addition, it is expected that the increased experiences of the socialization processes will lead to the decreased experiences of stress. Over time, this is expected to result in a prevention of symptoms of stress-related ill health (Bakker & Demerouti, 2007; Karasek & Theorell, 1990; McEwen et al., 2015; McEwen & Gianaros, 2011; Saks & Gruman, 2012). Investigations using longitudinal study designs have been requested to further the understanding of the development of the socialization concepts (Ashforth, 2012; Beal & Weiss, 2003). Development of experiences of stress following professional entry has rarely been investigated and the previous knowledge has thus been limited (Bauer & Erdogan, 2012; Ellis et al., 2015; Saks & Gruman, 2012).

#### *4.2.1.1 Developmental trajectories of the socialization processes and experiences of stress*

The results of Study I partly confirmed the assumptions from the organizational socialization framework (Saks & Gruman, 2012). We showed that the typical newly registered nurse experienced a decrease in experiences of stress during the first three months in the profession. During the same period, levels of task mastery and role clarity increased for the typical new nurse. However, in contrast to expectations from organizational socialization research, levels of social acceptance decreased.

We know of no other studies that have investigated the development of these variables during the first three months in the profession in a sample of newly registered nurses using a similar study design. Lima, Newall, Jordan, Hamilton, and Kinney (2016) investigated the development of competence (a construct closely related to task mastery) during the first year of professional working life in a sample of newly registered nurses working in a pediatric setting with a periodic survey every third month. In line with the present study, they found a statistically significant increase in experiences of competence from professional entry to three months later. Looking at a sample of university employees, also in line with our findings from Study I, Kammeyer-Mueller, Wanberg, Rubenstein, and Song (2013) found that perceived supervisor- and co-worker support (indicators of social acceptance) declined during the first 90 days following professional entry.

In addition to the general trends of the development of the socialization processes and experiences of stress, in Study I we also found that there was considerable variability among different newly registered nurses in rates of change in experiences of stress and the socialization processes. This means that although the typical nurse experienced a positive development of stress, role clarity, and task mastery, some individual nurses did not. The newly registered nurses' work environment, including demands and resources (e.g. participation in transition-to-practice program), was not accounted for in the analyses. It is likely that these different trajectories are in part due to different experiences of the newly registered nurses during the first three months. It has previously been suggested that the more dependent a new professional is of spontaneous events for learning, the more unpredictable his or her learning will be (Ashforth & Saks, 2002). This finding thus may be interpreted as indicating a need for a more standardized period of professional entry for newly registered nurses. Problems with a lack of a standard model for supporting newly registered nurses have similarly been acknowledged in previous research (Brown et al., 2015; Rush et al., 2013).

#### *4.2.1.2 The relationship between the socialization processes and experiences of stress*

In Study I, we also showed that newly registered nurses who in general experienced higher levels of the socialization processes experienced lower levels of stress. As the socialization processes are viewed as resources, these findings are in line with occupational health- (Bakker & Demerouti, 2007; Karasek & Theorell, 1990) and stress research (McEwen et al., 2015; McEwen & Gianaros, 2011) pointing to the relation between demands, resources, and stress. By identifying a relationship between the socialization processes and experiences of

stress, the results of Study I confirmed the assumptions from the organizational socialization framework (Saks & Gruman, 2012). Furthermore, they were in line with qualitative research indicating that the socialization processes are related to experiences of stress among newly registered nurses (Arrowsmith et al., 2016; Duchscher, 2009; Gardiner & Sheen, 2016; Halpin et al., 2017; Pellico et al., 2009; Pennbrant et al., 2013; Phillips et al., 2015; Sterner et al., 2017; Ten Hoeve et al., 2018; van Rooyen et al., 2018).

In addition, we showed that development of the socialization processes was related to the development of experiences of stress. Specifically, momentary changes in the socialization processes were related to concurrent changes in experiences of stress. That is, during weeks when a new nurse experienced a lower level of task mastery, role clarity, or social acceptance, he or she experienced a higher level of stress. Or, on the contrary, during a week when a new nurse experienced a higher level of task master, role clarity, or social acceptance, he or she experienced a lower level of stress. These relations have not previously been investigated using prospective longitudinal study designs or intensive longitudinal designs (Bauer & Erdogan, 2012; Ellis et al., 2015; Saks & Gruman, 2012). The intensive longitudinal design allows for explaining changes in individual experiences, thereby approaching interpretations of causality that are traditionally only allowed based on experimental designs (Bolger et al., 2003; Bolger & Laurenceau, 2013). As such, these results from Study I expand previous knowledge and confirm that the development of the socialization processes is related to the development of experiences of stress among newly registered nurses.

#### *4.2.1.3 The relationship between the socialization processes and symptoms of burnout*

In Study II we showed that higher levels of task mastery, role clarity, and social acceptance one year following professional entry were related to lower levels of symptoms of burnout at the same point in time. Again, these findings were in line with previous findings from occupational health (Aronsson et al., 2017; Kivimaki & Steptoe, 2018; Linton et al., 2015; Theorell et al., 2015; Theorell et al., 2016) and stress research (McEwen et al., 2015; McEwen & Gianaros, 2011), and confirmed the assumptions from the organizational socialization framework (Saks & Gruman, 2012).

In addition, we showed that increasing levels of all three socialization processes during the first two years in the profession were related to decreasing levels of symptoms of burnout during the same period. Furthermore, increasing levels of task mastery and social acceptance during the first three years in the profession were related to decreasing levels of symptoms of burnout during the same period. These findings expand previous knowledge concerning the relationship between prolonged exposure to stressful work situations and the development of symptoms of stress-related ill health, thereby addressing a request of prospective longitudinal studies investigating these relations (SBU, 2014).

However, change in role clarity was not related to change in symptoms of burnout during the three-year period. This finding was in contrast to assumptions based on previous research.



Considering the results of Study I and Study II in combination, this may indicate that role clarity is particularly important during the initial period following professional entry, but that the effect of the construct of experiences of stress and symptoms of burnout fades with time. In line with this suggestion, Tomietto, Rappagliosi, Sartori, and Battistelli (2015) found that predictors of turnover intentions (a construct that has been related to symptoms of burnout) varied in samples of newly registered nurses depending on the time elapsed since professional entry. Among nurses who had worked zero-six months, the main factors that were related to turnover intention were skills acquisition and comprehension of organizational rules. In the group that had worked for 7-12 months, social acceptance (measured as workgroup integration) was the most relevant explanatory variable for turnover intentions. Finally, in the group who had worked for 13-24 months, Tomietto et al. (2015) found that opportunities for professional development was the most important explanatory variable. However, it is also possible that this non-significant result on the effect of role clarity on symptoms of burnout from Study II reflects a ceiling effect.

In summary, adhering to the guidelines for development of interventions, Study I and Study II focused on developing an understanding of newly registered nurses' experiences of stress. Building on previous research, newly registered nurses experiences of stress were investigated in relation to the socialization processes task mastery, role clarity, and social acceptance. The results supported the hypothesis that newly registered nurses' experiences of stress and symptoms of burnout were related to the development of the socialization processes. The results furthermore supported the hypothesis that stress-related ill health among newly registered nurses may be prevented by an intervention seeking to increase the development of the socialization processes and suggests that there is room for an intervention addressing the development of all constructs as there was considerable individual variability in their rates of change.

#### **4.2.2 Develop a model of change**

The behavioral model of stress-related ill health recognizes that, in addition to organizational factors, engagement in avoidance behaviors in relation to demands and stress at work is a key component in the development of symptoms of burnout (Maslach et al., 2001; Schaufeli & Enzmann, 1998). It is assumed that, as individuals engage in avoidance behaviors in relations to perceived demands, the demands are not mastered, and resources such as knowledge, skills, or social support are not developed. Consequently, the next time a similar situation is encountered, it will be perceived as equally demanding, re-activate the stress response, and, over time, the risk of developing symptoms of stress-related ill health through allostatic load will increase. On the contrary, active engagement in demanding situations may result in successful management of demands, as well as foster development of resources that reduce the degree to which different situations at work are perceived as challenging. Thereby, active management of demands is assumed to reduce experiences of stress in the short run, and the risk of developing symptoms of stress-related ill health over time (Schaufeli & Enzmann, 1998).

New professionals engagement in proactive behaviors have similarly been recognized to facilitate management of demands at work and adaptation to the new professional role (Ashford & Nurmohamed, 2012; Ellis et al., 2015). According to observational data, engagement in proactive behaviors is related to the socialization processes role clarity and social acceptance (Bauer et al., 2007), as well as task mastery and group integration (a construct related to social acceptance) (Kammeyer-Mueller & Wanberg, 2003). However, it has also been recognized that engagement in proactive behaviors are at times avoided due to perceived risks of aversive events (Cooper-Thomas & Burke, 2012; Ellis et al., 2017; Nifadkar et al., 2012). In line with the behavioral model of stress-related ill health, avoidance of proactive behaviors is expected to increase experiences of stress in the short run as demands are not managed and resources are not developed, and increase the risk of developing symptoms of stress-related ill health over time. Thus, in this thesis, it was suggested that newly registered nurses' experiences of stress could be prevented by supporting engagement in proactive behaviors as they transition into their new professional role, and that this would result in a prevention of symptoms of stress-related ill health over time.

