

Positive and Negative Effects of Team Stressors on Job Satisfaction and New Product Performance*

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The subject of stress and its impact on performance has received limited empirical attention in the new product development field. The present study examines the impact of three work stressors (i.e., role ambiguity, role conflict, and pressure for performance) on team job satisfaction and three dimensions of new product performance: adherence to budget and schedule, product quality, and market success. Data were collected using a cross sectional, Web-based survey among Spanish innovative firms. A total of 197 questionnaires was received. Findings from this research suggest that role conflict and role ambiguity are negatively related to team job satisfaction. Results, however, show a lack of association between pressure for performance and job satisfaction. Regarding the effect of work stressors on new product performance, findings indicate that different stressors have different relationships with performance. Concerning role ambiguity, findings provide empirical evidence of a U-shaped relationship between role ambiguity and adherence to budget and schedule and between role ambiguity and product quality. Thus, intermediate levels of role ambiguity are hurtful, but low and high levels of role ambiguity are helpful. Nonetheless, given that the levels of ambiguity measured in this study are not high enough, the findings regarding the impact of moderate to high levels of ambiguity on new product performance should be viewed as tentative. Role conflict has a negative linear relationship with adherence to budget schedule and an inverted U-shaped relationship with product quality. For pressure for performance, findings indicate a triphasic effect on product quality. Specifically, the initial phase is characterized by increasingly lower levels of product quality owing to increasing levels of pressure for performance. As pressure for performance keeps further increasing, a positive effect on product quality begins to manifest. Beyond some threshold, however, a new phase starts in which product quality decreases with increasing amounts of performance pressure. Finally, results show a lack of association between pressure for performance and adherence to budget and schedule. All three stressors were found to have an indirect, rather than a direct, effect on market success via job satisfaction, adherence to budget and schedule, or product quality. Several managerial implications follow from these results. First, product managers should make every effort to reduce role ambiguity to minimal levels, ensuring that team members fully understand their role requirements and have adequate information about their job. Second, rather than reducing the level of role conflict to zero, managers must take into account the positive effect that moderate levels of role conflict have in product quality. Finally, management should put some pressure on the team members and make sure they understand that there is a sense of urgency.

Introduction

Individuals in society are subject to ever increasing levels of stress. One of the most important sources of stress is the workplace. The study of stress in work settings is not new. Research on the effects of work stress on performance has a long tradition in organizational behavior, sales, and marketing (Bettencourt and Brown, 2003; Dubinsky,

Dougherty, and Wunder, 1990; Gilboa et al., 2008; Onyemah, 2008; Parasuraman and Alutto, 1984; Singh, 1998). However, with a few exceptions (e.g., Akgün et al., 2007; Barczak and Wilemon, 2003; Kim and Wilemon, 2001), the study of stress and its impact on performance has received limited empirical attention in the new product development (NPD) literature. Yet NPD team members experience stress both individually and collectively (Akgün et al.). Project team members are often confronted with stressful situations as they have to deal with changes in customer demands, unforeseen technical problems, organizational ambiguities, and conflicts with senior management and other functional departments (Barczak and Wilemon; Kim and Wilemon). Recent work on stress in NPD team settings suggests that team members

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often experience fear, pressures, and uncertainty and feel confused in a collective manner (Akgün, Lynn, and Byrne, 2006).

Taken into account the importance of the topic and the paucity of research on stress in NPD teams, the goal of this study is to investigate the effect of three work stressors on the satisfaction and performance of NPD teams. Work stressors refer to situational factors potentially capable of producing stress reactions (Parasuraman and Alutto, 1984). The study focuses on three work stressors: role conflict, role ambiguity, and pressure for performance.

Research to date has shown that work stressors are generally negatively related to job satisfaction (Babakus et al., 1999; Boles and Babin, 1996; Brown and Peterson, 1993; Grant et al., 2001). However, empirical evidence on the relationship between stressors and job satisfaction in a NPD team setting is scarce. This study addresses the need for research on this subject by investigating the effect of role conflict, role ambiguity, and pressure for performance on job satisfaction of NPD teams.

Literature on organizational and work group-level studies shows conflicting findings on the effect of job stressors on performance (Song, Dyer, and Thieme, 2006). Thus, while some studies have found a negative

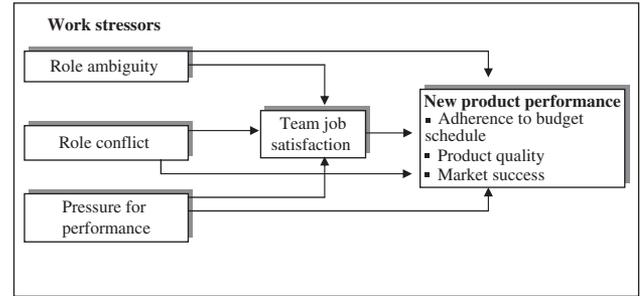


Figure 1. Proposed Model

association between stressors and performance (Tubre and Collins, 2000), others report a positive association (Babakus et al., 1999; Singh, Goolsby, and Rhoads, 1994), and still other studies have found a curvilinear effect, such that moderate levels of stressors result in the best performance outcomes (Jehn, 1995). Drawing on Yerkes-Dodson's law (Yerkes and Dodson, 1908) and activation theory (Scott, 1966), this study examines the existence of inverted U-type effects of role ambiguity, role conflict, and pressure for performance on three new product performance outcomes: adherence to budget and schedule, product quality, and market success.

To help the discussion of the study and its results, the paper first examines the expected relationships among the model's constructs and provides hypotheses. Next, the sample characteristics and the measurement approach are described. Finally, the study results are presented, and the managerial implications are examined. Figure 1 depicts the research framework.

