Longitudinal Effects of Role Stressors on Strain: A Comparison Between Three Competing Analytical Approaches

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ABSTRACT

Role stressors (role overload, role ambiguity and role conflict) were used to predict strain among samples from Malaysian public university academics. A longitudinal survey with a six-month time interval yielded 310 academics for time 1 and 194 academics for Time 2. The study successfully matched only 170 respondents at Time 1 with respondents at Time 2. The study used three analytical approaches to infer causal relationships: (a) relationships between variables at Time 1 and Time 2, (b) the effects of predictors at Time 1 on changes in criterion variables, and (c) effects of changes in predictor variable on changes in criterion variables. Based on approach 1, only role conflict was related to strain within a six-month lag time. Based on approach 3, role overload and role ambiguity were related to strain. The findings of the study highlight the contribution of sustained role overload and role ambiguity to strain among academics.

Keywords: Role stress, strain, academics and longitudinal

INTRODUCTION

Many researchers agree that making a causal claim between two phenomena based on cross-sectional data may lead to erroneous conclusions (Cole & Maxwell, 2003; Sobel, 1990). However, studies on stress at work are largely cross-sectional questionnaire surveys (Maxwell & Cole, 2007). With this, any casual interpretation of empirical relations between stressors and strain is dubious. The cause and effect relations could also be of reversed direction. Furthermore, self reports of stressors and strain may be related because of an underlying common third variable (cite). Moreover, the result may be affected by common method variance. Common method variance is a type of spurious internal consistency which occurs when the apparent correlation among indicators or even constructs is due to their common

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source *(Spector, 2006)*. Therefore, I used three analytical approaches to examine the effects of predictor variables on criterion variables in order in infer longitudinal relations. Peiro and colleagues suggest that the effect of role stressors on strain is longitudinal because strain is induced by role stressors in a process that unfolds overtime (Peiro, Gonzalez-Roma, Tordera & Manas, 2001). Thus, the ambiguities in the interpretation of empirical result could be reduced with longitudinal studies. Specifically, the objective of the study is to explain the effect of predictor variable on criterion variable over a specified time period. The longitudinal model implies that there is temporal precedence in which predictor variables cause criterion variables. Hoyle and Smith (1994) outlined three primary criteria for establishing that one variable causes another. The criteria are (1) there is an association between the two variables, (2) the association is not spurious, and (3) the cause precedes the effect in time.

LITERATURE REVIEW

Conceptualization of Role Stressor

A role stressor can be defined as the pressure experienced by an individual as a result of organizational and job-specific factors in the form of demands and constraints that have been placed on them (Kahn, Wolfe, Quinn, & Snoek, 1964). Role stress theory states that organizational factors generate role expectations among role senders, who then transmit these as role pressures to the person. Experienced and prolonged pressure creates symptoms of ill health (Kahn *et al.*, 1964).

Role attributes have various effects on different individuals. People are willing to accept roles because they provide important psychological benefits such as status, ego gratification, and increased self-esteem (William & Alliger, 1994). However, there are also potential costs associated with the roles when individuals are not able to perform those roles as expected. Whenever individuals do not have clear guidelines regarding their role's authority and responsibility, they will experience stress, become dissatisfied, and perform less effectively (Lee & Schular, 1980). Employees are concerned about their work roles and goals because their rewards are based on the accomplishment of the work goals and fulfillment of role expectations (Ashforth & Lee, 1990). When goals, roles and performance criteria are ambiguous, employees may perceive these ambiguities as threatening their interests. Subsequently, this will lead to the feeling of strain.

