Running heading:

Not All Shifts Are Equal

Title:

Managing Work Across Shifts: Not All Shifts Are Equal

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Heading level 2:

Abstract

Purpose: Despite the prevalence of shiftwork, the mechanisms underlying its effects on nurses' well-being and adaptation to the shifts are not fully understood. This study examines whether the characteristics of the person, particularly chronotype, and aspects of the situation (i.e., shift schedule and the nature of work on each shift for each work context) affect job-specific and general well-being above and beyond potential confounds such as age and negative affectivity (NA).

Design: Primarily surveys of Australian nurses ($N = 446$) in three contexts (general acute hospital, maternity hospital, aged care).

Conclusions: The findings highlight the role of nurses' dispositional characteristics, especially NA and conditionally chronotype, as well as

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the need to consider the nature of the work conducted on each shift within a context.

Clinical Relevance: Nurse managers need to consider the nature of the work conducted on each shift, whether to look at balancing workloads or setting up processes for handling spikes in workload, especially administration.

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Body of article:

Despite the increasing prevalence of shiftwork, the mechanisms underlying its effects on employee health and well-being, common indicators of employee adaptation to the shifts, are not fully understood (Kantermann, Juda, Vetter, & Roenneberg, 2010). The present study intends to examine whether characteristics of the person, particularly chronotype, and aspects of the situation (i.e., shift schedule and the nature of work on those shifts as entailed for various work contexts) affect job-specific and general well-being above and beyond potential confounds such as age and negative affectivity (NA) in three samples of Australian nurses.

Heading level 1:

The Shift, the Individual's Physiology, and Their Interaction

The most widely investigated reason for health problems in shiftwork is the conflict between unsociable work hours and the nature of the human internal biological clock, with the largest potential conflict between internal and external time occurring for night shift workers. Healthcare workers on night shift have generally reported poorer health, more absenteeism, and less job satisfaction than day workers (Burch et al., 2009; Korompeli, Sourtzi, Tzavara, & Velonakis, 2009). That is, there may be a direct effect of the shift's schedule on well-being that occurs because of a conflict between internal and external time.

However, the findings regarding the impact of shiftwork schedule on employees are mixed, possibly due to the relatively overlooked influence of the individual's circadian preference, or chronotype (Kantermann et al., 2010). The individual's circadian preference is associated with the diurnal timing of numerous psychological and physiological processes, including sleep patterns, body temperature, blood pressure, and melatonin and cortisol levels (Burch et al., 2009; Roenneberg et al., 2007). People reporting a preference for evenings (known as "eveningness") are more likely to report that they have poor health (Paine, Gander, & Travier, 2006), have greater levels of depression (Chelminski, Ferraro, Petros, & Plaud, 1997; Kitamura et al., 2010), and may have higher stress reactivity, resulting in difficulty coping with demands as well as reporting more affective symptoms (Buschgens, Graham, & Cottrell, 2010). In contrast, "morningness" has been linked to positive indicators such as well-being (Buschgens et al., 2010). Although chronotype is receiving increased attention, it is often ignored by shiftwork studies in the field (Kantermann et al., 2010).

Relatively recent studies suggest there may also be an extra influence where the extent of the conflict between internal and

external time (i.e., the direct effect of the shift's schedule) is moderated by chronotype (Kantermann et al., 2010). A study of a broad spectrum of the populace strongly suggested that work schedules should be adapted to take staff members' chronotype into consideration whenever possible (Wittman, Dinich, Mellow, & Roenneberg, 2006). Matching chronotype with shift schedule can mitigate the adverse effects on health for nurses (Korompeli et al., 2009). Similarly, when shift times are incongruent with chronotype preference, negative effects, including disturbances to sleep (Juda, Vetter, & Roenneberg, 2013) and reduced job satisfaction (Moreno, Marqueze, Lemos, Soares, & Lorenzi-Filho, 2012), may occur. To date, this interaction between shift schedule and chronotype has not been widely tested.