#### *4.2.2.1 Engagement in proactive behaviors*

We showed that it was possible to understand newly registered nurses' engagement in, as well as avoidance of, proactive behaviors using principles from learning theory (O'Donohue, 2009; Ramnerö & Törneke, 2008). Although previous research has studied these behaviors, a thorough understanding of how proactive behaviors and avoidance behaviors are learnt and maintained has been lacking (Ashford & Nurmohamed, 2012; Cooper-Thomas & Burke, 2012; Ellis et al., 2015; Nifadkar et al., 2012). Based on data from interviews with newly registered nurses, we made the interpretation that important antecedents for newly registered nurses' engagement in proactive behaviors were experiences of uncertainty in combination with perceived support from coworkers as well as perceived competence to execute the given proactive behaviors. These findings corresponded to previous investigations of newly registered nurses' engagement in proactive behaviors (Duchscher, 2009; Jackson, 2016; Malouf & West, 2011; Mellor & Gregoric, 2016; Regan et al., 2017; Tong & Epeneter, 2018).

Furthermore, our understanding based on the interviewees' reports was that newly registered nurses' engagement in proactive behaviors was maintained as it resulted in increased experiences of task mastery, role clarity, and social acceptance, and a reduced perception of risks and experiences of stress. Among newly registered nurses, proactive behaviors have previously been acknowledged to facilitate learning and reduce experiences of stress (Chen et al., 2017; Lengetti et al., 2018; Lima, Jordan, et al., 2016; Mellor & Gregoric, 2016; Regan et al., 2017; Tong & Epeneter, 2018). These results thus align with, and expand, previous knowledge of the relationship between engagement in proactive behaviors, development of the socialization processes, and experiences of stress among new professionals in general and newly registered nurses in particular.

#### 4.2.2.2 *Avoidance of proactive behaviors*

However, also in line with previous research, we noted that the newly registered nurses' engagement in proactive behaviors was at times avoided. Specifically, in situations when the newly registered nurses experienced fear in relation to perceived risks of making mistakes, not living up to role expectations, and not being accepted by peers, they described that they avoided engaging in proactive behaviors. These findings are in line with previous organizational socialization research recognizing that perceived performance, role, and social risks inhibit engagement in proactive behaviors (Cooper-Thomas & Burke, 2012; Ellis et al., 2017; Nifadkar et al., 2012). They are also in line with previous nursing research (Duchscher, 2009; Jackson, 2016; Malouf & West, 2011; Mellor & Gregoric, 2016; Regan et al., 2017; Tong & Epeneter, 2018).

In addition to identifying these antecedents of avoidance of proactive behaviors, we interpreted the newly registered nurses' reports to indicate that the avoidance behaviors were maintained as they reduced immediate experiences of fear and stress as the perceived risks were avoided. This result expands previous knowledge on newly registered nurses' avoidance of proactive behaviors. In addition, in line with the behavioral model of stress-related ill health, we suggested that avoidance of proactive behaviors would result in increased fear and stress over time as skills were not developed, professional roles were blurred, and relationships were not strengthened, and thus perceived risks and experiences of fear and stress remained or increased. The findings were thus in line with the hypothesis that supporting engagement in proactive behaviors could contribute to preventing newly registered nurses' experiences of stress in the short run and the risk of developing symptoms of stress-related ill health over time.

The benefit of analyzing behaviors in terms of the antecedents and consequences that contribute to learning and maintenance is that this opens up to strategies for behavior change. Strategies for increasing new professionals' engagement in proactive behaviors has previously been limited (Ashford & Nurmohamed, 2012; Cooper-Thomas & Burke, 2012; Ellis et al., 2015; Nifadkar et al., 2012). The results of Study III suggested that the behavior change technique known as systematic exposure (Craske et al., 2008) could be suitable to reduce newly registered nurses' avoidance of proactive behaviors.

#### 4.2.2.3 *Avoidance of leisure activities*

When analyzing data from the interviews with the newly registered nurses, we also made the interpretation that newly registered nurses had reduced their engagement in energizing leisure activities following professional entry. These findings correspond to the findings of Duchscher (2009) and Ten Hoeve et al. (2018) suggesting that workload and shiftwork negatively impacted newly registered nurses' leisure activities. Specifically, we found that the principles of the newly registered nurses' engagement in energizing leisure activities corresponded to the principles of depressed individuals' engagement in activities (Martell et al., 2001). As reduced engagement in recovery-promoting behaviors has been recognized to

increase the risk of developing symptoms of stress-related ill health over time following exposure to demands (Dhabhar, 2014; Kivimaki & Steptoe, 2018; McEwen & Gianaros, 2011; Schaufeli & Enzmann, 1998), and fatigue and exhaustion have been recognized to inhibit engagement in proactive behaviors (Bolino et al., 2010; Sonnentag, 2003), we decided to include a focus on engagement in energizing leisure activities in the intervention. The behavior change technique known as reinforcing approach behaviors was identified as suitable (Kanter et al., 2006; Martell et al., 2001).

In summary, adhering to the guidelines for development of interventions, in Study III, based on an analysis of the antecedents and consequences affecting newly registered nurses' engagement in, and avoidance of, proactive behaviors as well as energizing leisure activities, a behavior change model and intervention was developed. The key behavior change goals were to reduce avoidance of proactive behaviors and increase engagement in energizing leisure activities. As previously mentioned, interventions that are based on an explicit theory of the mechanisms of change have been found to be more effective than interventions with no such theory (Craig et al., 2013; Durlak, 2014; Nation et al., 2003; Prestwich et al., 2014; Tebes et al., 2014). Accordingly, the behavior change techniques systematic exposure (Craske et al., 2008) and reinforcing approach behaviors (Kanter et al., 2006; Martell et al., 2001) were included in the intervention, together with a technique for action planning (Gollwitzer, 1999).

#### **4.2.3 Test the feasibility of conducting an effect evaluation**

In Study III, we also investigated the feasibility of conducting a trial to evaluate the effect of the intervention as an add-on to a transition-to-practice program for newly registered nurses. In line with previous prevention research, as well as organizational socialization research (Tebes et al., 2014; Vancouver & Warren, 2012), we identified some challenges. Specifically, we concluded that the newly registered nurses could not be randomized to the two conditions of the trial using simple randomization. Instead, their clinical placements had to be taken into consideration to avoid causing a problem of staffing on the wards. Ensuring that an intervention is accepted by key stakeholders (such as the managers of the clinical wards) is recognized to have a positive impact of effect and later stages of dissemination (Tebes et al., 2014). We evaluated the risk of selection bias following this amendment in the randomization procedure and concluded that it should not pose a problem for the evaluation.

We also concluded that the time of the intervention would have to be extended for the effect evaluation to fit the content as indicated by the manual. Adhering to the manual is essential in effect evaluation trials (Öst, 2008). Thus, ensuring that the intervention can be delivered as intended is important.

Finally, although the feasibility criterion was fulfilled, the psychometric properties of all of the measures were not fully satisfactory, and the response rate after the end of the intervention was only just on the limit. Therefore, it was suggested that a qualitative evaluation of the effect of the intervention should be added to the design. The benefit of

adding qualitative components to evaluations of interventions has similarly been recognized in guidelines of prevention research (Tebes et al., 2014).

Beyond these issues, however, based on the results of the feasibility trial, we concluded that it would be feasible to conduct a trial investigating the effect of the intervention as part of a transition-to-practice program for newly registered nurses. Importantly, we found that it was possible to integrate the intervention in the schedule of the transition-to-practice program and that the content and format of the intervention was accepted by the participating nurses. As previously mentioned, ensuring acceptability of key stakeholders (i.e. the newly registered nurses) is important (Tebes et al., 2014).

At least nine reviews of the effects of transition-to-practice programs have been published since the 2011 report from the Institute of Medicine (Institute of Medicine, 2011), and all of these come to the conclusion that there is a need for studies with designs of higher quality, including randomized controlled trials. These results of Study III suggest that it is feasible to conduct such trials as part of transition-to-practice programs and it is surprising to find that only a handful of parallel group pre-post randomized controlled trials of strategies for supporting the professional transition of newly registered nurses have been published during the same period (Chen et al., 2017; Chesak et al., 2015; Lengetti et al., 2018; Li-Ling, Wen-Hui, & Suh-Ing, 2015; Maneval et al., 2012; Monagle, Lasater, Stoyles, & Dieckmann, 2018)<sup>4</sup>.

In summary, adhering to the guidelines for development of interventions, in Study III, the feasibility of conducting an effect evaluation of the intervention as an add-on to a transition-to-practice program for newly registered nurses was confirmed. Evaluating the feasibility of conducting an effect evaluation and amending identified problems in the design is assumed to reduce the risk of conducting a type-II error in the later effect evaluation (Abbott, 2014; Craig et al., 2013; Thabane et al., 2010).

#### **4.2.4 Evaluate the effect**

Finally, in Study IV, we evaluated the effect of the intervention as an add-on to a transition-to-practice program using a randomized parallel group design with an active control. The study hypotheses were that, following the end of the experimental intervention, experimental group participants would experience lower levels of stress than control participants. In addition, they would be more engaged in energizing leisure activities and less engaged in avoidance behaviors. Finally, they would experience higher levels of task mastery, role clarity, and social acceptance than the control participants. Below, the results are discussed in turn, followed by an overall discussion of potential reasons for the inconclusive findings.

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<sup>4</sup> Systematic literature review conducted in November 2015 and updated in November 2018. Frögéli E. A systematic review and of rationales, theoretical underpinnings, targeted processes and effects of programs intended to facilitate the socialization of newly registered nurses (thesis as part of doctoral education at the Karolinska Institutet). Stockholm: Karolinska Institutet; 2015.