Literature has established the relationship between role stressors and the feeling of strain (Lee & Ashforth, 1996; Fogarty, Singh, Rhoads, & Moore, 2000; Peiro, *et al*., 2001; Posig & Kickul, 2003). According to Posig and Kickul (2003), strain occurs mainly because of fatigue that results from pressure to comply with the set of demands. Researchers agree that role stressors are made up of three separate but related contructs: role overload, role ambiguity and role conflict (Kahn, 1980;

Schaubroeck, Cotton & Jennings, 1989; Kelloway & Barling, 1990; Peiro *et al.*, 2001). Role overload exists when role expectations are greater than the individual's abilities and motivation to perform a task (Schaubroeck *et al.*, 1989; Spector & Jex, 1998; Conley & Woosley, 2000). Role ambiguity arises when individuals do not have clear authority or knowledge about how to perform the assigned jobs (Rizzo, House & Lirtzman, 1970; Ivancevich & Matteson, 1980; Ashforth & Lee, 1990). Role conflict refers to incompatibility of expectations and demands associated with the role (Rizzo *et al.*, 1970; Ivancevich & Matteson, 1980; Ashforth & Lee, 1990).

The Conceptualization of Strain

Lee and Ashforth (1996) defined strain as affective, feeling states of the individual characterized by depleted emotional resources and lack of energy. There are many ways to explain the feeling of strain. Lazarus' transactional theory uses the concept of strain to explain the pain which is experienced by individuals when environmental factors are perceived as overtaxing and exceeding their ability to cope with them (Lazarus & Folkman, 1984). In a continuous battle to fight strain, the individuals adjust or manage their cognition, emotion and behaviour to adapt to the perceived stressors. In the case of the failure to handle these stressors, strain will occur. In order to avoid strain individuals need resources to provide the strength to face the stressors. From the perspective of COR theory, strain occurs when individuals are lacking the power to obtain, retain and protect valued resources (Hobfoll, 1989). In a more serious situation, the strained individuals feel that they no longer have necessary resources to predict, understand and control the stressors confronting them (Wright & Hobfoll 2004).

The feeling of strain is associated with psychological and physiological reactions. Psychological strain refers to a particular form of emotional distress arising in response to a situation involving perceived threat to a person's well-being. Transactional models of stress emphasize the perceptual nature of stress-produced emotions (Cox, 1978; Folkman & Lazarus, 1988). Emotion can takes positive and negative forms. Examples of the positive emotions are happiness, pride, relief and love. The negative emotions include anger, fright, anxiety, shame, guilt, sadness, envy, jealousy and disgust. Psychological stress centers on negative emotions, though positive emotion often serve as breathers (a break from stress), sustainers and restorers (replenishing damaged resource) (Lazarus & Folkman, 1980). Anger, anxiety, frustration, and depression are among the most important forms of negative emotion reported in the literature (Smith & Lazarus, 1993).

METHODOLOGY

Data and Respondents

Academics from five big public teaching and research universities in Malaysia were invited to participate in this study. A questionnaire with a stamped, addressed envelope was sent out to 2000 academics. The first stage of data collection started in January 2005. A coded questionnaire helped me to resend the questionnaires to respondents at Time 2. The second wave of data collection was carried out in July 2005 after a six-month lag time. A total of 310 out of 2000 academics returned the questionnaires at Time 1 for a response rate of 16%. At Time 2, 194 respondents returned questionnaires for a 63% response rate. The study successfully matched 170 respondents at Time 1 with respondents at Time 2. The overall response rate was 10%. Data also collected on five demographic variables that were gender, length of service, field of studies (i.e. science and social sciences), level of qualification (i.e. Master and Ph.D) and employment status (i.e. permanent, probation and contract)
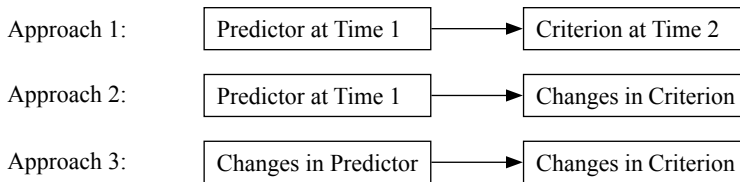
Measures

