



## **Preface**

This master`s thesis is the result of my five years as a student at NTNU, being the last brick in the puzzle of obtaining a Master of Science (MSc) in Work and Organizational Psychology. I have challenged myself quite a bit with writing an empirical article in English, which I have never done before. My thesis is a part of a research project under the auspices of the Department of Psychology at NTNU. With the exception of seeking approval from the Norwegian Social Science Data Services to conduct the research and creating the survey, I have either partly or solely been responsible for the research.

I would like to express my gratitude to Ingvild Saksvik-Lehouillier, for helping me and guiding me in all aspects of my master`s thesis. I would also like to thank Eva Langvik, for feedback and methodological assistance. Finally, I would like to thank Guro Kleiva, for supporting me throughout this process.



Running head: PERSONAL DISPOSITIONS AND SHIFT WORK TOLERANCE. A  
LONGITUDINAL STUDY OF SHIFT WORKERS IN TRONDHEIM MUNICIPALITY

Personal Dispositions and Shift Work Tolerance. A Longitudinal Study of Shift Workers in  
Trondheim Municipality

by

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### Abstract

The aim of the present study was to investigate how dispositional resistance to change (RTC) and neuroticism could predict shift work tolerance (SWT) over a period of six months. Electronic questionnaire were completed by 74 shift workers employed in Trondheim municipality in January 2013 (T1) and in June 2013 (T2). The results showed that age, gender, neuroticism, and RTC were related to SWT. Age at T1 predicted better SWT at T2, while male gender predicted worse SWT at T2. RTC at T1 predicted better SWT at T2, while neuroticism at T1 predicted worse SWT at T2. The findings suggest that individual differences, especially neuroticism, can predict SWT over a period of six months.

*Keywords:* dispositional resistance to change, neuroticism, shift work tolerance

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Changes occur more frequently in both work life and society now than a few decades ago (Wanberg & Kammeyer-Mueller, 2000), demanding greater tolerance towards these changes. Particularly, the use of shift work and irregular work hours is continuously growing. The Norwegian Labor Force Survey (Statistics Norway, 2014) estimate that as much as 33.2% of the total labor force works outside ordinary hours. This type of work imposes a great deal of challenges to the individual and can have adverse impact on the employee's health (e.g. Costa, 2003b). While the body of research on shift work and work related outcomes are substantial, more research is needed on how individual dispositions are related to shift work and work related outcomes. Managers, change agents, and HR specialists can benefit from increased knowledge about individuals who have a harder time coping with changes, particularly when it comes to individuals engaged in shift work. Additionally, it may help to identify employees that could benefit from special training or implement strategies to facilitate positive work outcomes and successful change processes.

### **Resistance to change and neuroticism**

Most approaches on organizational change focus on the antecedents and consequences of the change itself, attributing its success or failure to external sources. For example, Armenakis and Bedeian (1999) conducted a review examining the theoretical and empirical literature on organizational change, providing an overview of the most contributing issues to all change efforts; Content issues, contextual issues, process issues, and criterion issues. None of which emphasize the importance of individual factors. Only in the last decades have researcher begun to focus on change from an individual's point of view (e.g., Judge, Thoresen, Pucik, & Welbourne, 1999; Oreg, 2003; Piderit, 2000). However, the opinions of how resistance to change is perceived in an organizational context have been divided into those who celebrate it and those who demonize it (Thomas & Hardy, 2011). As a result, understanding resistance to change has several approaches, one of which focuses on the individual's reactions to change (Oreg, Vakola, & Armenakis, 2011). Oreg (2003) developed a scale to measure an individual's dispositional inclination to resist change, the dispositional resistance to change scale.

In Oreg's (2003) perspective *Resistance to Change* (RTC) is multidimensional disposition differing from person to person, entailing affective, cognitive, and behavioral

components. These components manifest into four factors in the scale; Routine Seeking, Emotional Reaction, Short-Term Thinking, and Cognitive Rigidity. *Routine Seeking* consists of an individual's tendency to adopt routines. *Emotional Reaction* reflects to which degree an individual experiences stress or unease when faced with change. *Short-Term Thinking* measures the extent to which an individual gets distracted by short-term inconveniences involving changes, clouding their ability to focus on potential long-term benefits of the change. *Cognitive Rigidity* is the degree to which an individual easily adapts to new ideas or perspectives (Oreg, 2003). The RTC scale has been validated in different samples in the United States (Oreg, 2003, 2006) and cross-nationally (Oreg et al., 2008). The RTC scale has shown to associate well with several of the five-factor model traits (Oreg, 2003; Saksvik & Hetland, 2009). In the field of personality, the five-factor model of personality has been the dominating theoretical framework for studies on individual differences during the past three to four decades. The theory behind these well-established personality traits, headlines five different dimensions which pans out in individuals, including; Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness (McCrae & Costa, 1987). Although some traits can show signs of intra-individual variation from day to day (e.g., Judge, Simon, Hurst, & Kelley, 2014), the personality trait structure is claimed to be both universal and stable (McCrae & Costa, 1997; McCrae et al., 1999). This is also assumed to be the case for RTC (Oreg, 2006). Among the traits in the five-factor model, neuroticism has shown the strongest connection to RTC (Oreg, 2003, study 3; Saksvik & Hetland, 2009). Individuals with high scores on neuroticism is characterized by more experiences of anxiety, hostility, depression, self-consciousness, impulsivity, and vulnerability (McCrae & John, 1992). Studies have shown that high levels of neuroticism is associated with turnover intentions (Rafferty & Griffin, 2006), depression and anxiety (e.g., Clark, 2005; Jylhä & Isometsä, 2006; Kotov, Gamez, Schmidt, & Watson, 2010), ineffective coping strategies (Carver & Connor-Smith, 2010), and burnout (e.g., Kokkinos, 2007; Maslach, Schaufeli, & Leiter, 2001). Contrarily, low levels of neuroticism can be regarded as a coping resource in stressful situations (Terry, 1994).

### **Shift work tolerance**

Shift work is a term which has been used in a variety of ways in the scientific literature (Knutsson, 2004), as there seems to be little agreement on how to define it (Costa, 2003a). Costa (2003b) defines shift work as “a way of organizing daily working hours in which different persons or teams work in succession to cover more than the usual 8 h day, up to and including the whole 24 h” (p. 84). Additionally, night work can be defined as a special

type of shift work where the majority of the work time falls between 10 pm and 6 am (Åkerstedt, 2003). Rotating shift work comprises a pattern of day, evening, and night work (Saksvik-Lehouillier et al., 2012). The adverse health outcomes of shift work, which includes night work, can occur in terms of psycho-physiological, pathological and social problems (Costa, 2003b). However, individuals differ from one another. Some may develop serious problems due to shift work, while others can tolerate shift work quite well (Saksvik, Bjorvatn, Hetland, Sandal, & Pallesen, 2011). The term *Shift Work Tolerance* (SWT) was first coined by Andlauer and his colleagues in 1979. They defined it as the ability to adapt to shift work without adverse consequences, such as the absence of digestive troubles, persisting fatigue, unusual nervousness, and sleep alterations (Andlauer, Reinberg, Fourrè, Battle, and Duverneuil, 1979, as cited in Saksvik et al., 2011). Alternatively, Reinberg and Ashkenazi (2008) characterize the presence of these problems as an intolerance to shift work.

