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Full Length Research Paper

Impact of role ambiguity and role conflict on employee creativity

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Exactly how role stress and various performances of individuals are related has received considerable attention, in which stress has been found to affect individual creativity. However, exactly how role stress and employee creativity are related has seldom been examined empirically. By extending the results of literature, this study proposes five hypotheses on how role ambiguity and role conflict (via self-efficacy and job satisfaction) affect employee creativity directly and indirectly. Survey data from 202 employees of Taiwanese companies reveal not only a direct and negative link between role ambiguity and creativity, but also a direct and positive link between role conflict and creativity. The survey results further demonstrated that both self-efficacy and job satisfaction serve as partial mediators between role conflict and creativity. However, only job satisfaction (and not self-efficacy) is a partial mediator between role ambiguity and creativity. Implications of the findings of this study and possible directions for future research are also discussed.

Key words: Role ambiguity, role conflict, creativity.

INTRODUCTION

As is widely recognized, enhancing employee creativity is essential for a competitive edge and organizational survival (Amabile, 1988; Burnside, 1990; Shalley, 1995). Exactly how social environment impacts employee creativity has thus received considerable attention in recent decades (Amabile et al., 1996; Perry-Smith and Shalley, 2003). Amabile et al. (1996) identified several work environment factors that either enhance or reduce the intrinsic motivation of employees, thus increasing or decreasing their creativity. For instance, time pressure may either benefit or harm employee creativity (Andrews and Farris, 1972; Ekvall and Ryhammer, 1999; Baer and Oldham, 2006; Amabile et al., 1996). As time pressure belongs to work stress, the latter has been extensively studied given its prevalence in contemporary society and its potential impact on employee productivity (Jex, 1998; Beehr, 1995; Tubre and Collins, 2000). The European Foundation and European Commission cited work stress as the primary complaint among workers (Paoli and Costa, 1994). The American Institute of Stress (2004) estimated that organizational costs of workplace stress for U.S. employers are more than $US 300 billion annually.

Role stress is a commonly studied work stress at the individual level (Beehr, 1995), largely owing to that roles are integral to work-related functions of employees. Role stress may occur if expected and perceived roles differ. In recent decades, many organizations have switched their focus to organizational change, flexibility, and employee empowerment (Smith, 1997; Kalleberg, 2001). However, the growing emphasis on organizational change, flexible work arrangements, employee empowerment, and autonomous working conditions has led to constantly changing job specifications and role uncertainty. Moreover, losing stable job boundaries subsequently increases the potential for role stress (Applebaum and Berg, 1997; Cooper and Dewe, 2004). Role stress is generally viewed as detrimental to individual and organizational outcomes, such as increases in perceived job tension, job dissatisfaction, employee turn over, and employee burnout (Fisher and Gitelson, 1983; Jackson and Schuler, 1985; Van Sell et al., 1981; Lee, 1997; Jones, 1993) and diminished organizational commitment

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diminished organizational commitment and performance (Johnston et al., 1990; Jackson and Schuler, 1985). Still, role stress affects individual outcomes either positively or negatively (Beehr and Glazer, 2005).

Unfortunately, exactly how role stress and employee creativity are related is unclear, explaining why this relation has seldom been examined. This relation is relevant given that employee creativity is essential for organizational success and an increasing number of individuals inevitably suffer from role stress (Jex, 1998; Beehr and Glazer, 2005). Therefore, understanding how role stress and employee creativity are related as well as mediators or moderators of such relations have obvious theoretical and practical implications. Two related issues are therefore explored.

Owing to that role ambiguity and role conflict are the two main components of role stress (Jackson and Schuler, 1985), this study examines whether role ambiguity and role conflict influence employee creativity. Whether self-efficacy and job satisfaction mediate the relations bet-ween role ambiguity, role conflict and employee creativity is also examined. Although role stress may influence self-efficacy and job satisfaction (Beehr and Newman, 1978; Jex and Gudanowski, 1992; Kahn et al., 1964; Singh et al., 1996), the mediating effects of self-efficacy and job satisfaction between role stress and employee creativity have seldom been examined.

The rest of this paper is organized as follows. Section 2 introduces relevant literature and the five hypotheses of this empirical study. Section 3 then describes the research method, samples, research settings, measurement, and analysis method. Next, Section 4 summarizes the results and exploratory findings. Conclusions are finally drawn in Section 5, along with recommendations for future research.

THEORETICAL BACKGROUND AND HYPOTHESES

Several models of how stress in a work environment impacts employees have been developed in work stress research. Two of the first work stress models originated from the institute for social research (ISR) model of work stress (Katz and Kahn, 1978) and the McGrath's process model of work stress (McGrath, 1976). Based on these models, while developing a model of how job stress impacts job performance, Jex (1998) asserted that most work stress that impacts job performance can be described as both direct and indirect. Restated, although some work stress such as situational factors directly affects performance, much work stress also influences performance indirectly by initially impacting many antecedents of performance.

Alternatively, the theoretical work that is the componential model of creativity, of Amabile (1988, 1996) as a general framework describes many relevant environmental or societal factors that can either enhance or diminish employee creativity. This pioneering model thoroughly reviewed how cognitive, personality, motivational, and societal influences impact on creativity.