Heading level 1:

Controlling for Possible Confounds: Age and Negative Affectivity

Although age has been investigated previously with regard to shiftwork, the results have been mixed. For example, an age-based selection effect was found for shiftworkers as a general group (relative to nonshiftworkers) in terms of older workers having fewer health complaints (Raediker, Janben, Schomann, & Nachreiner, 2006). This age-based finding may be a form of the self-selection effect known as the survivor effect, where the continuing older workers may be better adapted to the profession, work, and shifts (Burch et al., 2009). In addition, age covaries with chronotype, where older individuals tend to show greater morning preference (Kitamura et al., 2010), suggesting that age needs to be examined, or at least controlled, with chronotype in order to more specifically disentangle any age-related effects.

In addition to age, the individual's affective disposition, especially NA, is important in analyzing the perceived work environment. Individuals with high NA tend to have a generally negative worldview and report higher levels of distress than those low in the trait (Burke, Brief, & George, 1993; Watson, Clark, & Tellegen, 1988). NA may serve a direct and substantive role in the stress process, either through use of inferior coping strategies or a tendency to create stressful environments, or both (Bolger & Schilling, 2006). Hence, NA may be particularly relevant in terms of assessing the perceived effects of shiftwork on how well employees adapt to shifts (Parkes, 2003; Tamagawa, Lobb, & Booth, 2007). Further, the inclusion of NA may help to clarify whether the impact of eveningness is due to stress reactivity (per Buschgens et al., 2010)—in which case the inclusion of NA would make the chronotype effect disappear—or more inherent biological mechanisms.

Heading level 1:

The Importance of Work Context

Perhaps one reason for the variation in findings on the impact of shiftwork is the work context of the employee. The contexts for much of the early basis of the shiftwork literature, manufacturing or mining work, varied little between shifts, with individuals performing approximately the same activities on each shift. Yet within service

industries, such as the largest service industry in Western developed countries—health services—the type of work performed by nurses differs considerably by shift (Coffey, Skipper, & Jung, 1988).

Further, the type of hospital may also influence employee outcomes regarding shiftwork. Thus, shiftwork research needs to adopt a more comparative approach, explicitly noting the role of context (Johns, 2006; McDermott, Fitzgerald, Van Gestel, & Keating, 2015), by intentionally analyzing different nursing situations that vary in terms of the nature of the work in that context, as well as differences between shifts in the different contexts.

Therefore, the current study examines three distinct nursing contexts (i.e., acute general hospital, maternity hospital, and aged care facilities) in order to be able to assess the nature of any relationships found in testing the direct proximal effects reviewed above. At a broad level, these nursing samples were selected because they have generally similar working conditions, policies, and qualifications (i.e., education required for specific forms of nursing care, such as medication administration, in each context). Applying Johns' (2006) model, the distinctive aspects of each context that may influence the nature of nurses' shiftwork both by context and by shift within context were found by conducting qualitative interviews with nurses, managers, and corporate staff and are summarized in Table 1. General acute nurses may have the most diverse and chaotic work demands, especially during night shifts, compared to other areas. In contrast, there are more enrolled nurses (i.e., nurses who have an advanced certificate and work under registered nurses, administering basic care) and older nurses in aged care (Health Workforce Australia, 2013). Nurses in aged care also generally work under long-term demands, primarily caring for patients suffering chronic mental and medical conditions (Elstad & Vabø, 2008). In a similar manner to the distinctive characteristics of aged care, nursing in maternity hospitals is more specialized compared to nursing in the general acute context, with care focused on women and their newborns, providing intrinsically rewarding work (Miers, Rickaby, & Pollard, 2007).

Insert Table 1 about here

This study examines whether the characteristics of the nurse, particularly chronotype, and aspects of the situation (i.e., shift schedule and the nature of work on those shifts for various work contexts) affect job-specific and general well-being above and beyond potential confounds such as age and NA in three samples of Australian nurses.