In 1998, Nachreiner published a review on research examining individual and social determinants of SWT published since 1993, concluding that individual differences showed only low and inconsistent relations to SWT. These individual differences, such as age, gender, neuroticism, showed no predictive power for SWT (Nachreiner, 1998). In a systematic review on individual differences and SWT by Saksvik and her colleagues (Saksvik et al., 2011), studies revealed several relations between individual differences and SWT, although finding only low predictive power for individual differences on SWT, due to few longitudinal studies on the matter. As Saksvik et al. (2011) states “more studies are needed to justify conclusions about the predictive nature of personality traits” (p. 233).

### **Dispositional resistance to change, neuroticism, and shift work tolerance**

Shift work challenges the human adaptability to changes, both biologically and socially (Costa, 2003a). Working rotating shift work, including day, evening and night work is common among shift workers (Statistics Norway, 2014). This dynamic working arrangement requires individuals to change their work schedule very frequently, which demands a certain level of adaptability. In a study on dispositional RTC and occupational interests and choices (Oreg, Nevo, Metzer, Leder, & Castro, 2009), individuals who tend to resist changes are more likely to choose jobs which entail stability, as opposed to jobs that are more dynamic. The changes themselves, and the individual's reactions to the changes could therefore be of great significance in understanding how individuals tolerate shift work. Although previous studies have investigated individual differences in SWT, dispositional RTC has never been accounted for in this matter. Individuals that have a disinclination to adapt to changes are more likely to experience negative emotional reactions, such as anxiety,



anger, and fear, when facing imposed change (Oreg, 2006). This reaction to an imposed change resembles the characteristics found in the personality trait neuroticism (McCrae & John, 1992). RTC is conceptualized as a stable personality trait (Oreg, 2006), although no studies to date have proven that RTC is stable over time. Due to the relationship between the RTC scale and personality traits (e.g. Saksvik & Hetland, 2009), and because personality traits are considered to be stable over time in adulthood (McCrae et al., 1999), it is reasonable to expect that RTC will be stable over time. Although some studies have investigated the relationship between RTC and work related outcomes (e.g., Oreg et al., 2009; van Dam, Oreg, & Schyns, 2008), no previous research has been conducted on RTC among a sample of shift workers.

In a prospective study of seasonal variation in SWT by McLaughlin and her colleagues (McLaughlin, Bowman, Bradley, & Mistlberger, 2008), the researchers found evidence suggesting seasonal variation in SWT, increasing the risk for adverse health outcomes. Neuroticism was found to be the strongest predictor of SWT. In fact, neuroticism predicted almost all aspects of the shift workers well-being, including sleep disturbance, physical complaints, and psychological health (McLaughlin et al., 2008). Additionally, two other studies have demonstrated a negative relationship between measures of shift work tolerance and neuroticism or related traits (Parkes, 2002; Tamagawa, Lobb, & Booth, 2007). However, in a study by Hennig, Kieferdorf, Moritz, Huwe, and Netter (1998), neuroticism was not related to circadian adaptation (SWT).

The current longitudinal study aims to investigate how dispositional RTC and neuroticism relates to SWT, answering the calls for more longitudinal studies investigating SWT and individual differences (Nachreiner, 1998; Saksvik et al., 2011).

The current investigation will be conducted on rotating and night shift workers employed in Trondheim municipality, examining differences at six months apart. The respondents in the current study worked mainly in the sectors of health care and education and upbringing. Health- and social services is the industry with the highest proportion with shift workers in Norway per 2013, with a significant over-representation of female workers (Statistics Norway, 2014).

In line with previous findings and research literature on dispositional RTC, neuroticism, and SWT, the following hypotheses will be investigated:

*Hypothesis 1:* Low scores on RTC will positively predict higher SWT at T2 when controlling for the scores on age and gender at T1.

*Hypothesis II:* Low scores on neuroticism will predict higher scores SWT at T2 when controlling for the scores on age and gender at T1.

## Methods

### Sample

In the first wave of the data collection (T1), 1041 individuals received the invitation to participate in the survey. A total of 296 individuals completed all or part of the survey (response rate 28.4%). Altogether, 223 of the participants were women (75.6%) and 72 (24.4%) were men. Age ranged from 19-66 years (mean 38.4,  $SD = 11.61$ ).

As for the second wave of data collection (T2), 1040 individuals received the survey. A total of 171 individuals completed all or part of the survey (response rate 16.4%).

A total of 85 individuals completed all or part of the survey at T1 and T2, constituting the longitudinal sample ( $N$  may range differently in some analyses). Sixty-two of the participants were women (72.9%) and 23 (27.1%) were men. Age ranged from 20-65 years (mean 37.07,  $SD = 10.98$ ). In regards of areas of employment, 68 worked in health and care services (80%), 13 participants worked in education and social work (15.3%), and 4 participants worked in other areas (4.7%). A total of 80 participants (94.1%) were permanent employees, whereas 5 were temporarily employed (5.9%). As for working hours, 47 participants worked only night work (53.4%) and 26 participants worked rotating shift work, comprised of day, evening, and night work (29.5%).

### Procedure

The current study was carried out under the auspices of the Department of Psychology at the Norwegian University of Science and Technology (NTNU). The data was collected using an electronic survey (Appendix A) regarding shift work, sleep, and individual preferences among employees in Trondheim municipality. A list of all employees in Trondheim municipality, which now or previously were engaged in night and shift work, was provided by the municipality containing a total of 1106 names and email addresses. Emails were sent out with a link to an electronic survey. Sixty-five emails did not reach the intended participants at T1 and 66 emails did not reach the intended participants at T2, due to wrong email address. The survey was administered by email twice with six months apart. At T1 the

data collection took place in January 2013, whereas for T2, the data was collected in June 2013. For each time of data collection the survey was open for a period of three weeks, where two encouraging reminders was sent to individuals who had not responded. The participants received an email with information regarding the study and a link to the survey (Appendix B). When clicking on the link the participants were automatically forwarded to the site containing the survey, where information regarding the purpose of the study was provided, as well as anonymity and voluntary participation was emphasized. In order to link the data from T1 and T2, the respondents were asked to provide the last five digits of their phone number as an anonymous identifier. The project was approved by the Norwegian Social Science Data Services, while approval by the Regional Committee for Medical and Health Research Ethics in Central Norway was not required.