While not specifically defining a particular environmental factor, this model attempts to explain why employee work is vital for creativity. For instance, the Amabile model viewed workload pressure as a work environment factor that affects creativity. Moreover, other studies such as Amabile (1983) and Backer (1992) indicate that managing stress, ambiguity, and conflict are essential to ensure creative thought and needs of intrinsic motivation. There-fore, while this study attempts to build upon these models, work stress might be included in contextual factors to influence creativity. Such theoretical models provide the conceptual framework for this study.

Among the numerous forms of work stress include work overload, time pressure, and role stress. In organizations, roles serve to function in the role of coordinating individual behaviors (Katz and Kahn, 1978). As is widely assumed, role stress significantly contributes to organizational outcomes. Moreover, role ambiguity and role conflict are among the most widely studied role stress variables, explaining why this study adopts them rather than role stress. We posit that role ambiguity and role conflict influence employee creativity.

Role ambiguity and creativity

According to role theory, role ambiguity refers to the lack of specificity and predictability for an employee's job or role functions and responsibility (Kahn et al., 1964; Beehr, 1976). Unclear role-related information may lead to role ambiguity. Exactly how role expectations or goals affect creativity has received considerable interest. For instance, Shalley and Gilson (2004) proposed several job-level con-text factors of creativity, including role expectation and goals. Mumford (2000) asserted that goals are an informational directive mechanism. Goals are an impor-tant factor in creativity because they are often ambiguous, and ambiguity may induce stress. Additionally, Ford (1996) suggested that employees who are confused by other goals (e.g., who are attempting to cope with strain or to reduce strain) may abandon creative initiatives.

According to Amabile and Gryskiewicz (1987), management must establish clear organizational goals to achieve high creativity. Sherman (1989) postulated that role clarity is a positive motivator for engineers and technical personnel. According to that study, when motivated properly, engineers tend to solve problems that require a high level of effort and innovation to complete a project. Moreover, role clarity is also positively related to innovation (Jansen and Gaylen, 1994). Role clarity refers to how clearly a set of activities expected from an individual are expressed. Role ambiguity or role uncertainty is the reverse situation (Jansen and Gaylen, 1994). This implies that role ambiguity negatively and significantly affects employee creativity. Therefore, we hypothesize the following:

Hypothesis 1: Role ambiguity negatively affects employee creativity.

Role conflict and creativity

According to role theory, role conflict results from two or more sets of incompatible demands involving work - related issues (Kahn et al., 1964; Katz and Kahn, 1978). According to Farr and Ford (1990), stress produces routine behavioral patterns and generally interferes with novel or creative responses. Jex (1998) noted that stress and strain particularly hamper the motivational aspects of performance, such as manifest effort or going beyond routine job responsibilities. Taggar (2002) demonstrated that teams have difficulty in assigning tasks, and the roles of team/members could indirectly distract an individual and directly from a team's ability to perform creatively.

Despite the potentially negative effects of role conflict, contrary evidence suggests that role conflict might en- hance creativity. First, an individual's promise of multiple roles (e.g., work-family conflict) is a response to role demands that induce strain (Lenaghan and Sengupta, 2007). Moreover, strain is often viewed as a negative emotional response to stress that could eventually lead to a negative affect (Rothbard, 2001). Importantly, other studies have suggested that a negative affect might increase creativity. For instance, Ludwig (1992) found that depression and the level of creative achievement are slightly, but significantly correlated with each other. According to George and Zhou (2002), information provided by negative affective states can influence an individual's effort and creativity at work. Second, some studies adopt a positive view towards role conflict. For instance, when individuals engage in multiple roles, it might create positive affect (Lenaghan and Sengupta, 2007). Interestingly, some researchers suggest that a positive affect leads to cognitive variation that stimulates creativity. For instance, Isen (1999a, b) stated that, through a cognitive process, a positive affect enhances creativity. Third, other researchers asserted that role conflict can expose individuals to different perspectives, make them more flexible, and expand their source of information (Jones, 1993; Seiber, 1974). Such changes may increase creativity. Similarly, Janssen (2000) found that higher levels of job demands (including role ambiguity and/or conflicting role demands) trigger innovative res-ponses. In sum, role conflict seems to enhance or reduce creativity. We thus posit the following:

Hypothesis 2: Role conflict significantly affects employee creativity.

Role ambiguity, self-efficacy, and creativity Self-

efficacy appears to significantly influence how work stress and employee creativity are related. As a major element in the social learning theory of Bandura (1977, 1978), self-efficacy refers to an individual's belief in one's competency to perform a specific task. Researchers have contended that reducing self-efficacy may induce job-related strain (Brief and Aldag, 1981; Stumpf et al., 1987). Gist and Mitchell (1992) argued that a larger number of individuals that believe their performances are uncontrollable (that is high role ambiguity and conflict) imply a lower self-efficacy among them. Bray (1998) and Eys and Carron (2001) indicated that role ambiguity is related to self-efficacy. Hartline and Ferrell (1996) and Chebat and Kollias (2000) also suggested that role ambiguity is negatively related to employee self-efficacy. Role ambiguity may be negatively related to self-efficacy for the following two reasons (Li and Bagger, 2008). First, role ambiguity diminishes the quality of the information available to evaluate correctly an individual's ability to perform a task. Secondly, according to social cognitive theory (Bandura, 1977), achieving a high level of self-efficacy requires that an individual can visualize an excellent performance in a given situation. However, high role ambiguity inhibits an individual's ability to visualize one's performance, ultimately reducing one's confidence in their ability to perform effectively. Clearly, role ambiguity may negatively affect an employee's self-efficacy.