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Methods

Across the three contexts, all of the nurses who had worked at least two paid shifts in the prior week were sent a survey through their internal mail system. The respondents included 255 from the large maternity hospital facility (a response rate of approximately 33%), 183 from the medium-sized hospital facility (approximately 36% response rate), and 210 from aged care facilities (approximately 37% response rate). The broad qualitative background of these three contexts (as recommended by Johns [2006] and recently applied by McDermott et al. [2015]) included two types of hospitals. One hospital was a large

specialist maternity hospital (i.e., with more intrinsically rewarding work; Miers et al., 2007) and the other was a medium-sized general acute hospital. The third type of facility was composed of a group of similar facilities providing residential care for the elderly. All employees across the contexts were covered by the same suite of human resource management practices due to being members of an over-arching organization that had agglomerated these facilities over time. These sets of facilities allowed the researchers to essentially “control for” any differences that could otherwise arise from having different human resource policies and (broad) practices and instead focus more on the differences that arise due to the nature of the work in these different areas.

Respondents reporting that they had worked “some other type of shift” (see later section on “Shift Schedule”) were excluded (30 from the large hospital, 24 from the general acute hospital, and 12 from aged care), as this option provides no information as to the time of day worked. Follow-up interviews confirmed that “other” primarily consisted of emergency department and casual staff. The respondents remaining were working their shifts in what would be classed as relatively slow-rotation shifts (e.g., weekly or less frequently rotated; a coding similar to that of Juda et al. [2013]). The slower rotation should minimize carryover effects on well-being due to having been on a different shift type in the recent past.

Most nurses in the large (84.1%) and medium-sized (95.7%) hospitals had either a baccalaureate or postgraduate qualification, whereas in the aged care facilities, approximately equal proportions had secondary (29.9%), certificate (27.6%), or baccalaureate (29.1%) qualifications. Tukey post-hoc tests showed that the sites reflected the trends in the industry in that the average age of nurses in the aged care context ($M = 47.43$ years, $SD = 10.21$) and in the large maternity hospital ($M = 45.21$ years, $SD = 10.74$) was higher ($F(2,376) = 8.203$, $p < .001$) than the age of those in the medium general acute hospital ($M = 41.90$ years, $SD = 9.76$), a result confirmed nonparametrically by a Kruskal-Wallis test. The vast majority of nurses working in both the large (97.2%) and medium (95.7%) hospitals were female, and in both cases more than half were 40 years of age or over (67.8% and 55.4%, respectively). In the aged care facilities, 93.1% of nurses were female and the substantial majority (81.4%) were 40 years of age or over.

Some of the inconsistency in previous studies may also be a result of research design issues, such as how key concepts have been operationalized. With regard to chronotype, most studies have operationalized chronotype using dichotomous or categorical coding, categorizing individuals as morning, evening, or neither types, yet morningness-eveningness could be better viewed as a continuous characteristic (Buschgens et al., 2010). Categorized chronotypes may be easier to match to shift, but several studies have shown that large proportions (up to 70%) of a sample are often classified as a “neither” or “intermediate” type (Chelminski et al., 1997). Consequently, a large amount of the variation along the spectrum of morningness-eveningness is lost when discrete chronotypes are used. Since chronotype has been shown to closely approximate a normal distribution (Chelminski et al., 1997), it would be more appropriate to use chronotype as a continuous measure.

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Measures

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Chronotype. Chronotype was measured using the 12-item Early/Late Preferences Scale validated by Bohle, Tilley, and Brown (2001). Respondents were asked at which time during the day they would prefer to perform various activities (e.g., "When would you prefer to start work every day?"). Responses were recorded on a 5-point scale (1 = *much earlier than most people*; 5 = *much later than most people*). Higher scores indicated a greater evening preference.

Heading level 3:

Age. Age was measured across seven age categories, which were median coded: less than 25 years (coded as 23), 25–34 years (=30), 35–39 years (=37), 40–44 years (=42), 45–49 years (=47), 50–54 years (=52), and 55 years or more (=60).

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Negative affectivity. NA was measured using the Negative Affect Schedule Scale from the Positive and Negative Affect Scale (Watson et al., 1988). Respondents rated the extent to which they had experienced 10 emotions (e.g. "distressed") during the previous week. Responses were made on a 5-point rating (1 = *very slightly or not at all*; 5 = *very much*).