### **Instruments**

The instruments relevant for this study that was administered at both T1 and T2 were: Questions regarding age, gender, working hours, employment, as well as instruments measuring RTC, neuroticism, and SWT. To measure age, the respondents entered year of birth. As for gender, female (=1) and male (=2) were the only two options made available. Norwegian language versions of all the instruments were applied.

#### **Dispositional Resistance to Change.**

The dispositional RTC scale measures an individual's dispositional inclination to resist changes, comprised of 17-items with a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Sample items include "I generally consider changes to be a negative thing" and "I'd rather do things I'm used to than try out new and different ones" (Oreg, 2003). The RTC scale has been translated and validated in 19 countries, including Norway (Oreg et al., 2008; Stewart, May, McCarthy, & Puffer, 2009). The scale's Cronbach's alpha value in the present study was .72.

#### **Neuroticism.**

The Mini-IPIP scale is a 20-item scale measuring each of the five traits in the five-factor model, using a 5-point Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Sample items for neuroticism include "Get upset easily" and "Have frequent mood swings". The scale shows good reliability and validity (Donnellan, Oswald, Baird, & Lucas, 2006). The scale's Cronbach's alpha value in the present study was .67.

**Shift Work Tolerance.**

SWT was measured by using two established and validated instruments, as well as questions regarding digestive problems.

***Bergen Insomnia Scale (BIS).*** The BIS measures insomnia comprised of six items rated on an 8-point scale, ranging from 0 to 7 that reflect the number of days per week different symptoms of insomnia is experienced. Sample items include "During the past month, how many days a week has it taken you more than 30 minutes to fall asleep after the light was switched off?" and "During the past month, how many days a week have you been dissatisfied with your sleep?" The BIS is based on DSM-IV and common clinical practice criteria's. In addition to having good psychometric properties, it is one of few insomnia scales which provide normative data for comparison that has been validated against subjective as well as polysomnographic data (Pallesen et al., 2008). The scale's Cronbach's alpha value in the present study was .83.

***Fatigue Questionnaire (FQ).*** The FQ measure the severity of fatigue, comprised of 11 items concerning experience of fatigue over the last month. Respondents rate how often or to what degree these experiences have occurred on a 4-point scale ranging from 1 (*less than usual*) to 4 (*much worse than usual*). The instrument is both reliable and valid (Chalder et al., 1993), and has been validated in a large study of a representative sample of the general Norwegian population (Loge, Ekeberg, & Kaasa, 1998). The scale's Cronbach's alpha value in the present study was .91.

***Digestive Problems.*** Digestive problems was measured by two questions, asking the respondents to rate how often they experience disturbed appetite and stomach ache, nausea or digestive problems on a 4-point scale. Scores range from 1 (*almost never*) to 4 (*almost always*).

Originally, use of sleep medication was included as an instrument to measure SWT. However, confirmatory factor analysis (principal component analysis with varimax rotation) revealed that sleep medication did not relate as well with the other measures of SWT as suspected. After the exclusion of sleep medication, the three remaining measures for SWT were collapsed into one variable. This was done by transforming the scores for the three measures into z-scores, as an accumulated score for SWT. Then, the composite scores were reversed so that high scores on SWT indicate low scores on insomnia, fatigue, and digestive

problems. This is the same procedure as Saksvik-Lehouillier and her colleagues (2013) applied in their study.

### **Statistical analysis**

Correlation analyses for all the study variables at T1 and T2 was conducted to investigate the correlation between age, gender, RTC, neuroticism, and SWT. Hierarchical multiple regression was used to assess the ability of RTC and neuroticism to predict levels of SWT, after controlling for gender and age. The first regression analysis was conducted on the main sample ( $N=218$ ), and the second was performed on the longitudinal sample ( $N=74$ ). Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. The Kolmogorov-Smirnov test of normality revealed a significant result on the variables age and neuroticism at T1, suggesting a violation of the assumption of normality. However, after conducting a visual inspection of the distributions on the two variables, they appeared to be normally distributed, which reasonably satisfies the assumption of normality.

The statistical program IBM SPSS Statistics 20 (SPSS, Inc., IBM) was applied to conduct the analysis. The dependent variable was SWT at T2, whereas the independent variables were age, gender, RTC and neuroticism at T1. The analyses were performed in two steps. Step 1 included age and gender, and step 2 included RTC and neuroticism at T1 (final model). The statistical power analysis program G\*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) was applied to assess the statistical power of the longitudinal regression analysis. Due to the relatively small longitudinal sample ( $N=74$ ), an investigation of the statistical power was therefore necessary.

Additionally, paired t-tests were conducted to investigate the relationship between the SWT scores at T1 and T2, showing no statistical difference between the two mean scores. Also, paired t-test was conducted on the different groups of shift workers, revealing no statistical difference.

## **Results**

Table 1 shows mean, standard deviations and correlation analysis between all study variables for the longitudinal sample ( $N=69$ ). Changes in mean scores of SWT, RTC, and neuroticism from T1 to T2 were minimal and not significant (see Table 1). Age correlated

positively with SWT at T2 ( $r = .27, p < .05$ ), while gender showed no significant correlation with SWT at both T1 and T2. Additionally, SWT at T1 shows a positive correlation with RTC at T1 ( $r = .27, p < .05$ ). Neuroticism at both T1 and T2 shows no significant correlation with RTC at T1 ( $r = .15, p > .05$ ), although RTC at T2 is positively correlated with neuroticism at T2 ( $r = .37, p < .01$ ).

Hierarchical multiple regression was used to assess the ability of RTC and neuroticism to predict levels of SWT at T2, after controlling for gender and age (see Table 2). Gender and age was entered at Step 1, explaining 9.5% of the variance of SWT. After entry of RTC and Neuroticism at T1 in Step 2 the total variance explained by the model was 17.7% ( $F(4, 68) = 4.88, p < .01$ ). Neuroticism and RTC explained an additional 12.8% of the variance in SWT, after controlling for gender and age ( $R$  squared change = .13,  $F$  change (2, 68) = 5.58,  $p < .01$ ). In the final model, age, gender, RTC, and neuroticism were all statistically significant contributors, with neuroticism recording a higher beta value ( $b = -.33, p < .01$ ) than RTC ( $b = .24, p < .05$ ).

## Discussion

The overall goal of the study was to conduct a longitudinal study investigating how dispositional RTC and neuroticism relates to SWT in shift workers in Trondheim municipality. Particularly, the specific aim of this study was to find out if RTC and neuroticism at T1 can predict SWT six months later at T2. Findings suggest that older age, female gender, low scores on neuroticism, and high scores on RTC predict good SWT six months later.

### RTC and SWT

Dispositional RTC was positively related to SWT, indicating that high scores on RTC at T1 predict better SWT at T2. Accordingly, this study suggests that individuals with low scores on dispositional resistance to change tend to tolerate shift work worse than those with high scores on RTC. Hence, the findings contradict hypothesis I.

