The relationship between task mastery, role clarity, social acceptance, and stress: An intensive longitudinal study with a sample of newly registered nurses

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ABSTRACT

Background: Transitioning into a new professional role is challenging. Unfortunately, little is currently known about how to reduce experiences of stress among new professionals. The socialization processes role clarity, task mastery, and social acceptance are assumed to reduce experiences of stress as they mediate new professionals' acquisition of knowledge, skills, attitudes, and behaviors. However, little prospective data is available on the actual effect of the processes on stress.
Objectives: To prospectively investigate how the socialization processes relate to experiences of stress among new nurses during the first three months of professional working life. Specifically, to investigate development over time, as well as how episodes of increased or decreased levels of the socialization processes relate to concurrent levels of stress. The general purpose of this investigation was to examine the suitability of the socialization processes as targets of an intervention seeking to reduce stress among new professionals.
Design: An intensive longitudinal study with weekly data collections over three months.
Participants: 264 newly graduated Swedish nurses who started their first job during the period of the study.
Methods: The participants were followed prospectively during 14 consecutive weeks after their professional entry. Data on stress (Stress and Energy Questionnaire), role clarity (General Questionnaire for Psychological and Social Factors at Work), task mastery, and social acceptance (Needs Satisfaction and Frustration Scale) were collected weekly using digital surveys (mean response rate 82.7%). Data was analyzed using a multilevel model for intensive longitudinal data.
Results: For the typical nurse, stress decreased by 0.13 units per month, role clarity and task mastery increased by 0.08 and 0.05 units, and social acceptance decreased by 0.08 units. In addition, the slopes of 95 percent of the new nurses varied within 1.18 (stress), 0.72 (role clarity), 0.44 (task mastery), and 0.86 (social acceptance) units of the typical nurse. Most importantly, when the new nurses experienced higher levels of task mastery, role clarity, and social acceptance, they experienced lower levels of stress (within-person parameter estimates: task mastery −0.40, p = .001; role clarity −0.34, p = .001; and social acceptance −0.33, p = .001).
Conclusions: Supporting the development of the socialization processes could be one theoretically based strategy to reduce levels of stress among new nurses. As stress among new professionals is not unique to the nursing profession, and the processes are considered important mediators of new professionals' adaptation in general, the results from this study should likely be generalizable to other professions.

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What is already known about the topic?

- There is a lack of effective theory based interventions to reduce stress among new professionals
- Repeated activation of the stress response increases the risk of developing symptoms of burnout and new nurses are one professional group that report high levels of burnout

- The socialization processes task mastery, role clarity, and social acceptance are assumed to affect new professionals' experiences of stress, however this has not been thoroughly investigated

What this paper adds

- When new nurses experience higher levels of task mastery, role clarity, and social acceptance, they experience lower levels of stress

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- Development of task mastery, role clarity, and social acceptance in the transition into the nursing profession differ between different individuals
- Supporting the development of task mastery, role clarity, and social acceptance could be one theoretically based strategy to reduce stress among new nurses (and the results are likely generalizable to other professions as well)

1. Introduction

Transitioning into a new professional role is challenging. The new professional needs 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. Many new professionals perceive themselves as inadequately prepared to manage these demands (Wanberg, 2012) and it is widely recognized that the first stage of a new professional's working life is tainted by uncertainty and stress (Allen et al., 2017, Saks and Gruman, 2012). In fact, public health data indicate that young adults are the population group that experiences the highest level of stress (The Public Health Agency of Sweden, 2016). Although a certain level of stress facilitates learning and adaptation, repeated activation of the stress response without sufficient periods of recovery may result in symptoms of stress-related ill health, or burnout (McEwen and Gianaros, 2011).

New nurses are known to experience particularly high levels of stress (AFA Insurance, 2015). In Sweden, new registered nurses predominantly work in hospital settings and are exposed to a busy work environment with a constantly changing and exceedingly specialized health care organization and shift work (Dahlgren et al., 2016; Rudman et al., 2010). During the first three years of practice every fifth new nurse in a national Swedish sample had an episode of job burnout (Rudman and Gustavsson, 2011). Concurrently, work engagement decreased and after five years of practice every fifth new nurse wanted to leave the profession (Rudman et al., 2014). In addition, 50% of new Swedish nurses reported symptoms of neck/shoulder pain and 40% reported symptoms of back pain (Lövgren et al., 2014). Similar results have been found in samples of Canadian nurses (Boamah and Laschinger, 2016; Laschinger et al., 2010). In this paper, we use the terms 'new registered nurses' and 'new nurses' to refer to nurses who have just finished their higher education (and received a Bachelors' degree) and started their first employment as registered nurses.

Issues surrounding the professional establishment of new nurses have been debated in healthcare settings and in the nursing literature for years (Hickerson et al., 2016; Kramer, 1974; Missen et al., 2016; Pellico et al., 2009; Pennbrant et al., 2013; Phillips et al., 2015). The need to intervene and facilitate the professional adaptation of new nurses has been recognized internationally (Institute of Medicine, 2011; Mirsch, 2016; Voldbjerg et al., 2016, 2017). However, no standards of such interventions are yet available (Anderson et al., 2012; Brown et al., 2015; Edwards et al., 2015; Rush et al., 2013) and little is currently known about how to reduce experiences of stress among new professionals (Klein and Polin, 2012; Saks and Gruman, 2012). Therefore, it has been suggested that more research needs to be directed towards developing effective interventions (Klein and Polin, 2012; Vancouver and Warren, 2012). Effective interventions are based on an understanding of the mechanisms or processes that contribute to the development of a problem and suggest how the problem may be addressed. Therefore, the first step towards developing an intervention to reduce stress among new nurses is to identify the processes that contributes to the occurrence of these experiences (Craig et al., 2008; Durlak, 2014; Prestwich et al., 2014).