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Shift schedule. Shift schedule was measured by asking respondents to indicate which of four statements best described their workday over the previous month: "I worked morning shifts"; "I worked afternoon shifts"; "I worked night shifts"; "I worked some other type of shifts." To create a dichotomous measure of work schedule for the regression analyses, respondents were classified as (a) morning or (b) afternoon/night shift, reflecting a standard hours versus nonstandard schedule classification, excluding "miscellaneous shifts."

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Job satisfaction. Job satisfaction was measured using the six-item scale from Agho, Price, and Mueller (1992). Responses were made on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). An example item is: "I like my job better than the average person."

Heading level 3:

General mental health. Well-being was assessed using three measures, the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988), the Kessler-10 (K10; Kessler & Mroczek, 1994), and a shortened, nine-item version of the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). As shown below, these three measures were highly correlated, with an absolute magnitude of around 0.7, and their regression results, in terms of which variables were significant, were quite similar. Consequently, only the results of the analyses on the CES-D, the most representative results, are included in the regression table, with that scale representing the well-being and adaptability of the nurses. For the shortened CES-D, respondents were asked to rate the extent to which the nine statements reflected their feelings over the previous week (e.g., "I was bothered by things that usually don't bother me") on a 4-point rating (0 = *rarely or none of the time*; 3 = *most or all of the time*).

Heading level 1:

Results

The means, standard deviations, and Cronbach's alpha coefficients for the continuous variables are given in Table 2. Correlations between the variables for the large and medium hospital facilities are shown in Table 3. In both cases there were several significant correlations, most notably between the four dependent variables and NA. The correlations for the aged care nurses in Table 4 show a similar pattern of results. Separate regression analyses were conducted for each of the three facilities. The variables used to create the interaction terms were mean-centered for each of the facilities respectively.

Insert Tables 2, 3, & 4 about here

Chronotype, age, NA, shift schedule, and the interaction between chronotype and shift schedule were entered in multiple linear regression analyses for each of the target variables: job satisfaction, well-being, and depression among each of the three types of facilities. Given the variety of forms of variables in the analyses below, rather than trying to impute either relatively concrete variables (e.g., shift, age) or relatively new variables (e.g., chronotype), a strict approach of excluding cases with any missing data was used (excluding 84 from the large hospital, 65 from the general acute hospital, and 53 from aged care). The results of the regression analyses for each of the three sites are presented in Table 5.

Insert Table 5 about here

The overall regression model for the maternity hospital explained a significant amount of variance in both target variables: job satisfaction ($R^2_{\text{adj}} = .111$, $F[5,120] = 4.14$, $p < .01$) and depression ($R^2_{\text{adj}} = .458$, $F[5,114] = 21.10$, $p < .001$). The regression model for the medium-sized hospital explained a significant amount of variance in depression ($R^2_{\text{adj}} = .478$, $F[5,84] = 17.28$, $p < .001$). A significant amount of variance was explained by the model for the aged care facilities for both outcome variables: job satisfaction ($R^2_{\text{adj}} = .101$,

$F[5,121] = 3.83, p < .01$) and depression ($R^2_{adj} = .444, F[5,119] = 20.81, p < .001$).

The impact of common method variance (CMV) has been proposed to be much less than often assumed, with little effect on the integrity of results (e.g., Spector, 2006). CMV is particularly unlikely for variables such as age, shift, and nomination of work context because they are unlikely to be biased by perceptions, being essentially recall questions, and are relatively objective indicators that would not be prone to variation due to percept-percept inflation from common methods. Further, the main source of possible inflation with measures of well-being would be NA, and that variable is explicitly included in these analyses (accounting for potentially inflationary variance, per Spector [2006]).

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Discussion

The present study investigated the interrelationships between shift and chronotype, after allowing for age and NA, to examine their impact on the employees' job-specific and general well-being, explaining those relationships across three different healthcare contexts. The most consistent relationship across the variables of job satisfaction and mental health across all three settings was with NA.