#### 4.2.4.1 *Experiences of stress*

Albeit inconclusive, the results of Study IV provided support for a small preventative effect of the experimental intervention on newly registered nurses' experiences of stress, in line with the study hypothesis. The finding was supported by additional analyses showing an effect of the experimental intervention on experiences of being frustrated (between-group analysis) and experiences of stress (within-group analysis).

The result of Study IV is in contrast to investigations of transition-to-practice programs that have not found preventative effects on experiences of stress (Edwards et al., 2015; Goode et al., 2013). Previous research suggests that interventions that are developed based on an explicit model of change are more effective than programs without such a model (Prestwich et al., 2014). Surprisingly, although one key aim of transition-to-practice programs is to prevent or reduce experiences of stress among newly registered nurses (Baumann et al., 2018; Edwards et al., 2015; Letourneau & Fater, 2015; Phillips et al., 2015), most programs do not include a focus on such experiences (Larsen et al., 2018; Rush et al., 2013). Because of this, the experimental intervention in Study IV was developed based on an explicit model of change using principles from cognitive behavior therapy.

By focusing on prevention of symptoms of stress-related ill health among newly registered nurse, the work in this thesis expands previous research of interventions based on principles from cognitive behavior therapy for preventing symptoms of stress-related ill health among nursing professionals (Marine et al., 2009; Ruotsalainen et al., 2008; Ruotsalainen et al., 2015; van Wyk & Pillay-Van Wyk, 2010). When comparing the effects of interventions based on principles from cognitive behavior therapy to no intervention, Ruotsalainen et al. (2015) found effects to increase over time from a small but not statistically significant effect within the first month after the end of interventions, to a small and statistically significant effect one to six months after the end of interventions, and finally, to a statistically significant and large effect more than six months after the end of interventions. However, when compared to an active control condition, the effects were found to be medium in size but not statistically significant according to the results of the review. By indicating (albeit inconclusively) a small preventative effect of the experimental intervention as compared to an active control condition, the present trial thus adds further support to the use of principles from cognitive behavior therapy for preventing symptoms of stress-related ill health among nursing professionals.

#### 4.2.4.2 *Avoidance of proactive behaviors*

The results of Study IV also provided support for a small to medium effect of the experimental intervention on the newly registered nurses' avoidance of proactive behaviors, in line with the study hypothesis. As for the results on experiences of stress, these findings of different methods of analysis were inconclusive. Avoidance in relation to perceived challenges at work has been recognized to contribute to an increased risk of developing

symptoms of stress-related ill health over time within the occupational health literature (Maslach et al., 2001; Schaufeli & Enzmann, 1998).

In their meta-analysis of the effects of cognitive behavioral interventions focusing on supporting employees (i.e. not new professionals) to actively manage job demands, Richardson and Rothstein (2008) found that participants in the interventions reported lower levels of stress and anxiety following the end of the intervention as compared to a control condition (the nature of the control condition was not reported). The sizes of the effects were large and, interesting in relation to avoidance behaviors, the effect on anxiety was particularly pronounced. However, no investigation of the effect on avoidance behaviors was included in the analysis.

Reducing avoidance of proactive behaviors has not typically been included as an objective of efforts for supporting new professionals (Bauer & Erdogan, 2012; Ellis et al., 2015; Nifadkar et al., 2012 ). This is surprising as new professionals' avoidance of proactive behaviors has been recognized to debilitate their management of challenges and adaptation to the new professional role (Ashford & Nurmohamed, 2012; Ellis et al., 2015; Nifadkar et al., 2012) and excessive behavioral avoidance in relation to challenges has been recognized as a key factor of psychological distress (Chawla & Ostafin, 2007; Hayes et al., 1996). Among newly registered nurses, it has been confirmed that stress-related ill health among newly registered nurses may be modeled as a sequential-developmental process where symptoms develop progressively from initial levels of perceived stress and exhaustion through the engagement in avoidance strategies (Gustavsson et al., 2010). Still, the behavioral model of stress-related ill health and strategies for reducing avoidance behaviors have not typically been recognized in efforts for supporting newly registered nurses as they transition into their new profession (Larsen et al., 2018; Rush et al., 2013). By attempting to reduce avoidance of proactive behaviors among newly registered nurses and using techniques from cognitive behavior therapy, the work in this thesis thus expands previous research and suggest that the behavior change techniques systematic exposure, reinforcing approach behaviors, and action planning that have been developed in clinical contexts are applicable to challenges encountered during professional transitions as well.

#### *4.2.4.3 Leisure activities*

Regarding engagement in leisure activities, the statistical analyses from the randomized controlled trial in Study IV could not confirm a statistically significant effect of the experimental intervention on increased engagement in leisure activities. The direction of the difference between the groups was in line with the study hypothesis, but the size of the effect was very small. This finding was surprising as it stood in contrast to reports of active engagement in the homework assignments during the course of the experimental intervention.

There is a lack of evaluations of programs focusing on newly registered nurses' engagement in recovery-promoting leisure activities using randomized parallel group designs or at least non-randomized parallel group designs for comparison. Hrabe, Mazurek Melnyk, Buck, and

Sinnott (2017), using a within group design, evaluated the effect of a health-oriented workshop focusing on energy management using principles from cognitive behavior therapy working on goals and values, as well as practical strategies to improve self-care, and found that health behaviors increased and the size of the effect was small. However, the change was not statistically significant.

#### *4.2.4.4 Socialization processes*

Finally, in contrast to the study hypothesis, no statistically significant effects of the experimental intervention could be confirmed for task mastery, social acceptance, or role clarity. However, additional within-group analyses showed that participation in the experimental intervention, as well as adherence to homework assignments both predicted a statistically significant increase in social acceptance during the period of the experimental intervention, in line with the study hypothesis.

According to results of systematic reviews, transition-to-practice programs are effective in improving learning and performance (Mellor et al., 2017), and confidence (Edwards et al., 2015; Missen et al., 2014), constructs that are closely related to task mastery. In addition, a number of previous studies have demonstrated effects of simulation exercises on competence. Simulation exercises are typically used to allow newly registered nurses to practice clinical skills without the risk of harming patients, as well as to practice team-responses in relation to emergency situations (Holtschneider & Park, 2019). In a randomized controlled trial by Chen et al. (2017), participation in a simulation exercise that encouraged engagement in proactive behaviors resulted in statistically significant increased situation-specific confidence.

Furthermore, using a non-randomized between-group design, Kim, Hur, and Kim (2018) found that participants in a simulation exercise reported a statistically significant higher situation specific competence than a control group who received peer-learning. Finally, also using a non-randomized between groups design, Rhodes et al. (2016) found that participation in an individual simulation practice session resulted in a statistically significant higher report of competence than participation in a multidisciplinary simulation. Unfortunately, none of these studies reported size of effects or provided adequate data for effect size calculation. In contrast, Lengetti et al. (2018), Maneval et al. (2012) and Li-Ling et al. (2015) found no statistically significant effects on competence from participation in simulation exercises when compared to control conditions using randomized designs.

Few studies have evaluated the effect of specific programs on role clarity or social acceptance, or related constructs. In their review of effects of transition-to-practice programs, Missen et al. (2014) found an effect of programs on belonging, a construct related to social acceptance. It has been suggested that simulation exercises could and should be developed to also contribute to the acquisition of inter-professional skills, including knowing one-another's roles and responsibilities, mutual respect, and responsive communicating (Holtschneider & Park, 2019). Justus and Appel (2018) found that newly registered nurses who participated in a simulation exercise together with advanced care providers reported a statistically significant higher level of knowledge of different roles (medium effect size) as compared to newly



registered nurses who participated in simulation exercise with only newly registered nurses using a non-randomized design. In contrast, they reported a lower level of ability to perform as a healthcare team member. The size of the effect was small but not statistically significant. There were no statistically significant differences between the groups in terms of communication and collaboration skills.

Richardson and Rothstein (2008) also investigated effects of interventions based on principles from cognitive behavior therapy for reducing experiences of stress among professionals on job/work satisfaction, motivation, social support, daily hassles, role ambiguity, role overload, and perceived control, and found a large effect size. However, the effect was not statistically significant. Finally, in the trial in Study IV, the control group participants experienced an increase in role clarity when compared to the experimental group participants of a small to medium effect size. Considering the content of the control intervention, this effect was potentially due to participation in activities focusing specifically on the nurses' role, including rights and responsibilities.

In summary, with reservation for the inconclusive findings of different methods of analysis, the results provided support of the effect of the experimental intervention on experiences of stress as well as engagement in avoidance behaviors. This was further supported by additional analyses indicating a preventative effect on experiences of frustration. There were no statistically significant effects of the experimental intervention on engagement in leisure activities, task mastery, or role clarity. However, additional within-group analyses showed that engagement in the experimental intervention as defined by level of participation and adherence to homework assignments predicted an increase in social acceptance. Qualitative data suggested that the participants perceived the experimental intervention to be of value.

#### *4.2.4.5 Potential explanations of inconclusive findings*

Assuming that the findings that indicate an effect of the experimental intervention have not just occurred by chance, but are indications of real effects, the inconclusive results of the different method of analysis suggest that the measured effects were not strong enough. There are many potential explanations to this, including the dosage and content of the intervention, the period of follow-up, the measures used to measure the effects, as well as contextual factors interacting with the experimental intervention. These different possible explanations are discussed below.