Additionally, self-efficacy may influence employee creativity. In this respect, Bandura and Schunk (1981) stated, that "a sense of personal efficacy in mastering challenges is apt to generate greater interest in the activity than is self-perceived inefficacy in producing competent performances" (p. 587). Their test results indicated that self-efficacy is positively related to intrinsic interest. Moreover, intrinsic interest (or motivation) is essential for employee creativity (Amabile, 1988; Amabile et al., 1994; Tierney et al., 1999). A subsequent study by Bandura posited that self-efficacy and creative performance are likely related (Bandura, 1997). Similarly, Ford (1996) included self-efficacy beliefs as a major motivational element in his model of individual creativity. Furthermore, Tierney and Farmer (2002) explained that creative efforts require an internal, sustaining force that drives individuals to persist in the face of the challenges of creative work. Obviously, self-efficacy may positively affect employee creativity. We thus hypothesize the following:

Hypothesis 3: Self-efficacy mediates the relation between role ambiguity and employee creativity.

Role conflict, self-efficacy, and creativity

Role conflict as well as role ambiguity can reduce self-efficacy (Jex and Gudanowski, 1992). Bandura (1997) asserted that role conflict and ambiguity may negatively affect self-efficacy. That is, environments with conflict

cause individuals to question their capabilities. Thus, experiencing role conflict may decrease self-efficacy. Martinko and Gardner (1982) and Gist and Mitchell (1992) reached a similar consensus. Evidence from several empirical studies supports this argument. For instance, Hartline and Ferrell (1996) and Chebat and Kollias (2000) found that a higher level of customer-contact employee role conflicts imply a lower level of customer-contact employee self-efficacy. Beauchamp and Bray (2001) also found that role conflict is negatively associated with role-related efficacy. Karatepe et al. (2006) recently demonstrated similar results for the deleterious effects of role conflict on self-efficacy. We thus, posit the following:

Hypothesis 4: Self-efficacy mediates the relation between role conflict and employee creativity.

Role ambiguity, role conflict, job satisfaction, and creativity

Job satisfaction also appears to significantly influence how work stress and employee creativity are related. Locke (1976) defined job satisfaction as a pleasurable or positive emotional state based on an appraisal of one's job experiences. Previous research on the relation between role ambiguity and job satisfaction, as well as the relation between role conflict and job satisfaction, found a negative correlation (Kahn et al., 1964; Rizzo et al., 1970). In marketing literature, role stress negatively affects a salesperson's job satisfaction through marketing-oriented boundary spanners and managerial sales orientations (Singh et al., 1996; Sumrall and Sebastianelli, 1999). In accounting literature, role ambiguity and role conflict also negatively related with job satisfaction (Gregson and Wendell, 1994; Rebele and Michaels, 1990; Fisher, 2001; Ussahawanitchakit, 2008).

Others studies obtained similar results (Van Sell et al., 1981; Fisher and Gitelson, 1983; Jackson and Schuler, 1985; Chang and Hancock, 2003; Chen et al., 2007; Karadal et al., 2008; Ho et al., 2009; Tarrant and Sabo, 2010; Wu and Norman, 2006). A positive correlation has seldom been found between role stress and job satisfaction (Igbaria et al., 1994). Consequently, role ambiguity and role conflict appear to negatively influence job satisfaction.

Although job satisfaction has been extensively studied in organizations, its relation to creativity has seldom been addressed. For instance, Nerkar et al. (1996) found that job satisfaction is positively related to innovative performance. Shipton et al. (2006) investigated how aggregate job satisfaction and organizational innovation are related, indicating that aggregate job satisfaction benefits subsequent organizational innovation. Other studies supported this suggestion (Whaley, 1993; Akehurst et al., 2009). Such a relation may exist for several reasons (Shipton et al., 2006). First, Isen and Baron (1991) and Isen et al. (1987) indicated that individuals who experience positive feelings in organizations are more likely to be creative. The framework of Staw et al. (1994) suggests that satisfaction or positive feelings at work might be attributed to several mechanisms to encourage innovation. That is, positive feelings can increase both the expectancy and belief that leads to an excellent performance and desirable outcomes such as innovation. Second, job satisfaction is related to intrinsic motivation (Oishi et al., 1999), and intrinsic motivation is essential for creativity (Amablie, 1988). Job satisfaction thus leads to creativity. Interestingly, some studies indicate that under certain circumstances, employees who are dissatisfied with their jobs are more creative than those who are satisfied (e.g., Zhou and George, 2001; George and Zhou, 2002). Based on these findings, job satisfaction may induce creativity. We thus posit the following:

Hypothesis 5: Job satisfaction mediates both the relation between role ambiguity and employee creativity, as well as the relation between role conflict and employee creativity.