There was limited support for the proposition that working afternoon or night shifts may result in reduced depression, where the improved mental health effect was only present for those nurses working in the medium-sized, general acute hospital, and not the maternity or aged care settings. This finding runs counter to previous research indicating that working night shifts entails a risk for negative health and social outcomes, such as poorer health and less job satisfaction, than day workers (Burch et al., 2009; Korompele et al., 2009). The differences relative to previous shiftwork research for nurses may be due partly to the characteristics of the samples used in the studies, suggesting their contexts may play a role. For example, studies showing poorer health for night shift workers tended to also have niche, rather than general, roles (e.g., Korompele et al. [2009] studied intensive care unit staff), and those showing better outcomes for night shift workers allowed a significant degree of choice of shifts (e.g., 83% of staff in the Skipper, Jung, & Coffey [1990] report chose their shift).

The current results provide limited support across variables and settings for the impact of chronotype, except on depression, for either the maternity or general acute hospitals. These results are confirmation of previous research associating morning chronotype with positive outcomes such as well-being (Buschgens et al., 2010) and where evening types were more likely to report they were not in good health (Paine et al., 2006), with greater levels of depression (Chelminski et al., 1997; Kitamura et al., 2010). A potential reason for the significant chronotype results for the well-being outcomes, but not the job satisfaction outcomes, relative to previous research, may be due to the operationalization of chronotype as a continuous measure in this study. Treating chronotype as a continuous variable enhances the power of statistical analyses to find true linear effects, relative to a dichotomous or ordinal measure where a large amount of the variation of morningness-eveningness is lost.

The only interaction effect between shift and chronotype was observed in the large maternity hospital for job satisfaction, where those with an evening chronotype expressed greater job satisfaction when working the night shift, but there was little difference due to chronotype for those with a morning preference. This pattern of results appears to clarify the findings of Wittman et al. (2006), where people with higher eveningness could have problems synchronizing internal and external timing (in that evening types have a problem synchronizing with morning shifts), whereas morningness may confer an advantage.

An interesting twist to this study's examination of age effects is that the only context in this study where there was a significant age effect was the aged care context. The significant relationship showing older nurses in aged care having higher job satisfaction provides some indication of a survivor effect, where older nurses may be more adapted to the profession, work, and shifts (Burch et al., 2009). The survivor effect arises because aged care nurses with low job satisfaction moved out of shiftwork, leaving the more satisfied older nurses.

NA was a significant predictor in all of the analyses across each of the three contexts, highlighting the importance of individual dispositions in shiftwork. Irrespective of whether NA may be acting as a nuisance variable inflating the relationship with outcomes (Burke et al., 1993) or whether NA has a substantive role in the links between shiftwork and outcomes, the sheer strength and consistency of the NA results indicates that future shiftwork research needs to include NA and begin to tease out the relative extent to which NA is a biasing influence or a substantive effect in the mechanisms of shiftwork's impact on nurses.

Heading level 1:

Work Context

Comparisons of the distinguishing characteristics between contexts (following the models of Johns [2006] and McDermott et al. [2015]) suggest that there are specific work characteristics (see Table 1) that may be changing the nature of shiftwork for these nurses. For example, morning shift nurses (in contrast to night shifts) in general acute hospitals have more help available in terms of support and resources, but face more stressors in terms of the higher potential for interpersonal conflict due to their higher rate of contact with other staff and greater frequency of patient care activities (Coffey et al., 1988). The results indicating that the morning shift in the general acute hospital had higher levels of depression appear to be a function of the differences in the nature of work between the morning shift and the later shifts in the general acute setting. In this case, the general acute hospital has a large spike of administrative work, especially regarding the morning round and discharge paperwork, which occurs on top of the expected clinical work during morning shifts. Conversely, the lack of a shift schedule effect in the other two contexts could also be informative. It may be the case that the relative similarity of the nature of work by shift in the maternity hospital may have prevented any shift schedule effect occurring there. More interestingly, the aged care setting does have somewhat different duties on night shift versus the morning, where night shifts tend to be quieter, but the aged care facilities were also more aggressive with

increasing the nurse:patient ratios on night shift, which appear to even out, or balance, the quantitative and qualitative workloads by shift. In short, while not all shifts are equal, management can act to balance loads across shifts. Future research will need to design systems for characterizing the loads on any given shift by content and context rather than using generic classifications.