When using the behavior change technique systematic exposure to change avoidance behaviors in therapeutic settings, it is typically worked on during a number of consecutive sessions. During these sessions, the therapists work with the patient to reinforce all attempts, give corrective feedback, solve problems that arise along the way, and expand the technique to different behaviors and situations (Hazlett-Stevens & Craske, 2009). Suggested strategies to enhance accessibility and retrievability of exposure-based learning include performing exposure trials in a random and variable manner, spacing exposure trials, and conducting exposure trials in multiple contexts. Random and variable practice is expected to enhance

long-term effects by increasing the availability of retrieval cues, as well as by resulting in the generation of a rule that may be applied across different situations. Spacing exposure trials is expected to enhance learning and retrievability by increasing the storage strength of memories. Finally, conducting exposure trials in multiple contexts is expected to offset contextual renewal of fear learning (Craske et al., 2008).

In the experimental intervention on trial in Study IV, systematic exposure was introduced as a behavior change technique in the second session. The participants were invited to plan for an exposure trial between the second and third session. In the third session, the participants' experiences of exposing themselves to a previously feared situation were discussed to reinforce attempt and problem solve for future trials. The participants were then invited to plan for an additional exposure trial building on their previous experiences. It is possible that this was not a sufficient application of the behavior change technique in the experimental intervention. Given the suggested strategies to enhance accessibility and retrievability (Craske et al., 2008), it seems likely that the effect could benefit from the addition of more sessions during which the work could be expanded over periods of time and settings.

According to a review of theories of maintenance of behavior change, motivation to avoid negative health outcomes in the future, as is the case in preventative interventions, is insufficient to maintain changes of health behaviors that require maintained effort (Kwasnicka, Dombrowski, White, & Sniehotta, 2016). Consequently, motivating participants is an inherent challenge in preventive efforts (Gordon, 1983). A number of strategies are suggested to support maintenance of health behaviors such as the recovery-promoting leisure activities that were addressed in the experimental intervention. First, helping individuals maintain positive motives of behavior change is recommended, for instance by emphasizing the positive outcomes of the health behavior or by encouraging engagement in health behaviors that are perceived as enjoyable. Second, supporting and facilitating self-regulation, for instance through strategies for self-monitoring and strategies for problem solving in cases of encountering obstacles is further expected to facilitate maintenance. Third, supporting habit development, for instance by repeatedly engaging in the health behavior, is recommended. Finally, maintenance of behavior changes is also assumed to be facilitated by providing physical and psychological resources that are needed to keep engaging in the health behavior over time, as well as changes in the environment at the individual, social, and community level (Kwasnicka et al., 2016).

The work on increasing engagement in energizing leisure activities in the experimental intervention started in the first session with a discussion of the benefit of engaging in different recovery-promoting behaviors during ones' time of leisure. The purpose of this discussion was to emphasize the positive outcomes of such behaviors. After this discussion, the newly registered nurses were given a pen-and-paper exercise in which they were encouraged to identify their current routines or behavior patterns in relation to exercise, sleep, hobbies/interests, and social relations. Next, they were encouraged to identify their desired behavior patterns in relation to these four areas of life. Then, they used a worksheet to

visualize the difference between their current behaviors and their desired behavior patterns. The purpose of this was to contribute to a motivation for behavior change. Based on their visualization, the newly registered nurses were encouraged to choose one of the areas to focus on as a homework assignment from session one to session two. This work was inspired by the behavioral activation model for depression (Martell et al., 2001). Using the principles from action planning (Gollwitzer, 1999), the nurses made two plans of engaging in energizing leisure activities with the purpose of decreasing the discrepancy between their current and desired behavior patterns. During the second session, the participants' experiences of engaging in leisure activities based on their action plans was discussed as a strategy of self-monitoring, to encourage engagement, and to problem-solve in the case of obstacles. Finally, with the purpose of supporting the development of new habits, engagement in leisure activities based on this work was included as a homework assignment between the second and third session of the experimental intervention, as well as from the third session.

As previously mentioned, during the period of the experimental intervention, engagement in homework assignments was high. However, the qualitative data indicated that maintenance of behavior changes following the end of the experimental intervention was difficult.

Considering the strategies for improving maintenance of health behavior change (Kwasnicka et al., 2016), it is possible that the experimental intervention would benefit from more self-monitoring as observed progress is expected to function to reinforce behaviors. Instead of only discussing experiences from the homework assignments, the participants could perhaps also mark their new level of leisure activities in the visual worksheet from session one to make the movement in relation to the desired level more clear. In addition, like the work on avoidance behaviors, behavior changes in relation to engagement in leisure activities would likely benefit from an extended number of sessions during which the behavior change could be supported and habit development could be further facilitated. Adding additional sessions to the experimental intervention to facilitate maintenance of behavior changes was similarly suggested by the newly registered nurses who were interviewed about their experiences of participating in the experimental intervention.

In addition, the experimental intervention may need to be adjusted to include additional content that specifically focuses on enhancing proactive behaviors. Enhancing proactive behaviors was merely included as a by-product of the work on reducing avoidance behaviors (i.e. it was encouraged that the participants replaced their avoidance behaviors with suitable proactive behaviors). Furthermore, based on principles of motivation of behavior engagement (Ryan & Deci, 2000), the experimental intervention was explicitly autonomy supportive. That is, participants were invited to participate in the exercises (as opposed to instructed), and encouraged to focus on the behaviors that were of the highest interest to themselves (as opposed to a behavior identified as important by an external part). These principles were assumed to facilitate the implementation of the experimental intervention, particularly considering its preventative nature. However, previous research suggests that certain behaviors are more likely to contribute to task mastery, role clarity, and social acceptance than others. According to the model of task mastery (Bandura, 1997), three classes of

behaviors contribute to the development of task mastery and would thus be suitable for the newly registered nurses. First, by engaging in and successfully executing a challenging task (i.e. enactive mastery experiences) the nurses would be expected to experience positive reinforcement for their execution of the task. Secondly, by observing competent models acting and being rewarded for their performance, the nurses would be expected to develop task mastery vicariously. An important proactive behavior for newly registered nurses could thus be to ask an experienced colleague to model how to perform a certain behavior. Thirdly, by receiving verbal reassurance about one's level of capability and/or need of development of skills, nurses can learn by gaining information about their performance and may adjust their behavior accordingly and develop task mastery. In line with this model, information seeking, monitoring and imitating the behaviors of experienced colleagues, and practicing skills has been suggested to be particularly important proactive behaviors for newcomer adjustment (Bauer et al., 2007; Cooper-Thomas & Burke, 2012). Thus, it is possible that the effects of engagement in proactive behaviors on the socialization processes as implemented in the experimental intervention would benefit from a narrower focus on these specific proactive behaviors as opposed to encouraging each participant to identify proactive behaviors themselves. However, this would necessitate ensuring that the participants' motivation of changing their behaviors would not be impacted (Ryan & Deci, 2000). Strategies such as taking the newly registered nurses' perspectives as well as integrating their thoughts, feelings, and behaviors into discussions and exercises are expected to contribute to enhancing motivation in learning situations (Reeves, 2013). As these strategies are innate in cognitive behavior therapy interventions, this suggests that this narrowed focus on specific proactive behaviors could be an acceptable change in the design of the experimental intervention.

Related to the notes on the number of sessions in the experimental intervention and the possibility of developing measureable behavior changes, it is possible that the period of follow-up was too short to detect significant changes in the outcomes as it only extended to one week following the end of the experimental intervention. It would have been desirable to follow the effects for a longer period of time. The initial plan was to evaluate the effect of the experimental intervention at the end of the intervention as well as after an additional month. However, as previously mentioned, following the feasibility trial, the experimental intervention was extended to include a third session. To be able to give the experimental intervention to the experimental group as well as the control group within the schedule of the transition-to-practice program, the one-month follow up had to be excluded from the study design. Consequently, it was not possible to evaluate the effect after this extended period of time. A third measurement point in the analysis of change over time would have strengthened the analysis and the possibility of detecting statistically significant changes.

Furthermore, the reliability of the measures of task mastery and engagement in leisure behaviors was not satisfactory, and the reliability of the measure of social acceptance was questionable. This may also have limited the ability to properly measure change in these outcomes, and thus the ability to detect statistically significant effects of the experimental intervention. We were surprised by the low Cronbach's alpha of the task mastery scale as this

measure has been shown to have good psychometric qualities based on data from a national Swedish sample (Aurell et al., 2016). As regards to the measure on leisure activities, the questions were developed for this thesis as we could not find a suitable alternative at that time. It is possible that the health behavior scale used in Hrabe et al. (2017) could be useful for future trials.

Finally, there has been an increased recognition of the importance of taking account of context in development of interventions (Craig et al., 2018). Craig et al. (2018) defines context as “any feature of the circumstances in which an intervention is implemented that may interact with the intervention to produce variation in outcomes” (p. 6). The role of the context is similarly recognized in relation to maintenance of behavior changes (Kwasnicka et al., 2016).