According to the theoretical framework of organizational socialization (Wanberg, 2012), the main challenges that affect new professionals' experiences of stress are uncertainties around role clarity, task mastery, and social acceptance (Saks and Gruman, 2012). Role clarity concerns information about what tasks and level of performance is expected within the new professional role, and what behaviors are appropriate to achieve the expected performance goals (Kammeyer-Mueller and Wanberg, 2003). Social acceptance refers to the extent a new professional perceives him/herself to be accepted and integrated into the new social group (Kammeyer-Mueller and Wanberg, 2003). Finally, task mastery refers to one's ability to master the tasks that are included in the professional role (Bandura, 1997). It is assumed that development of these constructs over time, following the transition into a profession, reduces experiences of stress and uncertainty as it mediates acquisition of knowledge, skills, attitudes, and behaviors, these being resources that facilitate successful management of challenging situations. Because of this, role clarity, social acceptance, and task mastery are often referred to as socialization processes, that is, constructs that, as they develop, drive new professionals' socialization (Saks and Gruman, 2012; Wanberg, 2012).

Qualitative research indicates that the socialization processes are of importance for new nurses' experiences of stress. Pellico et al. (2009) analyzed the experiences of 612 new nurses in the United States and found that a key cause of stress was that they were required to move out of the newcomer role too quickly. Many new nurses expressed that they were never given the opportunity to take on the role of a novice and develop task mastery but rather they were expected to be able to manage a full patient load from the start (role clarity and task mastery). In addition, many nurses found the social climate of their workplaces to be stressful, as physicians and experienced nurses could be critical, arrogant, and rude towards the new nurses (social acceptance).

Duchscher (2009), in line with the aforementioned, described the stress experienced by new nurses in Canada to be related to unrealistic expectations of performance and a perceived lack of competence and training (task mastery), as well as insufficient functional- and emotional support and fear of social disapproval (social acceptance). The importance of relational aspects to the adaptation of new nurses was furthermore confirmed by van Rooyen et al. (2018) who found that social aspects of work and a sense of belonging was one of the three most important factors to facilitate transition from training to clinical practice (social acceptance). In addition, Sterner et al. (2017) showed that new nurses experienced care situations as particularly challenging when they had difficulties in communicating with and understanding patients or colleagues, as well as when colleagues did not acknowledge their need for help (task mastery), when they felt ignored, or not taken seriously (social acceptance).

Based on results of a number of studies with Australian nurses, Phillips et al. (2015) likewise suggested that the transition and retention of new nurses may be improved by considering aspects of organizational socialization and ensuring that new nurses start their careers with a thorough orientation (role clarity), appropriate patient allocation (task mastery), and respect from coworkers (social acceptance). Finally, in a Swedish context, nurses' professional adaptation was found to be the result of an ongoing process building on the nurses' experiences and interactions with the surrounding environment (Pennbrant et al., 2013). The professional development involved educational experiences, acquiring professional self-efficacy and clinical expertise (task mastery). Pennbrant et al. (2013) underscored the importance of developing a professional nursing role (role clarity) within the new working context and this involved good relationships with teachers and healthcare managers (social acceptance).

In summary, the theoretical framework of organizational socialization as well as results from qualitative studies on new nurses' experiences of stress suggests that one way to reduce stress among new nurses could be to strategically target the development of the socialization processes. However, little prospective data is available on the actual effect of these processes on stress (Bauer and Erdogan, 2012; Ellis et al., 2015; Saks and Gruman, 2012). Therefore, to examine the suitability of the socialization processes as target processes of an intervention seeking to reduce stress among new professionals, with this study we aimed to prospectively investigate in situ how these processes relate to experiences of stress among new Swedish nurses during the first three months of professional working life. This period has been suggested to be particularly critical for establishing the professional role and learning the social and technical aspects of a profession that are required to be an efficient member of a new organization (Saks and Gruman, 2012). Specifically, we wanted to investigate how episodes of increased or decreased levels of the socialization processes relate to concurrent levels of stress.

2. Method

2.1. Study design

The study was an intensive longitudinal study (Bolger and Laurenceau, 2013) in which we prospectively followed a sample of newly graduated nurses with repeated data collections over a period of 14 consecutive weeks after their professional entry. The study was approved by the ethical committee at the Karolinska Institutet (2014/1531-31/5).

2.2. Setting

We conducted the study in Sweden during the summer of 2015 (June 2015–August 2015) and the spring of 2016 (February 2016–April 2016). As there are two periods of graduation in Sweden (one in January and one in June), this allowed for the inclusion of a larger sample. Data from the summer of 2015 were collected during the 13 weeks following the assumed first day of the nurses' new employment positions. Data from the spring of 2016 were collected for 13 weeks starting the second week following the nurses' assumed professional entry. All health care regions in Sweden were included in the study.

2.3. Participants

Suitable participants for the study were graduating nurses in Sweden who were starting their first employment position as registered nurses during the period of the study. We recruited participants while they were completing the final weeks of their higher education. To recruit participants, we asked the deans of all 25 universities in Sweden offering a Bachelor's degree in nursing to forward a message via e-mail or university online forums to their students, informing them about the study. We also published information about the study on our research group's Facebook page.

The message included a URL to a webpage with full information about the study and the opportunity to register interest in participating. Students who gave their informed consent and declared that they were graduating and going to start their first employment position directly after their graduation were sent the baseline questionnaire to an e-mail account of their choice. Participants who responded to the baseline questionnaire within one week were included in the study. The registration was open for a four-week period prior to the expected time of graduation.