RTC is a personality trait that is an inherent tendency of individuals to avoid and oppose changes (Oreg, 2003). High scores on RTC indicate a greater tendency to avoid and oppose changes than lower scores. In the current study, individuals that have a greater tendency to avoid and oppose changes, also tolerate shift work quite well. One possible

explanation to RTC's predictive value on SWT is related to the "healthy worker effect" (Knutsson, 2004). The healthy worker effect refers to "a selection process that leads to a workforce of shift workers that is healthier than day workers" (Knutsson, 2004, p. 1040). As a result of this, individuals that are considered as healthier than the average population is generally more often recruited to jobs with more demanding working conditions. The selection process continues in terms of a survivor effect, whereas the less healthy or less shift work capable individuals are more likely to quit and leave the workplace. This phenomenon can occur whether or not the cause of health problems is occupational (Knutsson, 2004).

Consequently, "the healthy shift worker" is most likely accustomed to and experienced in working shifts, and has therefore no major problems or concerns with working shifts. Since these individuals are accustomed to working shift, it is likely they will continue working shifts because of their tendency to oppose changes. Thus, they might find themselves being satisfied working shifts, as long as they don't have to change their working arrangement. So, because of their inherent tendency to resist changes, it can possibly make them stay longer in their current job and working arrangement, respectively.

Oreg (2006) found that individuals that are dispositional resistant to change are less likely to voluntarily embrace changes and more likely to form negative attitudes when encountering imposed changes. In addition to the findings in the current study, this may be of significance for practical implications in how the shift work is organized and distributed. It is possible that individuals who are dispositional resistant to change will tolerate and more willingly accept shift work if there is a more conscientious and foreseeable approach to the distribution of shift work, in contrast to a unforeseen and swift change in the shift work arrangement.

Another possible explanation for the predictive value of RTC on SWT lies in the conceptualization of RTC. To address the relationship between RTC and SWT, one must look at the different components which RTC consists of. In accordance to Routine Seeking (Oreg, 2003), the tendency to adopt routines, this might function as a form of coping mechanism for shift workers. Experienced and healthy shift workers who are used to working abnormal hours in a predetermined schedule, may very well perceive this as a routine. Hence, organizing work into foreseeable shifts may not require a high degree of flexibility as it was first hypothesized. The same line of thought could conceivably apply for cognitive rigidity. Cognitive rigidity is the degree to which an individual easily adapt to new ideas and perspectives, where high

scores indicate a reluctance to adapt to new ideas and perspectives (Oreg, 2003). If an individual is used to working shifts in for example a foreseeable rotating shift, there may not be so many new ideas and perspectives to adapt to. Accordingly, an individual with high scores on RTC could be an individual with good tolerance to shift work. The term resistance to change is highly debated, whether it is something negative or positive for organizations (Thomas & Hardy, 2011). Oreg's (2003) dispositional approach offers a new point of view in the search of understanding RTC. Nevertheless, it is initially defined as a negative response to changes, where individuals who are dispositional resistant to changes experience stress or unease when faced with change (Oreg, 2003). However, resistance can offer opportunity (Ford & Ford, 2010). Resistance can be understood as "a response of engaged and committed people who want a voice in something that is important to them" (p.25, Ford & Ford, 2010). As it is evident from the current study, RTC can actually predict better SWT. This emphasizes the importance to not exclusively view resistance as a negative reaction or tendency, but as an opportunity – or even a resource. Hence, it could also be viewed as a dispositional resource in a shift work context.

Additionally, the mean score of the dispositional RTC in the current sample of shift workers is somewhat lower than what can be observed in cross-national norm data (Oreg et al., 2008). However, the mean RTC score among shift workers are almost identical to what can be observed in a Norwegian sample (Oreg et al., 2008). In the current study, the mean RTC scores for T1 and T2 in the longitudinal sample show no discrepancy. These findings suggest that RTC is a stable disposition with relatively good test-retest reliability, at least over a period of six months.

### **Neuroticism and SWT**

In the present study, neuroticism was the strongest predictor for SWT. Neuroticism at T1 negatively predicted SWT at T2, as well as being a significant predictor for SWT at T1. This indicates that individuals with low scores on neuroticism at T1, have higher scores on SWT at T2, predicting better SWT over time. These findings support hypothesis II and are consistent with some previous studies, where high scores on neuroticism or associated traits relate to poor SWT (Parkes, 2002; Tamagawa, Lobb & Booth, 2007; McLaughlin et al., 2008). The link between neuroticism and SWT might seem obvious, due to the characteristics of individuals with high scores on neuroticism. Even though people who score high on neuroticism seem to report more health complaints (Costa & McCrae, 1987), this may be



because individuals scoring high on neuroticism seem to notice and interpret normal body sensations as signs of illness (Watson & Pennebaker, 1989). Hence, findings suggesting that individuals scoring high on neuroticism do not tolerate shift work as well as those scoring lower on neuroticism, does not mean that they suffer from poorer physical health (McLaughlin et al., 2008). Additionally, low scores on neuroticism can be regarded as a coping resource in stressful situations (Terry, 1994). Low scores on neuroticism could possibly serve as a coping resource for SWT, as the present study's findings suggest. However, Hennig et al. (1998) emphasizes that it is important not to overestimate the relationship between neuroticism and SWT. Because of the broad and various definitions of SWT (Knutsson, 2004), it is hard to compare results and findings from different studies in relation to SWT and neuroticism, and therefore making it difficult to determine neuroticism's effect on SWT. Still, neuroticism is associated with several negative factors in a working context, such as depression, turnover intentions and burnout (e.g., Kotov et al., 2010; Maslach et al., 2001; Saksvik & Hetland, 2009), which emphasizes the importance of further understanding the impact of neuroticism.

In the current study, the mean scores on neuroticism are very similar to what can be observed in a US sample (Donnellan et al., 2006). The scale also exhibits a good internal consistency for an instrument measuring neuroticism with only four items. This indicates that the MINI-IPIP scale (Donnellan et al., 2006) works well on a Norwegian sample of shift workers.

### **Demographic variables and SWT**

Neither age nor gender was related to SWT in the main sample. However, in the longitudinal sample, both age and gender was related to SWT at T2 when controlling for neuroticism and RTC at T1. Age was positively related to SWT at T2, indicating that older respondents score higher on SWT than younger. In other words, higher age predicts better tolerance of shift work. Most studies indicate that younger age is associated with better SWT, whereas only a few studies display a relation between older age and better SWT (Saksvik et al., 2011). One possible explanation for the favoring of older age could be in line with "the healthy worker effect", whereas the older respondents in the current study have successfully managed to cope with the strains and stress which is associated with shift work. The older individuals with more shift work experience might have handled shift work better when first

starting working shift and therefore continued working shifts without any adverse health outcomes. A study by Härmä et al. (2006) indicate that a rapid forward rotating shift schedule can positively influence better alertness, sleep and well-being among older shift workers. Consistent with this, the older shift workers in the present study could possibly be working a shift schedule which positively benefits their health and therefore their tolerance to shift work. Also, it is possible that older and more experienced shift workers engage in less demanding shift schedules than younger shift workers, due to seniority.