METHODS

Research setting, participants, and procedures

Two hundred and two employees from 25 Taiwanese manufacturers or service sector providers in central Taiwan participated in this study. Employee positions included administrative staff, design engineers, manufacturing engineers, technicians, and sales persons, in various divisions of the company, including engineering, R and D, marketing, and information technology. To eliminate common response biases, direct supervisors and subordinates were selected from each company to complete different survey instruments. The survey required direct supervisors to evaluate the creativity of their subordinates. After completing the evaluation, the direct supervisors were instructed to give an employee questionnaire to each subordinate. Employee questionnaires contained information on role ambiguity, role conflict, self-efficacy, and job satisfaction scales. Each employee questionnaire was marked with an identification code so that the supervisors' evaluation could be matched with the subordinates' responses. Participants were ensured confidentiality of all information in the survey. Moreover, the general managers or department directors of each company were contacted by telephone and elicited to participate in the study.

Two hundred and two pairs of completed and usable questionnaires were returned, representing an overall response rate of 50.5%. Most employees (about 51%) ranged between 26 and 35 years old. The greater majority (about 86%) had an undergraduate degree or above and about 46% of them had been working in the company between one and five years. The sample respondents included 99 females (49%) and 103 males (51%). Finally, about 26% of the companies had between 300 and 400 employees.

Measures

In addition to control variables, participants responded to measures of role ambiguity, role conflict, self-efficacy, job satisfaction, and creativity. Responses to the measures were rated on a 6- point scale (1=strongly disagree to 6=strongly agree). The Appendix provides a detailed list of scales.

Role ambiguity

Rizzo et al. (1970) defined role ambiguity as "reflect certainty about duties, authority, allocation of time, and relationships with others; the clarity or existence of guides, directives, policies; and the ability to predict sanctions as outcomes of behavior"(p. 156). This is closely aligned to the objectives of this study. This study thus follows the definition of Rizzo et al. (1970). The six items from the role ambiguity scale developed by Rizzo et al. (1970) were averaged. Cronbach's alpha in this study was 0.86.

Role conflict

In accordance with Rizzo et al. (1970), this study defined role conflict as "the dimensions of congruency- incongruency or compatibility-incompatibility in the requirements of the role, where congruency or compatibility is judged relative to a set of standards or conditions which impinge upon role performance"(p.155). For example, an employee who must play two or more roles simultaneously may find that the demands of the roles are incompatible. Eight items from the role conflict scale also developed by Rizzo et al. (1970) were averaged. Cronbach's alpha in this study was 0.89.

Self -efficacy

Self-efficacy, as initially defined in social psychology by Bandura (1977), has regularly appeared in organizational psychology literature. Thus, this study adopts the definition of Bandura (1986) for self- efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p.391). Ten items adapted from Riggs et al. (1994) were averaged to create a measure of self-efficacy. Cronbach's alpha in this study was 0.93.

Job satisfaction

Two theories dominate job satisfaction literature: expectancy theory (Vroom, 1964) and two-factor theory (Herzberg et al., 1959). Two-factor theory asserts that, while increasing job satisfaction requires bringing about changes in the motivators, decreasing job dissatisfaction entails increasing the hygiene factors. In contrast, expectancy theory argues that increasing job satisfaction involves either lowering expectations or increasing rewards. Job satisfaction can be viewed as a global feeling about a job (global approach) or as a combination of attitudes about various facets of the job (facet approach) (Spector, 1997). The global approach, which is applied when the overall attitude is of interest, can be measured by simply proposing a holistic question about whether or not an employee is satisfied.

A single- item measure is generally used to assess overall job satisfaction (Wanous et al., 1997). Structured scales developed to measure global job satisfaction include the Job in General Scale (Ironson et al., 1989) and the Michigan Organizational Assessment Questionnaire satisfaction subscale (Cammann et al., 1979). The facet approach is used to identify which aspects of a job produce satisfaction or dissatisfaction (Spector, 1997). Facet job satisfaction scales measure satisfaction with a specific job facet. Examples include the Job Satisfaction Survey (Spector, 1985), the Job Descriptive Index (Smith et al., 1969), and the Minnesota Satisfaction Questionnaire (Weiss et al., 1967). This study adopted two-factor theory because it captures the conceptual domain in this study better. Thus, this study adopted the definition of Locke (1969) for job satisfaction as "the pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating the achievement of one's job value" (p.316).

Of these scales, the Minnesota Satisfaction Questionnaire has the most facets and was used to measure job satisfaction in this study. Job satisfaction was assessed with the 20 item Minnesota Satisfaction Questionnaire (MSQ) scale short form adapted from Weiss et al. (1967) . These items required respondents to assess three categories of job satisfaction. The general satisfaction scale score was obtained by summing the scores for these 20 items. The Cronbach's alpha of these 20 items was 0.94.

Creativity

This study adopted the definition of Amabile (1988) for creativity as "the production of novel and useful ideas" (p.126); several creativity studies have also adopted this definition. Creativity was measured with a 13-item scale adapted from Zhou and George (2001). The 13 item scale was averaged for an overall score. Direct supervisors familiar with the employees' work behavior were instructed to rate each of their 13 work behaviors of creativity. Cronbach's alpha in this study was 0.94.

Confirmatory factor analyses

The study performed confirmatory factor analysis (CFA) of a single first-order model of the role ambiguity construct. The analytical results showed that the single first -order model obtained a satisfactory data fit (^{2} = 6.08, *df* = 5, GFI = 0.99, AGFI = 0.96, RMSEA = 0.027, NFI = 1.00). A single first- order model established for the role conflict construct also obtained a good data fit (^{2} = 34.08, *df* = 18, GFI = 0.96, AGFI = 0.92, RMSEA = 0.067, NFI = 0.98).