2.4. Variables

For this study, we prioritized validated and methodologically sound instruments with the following characteristics: (1) few items per subscale; (2) few words per item for easy presentation in a digital survey; and (3) items focusing on work related experiences. The following instruments were chosen:

2.4.1. Outcome

Stress was measured using the Stress and Energy Questionnaire (SEQ; Hadzibajramovic et al., 2015; Kjellberg and Iwanowski, 1989). The questionnaire includes a subscale with six items (adjective statements) asking about responders' experiences of stress while at work during the last week (sample item: During the last week while you have been at work, to what degree have you felt stressed?). The response format was a six-point Likert scale ranging from 'Not at all' to 'Very much'. A higher value represented a higher level of stress. This instrument has previously been used as an outcome measure in stress intervention research and as a tool to monitor stress levels among health care personnel (Hadzibajramovic et al., 2015; Stake and Hay, 2016). In the present study, the internal consistency reliability (between-persons reliability) was 0.964 and the reliability of change (within-person reliability) was 0.870 as estimated by omega coefficients from a multi-level confirmatory factor analysis (Bolger and Laurenceau, 2013).

2.4.2. Predictors

As predictors, we included three measures of the socialization processes that were decomposed to represent variation between and within individuals. Role clarity was measured using a shortened three-item version of a scale from the General Questionnaire for Psychological and Social Factors at Work (QPS Nordic; Dallner et al., 2000; Wannstrom et al., 2009a,b). The items asked about experiences during the last week at work and were responded to using a five-point Likert scale ranging from 'Very seldom or never' to 'Very often or always' (sample item: During the last week, how often have you felt that you know your responsibilities?). A higher value represented a higher level of role clarity. This scale has previously been used in a large scale prospective study monitoring the careers of new nurses in Sweden (Rudman et al., 2010), and has been extensively evaluated in samples of health care personnel (Wannstrom et al., 2009a,b). In the present study, the between-persons reliability was 0.936 and the within-person reliability was 0.720 as estimated by omega coefficients from a multi-level confirmatory factor analysis.

We measured task mastery using the competence subscale of the Swedish version of the Needs Satisfaction and Frustration Scale (NSFS; Aurell et al., 2015; Longo et al., 2016). This scale specifically addresses frustration about not being able to deal effectively with everyday demands and hassles at work. The scale is developed from the theory of self-determination, where competence is defined as a basic psychological need. Mastery of everyday tasks and demands at work is assumed to contribute to the satisfaction of the basic need for competence. Two items asked about participants' experiences of task mastery during the previous week at work and were responded to using a five-point Likert scale ranging from 'Very seldom or never' to 'Very often or always'. Item 1 was negatively framed ("[During the last week] I have felt that I have been able to master even the most challenging tasks") and item 2 was positively framed ("[During the last week] I have felt that I have not been able to master my assignments"). The negatively framed item was reversed in the computation of the score and hence a higher value represented a higher level of task mastery. The between-persons reliability was 0.875 and the within-person reliability was 0.277 as estimated by omega coefficients from a multi-level confirmatory factor analysis. Due

to the low within-person reliability, to reduce the risk of drawing inaccurate conclusions in case the two items were not equally reliable representations of the same construct, we decided to conduct all analyses on the summed two-item scale, as well as on the two items separately. We will use the term 'task mastery' to refer to the summed scale, and 'task mastery item 1 and item 2' to refer to the separate items.

Finally, we measured social acceptance using the relatedness subscale of the Swedish version of the Needs Satisfaction and Frustration Scale (NSFS; Aurell et al., 2015; Longo et al., 2016). This scale specifically addresses frustration about not experiencing a sense of belonging at work. The scale is developed from the theory of self-determination, where relatedness or the need to belong is defined as a basic psychological need. Social acceptance at work is assumed to contribute to the satisfaction of the basic need to belong. Two items asked about participants' experiences of social acceptance at work during the last week and were responded to using a five-point Likert scale ranging from 'Very seldom or never' to 'Very often or always' (sample item: "[During the last week] I have felt that my colleagues really care about me"). A higher value represented a higher level of social acceptance. The between-persons reliability was 0.885 and the within-person reliability was 0.572 as estimated by omega coefficients from a multi-level confirmatory factor analysis.

2.5. Data sources/measurement

We collected data using a digital survey (Artologik, 2019) that was sent to the participants via e-mail at the same time and day every week of the study. The e-mail included an individualized URL through which the participants were directed to the survey questions. Participants who did not respond to the survey within four days of receiving it were sent a reminder e-mail including the URL. Each survey was active for a week, i.e. until the survey of the following week was to be sent out.

In Table 1, the design of the data collection is presented. Week one refers to the participants' first week in the profession. Data on stress was collected every week of the study with the exception of the final week. This last week, the survey included a measure of symptoms of burnout that was included to study long term effects of exposure to stressors. The measure of weekly stress was omitted in that week to avoid asking the participants to report data on overlapping constructs (i.e. everyday experiences of stress as well as symptoms of burnout).

To reduce the number of items in each weekly survey (in order to reduce the risk of bias, further addressed below) without reducing the power of the analyses, data on the process measures were collected every other week of the study, at opposing weeks in the two sets of data (i.e. the summer of 2015 [group 1] and the spring of 2016 [group 2]). For example, data on role clarity was

Table 1
Study variables at all time-points.