Gender was negatively related to SWT at T2, indicating that male gender predicts lower scores on SWT. In other words, males report more problems concerning insomnia, digestion and mental and physical fatigue than females. This is not in line with the majority of studies reviewed by Saksvik et al. (2011), where male gender is found to relate to better SWT. In this study, the sample size and gender distribution for the longitudinal analysis could be a source of bias (62 females and 23 males), due to the relative few male respondents. This might serve as a possible explanation for the contradictory findings on gender in SWT, relative to previous research findings. However, the health- and social services sector, which the current sample stems from, has a significant over-representation of female workers (Statistics Norway, 2014). Thus, a possible explanation could be that the healthiest workers and survivors of selection process are female. Another possible explanation could be that female shift workers tend to work in less physical and psychological demanding environments compared to males (Bara & Arber, 2009).

### **Strengths and limitations of the study**

The main strength of the current study is that it is based on a longitudinal design, investigating the relationship between RTC and SWT over a six month period. Due to the limited number of longitudinal studies on SWT and related factors (Nachreiner, 1998; Saksvik et al., 2011), the current study adds to search of further understanding of shift work tolerance. Longitudinal studies can offer great insight, especially when studying a concept such as shift work tolerance, which can be defined in a variety of ways (Knutsson, 2004).

A limitation in this study concerning SWT is what Knutsson (2004) calls preemployment selection bias. This is related to the “healthy worker effect”, whereas a selection process can lead to a workforce of shift workers that are healthier than day workers. Since the current study did not measure or control the individuals both before starting and

during shift work, this allows the possibility of an underestimation of the predictive power of personality traits before entering shift work. The probability that personality traits have affected the SWT before T1, is therefore present. Consistent with this, the effects of SWT at T1 on SWT at T2 is unknown. However, the difference in mean scores on SWT at T1 and T2 is non-significant, indicating no seasonal variance in digestion problems, insomnia and fatigue. Accordingly, this strengthens the likelihood of the T1 predictor's true contribution to changes in SWT T2. In the current study, more predictors in the analysis could have compromised the statistical power of the analysis due to the limited sample size. Thus, SWT T1 was not a control variable in the longitudinal regression.

Another limitation in the current study is the relatively small sample size and response rate. When statistically investigating a relationship, Green's (1991) rule of thumb is a commonly used formula to assess the number of participants needed in analysis. Green (1991) suggests  $N > 50 + 8m$  (where  $m$  is the number of IV's) for testing multiple relationships, which in the case of the current study would need  $N = 80 (50 + 8 \times 4)$  due to the number of IV's (4). Although the current study's longitudinal analysis ( $N = 74$ ) fails to fulfill this rule of thumb, VanVoorhis and Morgan (2007) propose a less conservative rule of thumb, where  $N = 50$  is a reasonable sample size for a regression analysis. Small samples can be a threat to the statistical power of the findings (Cohen, 1992). Therefore, a post-hoc investigation of the statistical power was necessary. The power analysis with G\*Power 3.1 (Faul et al., 2009) revealed a power value of .96, indicating that the current study has more than enough statistical power.

Due to the relatively low response rate, there is a possibility of a sampling bias. Hence, the respondents that completed the survey may differ from the intended population, which can be linked to "the healthy worker" effect and preemployment bias (Knutsson, 2004). However, the mean scores on RTC and neuroticism are very similar to the mean scores in other similar studies, indicating that the current sample of shift workers resembles what one might find in the general population. Also, the RTC scale and neuroticism in the Mini-IPIP scale shows good test-retest reliability. This increases the possibility that the findings from the current study can be generalized to a similar population of shift workers.

Although only two recent studies has applied an adjacent definition of shift work tolerance (Reinberg & Ashkenazi, 2008; Saksvik-Lehouillier et al., 2013), this specific combination of constructs appears to reflect what is commonly associated with shift work

tolerance (Andlauer et al., 1979, as cited in Saksvik et al., 2011). However, a positive aspect of the instruments in the current study, is the use of the well-established and validated instruments Bergen Insomnia Scale (Pallesen et al., 2008), Fatigue Questionnaire (Chalder et al., 1993), Mini-IPIP Scale (Donellan et al., 2006), and Resistance to Change Scale (Oreg, 2003). Nonetheless, in social sciences and questionnaire research there is always a possibility for common method biases which can contribute to inflated relationships between constructs (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Another limitation is the definition and usage of shift work tolerance. Knutsson (2004) addresses this issue and claims that shift work research would benefit from a more clear and explicit definition of the term, making it easier to interpret and compare. Additionally, the differences between types of shift work arrangements and definitions, can make comparison of results in different studies difficult (Costa, 2003a). In the current study, there were no statistical significant differences between those working rotating shift and those working only night work. Hence, these two groups were collectively considered as shift workers. Consequently, there is a possibility for an overestimation of the shift work exposure in the current study, due to the absence of distinction between the different shift work arrangements.

Therefore, findings from the present study must be considered with caution when generalizing the findings.

### **Practical implications**

The current study adds to the field of examining shift work tolerance and resistance to change. Knowledge about individual differences related to shift work may be applied in personnel selection and vocational counseling. The RTC scale has a potential for personnel selection and training, and for occupational counseling (S. Oreg et al., 2009). The current study could possibly contribute to understanding and identification of individuals who are in need of specific training or adaption to shift work based on their dispositional resistance to change. However, this study offers unexpected findings regarding the relationship between RTC and SWT, indicating that individuals who are dispositional resistant to change can work shift work quite well. This offers new insight in the debate on whether RTC is something positive or negative (Thomas & Hardy, 2011). Also, the current study adds to the search of further understanding what makes an individual tolerant to shift work. Could dispositional RTC be a positive coping resource for shift workers? More research on the relationship between RTC and SWT is needed before adapting this knowledge to tailoring shift work.

Moreover, this study shows that high scores on neuroticism or related traits is not only associated with poor SWT (McLaughlin et al., 2008; Parkes, 2002; Tamagawa et al., 2007), it can actually predict worse SWT over time. Also, this study suggests that the instrument Mini-IPIP (Donnellan et al., 2006) works well and have good stability despite being a relatively small measure of the five-factor model.