Finally, CFA was performed for a first-order model of the self-efficacy, job satisfaction, and creativity constructs. Again, the CFA results indicated that the model had acceptable data fit (^{2} = 57.01, *df* =29, GFI = 0.95, AGFI = 0.90, RMSEA = 0.069 NFI =0.98; ^{2} = 280.21, *df* = 159, GFI = 0.89, AGFI = 0.85, RMSEA = 0.060, NFI = 0.97; ^{2} = 175.58, *df* = 52, GFI = 0.90, AGFI = 0.84, RMSEA = 0.090 NFI = 0.97).

The study assessed construct reliability through calculation of composite reliability that assesses whether indicators are sufficient in their representation of their respective latent variables. Estimated composite reliability ranged from 0.90 to 0.95 (role ambiguity = 0.90, role conflict = 0.91, self-efficacy = 0.93, job satisfaction = 0.95, creativity = 0.92). All values exceeded 0.60, which satisfied the general reliability requirement for research instruments (Bagozzi and Yi, 1988) . Analysis of shared variance among indicators of each construct obtained average variance extracted (AVE) estimates ranging from 0.52 - 0.65 (role ambiguity = 0.61, role conflict = 0.56, self-efficacy = 0.60, job satisfaction = 0.52, creativity = 0.65). An AVE estimate of 0.50 or higher indicates that a measure of a construct is valid (Fornell and Larcker, 1981). All estimates were well above this value, which indicated that convergent validity was acceptable.

Control variables

This study follows previous literature that identifies several demographic variables, including an individual's age, education, and gender, as well as potential influences on employee creativity (Mumford et al., 2002; Shalley et al., 2000). This study included age, education, and gender because of our focus on the creativity of the individuals.

Table 1. Means, standard deviations, and correlations.

Variable	Mean	S.D.	1	2	3	4	5	6	7	8
Age	3.18	1.63								
Gender [a]	1.49	0.50	-0.02							
Education	2.58	0.84	-0.11	-0.04						
Role ambiguity	2.32	0.67	-0.24**	-0.03	-0.00	(0.86)				
Role conflict	3.33	0.87	-0.06	-0.13	0.11	0.24**	(0.89)			
Self-efficacy	3.80	0.81	0.23**	-0.06	0.01	-0.25***	-0.27***	(0.93)		
Job satisfaction	4.14	0.74	0.14*	0.06	-0.04	-0.36***	-0.35***	0.28***	(0.94)	
Creativity	4.05	0.70	0.03	-0.08	0.00	-0.31***	0.19**	0.17*	0.32***	(0.94)

[a]Gender (male = 1, female = 2); * p < .05 ** p < .01 *** p < .001; Cronbach's alphas are in parentheses.

RESULTS

Table 1 displays the mean averages, standard deviations, and correlations among all variables. Role ambiguity was negatively correlated with creativity (r = - 0.31, p < 0.001), self-efficacy(r = - 0.25, p < 0.001), and job satisfaction(r = - 0.36, p < 0.001). Role conflict was positively correlated with creativity(r = 0.19, p < 0.01). However, role conflict was negatively correlated with self- efficacy(r = - 0.27, p < 0.001) and job satisfaction(r = - 0.35, p < 0.001). Additionally, self-efficacy and job satisfaction were positively correlated with creativity (r = 0.17, p < 0.05; r = 0.32, p < 0.001). Before conducting regression analyses, the study examined residual plots and Kolmogorov - Smirnov (KS) tests and verified that regression assumptions were satisfied. The hypotheses were tested by performing hierarchical regression analyses. The suitability of the regression analysis was examined by testing for multicollinearity by checking the VIF (variable inflation factor) and CI (condition index). This examination did not reveal any violation in conducting the multiple regressions.

Hypotheses testing

Hypothesis 1 posits that role ambiguity negatively affects creativity. Hierarchical regression was performed to assess this hypothesis. The control variables were entered into the equation first, followed by the role ambiguity term. The first column of Table 2 displays the results of the analyses.

As hypothesized, the negative effect of role ambiguity on creativity was significant (= - 0.33, p < 0.001). Hypothesis 2 states that role conflict significantly affects creativity. According to the results of the hierarchical regression analysis, as shown in the first column of Table 2 as well, the effect of role conflict on creativity was positively significant (= 0.28, p < 0.001). Thus, Hypothesis 1 and 2 were supported. Hypothesis 3 states that self-efficacy mediates the relationship between role ambiguity and creativity while Hypothesis 4 states that self-efficacy mediates the relationship between role conflict and creativity. In addition, Hypothesis 5 posits that job satisfaction mediates both the relation between role ambiguity and creativity and the relation between role conflict and creativity. This study examines the mediated variables by following the suggestion of Baron and Kenny (1986). Considering a variable as a mediator of a dependent variable requires satisfying four conditions: The independent variable involved should significantly contribute to the dependent variable; The independent variable should significantly contribute to the mediator; The mediator should significantly contribute to the dependent variable; and when the influence of mediator is held constant, the independent variable to the dependent variable should have an insignificant contribution or decrease in magnitude despite the fact that it remains significant (Baron and Kenny, 1986).