Variable	Group	Survey (week in profession)													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Stress	1	x	x	x	x	x	x	x	x	x	x	x	x	x	
	2		x	x	x	x	x	x	x	x	x	x	x	x	x
Role clarity	1	x		x		x		x		x		x		x	
	2		x		x		x		x		x		x		x
Task mastery	1	x		x		x		x		x		x		x	
	2		x		x		x		x		x		x		x
Social acceptance	1	x		x		x		x		x		x		x	
	2		x		x		x		x		x		x		x

collected on odd weeks during the summer of 2015 and on even weeks during the spring of 2016 (see Table 1). This ensured that data was collected on all variables every week but the participants did not need to provide data more often than every other week.

2.6. Bias

The study design introduced at least three potential types of selection bias. To reduce the risk of bias due to a non-representative sample, we used a digital survey and attempted to invite all nurses in Sweden who fit the inclusion criteria by contacting students at all universities in Sweden. In addition, to reduce the risk of bias due to differences in willingness to participate among potential participants explained by differences in the study variables at professional entry (i.e. lower/higher perceived mastery, role clarity, social acceptance, or stress), we recruited participants while they were still students. However, these strategies did not prevent the risk of selection bias due to differences in willingness to support the recruitment of participants on behalf of the universities or differences in willingness to participate on behalf of potential participants explained by differences in the study variables at the time of recruitment.

To reduce the risk of bias due to response fatigue, the items included in the weekly surveys were set to a minimum. As previously mentioned, we included measures of stress every week of the study but the measures of the socialization processes were included in an alternating way to prevent exhausting the subjects (Table 1).

Finally, to reduce the risk of bias due to lack of motivation to participate in the study from week to week, every survey ended with an open-ended question asking about feedback on the survey and study, or general experiences as part of the transition into the profession. To show that we had considered the input that we received from the participating nurses, we addressed all posted comments at a general level in the message that accompanied the survey the following week.

2.7. Study size

The Monte Carlo option in Mplus was used to generate power estimates based on previous results using latent growth curve modeling. We used data from a student paper analyzing how stress levels changed in a sample of 150 new nurses during their first 12 weeks after graduation (Högman and Westin, 2016). Using latent growth modeling it was estimated that stress levels decreased with an effect size of 0.5 standard deviations (i.e. a moderate effect size) over three months. On the basis of all model estimates from this data we calculated the power to detect longitudinal effects of 0.2 standard deviations (i.e. small effects) across three months entering different sample sizes. Based on these power simulations it was decided to include at least 300 nurses (power = 86%) to have a final data set with more than 250 nurses (power = 80%). As we used a digital survey to collect data there was no limit to the number of participants who could be included in the study. For this reason, we sought to recruit all nurses who were graduating in Sweden in June 2015 and January 2016 and were to start their first employment positions as registered nurses within the period of the study.

2.8. Quantitative variables

For the analyses, we rescaled time to indicate time in months. For each study variable and week, we computed a scale score representing the mean of the raw scores on the items that week. These scale scores were included in the analyses.

In addition, in order to investigate if individual levels of stress were higher or lower on occasions when levels of the socialization processes role clarity, task mastery, and social acceptance were higher or lower, we computed between-person and within-person variables for each process, according to the centering procedure suggested by Bolger and Laurenceau (2013). First, we subtracted the grand-mean (i.e. the mean across all participants and time points) from the raw scores. Next, the between-person versions of the variables were computed as the person-mean of individual deviations from the grand-mean of each process variable. Finally, we created the within-person versions of the variables by subtracting the between-person score from the grand-mean centred variable.

2.9. Statistical methods

We analysed data using a multilevel model approach following the analytic strategies for intensive longitudinal data analyses as proposed by Bolger and Laurenceau (2013). Firstly, we visualized raw data with individual panel plots in order to conclude that the within-person change over time in each variable was approximately linear. Secondly, we visualized raw data with spaghetti plots in order to conclude that the average change over time in each variable was approximately linear. These plots were prepared using IBM SPSS Statistics 23.

Thirdly, we modelled the development of stress, task mastery, role clarity, and social acceptance during the three months of the study using linear growth model analyses (Bolger and Laurenceau, 2013). Time was included as a fixed variable and time and intercept were included as random variables. A statistically significant estimate for the fixed effect of time was interpreted as indicating a development of the variables for the typical subject over the study period. A statistically significant random effect of time was used to compute a range of the individual slopes including 95 percent of the study sample. This range was computed by taking the square root of the estimate of random time and multiplying this value with 2×1.96.

Finally, to investigate the study question, i.e. how do episodes of higher or lower levels of the process variables task mastery, role clarity, and social acceptance relate to concurrent levels of stress, we conducted linear growth curve models with the between- and within-person versions of the process variables (explained above) as predictors (Bolger and Laurenceau, 2013). Time was included as a fixed variable and time and intercept were included as random variables. 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. That is, someone who over the period of the study scored higher or lower on the process variables than the group average expressed higher or lower levels of stress. In addition, 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. That is, at an occasion when a subject was higher or lower than normal on the process variables when compared to his or her own person-mean, he or she expressed higher or lower levels of stress.

To investigate if there were any differences between participants from the summer of 2015 and the spring of 2016, we included wave as a grouping variable (coded 0 [summer of 2015] vs. 1 [spring of 2016]) in the growth model analyses. Time and group were included as fixed effects and time and intercept were included as random effects. We found no statistically significant differences between the starting values between the groups and therefore group was not included in the final analyses.