A consistent pattern of results across facilities is the impact of chronotype in the medium and large hospitals that would appear to confirm the higher stress reactivity of the evening chronotype. However, perceptual and psychological drivers of reactivity were accounted for via NA, entailing that the significant chronotype effects found were above and beyond NA, clarifying the key mechanism of chronotype to be physiological, reflecting the nurses' sleep patterns, melatonin and cortisol levels, or the consequences of unhealthy coping strategies, such as chronic alterations in physiological homeostasis, or the disruption and desynchronization of circadian rhythms (per Burch et al., 2009; Roennberg et al., 2007).

Further, in terms of the social organization of work (per Coffey et al., 1988), the medium-sized hospital and large maternity hospital have similar characteristics, especially in terms of having strong, all-pervading occupational and organizational hierarchies, whereas the aged care facilities do not to the same extent. These results suggest that the physiological basis of the chronotype effects were more likely to arise in hierarchical contexts, possibly suggesting that evening chronotypes are stressed by, or averse to, hierarchy.

Some limitations need to be considered when viewing the results of this study. A central limitation of the study is the cross-sectional nature of data collection. Future longitudinal research can investigate the causal direction of relationships between these variables and shift work and how they might influence employee outcomes. However, the strength of this article—testing the same model across three different but related contexts—is key to determining which contexts or extra-explanatory variables could be the focus of future longitudinal studies. Measures of how long nurses had been working a particular shift were also not included, and thus we were unable to distinguish participants who may have adapted to a shift over time. Another avenue for future research is to examine the effects of autonomy over shift scheduling in conjunction with chronotype.

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Conclusions

At the nurse level, this study's findings emphasize the role of dispositional characteristics of the individual in shiftwork and work design, especially the strong influence of NA across a variety of outcomes, along with the potential to manage the impact of shiftwork through chronotype. That is, variables such as chronotype and context are part of a set of complex interrelationships that determine an individual's adaptability to shiftwork.

The largest influence on the nature of the impact of shift and chronotype variables on nurses in this study was the context of the nurses' work, with different variables predicting outcomes more strongly in different contexts. That is, not all shifts are equal. The nature of the work can change substantially by shift within the same context, entailing that the impact of shiftwork on nurses is contingent

on the nature of work by shift in a context. Consequently, research needs to consider a more detailed range and classification of nursing shiftwork contexts. Nurse managers can consider the nature of the work conducted on each shift to look at balancing workloads or setting up processes for handling spikes in workload, especially administration in order to enhance their nurses' adaptability to shiftwork.

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Clinical Resource

- Health and Safety Executive.
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Table 1. Key Differentiating Characteristics of the Three Contexts

	General acute hospital	Maternity hospital	Aged care
Occupational hierarchy	Strong internal hierarchy	Moderate-strong hierarchy	Low-moderate hierarchy
Autonomy	Nurses have low-moderate autonomy	Nurses have moderate-high autonomy	Nurses have relatively higher autonomy
Skill utilization	Wide range of skills utilized; majority use moderate levels of skill	Nurses typically have more opportunities for skill utilization	Narrower range of skill utilization; primarily lower skills used
Typical patient profile	Full breadth of patients	Emphasis on female adult patients, typically 16–50 years of age	Most patients over 65 years of age; tendency toward female patients
Health conditions treated	Very wide range of health conditions	Relatively narrow range of health conditions	Moderate-narrow range of health conditions
Nature of common services provided	Moderate intensity	Episodic across all shifts, with spikes of intensity	Low intensity, chronic care
Intrinsic rewards from main work	Acute-oriented caring rewards; some areas at higher risk of abuse	Strong intrinsic rewards, usually joyful	Chronically oriented caring rewards; more palliative and/or mental health
Differences in demand by shift	Morning shifts busier, especially regarding discharge paperwork	Relatively consistent acute demands	Night shift relatively quieter, but higher staff:patient ratios