The block of control variables was first introduced into the equation, followed by appropriate independent and mediating variables. As mentioned above, in column 1 of Table 2, both role ambiguity and role conflict significantly contributed to creativity, thereby satisfying condition 1. Next, whether the role ambiguity and role conflict measures contributed to the mediators (self-efficacy and job satisfaction) was examined. According to the results in columns 2 and 3, role ambiguity and role conflict made negative, significant contributions to self -efficacy (role ambiguity, = - 0.21, p < 0.01; role conflict, = - 0.23, p < 0.01), and negative, significant contributions to job satisfaction (role ambiguity, = -0.28, p < 0.001; role conflict, = - 0.27, p < 0.001). These results satisfied condition 2 for mediation, suggesting that role ambiguity and role conflict affect self-efficacy and job satisfaction.

Condition 3 was examined by entering the control variables and mediators into an equation predicting creativity. According to column 4, both self-efficacy and job satisfaction made positive, significant contributions to creativity (self-efficacy, = 0.16, p < 0.05; job satisfaction, = 0.31, p < 0.05). Thus, these results satisfied condition 3 for mediation. Condition 4 was then examined by introducing control variables, self-efficacy, role ambiguity, and role conflict measures into an equation forecasting

Table 2. Summary of hierarchical regression analysis results.

Variable	Creativity		Self-efficacy		Job satisfaction		Creativity		Creativity		Creativity	
Step1												
Age	0.03		0.23**		0.14*		-0.03		-0.07		-0.06	
Gender	-0.07		-0.05		0.06		-0.09		-0.04		-0.06	
Education	0.00		0.04		-0.01		0.00		-0.04		-0.03	
R^2		0.01		0.05*		0.02		0.01		0.01		0.01
Step2												
Self-efficacy							0.16*		0.16*			
R^2								0.02*		0.02*		
Step3												
Job satisfaction							0.31***				0.32***	
R^2								0.08***				0.11***
Step4												
Role ambiguity	-0.33***		-.21**		-0.28***				-0.31***		-0.24**	
R^2		0.10***		0.04**		0.11***				0.08***		0.05**
Step5												
Role conflict	0.28***		-.23**		-0.27***				0.32***		0.38***	
R^2		0.07***		0.05**		0.07***				0.09***		0.12***
R^2 for total	0.18***		0.15***		0.21***		0.12***		0.21***		0.28***	
F for total	8.7		6.79		10.29		5.24		8.54		12.79	

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

creativity. According to the results in column 5, the magnitude of role ambiguity contribution for creativity measures was reduced (R^2 = 0.10 - 0.08), suggesting that self efficacy served as a partial mediator of the role ambiguity effect on creativity. However, the magnitude of role conflict contribution for creativity measures was not reduced (R^2 = 0.07 - 0.09), suggesting that self-efficacy failed to mediate the relation between role conflict and creativity. In a similar vein, this study also introduced the control variables, job satisfaction, role ambiguity, and role conflict measures into an equation predicting creativity. According to the results in column 6, the magnitude of role ambiguity contribution for creativity measures was reduced (R^2 = 0.10 - 0.05), suggesting that job satisfaction served as a partial mediator of the effect of role ambiguity on creativity. However, the magnitude of role conflict contribution for creativity measures was not reduced (R^2 = 0.07 - 0.12), suggesting that self-efficacy failed to mediate the relation between role conflict and creativity.

Although mediation analyses are most often guided by the procedures outlined by Baron and Kenny (1986), Preacher and Hayes (2004) noted the shortcomings of the Baron and Kenny method. They suggested the importance of directly testing the significance of indirect effects and provide SPSS and SAS macros. Thus, this study also examined the mediated variables with macros and SPSS/PASW 18 as suggested by Preacher and Hayes (2004). The Sobel test results showed that the estimated indirect effects of role ambiguity on creativity through self-efficacy and job satisfaction were -0.02 (z = -1.27, p = 0.202) and -0.09 (z = - 2.87, p < 0.01), respectively. Therefore, job satisfaction (but not self-efficacy) mediates the relation between role ambiguity and creativity. Addi-tionally, the estimated indirect effects of role conflict on creativity through self-efficacy and job satisfaction were -0.05 (z = -2.53, p < 0.05) and -0.12 (z = -4.09, p < 0.01), respectively. Thus, both self-efficacy and job satisfaction mediate the relation between role conflict and creativity. Although the results were mostly inconsistent with those obtained using the Baron and Kenny method, Preacher and Hayes (2004) argued that the Sobel test may be incompatible with the Baron and Kenny criteria for mediation. They further argued that the Sobel test is a more powerful strategy for testing mediation. Accordingly, although Hypothesis 4 was supported, Hypothesis 3 was not. Moreover, Hypothesis 5 was fully supported. Restated, the above results indicate that both self efficacy and job satisfaction partially mediate the effect of role conflict on creativity. Additionally, job satisfaction (but not self-efficacy) partially mediates the effect of role ambiguity on creativity.

CONCLUSIONS AND DISCUSSION

This study demonstrates that perceived role ambiguity has a negative, direct impact on employee creativity. The

finding is consistent with earlier research (Ford, 1996; Amabile, 1983; Amabile and Gryskiewicz, 1987; Jansen and Gaylen, 1994; Sherman, 1989). However, this exploratory study investigates how role ambiguity and employee creativity are related.