All analyses were conducted in Mplus version 8 using maximum likelihood estimation. When data is arranged vertically (stacked), as is the case when analysing linear growth models in Mplus, no individuals are dropped from the dataset because of missing data (Heck et al., 2014). Tests of the statistical significance of effects were based on the product of the parameter estimate divided by its standard error. For the sake of completeness, in Table A in the Supplementary material, we present the parameter estimate, standard error, probability value and the 95% confidence interval for each parameter included in the models. However, considering our research question, we will focus on the results of the time (fixed and random) parameters in the linear growth models, and the estimates of the between- and within-parameters in the linear growth curve models including between- and within-person versions of the process variables.

3. Results

3.1. Participants

The flow of participants is presented in Fig. 1. For the first recruitment, 19/25 universities confirmed that they had forwarded the information about the study to their students. For the second recruitment, 21/25 universities confirmed that they had forwarded the information. In total, the information was sent to 3339 students' (1598 students during the summer of 2015; 1741 students during the spring of 2016) university e-mail accounts or other messenger services. Unfortunately, we do not know how many graduating nurses actually received the information and used the URL to gain access to the full information about the study, or fulfilled the inclusion criteria (i.e. graduating and starting their first employment position as a registered nurse during the time of the study).

A total of 309 graduating nurses were about to start their first job directly after their graduation and gave their informed consent to participate. Of these, 267 responded to the baseline questionnaire and were thereby included in the study. However, three of these participants did not provide data at any of the follow-up occasions. The final sample for the longitudinal analyses included 264 newly graduated nurses. As presented in Fig. 1, the response rates ranged from 92.5% (week 1) to 72.7% (week 12).

Five participants actively withdrew from further participation during the course of the study. Four of these gave no reason for their withdrawal and the fifth declared that he/she was ill and would therefore not enter the profession during the study period.

3.2. Descriptive data

3.2.1. Characteristics of study participants

The majority of participants were female (231 females, 33 males). Participants' ages ranged from 22 to 51, with a median of 26. Half of the participants (51.3%) had previous experience of the clinical wards where they were starting their first employment position (through clinical practice placements during their time of study [34.5%], working extra alongside studies [22.5%], and/or employment positions prior to studying nursing [5.6%]). Most of the participants (85.2%) worked in a hospital unit (e.g. cardiology, oncology, critical care, general surgery). One out of ten (10.6%) worked in an elderly care service facility. A minority worked in the accident and emergency department, including the ambulance (2.6%) or at a primary care facility (1.5%). Two participants did not provide data on what kind of shift they worked, but the remainder (262 participants) reported working the day shift at least once during the study period (range 2–61 times, 85% of the sample reported working the day shift up to 35 times). Almost nine out of ten (232 participants) reported working the evening shift at least once during the study period (range 1–35 times; 85% of the sample reported working the evening shift up to 30 times). Finally, a
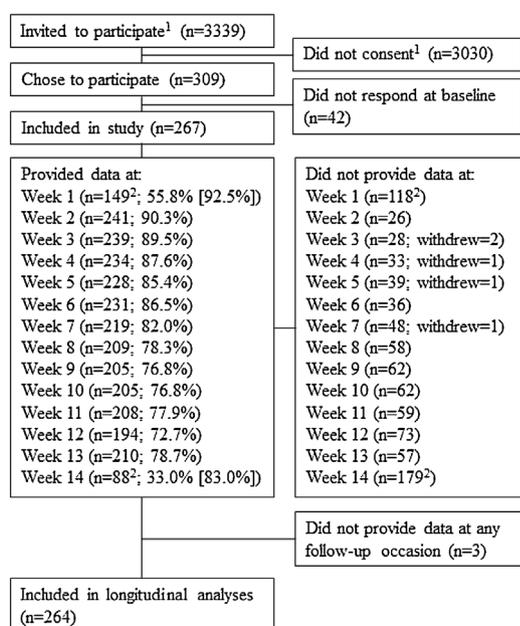
Fig. 1. Flow of participants throughout the study.
Notes: [1] We do not know how many actually received the information and fulfilled the inclusion criteria. [2] Survey were only sent to one of the two groups and hence the actual expected number of responder were 161 (week 1) and 106 (week 14), and the non-responders were thus 12 (week 1) and 18 (week 14).

minority of 31 participants (11.7%) reported working the night shift at least once during the study period (range 1–18 times, only 2.7% reported working the night shift more than five times).

3.2.2. Missing data

In Table 2, the number of expected responses and actual responses for each measure is presented.

3.3. Outcome data

3.3.1. Summary measures

Table 3 presents means and standard deviations for each variable over the 14-week period of the study.

3.3.2. Development over time

The development of the study variables over the three months of the study is represented in Table 4. For the typical new registered nurse, levels of stress decreased during the first three months following professional entry and the change was statistically significant. The reduction per month was 0.13 units. In addition, there were considerable individual differences in the rate of change. The slopes of 95 percent of the new nurses varied within 1.18 units of the slope of the typical nurse.

Levels of role clarity and task mastery increased during the three months to a statistically significant degree. The change in units per month was 0.08 for role clarity and 0.05 for task mastery. Looking at the two task mastery items separately, levels of item 1

Table 2
Expected number of responses as well as sum (and percentages) of responses throughout the 14 weeks of the study.

Variable	Expected responses	Responses
Stress	3204	2389 (74.6%)
Role clarity	1869	1390 (74.4%)
Task mastery	1869	1389 (74.3%)
Social acceptance	1869	1390 (74.4%)

Table 3
Summary measures (means and standard deviations) of study variables.