### **Conclusion**

In this study, findings suggest that individual differences such as age, gender, neuroticism and resistance to change were related to shift work tolerance. Particularly, the findings suggest that these individual differences can predict shift work tolerance over a period of six months. Unexpectedly, higher levels of dispositional resistance to change at T1 predicted better shift work tolerance at T2. In addition, old age and female gender at T1 also predicted better shift work tolerance at T2, showing an opposite relationship to the majority of research in this field of study, as well as being contradictory to what was hypothesized. These findings need validation, especially the relationship between RTC and SWT. However, it is important to not overestimate the impact of these findings, as the current study only investigated individual factors in relation to shift work tolerance. Even though situational and contextual factors were not included in the current study, they probably play a large role in completely understanding what influences SWT. In addition, more longitudinal studies are needed on both SWT and RTC, especially in relation to each other.

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Table 1

Means, standard deviations, and correlations for all study variables examined for longitudinal sample ( $N=69$ )

	Mean(S.D.)	1.	2.	3.	4.	5.	6.	7.	8.
1. Age	37.39 (1.37)	-							
2. Gender	1.29 (.46)	.17	-						
3. SWT (T1)	0.06 (2.48)	.23	-.10	-					
4. RTC (T1)	2.92 (.56)	-.03	.04	.27*	-				
5. Neuroticism (T1)	2.66 (.93)	-.16	-.31*	-.26*	.16	-			
6. SWT (T2)	0.09 (2.31)	.27*	-.13	.77**	.19	-.27*	-		
7. RTC (T2)	2.92 (.55)	.00	-.03	.23	.57**	.10	.05	-	
8. Neuroticism (T2)	2.61 (.85)	-.20	-.27*	-.03	.23	.73**	-.18	.37**	-

Note. \*  $p < .05$ . \*\*  $p < .01$

Table 2

Control variables, and RTC and Neuroticism at T1 predicting SWT at T2 ( $N=74$ ).

Variable	SWT (T2)		
	<i>B</i>	<i>seB</i>	$\beta$
Step 1			
Age	.07	.03	.28*
Gender	-.89	.61	-.17
Step 2			
Age	.06	.03	.24*
Gender	-1.39	.60	-.26*
RTC (T1)	1.04	.47	.24*
Neuroticism (T1)	-.88	.31	-.33**

Note. SWT:  $R^2$  Step 1=.095;  $\Delta R^2$  Step 2=.177\*\* ;  $p < .05$ . \*  $p < .01$  \*\*

Appendix A  
Electronic survey

## Arbeid, søvn og individuelle preferanser

Page 1

### Velkommen!

Formålet med denne spørreundersøkelsen er å studere hvordan ulike arbeidstakere ser på endringer, hvordan de håndterer balansegangen mellom jobb og hvile, og hvordan de har det på arbeid. Spørreundersøkelsen er en del av et prosjekt som gjennomføres ved Psykologisk institutt, Norges teknisk-naturvitenskapelige universitet (NTNU).

Det er frivillig å delta i undersøkelsen. Informasjonen vil bli behandlet konfidensielt, og resultatene vil bli presentert slik at ingen enkeltpersoner kan gjenkjennes. Undersøkelsen er godkjent av Personvernombudet for forskning, Norsk samfunnsvitenskapelig datatjeneste. Data vil bli anonymisert når datainnsamlingen avsluttes, senest ved utgangen av desember 2013. Siden undersøkelsen skal gjennomføres i to omganger, vil vi bruke de fem siste sifrene i mobiltelefonnummeret som «anonymt kodenummer», slik at vi kan kople samme svarene fra de to omgangene uten at det blir mulig å finne ut hvem som har gitt hvilke svar.

Det er ingen «riktige» eller «gale» svar på spørsmålene i dette skjemaet. Siden spørreskjemaet er satt sammen av ulike standardiserte skjema brukt i tilsvarende forskning internasjonalt, er enkelte spørsmål forholdsvis like. Det er likevel viktig for kvaliteten til undersøkelsen at alle spørsmålene blir besvart så godt som mulig, også de som kanskje ikke passer like godt for din situasjon. Vennligst besvar alle spørsmålene i én økt. Bryter du av underveis, vil du ikke kunne komme tilbake til dine svar. Det tar omtrent 15 minutter å svare på hele undersøkelsen.

Har du spørsmål kan du kontakte undertegnede,  
Takk for at du vil delta!

Ingvild Saksvik-Lehouillier  
Postdoktor  
tlf. 73 55 08 64.

## Arbeid, søvn og individuelle preferanser

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### Bakgrunnsinformasjon

- Denne undersøkelsen gjennomføres to ganger. For at vi skal kunne kople sammen dine svar fra de to omgangene samtidig som du bevarer din anonymitet, vil vi bruke de fem siste sifrene i mobiltelefonnummeret ditt som "anonymt kodenummer". Vennligst skriv de fem siste sifrene i mobiltelefonnummeret ditt i feltet under.

*NB: Dobbeltsjekk tallene! Skriver du feil, blir nytten av dine svar betydelig redusert*

- Kjønn:

Kvinne  
 Mann

- Fødselsår:

- Er du gift, registrert partner eller samboer?

Ja  
 Nei

- Har du omsorgsansvar for barn?

Ja, helt ansvar

- Ja, noe/delt ansvar  
 Nei

6. Har du omsorgsansvar for barn?

- Ja, helt ansvar  
 Ja, noe/delt ansvar  
 Nei

7. Stillingstype:

- Helse og omsorg (sykepleier, hjelpepleier, spesialsykepleier, vernepleier eller liknende)  
 Pedagogikk og oppvekst (assistent, barne- og ungdomsarbeider, omsorgsarbeider, sosionom, barnevernspedagog og liknende)  
 Annet

## Arbeid, søvn og individuelle preferanser

Page 3

### Generelt om arbeid og arbeidstid

8. Hvor mange timer arbeider du *vanligvis* totalt pr. uke?

*NB: Ta med alt lønnet arbeid inkludert overtid og evt. betalt studietid. Avrund til nærmeste antall hele timer*

9. Hvor mange timer *overtid* arbeider du i en vanlig uke hos din *hovedarbeidsgiver*?

*NB: Regn med alt arbeid utover normal ukentlig overtid. Avrund til nærmeste antall hele timer.*

10. Hvor mange år har du vært i arbeid totalt?

*NB: Avrund til nærmeste antall hele år. Skriv 0 hvis mindre enn ett år.*

11. Er du fast eller midlertidig ansatt hos din hovedarbeidsgiver?

- Fast ansatt  
 Midlertidig ansatt

12. Angi hvilket av de følgende alternativet som best beskriver din arbeidstidsordning:

*Dette gjelder for din nåværende jobb hos din hovedarbeidsgiver*

- Bare dagarbeid                       Bare kveldsarbeid  
 Bare nattarbeid                       Rundturnus med dag, kveld og natt  
 Dag og kveld

13. Hvordan trives du totalt sett med din skiftordning/turnus/arbeidstidsordning?

- Vedlig dårlig                                       Ganske dårlig  
 Verken bra eller dårlig                               Ganske bra  
 Veldig bra