The context is integrated at the foundation of the behavioral analysis of cognitive behavior therapy by the recognition that behaviors are learnt and maintained dependent on their antecedents and consequences (Drossel et al., 2009; O'Donohue, 2009; Ramnerö & Törneke, 2008). As previously stated, antecedents of behaviors function as signals indicating that certain consequences may be expected if engaging in a certain behavior. Consequences follow on the behavior and may produce changes in the rate of the behavior over time. The presentation of something appetitive or the termination of something aversive following engagement in a behavior is expected to function as a reinforcing consequence maintaining or increasing the rate of the behavior. On the contrary, the presentation of something aversive or the termination of something appetitive following engagement in a behavior is expected to reduce the rate of the behavior. The analysis of how the behaviors are learnt and maintained suggests how they may be changed. It may also contribute to the understanding of why a certain behavior is not changed as expected. Importantly, it highlights the role of the context in relation to behavior change.

Previous research has recognized that perceived support from coworkers, preceptors, and managers is central to newly registered nurses' engagement in proactive behaviors (Chen et al., 2017; Halpin et al., 2017; Kammeyer-Mueller et al., 2013; Lima, Jordan, et al., 2016; Regan et al., 2017; Ten Hoeve et al., 2018). This was also shown in the analysis of newly registered nurses' engagement in proactive behaviors conducted in Study III. That is, perceived support was found to function as an antecedent signaling that engagement in proactive behaviors would lead to desired consequences. However, the results of Study III also showed that this perceived support was not always available. This has similarly been shown in previous studies (Gardiner & Sheen, 2016; Halpin et al., 2017; Kammeyer-Mueller et al., 2013; Mellor & Gregoric, 2016; Ten Hoeve et al., 2018). In cases when perceived support is lacking, this may be expected to reduce newly registered nurses' engagement in proactive behaviors (Kammeyer-Mueller et al., 2013).

In addition, newly registered nurses have been found to be exposed to situational signals indicating that engagement in proactive behaviors may result in aversive consequences. Examples of such antecedents are supervisor aggressiveness (Nifadkar et al., 2012) and

pressure to conform to the practices of the team (Feng & Tsai, 2012; Halpin et al., 2017). In the presence of such antecedents signaling aversive outcomes, engagement in proactive behaviors is unlikely.

Furthermore, newly registered nurses have reported receiving punishments for engaging in proactive behaviors. Examples of such punishments are being criticized for asking questions (Halpin et al., 2017; Tong & Epeneter, 2018) and being yelled at for failing to conform to the norms of the team (Feng & Tsai, 2012). If newly registered nurses experience that they are being punished for engaging in proactive behaviors, they will most likely stop doing so.

These factors were not accounted for in the experimental intervention. Thus, it is possible that a lack of context dependent antecedents and consequences supporting newly registered nurses' engagement in proactive behaviors may have contributed to the findings in Study IV. That is, if the newly registered nurses did not experience their colleagues or managers to be supportive and encouraging of their attempts to increase their engagement in proactive behaviors, this may have dampened the effect of the experimental intervention. It has previously been recognized that the context in which proactive behaviors reside needs to be integrated into future research (Ashford & Nurmohamed, 2012).

In summary, adhering to the guidelines for development of interventions, Study IV focused on evaluating the effect of the experimental intervention using a randomized parallel group design with an active control condition. Although conflicting, the results indicated that participation in the experimental intervention prevented experiences of stress and engagement in avoidance behaviors, in line with the hypothesis. The results for engagement in leisure activities and the socialization processes (with the exception of role clarity) were similarly in line with the hypothesis, but the differences between the groups were not statistically significant. Additional analyses further showed that participation in the experimental intervention prevented an increase in experiences of frustration and stress, and predicted an increase in experiences of social acceptance, in line with the study hypothesis.

### **4.3 GENERAL DISCUSSION**

Below, the general implications, limitations, and directions for future research are addressed, followed by a general conclusion in relation to the overall aim of the thesis.

#### **4.3.1 Practical Implications**

Working life can be challenging and involve being exposed to a range of situations that are characterized by uncontrollability, unpredictability, and social risks. Situations like these are expected to activate the stress response with the purpose of mobilizing resources and facilitate effective management. However, repeated or prolonged activation of the stress response may result in an increased risk of developing symptoms of stress-related ill health, including burnout. Newly registered nurses are one professional group that has been recognized to be at particularly high risk of developing symptoms of stress-related ill health. Available programs for supporting newly registered nurses have not been found to effectively

target experiences of stress. It has been suggested that engagement in proactive behaviors in relation to challenges at work reduces the risk of developing symptoms of stress-related ill health. Engagement in proactive behaviors is expected to contribute to the development of the socialization processes task mastery, role clarity, and social acceptance. These processes are, in turn, expected to function as resources that reduce the degree to which situations are perceived as unpredictable, uncontrollable, and socially risky. Thereby, the availability of the socialization processes is expected to reduce the activation of the stress response and, in the long run, the risk of developing symptoms of stress-related ill health. Based on these lines of previous research, the work in this thesis focused on developing an experimental intervention for preventing stress-related ill health among newly registered nurses. The work was guided by theory and practice from cognitive behavior therapy as well as guidelines for developing interventions.

The results of Study I and II confirmed the assumed relations between the socialization processes and experiences of stress in the short-run, and symptoms of burnout over time. They also showed that there is room for improvement with regard to the development of these processes, as all newly registered nurses did not experience a positive development. Social acceptance was furthermore identified to decrease during the first three months of the profession. It has previously been recognized that there is a need for developing standards of transition-to-practice programs for newly registered nurses (Brown et al., 2015; Rush et al., 2013). These results suggest that it is important to explicitly consider the socialization processes in the work of developing such standards. This was also recognized by Phillips et al. (2015).

Furthermore, the results of Study III showed that it is possible to target newly registered nurses' engagement in, and avoidance of, proactive behaviors using principles from cognitive behavior therapy. Importantly, we found that the experimental intervention was accepted and appreciated by the newly registered nurses. In addition, the results of Study IV suggested that it prevented experiences of stress and avoidance of proactive behaviors, although the results were inconclusive. As previously mentioned, a behavioral model of this kind has not typically been included in transition-to-practice programs for new professionals or preventative efforts within the general occupational health framework. As the available strategies for preventing experiences of stress and symptoms of stress-related ill health among new professionals (transitioning from education to profession or from profession to profession) have not been found to be effective (Holman et al., 2018), this opens up the possibility of improving those strategies using behavior change theory. As engagement in, and avoidance of, proactive behaviors during the period of transitioning into a new professional role has been recognized within other professional groups as well, these results may have implications beyond the group of newly registered nurses.

In Sweden, prognoses suggest that there will be a lack of nurses at least until the year 2035 due to the growing population (Socialstyrelsen, 2018a). When investigating reasons for turnover and turnover intentions among newly registered nurses, experiences of stress and

symptoms of stress-related ill health are recognized (Flinkman et al., 2008; Rudman & Gustavsson, 2011; Statistics Sweden, 2017). Furthermore, symptoms of burnout experienced at professional entry have long-lasting consequences for the health of newly registered nurses (Arborelius et al., 2017). Identifying strategies to effectively reduce these experiences and support newly registered nurses as they transition into their new professional role is thus essential to ensure the provision of health care and improve newly registered nurses' health over time. The work that has been initiated in this thesis may prove useful towards this end.

#### **4.3.2 Limitations**

A detailed description of the limitations of each study is presented in the papers. In the following, the limitations in relation to the overall aim of the thesis will be addressed. The most important limitations of the thesis concern the questions that have not been investigated. Importantly, the model of the experimental intervention was based on the assumption that engagement in proactive behaviors will lead to increased levels of the socialization processes task mastery, role clarity, and social acceptance, and that this will mediate a prevention of experiences of stress and, over time, symptoms of stress-related ill health. However, the effect of engagement in proactive behaviors on development of the socialization processes was not investigated in the thesis. Nor was the role of the socialization processes as mediators of effect, or the effect of the experimental intervention on symptoms of stress-related ill health (e.g. symptoms of burnout).

Due to a lack of a suitable measure of engagement in proactive behaviors, for the purpose of the thesis, we developed a measure as an adaptation of a measure of students' agentic engagement (Reeves, 2013). Students' agentic engagement refers to students' proactive engagement in relation to their learning situations in school. In the original scale, proactive engagement in learning is defined by expressing preferences in relation to learning goals, asking questions, and letting ones' teacher know what one likes, needs, and wants. Agentic engagement measured by the original scale has been found to predict students' learning and achievement, as well as support received from teachers.

Based on prior understanding of the newly registered nurses' challenges (gained in part through the interviews in Study III), four items to measure newly registered nurses' proactive engagement was developed. These items were included in the intensive longitudinal design in Study I and, based on these data, the psychometric properties were considered acceptable, although some limitations were recognized (Frögéli, Aurell, et al., 2017; Frögéli, Högman, et al., 2017). However, as we were cautious not to burden the respondents with questionnaires that were too lengthy over the 14 weeks of Study I, the measure of proactivity was only included at four points in time (week 2, 6, 10, and 14). This turned out to be an insufficient design and we were not able to investigate within- and between person changes over time, and relations between changes in proactivity and the socialization processes as intended.

Next, the measure was included in the feasibility trial of Study III. Here we found that the psychometric properties were acceptable, but again, some limitations were recognized. Based



on this, we questioned the validity of the measure, and its utility in the randomized controlled trial. Finally, as previously mentioned (in section 3.4.3.5), as part of Study IV, the psychometric properties of the proactivity measure were not found to be satisfactory and the measure was excluded from the analyses of the effect of the experimental intervention. In summary, although we attempted to measure proactivity, as this was a key component in the thesis, we were not able to do so in a valid way. Consequently, the role of engagement in proactive behaviors in relation to the socialization processes, experiences of stress, and participation in the experimental intervention remains unknown.