Survey	Variables			
	Stress M (SD)	Role clarity M (SD)	Task mastery M (SD)	Social acceptance M (SD)
1	3.69 (0.97)	3.47 (0.83)	3.64 (0.87)	4.22 (0.82)
2	3.71 (0.95)	3.61 (0.79)	3.63 (0.84)	4.12 (0.97)
3	3.77 (0.96)	3.58 (0.88)	3.59 (0.85)	3.97 (0.90)
4	3.79 (0.99)	3.71 (0.83)	3.47 (0.93)	3.96 (0.98)
5	3.69 (1.05)	3.71 (0.81)	3.69 (0.84)	3.89 (0.91)
6	3.74 (1.04)	3.79 (0.80)	3.55 (0.94)	3.80 (0.96)
7	3.69 (1.06)	3.77 (0.81)	3.73 (0.80)	3.89 (0.92)
8	3.68 (1.13)	3.78 (0.86)	3.49 (0.89)	3.76 (0.90)
9	3.61 (1.06)	3.81 (0.81)	3.74 (0.86)	3.96 (0.85)
10	3.57 (1.11)	3.65 (0.95)	3.50 (0.89)	3.72 (0.98)
11	3.48 (1.04)	3.79 (0.74)	3.90 (0.86)	4.02 (0.83)
12	3.49 (1.08)	3.54 (0.85)	3.52 (0.84)	3.77 (0.96)
13	3.49 (0.97)	3.83 (0.78)	3.75 (0.78)	3.86 (0.92)
14	–	3.78 (0.95)	3.72 (0.84)	3.79 (1.04)

did not change significantly during the period of study, whereas levels of item 2 changed by 0.11 units per month.

In contrast to the other process variables, levels of social acceptance decreased during the study period with 0.08 units per month for the typical nurse (statistically significant change). For all processes, there were statistically significant individual differences in the rate of change. The slopes of 95 percent of the new nurses varied within 0.72 units of the typical slope for role clarity, 0.44 units of the typical slope for task mastery (0.56 units of item 2), and 0.86 units of the typical slope for social acceptance.

Main results

The results of the investigation of the relation between momentary changes in the process variables task mastery, role clarity, and social acceptance and stress, are presented in Table 5. Across the study period, participants who generally scored higher on role clarity, task mastery (both as two-item scale and single items), and social acceptance reported lower levels of stress. In addition, on occasions when the new registered nurses experienced higher levels of role clarity, task mastery, and social acceptance than normal (i.e. when compared to their own individual mean over time), they experienced less stress, as indicated by significant within-person effects. The results for the two task mastery items separately corresponded to the results of the task mastery two-item scale. All relations were statistically significant.

4. Discussion

The aim of this study was to investigate the relationships between the socialization processes (task mastery, role clarity, and social acceptance) and new professionals' experiences of stress. The general purpose of this investigation was to study the suitability of the processes as targets for interventions seeking to reduce stress among new professionals. This research question is important as repeated activation of the stress response increase the risk of developing symptoms of burnout (McEwen and Gianaros, 2011). We conducted our investigation during the first three months following a professional transition in the context of new nurses as this professional group is known to experience the transition into the profession as challenging (Hickerson et al., 2016; Kramer, 1974; Missen et al., 2016; Pellico et al., 2009; Pennbrant et al., 2013; Phillips et al., 2015) and prior qualitative research indicate that the socialization processes affect new nurses' experiences of stress (Duchscher, 2009; Pellico et al., 2009; Pennbrant et al., 2013; Phillips et al., 2015; Sterner et al., 2017; van Rooyen et al., 2018).

Table 4
Results of linear growth models.

Variable	Effect	Paramater	Est. (SE)	p	95% CI	
Stress	Fixed	Intercept	3.85 (0.06)	0.001	3.73	3.96
		Time	−0.13 (0.03)	0.001	−0.18	−0.08
	Random	Intercept	0.70 (0.08)	0.001	0.55	0.86
		Time	0.09 (0.01)	0.001	0.06	0.12
		I*T	−0.10 (0.03)	0.001	−0.15	−0.04
		Residual	0.39 (0.01)	0.001	0.37	0.42
Role clarity	Fixed	Intercept	3.57 (0.05)	0.001	3.48	3.67
		Time	0.08 (0.02)	0.001	0.04	0.12
	Random	Intercept	0.41 (0.05)	0.001	0.31	0.51
		Time	0.03 (0.01)	0.001	0.02	0.05
		I*T	−0.02 (0.02)	0.203	−0.05	0.01
		Residual	0.25 (0.01)	0.001	0.22	0.27
Task mastery	Fixed	Intercept	3.57 (0.05)	0.001	3.47	3.66
		Time	0.05 (0.02)	0.003	0.02	0.08
	Random	Intercept	0.41 (0.06)	0.001	0.30	0.52
		Time	0.01 (0.01)	0.048	0.00	0.00
		I*T	−0.01 (0.02)	0.563	−0.04	0.02
		Residual	0.30 (0.01)	0.001	0.27	0.33
Item 1	Fixed	Intercept	3.69 (0.06)	0.001	3.48	3.71
		Time	−0.01 (0.02)	0.637	−0.06	0.04
	Random	Intercept	0.43 (0.08)	0.001	0.28	0.59
		Time	0.01 (0.01)	0.468	−0.02	0.03
		I*T	−0.00 (0.03)	0.949	−0.05	0.05
		Residual	0.67 (0.03)	0.001	0.61	0.73
Item 2	Fixed	Intercept	3.55 (0.06)	0.001	3.44	3.66
		Time	0.11 (0.02)	0.001	0.07	0.15
	Random	Intercept	0.58 (0.07)	0.001	0.43	0.72
		Time	0.02 (0.01)	0.021	0.00	0.04
		I*T	−0.04 (0.02)	0.033	−0.08	−0.00
		Residual	0.39 (0.02)	0.001	0.36	0.43
Social acc.	Fixed	Intercept	4.03 (0.05)	0.001	3.92	4.13
		Time	−0.08 (0.02)	0.001	−0.12	−0.03
	Random	Intercept	0.49 (0.06)	0.001	0.36	0.62
		Time	0.05 (0.01)	0.001	0.03	0.07
		I*T	−0.05 (0.02)	0.018	−0.09	−0.01
		Residual	0.34 (0.02)	0.001	0.31	0.37

Note: Est. = estimate; SE = standard error; p = probability value; CI = confidence interval; I*T = intercept*time; item 1 = task mastery item 1; item 2 = task mastery item 2; social acc. = social acceptance.