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Table 2. Means, Standard Deviations, and Cronbach's Alpha Coefficients for the Variables

	Large maternity hospital			Medium hospital			Aged care		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α
Evening chronotype	2.02	0.55	0.86	2.22	0.22	0.88	2.30	0.17	0.84
Negative affectivity	6.00	0.10	0.90	5.00	0.84	0.83	6.02	0.12	0.91
Job satisfaction	1.70	0.81	0.88	1.71	1.71	0.86	0.84	0.84	0.87
Well-being	2.25	0.56	0.92	2.88	2.88	0.88	2.26	0.90	0.89
Psychological distress	6.17	0.49	0.91	6.19	6.19	0.91	7.10	0.65	0.92
Depression	0.30	0.01	0.91	0.20	0.20	0.91	0.92	0.92	0.90

Table 3. Correlations for the Large (Above Diagonal) and Medium (Below Diagonal) Hospitals

	1	2	3	4	5	6	7	8
1. Age	—	.04	-.05	-.01	-.001	-.09	.13	.02
2. Evening chronotype	-.12	—	-.09	.17*	.09	.004	-.01	.04
3. Negative affectivity	.03	.14	—	.10	-.31**	-.62**	.74**	.67**
4. Afternoon/night shift	-.22**	.29**	.05	—	.05	-.02	.06	.04
5. Job satisfaction	.02	-.11	-.25*	-.08	—	.27**	-.22**	-.31**
6. Well-being	-.14	-.22*	-.58**	.13	.29**	—	-.72**	-.77**
7. Psychological distress	.18	.24*	.51**	-.03	-.33**	-.60**	—	.79**
8. Depression	.14	.24*	.64**	.13	-.33**	-.72**	.72**	—

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

Table 4. Correlations Between Study Variables for the Aged Care Nurses

	1	2	3	4	5	6	7
1. Age	—						
2. Evening chronotype	-.05	—					
3. Negative affectivity	-.16	.05	—				
4. Afternoon/night shift	.01	.33**	-.19*	—			
5. Job satisfaction	.21*	-.02	-.31**	.07	—		
6. Well-being	.13	-.04	-.66**	.25**	.43**	—	
7. Psychological distress	-.19*	.02	.71**	-.14	-.34**	-.71**	—
8. Depression	-.14	.06	.66**	-.12	-.43**	-.73**	.79**

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

Table 5. Regression Analyses for Each of the Three Healthcare Contexts

	Job satisfaction			Depression		
	b	SE	β	b	SE	β
LMH: Age	.01	.01	.02	.01	.01	.04
LMH: Negative affectivity	-.38	.10	-.34**	.40	.04	.71**
LMH: Evening chronotype	-.21	.15	-.17	.14	.06	.21*
LMH: Afternoon/night shift	.08	.14	.05	-.05	.06	-.06
LMH: Chronotype X Shift	.57	.22	.31*	-.14	.09	-.15
MH: Age	.01	.01	.01	.01	.01	.09
MH: Negative affectivity	-.34	.16	-.23*	.49	.06	.62**
MH: Evening chronotype	-.14	.18	-.12	.19	.07	.30*
MH: Afternoon/night shift	-.07	.16	-.05	-.16	.06	-.21*
MH: Chronotype X Shift	.16	.26	.09	-.10	.10	-.10
AC: Age	.02	.01	.18*	-.01	.01	-.04
AC: Negative affectivity	-.38	.11	-.30*	.38	.04	.68**
AC: Evening chronotype	-.02	.19	-.01	.02	.07	.03
AC: Afternoon/night shift	-.09	.17	-.05	.06	.06	.08
AC: Chronotype X Shift	.13	.27	.06	-.03	.10	-.04

Note. AC = aged care; LMH = large maternity hospital; MH = medium hospital.

* $p < .05$; ** $p < .001$.

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