Others have similarly recognized challenges in relation to measuring engagement in proactive behaviors. It has been acknowledged that engagement in what looks like proactive behaviors is not consistently positive in terms of socialization. Asking questions has been both positively and negatively related to performance. Furthermore, feedback seeking has been positively and negatively related to task mastery (Cooper-Thomas & Burke, 2012). It has been acknowledged that many self-reports investigate the frequency of proactive behaviors, but not the result or function (Bolino et al., 2010; Morrison & Vancouver, 2000). This is true of the measure used in this thesis. This is an important limitation as the “same” behavior may be enacted in relation to different antecedents and result in different consequences. The psychometric evaluations of the proactivity measure in Study IV suggested that some of the items seemed to be adequate measures of proactive behaviors. However, some seemed rather to be measures of avoidance behaviors.

In addition, as previously mentioned, it was originally intended that Study IV would include a third data collection one month after the end of the experimental intervention. The purpose of this data collection was to evaluate the effects over an extended period of time, as well as to evaluate the mediation of effects, i.e. if changes in the socialization processes mediated effects of the experimental intervention on experiences of stress. However, as the time of the experimental intervention was extended following the results of the feasibility trial, it was not possible to fit the third data collection within the time-frame of the transition-to-practice program. Thus, the analysis of mediation of effects had to be excluded from the study.

With the design in Study IV, we also could not answer the overall question concerning whether or not it is possible to prevent symptoms of stress-related ill health among newly registered nurses. Theoretically, the indicated (although inconclusive) preventative effect on experienced of stress and avoidance of proactive behaviors would be expected to reduce the risk of developing symptoms of stress-related ill health over time. However, to answer the question of the effect of the experimental intervention on symptoms of stress-related ill health, a trial with a longer period of follow-up, including a measure of symptoms stress-related ill health would be required.

Finally, we did not include other variables in the analyses throughout the thesis. It is possible that the results could differ between participants with different levels of prior clinical experience, age, gender, clinical placements, working conditions et cetera. Organizational factors have been acknowledged to both enable and inhibit new professionals' engagement in

proactive behaviors. Specifically, when organizational socialization strategies are structured (i.e. formal), new professionals are more likely to use proactive behaviors than when organizational strategies are less structured. However, the more informal the organizational socialization strategies, the more dependent the new professionals become of engaging in proactive behaviors to adapt to the new role (Gruman, Saks, & Zweig, 2006). As such, proactive behaviors could potentially make up for the lack of a proper organizational introduction (Cooper-Thomas & Burke, 2012; Gruman et al., 2006).

In this thesis, it was assumed that the demands that the newly registered nurses were exposed to were manageable using organizational resources (i.e. social support and structural resources) as well as individual resources (i.e. proactive behaviors, knowledge, skills et cetera). However, what if the demands that were placed on the newly registered nurses were simply too high and the available resources too low? There are indications suggesting that the demands of the clinical practice are higher today than they used to be (Regan et al., 2017). According to Brown et al. (2015), "...today's patients are much more complex than the patients of yesteryear" (p. 148). Similarly, in Sweden, it is recognized that the health-care of today is more demanding than previously, as a greater proportion of patients are of older ages, have multiple diseases, and require more care. Furthermore, the management of care is more demanding due to structural changes such as an increased number of single-patient rooms that makes it more difficult to oversee all patients (Socialstyrelsen, 2018b).

It has been suggested that, when job demands are too high, the risk of developing symptoms of stress-related ill health is high, and the availability of resources does not matter (Fagerlind Stahl, Stahl, & Smith, 2018). Duchscher (2009), suggested that newly registered nurses should not without caution be employed in certain particularly challenging positions (e.g. acute care units that require rotation, permanent floating positions, emergency rooms or critical care). On more than one occasion, participants in the studies included in this thesis have given reports of working conditions that did not seem to offer possibilities of adjusting to the profession and developing task mastery, role clarity, and social acceptance. During such circumstances, the potential value of an intervention such as the one at trial in the present thesis is likely very limited, and the most suitable proactive behavior is probably to leave.

In the process of developing an intervention, one should strive to elucidate whether or not the intervention is effective, and if so, how it is effective, and during what circumstances (Craig et al., 2013). Further addressing these questions and limitations is important to improve the experimental intervention.

#### **4.3.3 Future research**

In addition to addressing the limitations of the studies included in the thesis, the major direction for future research concerns adding an increased focus to the role of the social context, as initially addressed in the discussion relation to the results of Study IV. The role of the social context has been acknowledged in relation to new professionals' engagement in

proactive behaviors in general (Nifadkar et al., 2012), as well as newly registered nurses' engagement in proactive behaviors in particular (Duchscher, 2009; Jackson, 2016; Malouf & West, 2011; Mellor & Gregoric, 2016; Regan et al., 2017; Tong & Epeneter, 2018). Opportunities for interactions are related to more proactive behaviors such as information seeking, feedback seeking, and relationship building (Cooper-Thomas & Burke, 2012; Wanberg & Kammeyer-Mueller, 2000). Increased levels of supervisor and co-worker support have been related to increased levels of proactive behaviors (Kammeyer-Mueller et al., 2013). Within research on engagement in proactive behaviors for learning among students, it is recognized that the learning outcome is not solely a function of the proactive engagement of the student, but rather a result of a reciprocal process between the student and the teacher (Reeves, 2013). However, the role of the social context has not traditionally been recognized in relation to the management of demands and stress in the behavioral model of stress-related ill health (Schaufeli & Enzmann, 1998).

The relationship between social acceptance and experiences of stress was identified in Study I. Importantly, it was recognized that perceived social acceptance decreased for the typical new nurse during the first three months following professional entry. In addition, in Study II, it was recognized that the development of social acceptance affected the development of symptoms of burnout. Support from management was recognized to be particularly important. Furthermore, in the analysis of newly registered nurses' engagement in proactive behaviors in Study III, it was recognized that perceived social support was an important antecedent for engaging in proactive behaviors. However, in line with previous research (e.g. Duchscher, 2009), fear of social disapproval was an important antecedent for avoiding proactive behavior. In the experimental intervention, the role of the social context was recognized at a theoretical level as part of the organizational socialization framework, as well as an antecedent or consequence impacting engagement in and avoidance of proactive behaviors in the behavior change model of the intervention. However, the social context was not included as an active part in the experimental intervention.

In their review of strategies for sustainable behavior changes, (Kwasnicka et al., 2016) highlighted that the social norms and rules of the groups individuals belong to largely impact the behaviors they engage in. Thus, changes in the social context can facilitate individual behavior change as well as maintenance of behavior changes. To achieve large-scale behavior change, it is often necessary to change the standard of what behaviors are acceptable in a given social context. Based on the results of the studies included in the thesis, as well as previous research, it may be hypothesized that including the social context as an active part in the experimental intervention could contribute to enhancing the effects.

In the context of nursing, it is recognized that supporting newly registered nurses as they transition into clinical practice is a shared responsibility of the entire team (Blakey & Jackson, 2016; Lima, Jordan, et al., 2016; Regan et al., 2017). However, the role of the preceptor is highlighted as particularly important (Rush et al., 2013). The preceptor is the newly registered nurse's primary support person and the two typically deliver care together

during a period of time. According to Bodine (2019), preceptors “help to deliver knowledge of both the unit and organization, develop the newly registered nurses’ fundamental skills so that they may safely perform their jobs, and socialize the new nurse to the unit” (p. 112). The preceptor is thus in a key position to encourage and support newly registered nurses’ engagement in proactive behaviors. As an example, Hu et al. (2015) using non-randomized, parallel group design, found that newly registered nurses who participated in a preceptor program in which they were supported in setting specific learning goals and engaging in challenging tasks reported a statistically significant lower levels of stress two months into the program than newly registered nurses who did not receive this support.

However, the results of a systematic review of preceptorship found effects on newly registered nurses’ competence, but not on newly registered nurses’ job satisfaction, organizational socialization, or retention (Ke, Kuo, & Hung, 2017). It has been suggested that more research needs to be addressed towards clarifying what preceptors can do to support newly registered nurses’ engagement in proactive behaviors (Gardiner & Sheen, 2016) and facilitate their adjustment to the profession (Ashford & Nurmohamed, 2012). It has also been suggested that more research is needed to increase our understanding of the factors that determine the way preceptors respond to newly registered nurses’ engagement in proactive behaviors (Ellis et al., 2017).

For example, it has been recognized that the preceptor role requires time and patience, and may be wearing (Kang, Chiu, Lin, & Chang, 2016; Socialstyrelsen, 2018b). In addition, it has been suggested that experienced nurses may perceive themselves as being challenged by newly registered nurses who ask questions (Mellor & Gregoric, 2016). Furthermore, the expectations on the preceptors in terms of how to support newly registered nurses are in general not well specified (Rush et al., 2013). For example, a more explicit model for a seemingly simple task such as giving feedback on behaviors has been requested to strengthen the development of knowledge and skills (Gardiner & Sheen, 2016; Olson-Sitki, Wendler, & Forbes, 2012; Tong & Epeneter, 2018).