We found that general levels of the socialization processes were related to stress (i.e. higher levels of the processes were related to lower levels of stress). In addition, and importantly for the question of reducing stress, episodes of higher levels of role clarity, task mastery, and social acceptance were associated with lower levels of stress. In other words, on occasions when the new nurses experienced elevated levels of role clarity, task mastery, and social acceptance, they experienced lower levels of stress. This suggests that stress among new professionals theoretically could be reduced by supporting the development of the socialization

processes. As interventions that are developed based on a thorough understanding of the processes that are contributing to the problem are typically more effective than interventions lacking such foundations (Prestwich et al., 2014), these results are promising. As far as we know, this is the first study to confirm these relations using an intensive longitudinal study design.

In addition to investigating the relations between the processes and stress, we modeled the development of the variables during the period of study. As far as we know, this is the first study to investigate how the three socialization processes and stress develop week-by-week during the first three months following a transition into a profession. In relation to the question of intervening to reduce stress among new professionals, this investigation was thought to answer the question of whether or not there is room for improvement as regards the development of the socialization processes, or if a satisfactory development may be expected without an intervention.

We showed that, during this period, new nurses' levels of stress decreased, as were expected from socialization theory (Saks and Gruman, 2012; Wanberg, 2012). However, there was individual variability in the rate of change, with the slope of 95% of the sample ranging between 1.18 units of the typical subject on the six-point scale. We furthermore showed that, during the same period, role clarity and task mastery increased, but social acceptance decreased. In line with the results for stress, although there were general trends of increased levels of role clarity and task mastery, there were individual variations in the rate of change in these variables as well. In other words, positive developments of the socialization processes and stress following a professional transition are not to be taken for granted, and all new registered nurses cannot be expected to get onboard at the same phase. It has previously been acknowledged that the more dependent a newcomer is on spontaneous events for learning (i.e. if no or only a few organized events for learning are available), the more unpredictable his or her trajectory of learning will be (Ashforth and Saks, 2002). Considering the lack of standard models for introducing new nurses into the profession (Brown et al., 2015; Rush et al., 2013), it does not seem unlikely that new nurses will be exposed to different opportunities for learning and hence experience different trajectories of development, as seen in this study. It is important that this is recognized as it may otherwise result in stigmatizing conclusions such as a newcomer "being a slow learner" when the truth is in fact that he/she has not been exposed to adequate and/or enough learning situations (Ashforth and Saks, 2002). In line with previous studies (Brown et al., 2015; Rush et al., 2013) the results of this study stresses the need to develop standards for how to introduce new nurses to the profession.

The decreasing levels of social acceptance following the transition into the profession was surprising. We expected social acceptance to increase over time as the new registered nurses got

Table 5
Fixed effects of relations between between-person and within-person components of socialization processes and perceived stress. Parameter estimates, standard errors, probability values, and 95% confidence intervals.

Variable	Parameter						
	Between				Within		
	Est. (SE)	p	95% CI		Est. (SE)	p	95% CI	
Role clarity	−0.60 (0.07)	0.001	−0.73	−0.47	−0.34 (0.05)	0.001	−0.43	−0.24
Task mastery	−0.77 (0.06)	0.001	−0.88	−0.66	−0.40 (0.04)	0.001	−0.48	−0.33
Item 1	−0.69 (0.05)	0.001	−0.79	−0.59	−0.27 (0.03)	0.001	−0.33	−0.22
Item 2	−0.59 (0.06)	0.001	−0.71	−0.48	−0.22 (0.04)	0.001	−0.30	−0.15
Social acc.	−0.57 (0.06)	0.001	−0.70	−0.45	−0.33 (0.04)	0.001	−0.40	−0.25

Note: Est. = estimate; SE = standard error; p = probability value; CI = confidence interval; item 1 = task mastery item 1; item 2 = task mastery item 2; social acc. = social acceptance.

acquainted with their new colleagues. In contrast, the result indicates that the new nurses did not experience a growing integration into the work group. Prior research suggests that one potential explanation for this finding could be that support from supervisors and coworkers decreased with the passage of time from professional entry (Kammeyer-Mueller et al., 2012). Importantly, as for the other study variables in this study, there were individual variations in the development of social acceptance ranging up to almost one point on the five-point scale. Thus, all did not experience the same decrease. That said, the fact that many did is troublesome, particularly considering that the nursing profession to a large degree involves teamwork and collaborations with other professionals. This finding corresponds to the results of a qualitative study showing that new nurses' beliefs in their own abilities to work in teams with other colleagues decreased over the first three years of practice (Ehrenberg et al., 2016). Effective teamwork is one of the most important factors for clinical effectiveness, safety in care, and nurses' job satisfaction, and effective teams are characterized by respect and collaboration (O'Daniel and Rosenstein, 2008). Taken together, these findings suggest that the integration of newcomers into the established team or group of colleagues is something that needs to be attended to with extra care to ensure the effectiveness and safety of patient care, as well as wellbeing of the individual nurses.