The analytical results indicate that employees perceive role conflict as having a positive and direct impact on employee creativity. This finding is in line with the observation of Janssen (2000) who suggested that higher levels of job demands trigger innovative responses, as well as with Jones (1993) who suggested that role conflict can force individuals to become receptive to different viewpoints, be more flexible, and expand their source of information. Conventional creativity research (Guilford, 1950; Torrance, 1969) describes the ability to think flexibly as a crucial element that can lead to novelty in ideas. According to the theory of Amabile (1996), social processes, including conflict, can influence many creative cognitive steps, e.g., preparation and response validation stages.

Nevertheless, our finding does not correspond to that reported by Farr and Ford (1992), Jex (1998), and Taggar (2002), as described in the above literature review. We posit that this discrepancy may be attributed to the Yerks-Dodson law (Yerkes and Dodson, 1908) or triphasic model (Selye, 1950; Nygaard and Dahlstrom, 2002). Yerkes-Dodson law of arousal describes how stress and performance are related. Performance is poor when arousal is extremely low. Increasing arousal enhances performance, but only to a particular point. Increasing arousal beyond that point diminishes the performance. Some empirical evidence demonstrates this relation. For instance, Singh (1998) specified and examined the quadratic efforts of a role stressor in a sales context with respect to job performance, job satisfaction, organizational commitment, job tension, and employee turn over intensions. Nygaard and Dahlstrom (2002) found a nonlinear relation in horizontal alliances between role stressors and various forms of job effectiveness. Despite divergent findings in the literature, this exploratory study investigates how role conflict and employee creativity are related.

Finally, in addition to examining how role ambiguity and role conflict contribute to self-efficacy and job satisfaction, this study explores the possibility that self-efficacy and job satisfaction mediate the association between role ambi-guity and creativity, as well as the association between role conflict and creativity. Analysis results indicate that role ambiguity negatively contributes to self- efficacy which is consistent with previous studies (Gist and Mitchell, 1992; Eys and Carron, 2001). Additionally, in line with earlier research (Jex and Gudanowski, 1992; Chebat and Kollias, 2000) our results indicate that role conflict negatively contributes to self- efficacy. Similarly, in line with results of previous research (Kahn et al., 1964; Rizzo et al., 1970; Jackson and Schuler, 1985; Singh et al., 1996; Ussahawanitchakit, 2008), our results indicate that role ambiguity and role conflict negatively contribute to job satisfaction. Moreover, in correlation with several studies (Bandura and Schunk, 1981; Bandura, 1997; Chipton et al., 2006), our results indicate that self-efficacy and job satisfaction positively contribute to creativity. The analytical results further demonstrated that self-efficacy and job satisfaction partially mediate the association between role conflict and creativity. Moreover, job satisfaction partially mediates the effect of role ambiguity on creativity. Thus, this empirical study explores for the first time whether self-efficacy and job satisfaction mediates both the relation between role ambiguity and employee creativity, as well as the relation between role conflict and employee creativity.

Cumulatively, results of this study provide further insight into how role ambiguity and role conflict perceived by employees influence the work environment for employee creativity. Specifically, this empirical study from Taiwan demonstrates that role ambiguity and role conflict are negatively and positively related to employee creativity, respectively. This possibility has seldom been examined in an actual work setting. Additionally, this study eluci- dates how role ambiguity, role conflict, and creativity are related by formulating and empirically testing the effects of self-efficacy and job satisfaction. Namely, role stress might impact creativity directly and indirectly. Notably, the above findings are tested using Amabile's componential theory. Componential theory rests on the premise that a social environment impacts individual creativity. This study examines role ambiguity and role conflict as key components of a social environment for creativity. Consequently, this study identifies role stress as social-environment influences on creativity. Overall, our findings elucidate the complex relations between role ambiguity, role conflict, self-efficacy, job satisfaction, and employee creativity.

This study has several practical implications. First, this study suggests that role ambiguity may affect creativity negatively. Thus, employee training and personnel development should emphasize tolerance of ambiguity and uncertainty in order to reduce role ambiguity. For instance, by deliberately placing employees in unstructured situa-tions that are relatively risk-free, employees can become accustomed to ambiguous situations. They can gradually learn to accept overall ambiguity as they gain work experience in unstructured environments. Training and personnel development are especially relevant for firms that have implemented a project management system or matrix management because a project management system could inevitably be faced with role ambiguity and role conflict. Moreover, a project management system is increasingly viewed as an effective means of enhancing management in the future. A case study by Quick (1979) employed participative goal setting to diminish role stress among insurance company employees. Training sessions emphasized three dimensions of goal setting, including task goal properties, supervisory goal behavior, and

subordinate goal behavior. Schaubroeck et al. (1993) applied a responsibility charting approach to reduce role ambiguity in the business services department of a university. There were consultants assisting a management team in negotiating and clarifying roles with subordinates. Obviously, employees oriented on role emphasis with prompt, clear and consistent feedback or by clarifying rules and roles reduce role ambiguity, subsequently increasing creativity.