14. Har du noen ganger jobbet nattarbeid?

*(etter kl 22 om kvelden eller før kl 06 om morgenen)*

- Ja     Nei

15. Hvis ja: I hvor mange år har du jobbet nattarbeid til sammen?

16. Jobber du alene (altså er den eneste ansatte som er på jobb), og hvis ja, hvor ofte?

- Ja, hver gang jeg jobber  
 Ja, av og til  
 Nei, aldri

17. Dersom du jobber alene på nattskift; føler du ubehag knyttet til å jobbe alene?

- Ja, alltid  
 Av og til

- Nei  
 Jeg jobber aldri alene

## Arbeid, søvn og individuelle preferanser

Page 4

### Generelt om fritid og livsstil

18. I løpet av *det siste året*, hvor mange timer med tung fysisk aktivitet (aktivitet som gjør deg svett og andpusten) har du hatt i fritiden din i *gjennomsnitt pr. uke*?  
*Reiser til og fra arbeidet regnes som fritid.*

- Ingen  
 Under 1 time  
 1-3 timer  
 Over 3 timer

19. Røyker du daglig nå?

- Ja  
 Nei

20. Bruker du snus daglig nå?

- Ja  
 Nei

21. Hvor mange kopper koffeinholdig drikke (kaffe, te, cola o.l.) inntar du vanligvis i løpet av en dag?

22. Hvor mange timer i løpet av en uke gjør du følgende aktiviteter?

	Aldri	1-2 timer	3-4 timer	5-6 timer	7 timer eller mer
Leser en bok	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Samtaler med andre om ikke jobberelaterte tema	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ser på TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gjør yoga, meditasjon eller liknende aktiviteter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lytter til musikk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. Hvor ofte opplever du følgende:

	Nesten aldri	Ganske sjelden	Ganske ofte	Nesten alltid
Forstyrret appetitt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vondt i magen, kvalme eller fordøyelsesproblemer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Arbeid, søvn og individuelle preferanser

Page 5

### Holdninger til endringer

24. Hvor enig eller uenig er du i disse utsagnene som handler om generelle antakelser om og holdninger til endring?

Svært Uenig Litt Litt Enig Svært



	uendig	uendig	uendig	uendig	uendig	uendig
Generelt synes jeg endringer er negativt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg foretrekker en dag preget av rutiner framfor en dag fylt av uventede hendelser til enhver tid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker å gjøre ting på den faste måten framfor å prøve nye og annerledes måter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når jeg føler at livet blir rutine, forsøker jeg å forandre på det	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg vil heller kjede meg enn å bli overrasket	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dersom jeg ble informert om at det skulle skje en betydelig endring i hvordan ting skal gjøres på jobben, ville jeg antageligvis bli stresset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når jeg informeres om endring i planene, blir jeg gjerne litt anspent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når ting ikke går som planlagt, blir jeg helt satt ut	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hvis lederen min forandret evalueringssystemet på jobben ville jeg mest sannsynlig føle ubehag selv om jeg trodde jeg kunne prestere like bra uten å måtte arbeide mer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Å endre planer føles veldig strevsomt for meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg opplever ofte endringer som litt ubehagelige, selv de endringer som potensielt kan forbedre livet mitt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når noen presser meg til å endre noe har jeg en tendens til å motarbeide det, selv om jeg tror at endringen til syvende og sist vil komme meg til gode	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Av en eller annen grunn forsøker jeg noen ganger å unngå endringer som jeg vet vil være positive for meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg ombestemmer meg ofte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg har ikke lett for å forandre mening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når jeg har kommet fram til en konklusjon er det ikke sannsynlig at jeg ombestemmer meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mine syn på ting er svært stabile over tid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Arbeid, søvn og individuelle preferanser

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### Om deg som person

25. Kryss av for det alternativet for hver påstand som best beskriver deg slik du generelt er:

	Veldig feil	Litt feil	Verken feil eller riktig	Litt riktig	Veldig riktig
Livner opp i selskap	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lever meg inn i andres følelser	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Får oppgaver unnagjort med en gang	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Har ofte humørsvingninger	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Har en livlig fantasi	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snakker ikke mye	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er ikke interessert i andre menneskers problemer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Glemmer ofte å sette ting tilbake på rett plass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er avslappet mesteparten av tiden	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er ikke interessert i abstrakte ideer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snakker med mange forskjellige mennesker i selskap	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Har medfølelse med andre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liker orden og struktur	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Blir lett opprørt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Har vansker med å forstå abstrakte ideer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Holder meg i bakgrunnen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er egentlig ikke interessert i andre	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roter ting til	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Føler meg sjelden nedfor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Har ikke god fantasi	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Arbeid, søvn og individuelle preferanser

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### Søvnvaner

26. Når ville du foretrukket å stå opp hvis du hadde en full dags jobb (8 timer) og kunne velge arbeidstiden selv?
- Før 06:30
  - 06:30-07:29
  - 07:30-08:29
  - 09:30 eller senere
27. Når ville du foretrukket å legge deg hvis du hadde en full dags jobb (8 timer) og kunne velge arbeidstiden selv?
- Før 21:00
  - 21:00-21:59
  - 22:00-22:59
  - 23:00 eller senere
28. Hvis du alltid måtte legge deg kl 24:00, hvordan ville det da være å sovne?
- Veldig vanskelig, ville ligget våken lenge
  - Ganske vanskelig, ville ligget våken en stund
  - Ganske lett, ville sovnet etter en kort stund
  - Lett, ville sovnet praktisk talt med en gang
29. Hvis du alltid måtte stå opp kl 06:00, hvordan ville dette vært?
- Veldig vanskelig og ubehagelig
  - Ganske vanskelig og ubehagelig
  - Litt ubehagelig, men ikke noe stort problem
  - Lett – ikke noe problem i det hele tatt
30. Når begynner du vanligvis først å merke at du er trøtt og har behov for søvn?
- Før 21:00
  - 21:00-21:59
  - 22:00-22:59
  - 23:00 eller senere
31. Etter at du har stått opp om morgenen, hvor lang tid tar det før du fungerer helt bra?
- 0-10 min
  - 11-20 min
  - 21-40 min
  - Over 40 min
32. I hvilken grad er du en morgenaktiv eller kveldsaktiv person?
- Veldig morgenaktiv (morgenaktiv og kveldstrøtt)
  - Til en viss grad morgenaktiv
  - Til en viss grad kveldsaktiv
  - Veldig kveldsaktiv (morgentrøtt og kveldsaktiv)

**Arbeid, søvn og individuelle preferanser**
**Page 8**
**Søvn**

33. Har du brukt noe av dette i løpet av det siste året (de siste 12 månedene)?

	Nei	Ja
Sovemedisin på resept	<input type="radio"/>	<input type="radio"/>
Lysbehandling	<input type="radio"/>	<input type="radio"/>
Melatonin	<input type="radio"/>	<input type="radio"/>
Sovemedisin uten resept	<input type="radio"/>	<input type="radio"/>