The study used Spector and Jex's (1998) Quantitative Workload Inventory (QWI) *to measure role overload among academics* ("How often does your job require you to work very fast?). *The five-item QWI* represents the elements of quantity of work, amount of workload and time pressure. This scale had internal reliabilities of .88 at Time 1 and .87 at Time 2. The study used Rizzo, *et al*.'s (1970) six-item scale to measure role ambiguity. The scale measured the level of academics' perceived ambiguity about their role's authority and responsibility, their work objective, necessary information about the job, and the expectation of others of them ('My job has clear, planned goals and objectives"). The study reverse coded all the items of this measure so that they would reflect ambiguity. This scale had internal reliabilities of .85 at Time 1 and .84 at Time 2. Role conflict was measured by Rizzo *et al*.'s (1970) eight-item scale ("I work with two or more groups who operate quite differently"). The scale was intended to measure the perception of resource adequacy, conflicting requests, group interdependence and different working styles experienced by academics. The internal consistencies for the scale were .88 at Time 1 and .84 at Time 2.

Goldberg's (1978) twelve-item General Health Questionnaire (GHQ12) was selected to measure the feeling of strain (sample item: "Been able to concentrate on what you are doing?"). This measure is a screening instrument covering a range of psychiatric symptoms: somatic, anxiety, depression, self-esteem, stress, negative affectivity and social dysfunction (Tait, French & Hulse, 2003). The respondents were asked to rate the frequency with which they had experienced each situation

on six-point scale (1 = Never, 6 = All the time). The internal reliabilities of this scale were .83 at Time 1 and .82 at Time 2.

Analytical Approaches

It is well known that cross-sectional data are of limited use in addressing the question of causality between two variables. Therefore, the study used a longitudinal design to infer causal relationships between the variables in the study. Specifically, the study used three analytical approaches to infer causal relationships: (a) relationships between variables at Time 1 and Time 2, (b) the effects of predictors at Time 1 on changes in criterion variables, and (c) effects of changes in predictor variable on changes in criterion variables. These approaches were used to explain the effect of predictor variable on criterion variable over a specified time period. These three analytical approaches are presented graphically in Figure 1.

Approach 1:	Predictor at Time 1	→	Criterion at Time 2
Approach 2:	Predictor at Time 1	→	Changes in Criterion
Approach 3:	Changes in Predictor	→	Changes in Criterion

Figure 1 Analytical approaches for longitudinal effects

Since this study involved longitudinal data, the study used three different approaches to provide more accurate inferences about causal relationships between predictor and criterion variables. The first approach is the time-effect model that considers the relationship between predictor at Time 1 with the criterion at Time 2. The second and third approaches are two types of change score model: (a) unconditional change score model and (b) conditional change score model (Finkel, 1995). These models are outlined below in more detail.

Time-effect Model

The time-effect model refers to a model to test whether a variable at Time 1 can predict variance in a variable at Time 2. The reason behind the use of this approach is to examine whether there is a significant time effect of a predictor variable on the criterion variables over a specified time period. Using panel data, the criterion variable at Time 2 was regressed on the predictor variable at Time 1, to fulfill the requirement of longitudinal inference in which a predictor precedes a criterion variable in time (Cole & Maxwell, 2003).

Change Score Model

The change score model is a model for assessing predictors of change in a response between two time points, where change in the variable of interest is regressed on the predictor of interest (Finkel, 1995). In order to apply the change score model, the study created new variables that were calculated based on the change score for all variables of interest. For example, role overload at Time 2 was regressed on role overload at Time 1 and then saved the standardized residuals as a new variable to represent changes in role overload between the two periods (Bergh & Fairbank, 2002). The same method applies for the criterion variables. The study used two types of change score models: (a) unconditional change score model and (b) conditional change score model.

The *unconditional* change score model describes the relationship between the predictor variable at Time 1 and changes in the criterion variable over time. In this model, the change in the criterion variable is assumed *to be independent* of the change in the predictor variable (Finkel, 1995). This approach was expected to show that academics who encountered with stressors (e.g. role overload) at a particular point in time will show significant level of changes in consequences (e.g. strain) after a six-month time lag. Therefore, in this particular approach, changes in the criterion variable will be regressed on the predictor variable at Time 1 to examine whether the predictor variable at Time 1 is related to changes in the criterion variable of interest. The reason behind this approach is to examine the effect of a predictor at a particular time to the changes in a criterion over a time period. In this study, the time period was six months.