In summary, the results of this study showed that the socialization processes affect new nurses' experiences of stress and are thus suitable targets for an intervention seeking to reduce stress among new professional nurses. The potential to reduce stress by supporting the development of the socialization processes is particularly interesting as these variables are considered to be changeable and there are ideas or methods available for how they develop, and hence, how their development could be supported. Development of role clarity is typically assumed to be based on the gaining of information about the expectations, responsibilities, and mandates that come with the professional role (Klein and Polin, 2012). Development of social acceptance is typically assumed to be based on formal and informal interactions with colleagues (Klein and Polin, 2012). Finally, task mastery is developed based on taking part in instructions on how to execute tasks, practicing new skills, or observing and imitating the execution of tasks by experienced colleagues (Bandura, 1997). It is increasingly recognized that the development of the processes is affected by actions taken by the organization and the individual alike (Bauer et al., 2007; Kammeyer-Mueller and Wanberg, 2003). That is, the organization may introduce the new professional in a manner in which he/she is given opportunities to develop role clarity, task mastery, and social acceptance. In addition, the new professional may him/herself engage in activities that put him/her in contact with opportunities for developing the socialization processes. This latter class of active engagement by the new professional is typically referred to as proactive behaviors and has been suggested to be a stronger predictor of learning than organizational strategies (Ashforth et al., 2007). Because of this, it has been suggested that one particularly promising way to strengthen the development of the socialization processes is to support new professionals' engagement in these behaviors (Bauer et al., 2007). The results of this study suggests that it is important that future studies are directed towards investigating this question.

4.1. Limitations

Although we attempted to invite all graduating nurses in Sweden to participate in the study in order to reduce the risk of selection bias, we did not succeed as not all universities agreed to forward the information to their students. We were also informed by the deans of the universities that not all students checked their university e-mail accounts on a regular basis. Hence, even when the information was forwarded, it is not certain that it was received in time to register for the study. As previously mentioned, we do not know how many actually received the information and fulfilled the inclusion criteria. However, in the final sample, nurses graduating from all nursing programmes in Sweden were represented.

In addition, we did not have any means to investigate differences between the graduating nurses who participated in the study and those who did not. As previously mentioned, the sample may have been affected by the universities' willingness to support the recruitment of participants (i.e. to forward the information about the study to the nursing students) as well as the potential participants' willingness to participate. However, as the aim of the present study was to investigate within-person changes over time, this should not constitute a major problem (i.e. it is possible that the intercepts are biased but the estimates of within-individual changes should be less sensitive to such effects).

Using a multi-level confirmatory factor analysis, we investigated both the internal consistency (between-persons) reliability and the reliability of change (within-persons) of each variable (Bolger and Laurenceau, 2013). Both forms were found satisfactory for stress, role clarity, and social acceptance. However, the reliability of change was not satisfactory for the two-item scale of task mastery, why we conducted additional analyses on the two items separately. The results of the linear growth curve models with the between- and within-person versions of the two items separately as predictors mimicked the results of the analyses conducted using the task mastery scale. However, the linear growth model analyses showed that levels of item 1 did not change over time, which item 2 did. Item 1 asks about the nurses' ability to 'manage their tasks' whereas item 2 asks about their ability to 'manage the most difficult tasks'. It is possible that item 1 is more sensitive to external factors hindering the nurses from managing all of their assigned tasks and that item 2 thus is a better measure of change in task mastery.

To reduce the risk of low power in the analyses due to response fatigue and low response rates, we collected data on the process measures every other week of the study at opposing weeks in the two sets of data. Theoretically, assuming the same response rates, more measurement points for the full sample would have resulted in a higher within-individual reliability and increased validity of the results.

When we investigated the relations between the socialization processes and stress, we did so disregarding the potential impact of other variables. It is possible that the results could differ between participants with different levels of prior experience, age, et cetera.

Finally, the direction of causality of effects cannot be decided based on this study. That is, whether changes in the socialization processes cause changes in stress, or whether changes in stress cause changes in the socialization processes. The first scenario is typically highlighted in the socialization literature (Saks and Gruman, 2012). On the other hand, it is also recognized that low levels of energy (a typical byproduct of high levels of stress) hinders engagement in proactive behaviors that are suggested to contribute to the development of the socialization processes (Sonnentag, 2003). A bidirectional model in which changes in one of the components (i.e. the socialization processes or stress) cause a change in the other component, and this effect is then fed back into the first component causing additional change (i.e. a spiral of effects), is perhaps the most ecologically valid. Either way, the results of this study support the recognition of a relationship between the socialization processes and stress and suggest that they are theoretically valid targets of an intervention seeking to reduce stress among new professionals.

4.2. Generalisability

Stress among new professionals is not a problem unique to the nursing profession, as indicated by public health data (The Public Health Agency of Sweden, 2016). Nor is the lack of effective, theoretically sound, interventions designed to support new professionals (Klein and Polin, 2012; Saks and Gruman, 2012). The socialization processes role clarity, task mastery, and social acceptance that were the focus of this study are the most commonly studied in the general literature on newcomer adjustment, and their role as mediators of new professionals' adaptation have been confirmed for many different occupations (Saks and Gruman, 2012). Thus, the results from this study, that is, the relationship between these socialization processes and new professionals' experience of stress, and the implications of these results, should likely be generalizable to other professions as well.

5. Conclusion

With this study, we have shown that new professionals who experience higher levels of the socialization processes role clarity, task mastery, and social acceptance, experience lower levels of stress. This result is important as it suggests a theoretical model for developing an intervention to reduce stress among new professionals by strategically targeting the development of these processes.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ijnurstu.2018.10.007.

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