Our results further demonstrate that role conflict may positively affect creativity, implying that managers might provide employees with opportunities to work on organizational boundaries (Cooper and Marshall, 1978). In doing so, role conflict occurs when employees interact with each other in a department within a company, or outside of the organization. Role conflict can provide a venue for further creative thinking. Therefore, we posit that role conflict produces more cognitive variation and the testing of ideas and, thus, further insight. This practice may be especially helpful for employees with relatively little experience in creativity or with a low level of creativity. Despite the potentially positive effects of role conflict, our earlier literature review pointed out that role conflict might enhance or diminish creativity. As Nygaard and Dahlstrom (2002) pointed out, a triphasic relation between role stressors and various forms of job performance is possible. Thus, we are not advocating that managers should increase role conflict to maximize how role conflict impacts creativity. Instead, we recommend that managers remain sensitive not to overemphasize role conflict. Future research should further address this issue.

Third, by demonstrating the mediating effects of self-efficacy and job satisfaction, our results suggest that managers must consider the mechanisms whereby role ambiguity and role conflict affect creativity. Doing so enables managers to reduce role ambiguity and role conflict and, ultimately, maintain employee creativity. Managers must understand that role ambiguity and role conflict can diminish self-efficacy and job satisfaction as well as reduce creative efforts, particularly in a workplace that requires constant creativity. Fourth, management could also benefit from the result that self-efficacy positively affects creativity. Managers should understand the necessity of recruiting, selecting, and retaining employees with a strong self- efficacy. Moreover, strengthening employee confidence in their competence through training programs may also be necessary to maintain highly creative employees.

Finally, as job satisfaction also positively affects creativity, managers should adopt the necessary measures to increase job satisfaction among their employees. For instance, in a stressful work environment, job rotation can reinforce the self confidence of employees in their own competencies and expertise. This is especially valuable for increasing job satisfaction.

Despite the above contributions, this study has certain limitations. First, according to our results, role conflict positively affects creativity and possibly explains why the relation between role conflict and creativity may be quadratic or triphasic. However, this study did not examine this possibility nor at what stage that role conflict might negatively impact creativity. Future studies should examine how various phases of role conflict can affect creativity within the quadratic or triphasic relation. Doing so would further elucidate how role conflict and creativity are related. Second, this study has explored the possi-bility that both self-efficacy and job satisfaction mediate the relation between role ambiguity and creativity. Future research must incorporate other mediators or moderators of the relation between role stress and creativity. Third, this study was cross-sectional; although the construct relationships suggested a causal direction, the cross-sectional design could only infer relationships. In fact, three kinds of evidence used to demonstrate the existences of causality are concomitant variation (or cova-riation), time order of occurrence, and absence of other causal factors. Demonstrating all three types increases confidence that a causal factor has been identified. Thus, future studies should examine longitudinal and/or experimental data to evaluate causality.

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Appendix. Measures of research variables.

Variables	Scale Items	Source
Role ambiguity	1. I feel certain about how much authority I have. 2. Clear, planned goals and objectives for my job. 3. I know that I have divided my time properly. 4. I know what my responsibilities are. 5. I know exactly what is expected of me. 6. Explanation is clear of what has to be done.	Rizzo et al. (1970)
Role conflict	1. I have to do things that should be done differently. 2. I receive an assignment without the manpower to complete it. 3. I have to buck a rule or policy in order to carry out an assignment. 4. I work with two or more groups who operate quite differently. 5. I receive incompatible requests from two or more people. 6. I do things that are apt to be accepted by one person and not accepted by others. 7. I receive an assignment without adequate resources and materials to execute it. 8. I work on unnecessary things.	Rizzo et al. (1970)
Self-efficacy	1. I have confidence in my ability to do my job. 2. There are some tasks required by my job that I cannot do well. 3. When my performance is poor, it is due to my lack of ability. 4. I doubt my ability to do my job. 5. I have all the skills needed to perform my job very well. 6. Most people in my line of work can do this job better than I can. 7. I am an expert at my job. 8. My future in this job is limited because of my lack of skills. 9. I am very proud of my job skills and abilities. 10. I feel threatened when others watch me work.	Riggs et al. (1994)
Job satisfaction	On my present job, this is how satisfied I feel about… 1. Being able to keep busy all the time. 2. The chance to work alone on the job. 3. The chance to do different things from time to time. 4. The chance to be “somebody” in the community. 5. The way my boss handles his/her workers. 6. The competence of my supervisor in making decisions. 7. Being able to do things that don’t go against my conscience. 8. The way my job provides for steady employment. 9. The chance to do things for other people. 10. The chance to tell people what to do. 11. The chance to do something that makes use of my abilities. 12. The way company policies are put into practice. 13. My pay and the amount of work I do. 14. The chance for advancement on this job. 15. The freedom to use my own judgment. 16. The chance to try my own methods of doing the job. 17. The working conditions. 18. The way my co-workers get along with each other. 19. The praise I get for doing a good job. 20. The feeling of accomplishment I get from the job.	Weiss et al. (1976)

Appendix: Contd.

Creativity	Please rate each of your subordinates on the extent to which he or her: 1. Suggests new ways to achieve goals or objectives. 2. Comes up with new and practical ideas to improve performance. 3. Searches out new technologies, processes, techniques, and/or product ideas. 4. Suggests new ways to increase quality. 5. Is a good source of creative ideas. 6. Is not afraid to take risks. 7. Promotes and champions ideas to others. 8. Exhibits creativity on the job when given the opportunity to. 9. Develops adequate plans and schedules for the implementation of new ideas. 10. Often has new and innovative ideas. 11. Comes up with creative solutions to problems. 12. Often has a fresh approach to problems. 13. Suggests new ways of performing work tasks.	Zhou and George (2001)