The *conditional* change score model is an alternative model that looks at how changes in the predictor variables might affect changes in the criterion variable. In this model, change in the criterion variable is assumed *to be dependent* on change in the predictor variable (Finkel, 1995). Therefore, using this model, changes in the criterion variable will be regressed on changes in the predictor variable to examine whether there is a significant relationship between changes in the criterion variable and changes in the predictor variable between two periods.

Analysis

The study performed longitudinal analyses to investigate the effects of role stressors on strain over time. The study used hierarchical multiple regression analysis to examine the contribution of the three role stressors to strain while controlling for some demographic variables (gender, length of service and level of education). T-tests and analyses of variance (ANOVA) performed on demographic variables showed that only gender, length of service and level of qualification were significantly related to strain. Field of study and employment status (permanent/ contract/probation) were not related to strain. In the first step, the study entered

gender, length of service, and level of qualification as control variables to examine their effects on the criterion variable. In the second step, role stressors (i.e. role overload, role ambiguity and role conflict) were entered simultaneously to test whether these variables accounted for significant changes of variance in strain.

RESULTS

Table 1 presents means, standard deviations and intercorrelations among all variables at Time 1 and Time 2. The intercorrelations between a specific variable at Time 1 and Time 2 are on the diagonal and bolded. Strain was positively correlated with all role stressors except for role ambiguity at Time 1 (r = .11).

Table 1 Means, standard deviations, and intercorrelations among study variables at Time 1 and Time 2

Variable at Time 1	Time	Mean	SD	Variable at Time 2							
				1	2	3	4	5	6	7	8
1. Strain	1	2.74	.605	**.54****							
	2	2.61	.527								
2. Role overload	1	3.85	.799	.21**	**.48****						
	2	3.61	.706	. 23**							
3. Role ambiguity	1	2.15	.788	.46**	.11	**.51****					
	2	2.24	.725	.33**	.22**						
4. 4 Role conflict	1	3.21	.974	.33**	.28 **	.31**	**.52****				
	2	3.09	.805	.30**	.28**	.36**					
5. Gender	1			.15*	.22*	.04	.04				
	2			.13	.10	.21*	.03				
6. Length of service	1			-.19*	-.12*	-.18*	-.06	-.13*			
	2			-.07	-.09	.01	-.07.	-.14*			
7. Field of studies	1			.22*	.01	-.02	.01	.17*	-.04		
	2			-.06	-.07	.02	-.11	.17*	-.05		
8. Highest qualification	1			-.13*	.08	-.07	.04	-.15*	.35*	-.15*	
	2			-.13	-.06	.03	-.02	-.16*	.23*	-.12	
9. Status of service	1			.00	-.07	-.06	-.07	-.11	.13	-.03	.06
	2			-.03	-.04	-.17*	-.11	-.19*	.08	-.06	.05

For the purpose of comparison, the study test cross-sectional relations between role stressors and strain at both Time 1 and Time 2. Results are presented in Table 2.

Table 2 Hierarchical regression of strain on role overload, role
ambiguity and role conflict at Time 1 and Time 2

Variables	Time 1 (N = 310)		Time 2 (N = 194)	
	Step 1	Step 3	Step 1	Step 3
Gender	.128*	.081	.102	.065
Length of service	-.145*	-.054	-.040	.001
Qualification	-.056	-.002	-.107	-.058
Role overload		.168*		.053
Role ambiguity		.252*		.262*
Role conflict		.116*		.145*
R^2	.053	.333	.030	.215
Change in R^2		.114		.185
F–statistic change	5.691*	17.153*	2.212	7.785*
Degree of freedom	3, 307	3, 304	3, 191	6, 188

Note: * significant at $p < .05$

The Time 1 and Time 2 regression results based on cross-sectional analysis
show that role overload, role ambiguity and role conflict were positively related
to strain. The study proceeded with three analytical approach to test longitudinal
relation between role stressors and strain. First, analytical approach 1 suggests
that role stressors at Time 1 would predict strain at Time 2. To examine this
proposition the study tested the effect of role stressors at Time 1 on strain at
Time 2 using hierarchical regression. Results of these analyses are presented in
Table 3.