In summary, it would be interesting to test the effect of the experimental intervention developed within this thesis in combination with a preceptor model in which the preceptors explicitly focus on supporting the newly registered nurses’ engagement in proactive behaviors. The development of such a preceptor model would require additional research to increase our understanding of the ways in which preceptors may contribute to newly registered nurses’ engagement in proactive behaviors, as well as increased understanding of the factors hindering such strategies on behalf of the preceptors. It is possible that this future line of research could learn from research on simulation exercises where there are available models of how to support newly registered nurses’ engagement in, and management of, challenging tasks (Holtschneider & Park, 2019). Chen et al. (2017), using a randomized parallel group design, found that newly registered nurses who participated in a interactive situated and simulated teaching program in which they were encouraged to engage in proactive behaviors in the face of challenging tasks reported statistically significant lower

level of situation specific stress as compared to a control group following the end of the experimental intervention, and the size of the between-groups effect was large. However, no general measures of experiences of stress, or symptoms of stress-related ill health were included in the study. Thus the generalizability of the effect to situations beyond those investigated is unknown.

Finally, at the end of the last session of the experimental intervention, I asked the participants to share one or two things from the intervention that they had experienced as particularly important to them. A statement that was repeated was the experiences of “being allowed to be novice”. The same statement was given by participants in a recent study (Gustavsson, Agrenius, et al., 2018) where we followed a sample of new professionals of different occupations during their first professional year. At the end of their first year, when asked what advice they would give to new graduates, the same response was repeated; “Allow yourself to be novice”. What is in this concept? And why is “being novice” something that has to be “allowed”? Addressing these questions could potentially further expand our understanding of how to help new professionals as they transition from education to profession.

#### **4.3.4 Ethical considerations**

The major ethical concern of this thesis is the focus on the behaviors of the individuals as a factor that contributes to the risk of developing symptoms of stress-related ill health and as a target for the experimental intervention. As acknowledged throughout this text, there are multiple organizational variables that could similarly be targeted with the purpose of preventing symptoms of stress-related ill health among newly registered nurses.

Task mastery concerns having the skills and knowledge needed to perform the tasks that you are expected to perform as part of your professional role. In organizations in which the newly registered nurses are expected to perform at a level of an experienced nurse from the get-go, perceived mastery of tasks will likely be low and decreasing. On the contrary, in an organization in which it is recognized that the newly registered nurses must first be given the opportunity and support to learn the tasks that he or she is expected to perform, perceived mastery of tasks is likely to be high and increasing.

Similar principles are true for the two other processes role clarity and social acceptance. In cases where newly registered nurses are welcomed into a clearly structured and supporting working environment, experienced role clarity and social acceptance is likely to be high and increasing. In cases where newly registered nurses enter an organization where there are no clear structures and the social climate includes incivility and bullying, the newly registered nurses' experience of role clarity and social acceptance is likely to be low and decreasing.

Hence, the focus on individuals' behaviors is not intended to imply that responsibility to “solve the problem of stress-related ill health among newly registered nurses” is in the hands of the newly registered nurses, nor that this strategy at the individual/organizational interface would be a sufficient solution. However, in line with the behavioral model of stress-related ill

health, a behavioral intervention may support engagement in behaviors that function to enhance management of challenges and reduce the activation of the stress response, and thereby reduce the risk of developing symptoms of stress-related ill health over time. As the available strategies for supporting newly registered nurses have not been found to be effective in preventing experiences of stress, the intervention developed in this thesis may provide an important addition. As previously mentioned, investigating the interactive effect of simultaneously addressing individual- and organizational level variables to increase newly registered nurses' engagement in proactive behaviors would be an interesting avenue for future research.

#### **4.3.5 Conclusion**

The general aim of this thesis was to investigate if it is possible to prevent symptoms of stress-related ill health among newly registered nurses by supporting engagement in proactive behaviors. The work was developed based on research from the fields of nursing, occupational health, stress, and organizational socialization. The overall hypothesis was that increased engagement in proactive behaviors would contribute to the development of the socialization processes task mastery, role clarity, and social acceptance, which, in turn, would mediate a reduction of experiences of stress and the risk of developing symptoms of stress-related ill health. A 3 × 3-hour experimental intervention was developed based on theory and practice from cognitive behavior therapy using the behavior change techniques systematic exposure, reinforcing approach behaviors and action planning to reduce avoidance of proactive behaviors and increase engagement in leisure activities.

We found that the development of the socialization processes was related to experiences of stress (Study I) and symptoms of burnout (Study II) among newly registered nurses during their first three months as well as their first three years in the profession, in support of the theoretical model of the experimental intervention. Furthermore, we found that the experimental intervention was accepted and appreciated by newly registered nurses and that it was possible to evaluate the effect as part of a transition-to-practice program (Study III). Finally, we found support for a small preventative effect of the experimental intervention on newly registered nurses' experiences of stress and a small to medium effect on avoidance of proactive behaviors (Study IV), in line with the study hypothesis.

However, the results of different methods of analysis on the effect of the intervention were conflicting and further refinements of the experimental intervention and additional evaluations of the effects are needed. Specifically, future research should focus on investigating the replicability of the results, as well as the potential of integrating the context to enhance effects. Furthermore, the effect of the intervention on symptoms of stress-related ill health over an extended period of time, and the role of the socialization processes as mediators of effects need to be investigated as these questions could not be addressed in the thesis.

In summary, the results suggest that transition-to-practice programs may benefit from adding an intervention that specifically addresses newly registered nurses' experiences of stress and avoidance of proactive behaviors using research from the fields of nursing, occupational health, stress, and organizational socialization, and techniques from cognitive behavior therapy. Identifying strategies to effectively reduce symptoms of stress-related ill health and support newly registered nurses as they transition into their new professional role is expected to contribute to ensuring the provision of health care and improve newly registered nurses' health over time. The work that has been initiated in this thesis may prove useful towards this end.

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## 7 APPENDIX

Table 1. Item content and representation in Studies I-IV.

	Representation in studies			
	I	II	III	IV
<b><i>Measure of experiences of stress and symptoms of stress-related ill health</i></b>				
Stress and Energy Questionnaire				
During the last week when you have been at work, to what degree have felt...				
rested?	x		x	
tense?	x		x	
stressed?	x		x	x
relaxed?	x		x	
pressured?	x		x	x
calm?	x		x	
frustrated?				x
Scale of work engagement and burnout				
In the past two weeks at work I have felt...				
lethargic		x		
indecisive		x		
exhausted		x		
In the past two weeks, in relation to my work I have felt a sense of...				
indifference		x		
meaninglessness		x		
resignation		x		
In the past two weeks while I have been working I have felt...				
unfocused		x		
weeks felt restless		x		
easily distracted		x		
<b><i>Measures of role clarity, task mastery, and social acceptance</i></b>				
QPS-Nordic Role clarity				
How often do you experience the following in relation to your professional role?				
That the goals of your work are clearly defined?	x	x	x	x
That you know your responsibilities?	x	x	x	x
That you know exactly what is demanded of you in your work?	x	x	x	x
QPS-Nordic Task mastery				
How often do you experience the following in relation to your achievements at work?				
That you are satisfied with the quality of the work that you do?		x		
That you are satisfied with the amount of work that you do?		x		
That you are satisfied with your ability to solve problems at in your work?		x		
NSFS Competence (Task mastery)				
If you consider your work, how often during the last week have you felt the following?				

I have felt that I have not been able to master my work assignments.	x		x	x
I have felt that i have been able to master even the most challenging assignments.	x		x	x
QPS-Nordic Leadership support (Social acceptance)				
How often do you experience the following in relation to the management at your work?		x		
That you receive support from your closest manager when you need it?		x		
That you receive appreciation for your achievements from your closest manager?		x		
That your closest manager encourages you to participate in important decision makings?		x		
That your closes manager helps you to develop your abilities?		x		
That your closest manager delegates work assignments fairly?		x		
That your closest manager treats the employees equally?		x		
QPS-Nordic Co-worker support (Social acceptance)				
How often do you experience the following in relation to the social support at work?				
That you receive support with your work from your colleagues when you need it?		x		
That your colleagues are willing to listen if you express problems concerning your work?		x		
That you have noticed disturbing conflicts among members of the team?		x		
NSFS Relatedness (Social acceptance)				
If you consider your work, how often during the last week have you felt the following?				
I have felt alone when I have been working with certain members of the team.	x		x	x
I have felt that those that I have worked with truly cared about me.	x		x	x
<b>Measures of proactivity, avoidance of proactivity, and engagement in leisure-activities</b>				
Proactivity				
During the last week when you have been at work, how often have you...				
asked your colleagues for feedback on which tasks you need to practice?			x	
asked a colleague to show you have to execute a specific task?			x	
actively engaged in work assignments that you believe you need to practice?			x	
In discussions within the team, spontaneously contributed with your opinions?			x	
Avoidance of proactivity				
During the last week when you have been at work, how often have you...				
avoided asking for help on a task because you have thought that you are expected to know how to do it?			x	x
avoided asking a question because you have thought that you are expected to know the answer?			x	x
Leisure activities				
During the last month, how often have you...				
engaged in physical exercise?			x	x
engaged in activities where you have felt connected to other (e.g. your friends or family)?			x	x
engaged in personal hobbies or interests?			x	x

Note: QPS-Nordic = General Questionnaire for Psychological and Social Factors at Work; NSFS = Needs satisfaction and frustration scale



Table 2. Results of multilevel model analysis. Group by time interactions for each outcome variable according to intent-to-treat and efficacy subset principles of analysis. Imputed data.