 34. De neste spørsmålene handler om hvor mange dager per uke du har opplevd ulike ting. 0 er ingen dager i løpet av en uke, 7 er alle dager i løpet av en uke. *Tenk deg ett gjennomsnitt slik det har vært den siste måneden.*
**Hvor mange dager per. uke har du:**

	0 dager pr. uke	1 dag pr. uke	2 dager pr. uke	3 dager pr. uke	4 dager pr. uke	5 dager pr. uke	6 dager pr. uke	7 dager pr. uke
Brukt mer enn 30 minutter for å sovne inn etter at lysene ble slukket?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vært våken mer enn 30 minutter innimellom søvnen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Våknet mer enn 30 minutter tidligere enn du har ønsket uten å få sove igjen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Følt deg for lite uthvilt etter å ha sovnet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vært så søvnig/trett at det har gått ut over skole/jobb eller privatlivet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vært misfornøyd med søvnen din?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Arbeid, søvn og individuelle preferanser**
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**Utmattelse**

Vi vil gjerne vite om du har følt deg sliten, svak eller i mangel av overskudd den siste måneden. Vennligst besvar alle spørsmålene selv om du ikke har hatt slike problemer. Hvis du har følt deg sliten lenge, sammenlikner du med hvordan du følte deg sist du var bra. Husk at alle 11 spørsmålene i dette avsnittet handler om hvordan du har hatt det i løpet av den siste måneden.

35. Har du problemer med at du føler deg sliten?

- Mindre enn vanlig  
 Ikke mer enn vanlig  
 Mer enn vanlig  
 Mye mer enn vanlig

36. Trenger du mer hvile?

- Nei, mindre enn vanlig  
 Ikke mer enn vanlig

- Mer enn vanlig
- Mye mer enn vanlig

37. Føler du deg søvnlig eller døsig?

- Mindre enn vanlig
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

38. Har du problemer med å komme i gang med ting?

- Mindre enn vanlig
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

39. Mangler du overskudd?

- Ikke i det hele tatt
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

40. Har du redusert styrke i musklene dine?

- Ikke i det hele tatt
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

41. Føler du deg svak?

- Mindre enn vanlig
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

42. Har du vansker med å konsentrere deg?

- Mindre enn vanlig
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

43. Forsnakker du deg i samtaler?

- Mindre enn vanlig
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

44. Er det vanskeligere å finne det rette ordet?

- Mindre enn vanlig
- Ikke mer enn vanlig
- Mer enn vanlig
- Mye mer enn vanlig

45. Hvordan er hukommelsen din?

- Bedre enn vanlig
- Ikke verre enn vanlig
- Verre enn vanlig
- Mye verre enn vanlig

46. Kryss av det som passer best for alle utsagnene under

	Stemmer helt	Stemmer ganske bra	Stemmer ikke særlig bra	Stemmer ikke
Det er rolig og behagelig stemning på min arbeidsplass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er godt samhold på arbeidsplassen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mine kolleger stiller opp for meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
På jobben har de forståelse for at jeg kan ha en "dårlig" dag	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg kommer godt overens med mine overordnede	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg trives bra med mine arbeidskamerater	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

47.

	Meget sjelden eller aldri	Nokså sjelden	Av og til	Nokså ofte	Meget ofte eller alltid
Hvor ofte får du støtte og hjelp fra arbeidskolleger?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hvor ofte får du støtte og hjelp fra nærmeste leder?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er du fornøyd med kvaliteten på arbeidet du utfører?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er du fornøyd med mengden arbeid som du får gjort?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er du fornøyd med din evne til å løse problemer som dukker opp i arbeidet?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Er du fornøyd med din evne til å ha et godt forhold til dine arbeidskolleger?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

48. De følgende påstandene handler om dine følelser rundt jobben din *det siste året*. Dersom du har vært i din nåværende jobb *mindre enn ett år*, så handler påstandene om *hele perioden* du har vært i din nåværende jobb. Angi i hvilken grad de følgende påstandene gjelder for deg på en skala fra 1-7.

	1 Stemmer ikke i det hele tatt	2	3	4 Stemmer til en viss grad	5	6	7 Stemmer veldig godt
Jeg føler jeg kan komme med mange innspill når det gjelder hvordan min jobb skal utføres	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg liker virkelig folkene jeg jobber sammen med	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg føler meg ikke særlig kompetent når jeg er på jobben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg kommer overens med folk på jobben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jeg er fri til å uttrykke mine ideer og meninger på jobben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
De fleste dager føler jeg at jeg har oppnådd noe fra å arbeide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Når jeg jobber føler jeg meg ikke særlig flink	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Det er få muligheter for meg å bestemme hvordan jeg skal utføre jobben min	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Folk på jobben er ganske vennlige mot meg	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Arbeid, søvn og individuelle preferanser

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### Stress og jobb tilfredshet

49. Stress vil si en situasjon hvor en person føler seg anstrengt, rastløs, nervøs eller engstelig eller ikke greier å sove om natten på grunn av at han/hun er plaget med forstyrrende tanker hele tiden. Føler du denne typen stress for tiden?

- Nei, ikke i det hele tatt
- Ja, litt
- Ja, i noen grad
- Ja, ganske mye
- Ja, veldig mye

50. Alt tatt i betraktning, på en skala fra 1-6, hvor tilfreds er du med den jobben du har nå? 1 = Ikke tilfreds 6 = Svært tilfreds

- 1       2       3       4       5       6

## Appendix B

### Email with information regarding the study

Kjære dere som jobber nattarbeid i Trondheim Kommune,

Vi ved psykologisk institutt NTNU holder på med en forskningsstudie om nattarbeid, søvn og individuelle preferanser. Vi ønsker å gjennomføre en spørreundersøkelse blant ansatte i Trondheim Kommune nå i januar, og igjen til sommeren og vi håper at du vil delta.

Det er helt frivillig å delta og du kan trekke deg når som helst. Du svarer på undersøkelsen ved å klikke på linken under og svare på spørsmålene. Det tar omtrent 15 minutter å svare på hele undersøkelsen.

Forskning på arbeidsforhold, nattarbeid og søvn knyttet mot individuelle preferanser kan være med på å avdekke generelle arbeidsforhold som bør endres for nattarbeidere, og kanskje forskjellige tiltak som kan passe for spesifikke grupper av personer.

Denne undersøkelsen er i regi av psykologisk institutt, NTNU, og erstatter ikke Arbeidsmiljøenheten i Trondheim kommunes egen nattarbeidsundersøkelse.

Ved spørsmål kontakt prosjektleder Ingvild Saksvik-Lehouillier ved NTNU på telefon 73 55 08 64.

Vennlig hilsen,

Ingvild Saksvik-Lehouillier

Førsteamanuensis psykologisk institutt,

NTNU