Results in Table 3 show that only role conflict at Time 1 was significantly
related to strain at Time 2. Overall, controlling for demographic variables, the
combined role stressors at Time 1 were significantly related to strain a Time 2
$(F (3, 162) = .4.25, p < .05)$. The R^2 change for the three role stressors was .095,
hence an additional 9.5% of the variance was accounted for.

Analytical approach 2 examined whether role stressors at Time 1 predict
changes in strain over time. The study tested the effects of role stressors at Time 1
on changes in strain over a six-month time period. Results are presented in Table 4.

Results in Table 4 show that no individual role stressor significantly related
to changes in strain. Also, the combined effects of role stressors at Time 1 were
not related to changes in strain over time, with a non-significant R^2 change of .015
$(F (3, 162) = .63, p > .05)$.

The study proceeded with analytical approach 3 that examined whether changes
in role stressors are related to changes in strain over time. Using the same steps
as those in the analyses above, the study tested the longitudinal direct effects of
changes in role stressors on changes in strain. Results are presented in Table 5.

Table 3 Hierarchical regression of strain at Time 2 on role overload, role ambiguity and role conflict at Time 1 (Approach 1)

	Standardized estimate (N = 170)	
	Step 1	**Step 3**
Control Variable:		
Gender	.169*	.133
Length of service	-.181*	-.120
Qualification	-.039	-.050
Role Stressor:		
Role Overload (RO)		.072
Role Ambiguity (RA)		.107
Role Conflict (RC)		.203*
R^2	.077	.172
Change in R^2		.095
F−statistic Change	4.611	4.254*
d.f.	3, 165	3, 162

Note: * significant at p < .05

Table 4 Hierarchical regression of changes in strain on role overload, role ambiguity and role conflict at Time 1 (Approach 2)

	Standardized estimate (N = 170)	
	Step 1	**Step 3**
Control variable:		
Gender	.077	.071
Length of service	-.116	-.111
Qualification	-.034	-.060
Role Stressor:		
Role Overload (RO)		-.012
Role Ambiguity (RA)		-.063
Role Conflict (RC)		-.035
R^2	.026	.011
Change in R^2		.015
F−statistic Change	1.481	.630
d.f.	3, 165	3, 162

Note: * significant at p < .05

Table 5 Hierarchical regression of changes in strain on changes in role overload, role ambiguity, and role conflict (Approach 3)

	Standardized estimate (N = 170)	
	Step 1	**Step 3**
Control Variable:		
Gender	.077	.002
Length of service	-.116	-.116
Qualification	-.034	-.029
Role Stressor:		
Role Overload (RO)		.165*
Role Ambiguity (RA)		.169*
Role Conflict (RC)		.038
R²	.028	.133
Change in R²		.105
F–statistic Change	1.481	3.255*
d.f.	3, 165	3, 162

Note: * significant at p < .05

Table 5 shows that changes in role overload (β = .17) and role ambiguity (β = .17) were positively related to changes in strain over time, but role conflict was not (β = .04). In combination, changes in role stressors significantly related to changes in strain, with the R² change being .105 (F (3, 162) = 3.255, p < .05).

In summary, the results of longitudinal analyses that were based on analytical approaches 1 and 3 indicate that over time role stressors would lead to strain. Overall, Hypothesis of the study is somewhat supported, although there were mixed findings in terms of the significance of the individual effects of role stressor variables on strain.

DISCUSSION

Recall that the analytical approaches used in this study produced different results. For example, in examining the relationships between role stressors and strain, under Approach 1 (i.e. effects of role stressors at Time 1 on strain at Time 2), only role conflict, but not role overload and role ambiguity, was related to strain. Under Approach 3 (i.e. the effects of changes in role stressors on changes in strain), role overload and role ambiguity, but not role conflict were related to strain. This is inconsistent with the results from cross-sectional analyses in which all role stressors were related to strain.