Variable	Parameter	Estimate	SE	t	df	p	95% CI
Stressed <sup>1</sup>	Intercept	4.31	0.12	36.57	229.55	0.000	[4.08; 4.54]
Stressed <sup>1</sup>	Time <sup>3</sup>	0.08	0.12	0.71	193.01	0.479	[-0.15; 0.32]
Stressed <sup>1</sup>	Group	-0.16	0.16	-1.03	231.30	0.303	[-0.48; 0.15]
Stressed <sup>1</sup>	Group by time	-0.09	0.16	-0.54	180.61	0.589	[-0.41; 0.23]
Stressed <sup>1</sup>	Time+Group by time <sup>4</sup>	0.00	0.11	-0.04	166.66	0.965	[-0.23; 0.22]
Stressed <sup>2</sup>	Intercept	4.31	0.11	37.60	229.22	0.000	[4.08; 4.53]
Stressed <sup>2</sup>	Time	0.08	0.12	0.70	194.10	0.484	[-0.15; 0.32]
Stressed <sup>2</sup>	Group	-0.18	0.18	-1.04	231.07	0.299	[-0.53; 0.16]
Stressed <sup>2</sup>	Group by time	-0.13	0.18	-0.72	196.22	0.470	[-0.50; 0.23]
Stressed <sup>2</sup>	Time+Group by time	-0.05	0.14	-0.36	157.91	0.720	[-0.33; 0.23]
Pressured <sup>1</sup>	Intercept	3.91	0.13	29.91	226.33	0.000	[3.65; 4.16]
Pressured <sup>1</sup>	Time	0.10	0.14	0.72	181.63	0.471	[-0.17; 0.36]
Pressured <sup>1</sup>	Group	-0.11	0.18	-0.65	229.97	0.518	[-0.46; 0.23]
Pressured <sup>1</sup>	Group by time	-0.11	0.19	-0.59	161.52	0.557	[-0.49; 0.26]
Pressured <sup>1</sup>	Time+Group by time	-0.01	0.13	-0.11	141.52	0.913	[-0.28; 0.25]
Pressured <sup>2</sup>	Intercept	3.91	0.13	30.83	225.75	0.000	[3.66; 4.15]
Pressured <sup>2</sup>	Time	0.10	0.14	0.72	182.42	0.474	[-0.17; 0.37]
Pressured <sup>2</sup>	Group	-0.13	0.20	-0.64	230.13	0.523	[-0.51; 0.26]
Pressured <sup>2</sup>	Group by time	-0.19	0.21	-0.89	182.61	0.376	[-0.61; 0.23]
Pressured <sup>2</sup>	Time+Group by time	-0.09	0.16	-0.55	141.52	0.581	[-0.41; 0.23]
Frustrated <sup>1</sup>	Intercept	3.37	0.13	26.96	229.53	0.000	[3.13; 3.62]
Frustrated <sup>1</sup>	Time	0.40	0.13	3.10	200.27	0.002	[0.15; 0.65]
Frustrated <sup>1</sup>	Group	0.08	0.17	0.46	231.38	0.648	[-0.26; 0.41]
Frustrated <sup>1</sup>	Group by time	-0.35	0.19	-1.88	162.80	0.062	[-0.72; 0.02]
Frustrated <sup>1</sup>	Time+Group by time	0.05	0.13	0.36	149.20	0.723	[-0.21; 0.30]
Frustrated <sup>2</sup>	Intercept	3.37	0.12	27.35	229.37	0.000	[3.13; 3.61]
Frustrated <sup>2</sup>	Time	0.40	0.13	3.06	201.32	0.003	[0.14; 0.65]
Frustrated <sup>2</sup>	Group	0.03	0.19	0.16	230.93	0.875	[-0.35; 0.41]
Frustrated <sup>2</sup>	Group by time	-0.33	0.21	-1.57	180.77	0.118	[-0.74; 0.08]
Frustrated <sup>2</sup>	Time+Group by time	0.07	0.16	0.43	143.68	0.670	[-0.25; 0.38]

Note: SE = standard error, t = t-value, df = degrees of freedom, p = significance value, 95% CI = 95% confidence interval [Lower level; Upper level], 1 = analyses conducted based on the intention-to-treat principle, 2 = analyses conducted based on the efficacy subset principle, 3 = the estimate of time is interpreted as the change over time in the control group, 4 = the estimate of Time+Group by time is interpreted as the change over time in the experimental group

Table 3. Descriptives, independent sample *t*-test and Cohen's *d* at baseline and follow-up for each outcome variable according to intent-to-treat and efficacy subset principles of analysis. Observed data.

Descriptives									Independent sample <i>t</i> -test and Cohen's <i>d</i> effect								
Variable	Baseline (M and SD)				Follow-up (M and SD)				Baseline				Follow-up				
	EXP		Control		EXP		Control		t	df	<i>p</i>	95% CI	t	df	<i>p</i>	95% CI	d
Stressed <sup>1</sup>	4.14	1.29	4.30	1.21	4.17	1.21	4.40	1.12	0.99	231	0.322	[-0.16; 0.49]	1.31	178	0.193	[-0.12; 0.57]	-0.20
Stressed <sup>2</sup>	4.12	1.22	4.30	1.21	4.07	1.16	4.40	1.12	1.02	179	0.310	[-0.18; 0.55]	1.72	148	0.087	[-0.05; 0.70]	-0.28
Pressured <sup>1</sup>	3.79	1.36	3.91	1.25	3.75	1.42	4.02	1.30	0.72	230	0.473	[-0.22; 0.47]	1.33	178	0.187	[-0.13; 0.67]	-0.20
Pressured <sup>2</sup>	3.78	1.30	3.91	1.25	3.66	1.32	4.02	1.30	0.72	178	0.475	[-0.24; 0.52]	1.65	148	0.101	[-0.07; 0.79]	-0.26
Frustrated <sup>1</sup>	3.46	1.31	3.38	1.30	3.47	1.26	3.79	1.28	-0.44	230	0.661	[-0.42; 0.27]	1.69	178	0.094	[-0.05; 0.69]	-0.25
Frustrated <sup>2</sup>	3.41	1.30	3.38	1.30	3.42	1.15	3.79	1.28	-0.17	178	0.869	[-0.42; 0.36]	1.79	148	0.076	[-0.04; 0.77]	-0.29

Note: Total = complete sample (n=238 at baseline and 183 at follow-up), EXP = experimental group (intent-to-treat group n = 129 at baseline and 90 at follow-up, efficacy subset group n = 77 at baseline and 59 at follow-up), Control = control group (n = 109 at baseline and 93 at follow-up), M = mean, SD = standard deviation, t = t-value; df = degrees of freedom, *p* = significance value, 95% CI = 95% confidence interval [Lower level; Upper level], d = Cohen's d derived from group differences in means and the pooled standard deviations of the intent-to-treat group and the control group at baseline, 1 = analyses conducted based on the intention-to-treat principle, 2 = analyses conducted based on the efficacy subset principle.

Table 4. Descriptives, independent sample *t*-test and Cohen's *d* at baseline and follow-up for each outcome variable according to intent-to-treat and efficacy subset principles of analysis. Imputed data.

Descriptives									Independent sample <i>t</i> -test and Cohen's <i>d</i> effect								
Variable	Baseline (M and SE)				Follow-up (M and SE)				Baseline				Follow-up				
	EXP		Control		EXP		Control		t	df	<i>p</i>	95% CI	t	df	<i>p</i>	95% CI	d
Stressed <sup>1</sup>	4.14	0.11	4.31	0.12	4.14	0.12	4.39	0.12	-1.00	230.54	0.317	[-0.49; 0.16]	-1.51	185.33	0.133	[-0.58; 0.08]	-0.20
Stressed <sup>2</sup>	4.12	0.14	4.31	0.12	4.07	0.14	4.39	0.12	-1.02	179.15	0.311	[-0.54; 0.17]	-1.74	155.20	0.084	[-0.68; 0.04]	-0.25
Pressured <sup>1</sup>	3.79	0.12	3.91	0.12	3.78	0.14	4.00	0.14	-0.66	228.75	0.509	[-0.45; 0.23]	-1.13	172.77	0.258	[-0.62; 0.17]	-0.17
Pressured <sup>2</sup>	3.78	0.15	3.91	0.12	3.69	0.17	4.00	0.14	-0.65	178.10	0.513	[-0.50; 0.25]	-1.45	147.11	0.149	[-0.74; 0.11]	-0.23
Frustrated <sup>1</sup>	3.45	0.12	3.37	0.13	3.50	0.13	3.77	0.13	0.45	230.49	0.652	[-0.26; 0.42]	-1.48	173.74	0.140	[-0.64; 0.09]	-0.21
Frustrated <sup>2</sup>	3.40	0.15	3.37	0.13	3.47	0.15	3.77	0.13	0.15	179.01	0.878	[-0.35; 0.41]	-1.48	146.43	0.141	[-0.70; 0.10]	-0.23

Note: EXP = experimental group (intent-to-treat group n = 129, efficacy subset group n = 95), Control = control group (n = 109), M = mean, SE = standard error, t = t-value, df = degrees of freedom, *p* = significance value, 95% CI = 95% confidence interval [Lower level; Upper level], d = Cohen's d derived from group differences in means and the pooled standard deviations of the intent-to-treat group and the control group at baseline, 1 = analyses conducted based on the intention-to-treat principle, 2 = analyses conducted based on the efficacy subset principle.