This two-wave panel study was designed to investigate the effects of role stressors on strain over time. As mentioned earlier, the study used three analytical

approaches to investigate the longitudinal relationships between role stressors and strain. Approach 1 (time effect model) was intended to examine the effect of role stressors at Time 1 on strain six months later. Approach 2, the unconditional change score model (which tested the relationship between changes in strain and role stressors at Time 1) tested the effect of role stressors at Time 1 on changes in strain over a six-month time lag. Approach 3, the conditional change score model (which show the relationship between changes in role stressors and changes in strain), was used to examine the effect of changes in role stressors on changes in strain over a six-month time lag. Longitudinal analyses based on these three analytical approaches produced different results. Based on Approach 1, role overload and role ambiguity at Time 1 were not related to strain six months later. However, based on Approach 3, changes in role overload and role ambiguity were related to changes in strain over a six-month time lag. On the other hand, role conflict at Time 1 was related to strain six months later, but, based on Approach 3, changes in role conflict were not related to changes in strain over a six-month time lag. The salient findings from this analytical approach are that the six-month time lag was sufficient to show that the changes in role overload and role ambiguity (but not role conflict) were the cause of changes in levels of strain among academics (i.e. based on approach 3). This seems to suggest that role overload and role ambiguity affect long-term goal accomplishment, whereas role conflict may only affect short-term goal accomplishment. Moreover, these findings also highlight the contribution of sustained role overload and role ambiguity to strain among academics. Academics who experience role overload and role ambiguity over a certain period of time are likely to experience strain.

The different longitudinal effects of the three role stressors on strain deserve an explanation. A possible reason is that different time lags were needed for these role stressors to have effects on strain. Role overload and role ambiguity may take some time to exert a major effect on strain, while the effect of role conflict may be more immediate. Peiro and colleagues used a time lag of a year to find the effects of role overload, role ambiguity, and role conflict on emotional exhaustion (Peiro *et al.*, 2001). The initial assumption that six-month lag time was sufficient to estimate the causation of role overload and role ambiguity to strain was based on its correspondence with a semester of teaching. However, the results suggest that it might take more than six months for role overload and role ambiguity to exert a substantial effect. Zaheer and colleagues point to the concept of the 'existence interval', which refers to 'the length of time needed for one instance of the process, pattern, phenomenon, or event to occur' (Zaheer, Albert, & Zaheer, 1999, p730). Different time intervals could alter the theoretical relationships between phenomena under study. In this study, the existence interval could be an academic year that can be linked to events and activities in universities such as performance appraisals, salary increments, and research evaluations. This existence interval that represents a series of organizational actions and events could alter the relationships between

these role stressors and strain (Ancona & Chong, 1996). For example, ambiguity about research and publications may take a year to have an effect on strain when academics are evaluated on their yearly research performance. Moreover, academics might have realized that teaching loads for the past year have left little time for them to do research. They might also have delayed in starting their research project due to unclear research direction. Since research normally takes more than six months to be published, the six-month lag time that was used in this study might not be enough to detect the effects of role overload and role ambiguity at Time 1 on strain six month later. They may realize these role stressors as threats to their well-being at the point of performance appraisal exercise a year later.

In contrast to role overload and role ambiguity, the study found that role conflict was related to strain within a six-month lag time. One possible reason might be that the perception of conflicting requests, or different working styles, might have been perceived by academics as threatening their well being in a shorter period. The perception of conflicting demands threatens the smooth implementation of work assignments when an academic has to attend to the requests of two superiors at the same time and the demands of two or more tasks. He or she may become less productive and this can limit short-term goal accomplishments. Thus, role conflict at Time 1 was related to strain six months later. In other words, the effects of role conflict appear to be more immediate than role overload and role ambiguity.

As mentioned earlier, time lag seems to play an important role in determining the effects of these analytical approaches (Zaheer *et al*., 1999). For example, the nature of the shorter-term effect of role conflict is believed to make Approach 1 works for it, but not for role overload and role ambiguity which have relatively longer-term effects on strain. Therefore, without a proper time lag to suit the nature of the relationship between variables, Approach 1 appears to lack power to predict longitudinal relations. For example, the perception of role conflict that can be eliminated as soon as the perceptions of conflicting requests are solved shows an immediate nature of its effect on strain.

Approach 2 did not produce any significant effects. One possible reason may be due to the autocorrelations between the variables. The change score might be related with initial measurement point (Bergh & Fairbank, 2002). It is nevertheless true in all behavioral studies that any given variable measured at time t correlate with itself when measured at a later time t + 1 (Maxwell & Cole, 2007). In this study, possibly role overload and role ambiguity at Time 2 correlated with their initial levels. Moderately high correlations between variables at Time 1 and Time 2 confirm these (Table 5.12). Maxwell and Cole (2007) assert that if the correlation between variable at Time 1 and Time 2 were large, one would say that the variable is stable even if the mean score changes during the specified period. Change score approach (Approach 3) has overcome this problem. This approach successfully removed the correlation between the change score and its initial component measure (Bergh & Fairbank, 2002) and gave better results. The results are also

more consistent with the results from cross-sectional analyses. Therefore, the study suggests that Approach 3 is a better approach to examine longitudinal relationships.

THEORETICAL AND PRACTICAL IMPLICATION

Theoretically, this study supports the role stress theory (Kahn *et al*., 1964) that role stressors are related to strain. The model specifies that individuals who are exposed to role stressors will first experience strain and then other consequences. Role stress theory contributes to knowledge discovery through the understanding the nature of longitudinal effect that can be expected as a result of certain role stressors. In this study, the hypothesized role stressors, particularly role ambiguity, were found to be associated with strain.

In term of practical implication, the findings of the study seem to suggest that some role stressors would take longer to have an effect on strain. Long-term effects of role overload and role ambiguity on strain imply that it might be difficult to prevent strain from occurring. Individuals may endure certain level of role overload and role ambiguity for a certain period of time in order to maintain their self-esteem (Bradley, 1978). The delay in recognizing the threats posed by role overload and role ambiguity may cause a delayed effect on strain. Long-term effects normally have lasting and adverse psychological consequences that may not become fully manifest within six months and could be difficult to rectify if left untreated.

LIMITATIONS AND FUTURE RESEARCH

The results of this study need to be viewed in the light of the study's limitations. The first limitation pertains to the generalisability of the findings. Since this study was conducted using academics from five large public universities, it may not represent levels of occupational stress in all public universities in Malaysia or in private universities. This study may only represent the experience of staff in large universities that have a relatively established curriculum design and a larger number of students.

A second limitation concerns the six-month lag time that was used in this study to examine the relations between predictors and the criterion variables. There were neither theoretical arguments nor sufficient empirical evidence in the literature to provide guidance on the most appropriate time lag for the effects of these variables on one another (Finkel, 1995; Zaheer, Albert, & Zaheer, 1999). Consequently, we used a six-month lag time because it constitutes a full cycle of the academic semester that was adopted by all of the targeted universities. It is possible that a full academic year might be more appropriate to predict the effects of role overload and role ambiguity on strain, because the key performance indicators for academics, such as teaching loads, research publications, and the number of students supervised, are reviewed on a yearly basis. Therefore, it is recommended that future research

test the effect of role stressors on strain using a lag time of one year or more to see if the results obtained here would be replicated over a longer period of time.

CONCLUSION

The findings of this study refine our understanding of the longitudinal process underlying the stressor-strain relationship. Therefore adopting this longitudinal design of the stress process will help to better understand occupational stress among academics in Malaysia, which complements stress studies that have been done in Western countries. Overall, the role stress theory that has been adopted as the conceptual framework in this study provided evidence of how work environments influence an individual's psychological strain in an organization.

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