Theoretical Background and Hypotheses

Many studies have examined the influence of different work stressors on performance. The dominant view is that stressors are negatively related to performance, yet empirical findings do not unequivocally support this effect (e.g., Babakus et al., 1999; Singh et al., 1994). Research in psychology suggests the existence of inverted U-shaped effects of stressors on performance. Yerkes and Dodson's (1908) research indicates that intermediate levels of stimuli outperform weak or strong stimuli when tasks are challenging. Similarly, activation theory (Scott, 1966) maintains that low levels and high levels of stressors constrain performance because of minimal stimulation or overstimulation and disorganization of responses,

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respectively. A low level of stressor undermines people's alertness or resource activation (i.e., stimulation), which may cause loss of motivation, withdrawal, or relaxation of effort (Onyemah, 2008). A high level of stressor scares and discourages people. Moreover, it overwhelms a person's reactive and coping capacities (Onyemah; Schaubroeck and Ganster, 1993). Intermediate levels of stressors, however, provide appropriate stimulation to obtain the desirable outcomes (Nygaard and Dahlstrom, 2002). Despite its intuitive appeal, empirical evidence of an inverted U-shaped relationship between stressors and performance has remained elusive (Onyemah).

In this study, role ambiguity refers to the degree to which the job of NPD teams is lacking in terms of existence or clarity of behavioral requirements, which serve to guide behavior and provide knowledge that the behavior is appropriate. It relates to uncertainty about duties, authority, allocation of time, and relationships with others (Rizzo, House, and Lirtzman, 1970). Role ambiguity occurs when an employee lacks salient information needed to effectively enact his or her role (Singh, 1993).

Role conflict refers to the degree of incongruity or incompatibility in the expectations or requirements communicated to the NPD team (Rizzo et al., 1970). Incompatibility or incongruency may result in various kinds of conflict: conflict between team members' internal standards or values and the defined role behaviors, conflict between the time, resources, or capabilities of the team and defined role behaviors, and conflicting expectations and organizational demands in the form of incompatible policies (ibid.).

Pressure for performance refers to the emphasis that an organization places on goal accomplishment and effectiveness-related activities (Bhagat, 1982; Selladurai, 1991). Research in NPD has cited performance and schedule pressures as major stresses in NPD (Barczak and Wilemon, 2003). Akgün et al. (2007) reported that team members often feel pressure from company executives and the environment (i.e., distributors, customers, competitors) to develop and launch new products successfully and quickly.

Effect of Work Stressors on Job Satisfaction of Teams

Job satisfaction of teams is defined as team members' affective response to the job (Dubinsky et al., 1990). Singh et al. (1994) noted that work stressors can have significant negative effects on job satisfaction. When

team members experience ambiguity and conflict and feel pressured to perform, they are likely to become disillusioned (Walker, Churchill, and Ford, 1979) and, therefore unsatisfied. Particularly, feelings of ambiguity have a negative impact on team satisfaction because it is difficult for team members to like their job and achieve feeling of personal accomplishment and growth when they are uncertain about what they are expected to do and how or when they receive contradictory instructions (ibid.). Role conflict also leads to job dissatisfaction (Grayson, 2007). Research in NPD teams showed that role conflict resulted in negative feelings about the project, frustration, and stress. These feelings, in turn, affected the morale, commitment, and satisfaction of team members (Barczak and Wilemon, 2003). Similarly, when performance pressure on the team is high, team members are less likely to be happy with their jobs (Strutton, Pelton, and Lumpkin, 1993). Under high pressure, employees are more likely to suffer from stress, exhaustion, and burnout. In addition, they are probably angry at management because of their high expectations. Therefore, the following hypotheses are offered:

H1: Role ambiguity has a negative influence on team satisfaction.

H2: Role conflict has a negative influence on team satisfaction.

H3: Pressure for performance has a negative influence on team satisfaction.

Effect of Work Stressors on New Product Outcomes

A number of researchers have proposed that moderate levels of stressors result in the best performance outcomes (Jehn, 1995; Onyemah, 2008). At moderate levels, stressors are primarily appraised as challenges rather than hindrances leading to internal arousal and higher performance outcomes (Gilboa et al., 2008; Singh, 1998). A moderate level of role ambiguity and role conflict confirms the challenges inherent in boundary-spanning positions such as NPD. This awareness motivates the NPD team to perform at a higher energy level (Nygaard and Dahlstrom, 2002; Onyemah; Singh). Similarly, intermediate levels of pressure for performance should encourage team members to push their efforts further to solve product-, process-, and customer-related problems, develop products on time or before that, and launch them successfully (Akgün et al., 2007).

Low and high levels of stressors have the opposite effects. At low levels, stressors provide limited opportunity to hone capabilities and yield low levels of competency and performance (Nygaard and Dahlstrom, 2002). Triandis (1959) posited that low levels of pressure lead to employee complacency and low performance effectiveness. At high levels, stress factors are overwhelming and similarly constrain competence (Nygaard and Dahlstrom). Excessive levels of role conflict reduce performance by directing employees' attention away from tasks, diminishing their ability to process information, and making them less receptive to the ideas of their peers (Jehn, 1995). Amabile, Hadley, and Kramer (2002) found that intense workload and time pressures led professional workers to be almost half as creative as they would otherwise be. Similarly, in their study of stress in NPD teams, Barczak and Wilemon (2003) reported that putting too much pressure on the team to perform can in fact have a detrimental effect on the project's outcomes due to poor decision making, poor-quality work, negative attitudes, and unhealthy workers.

Drawing on the preceding discussion, it is argued that moderate levels of role ambiguity, role conflict, and pressure for performance should be associated with superior performance (i.e., adherence to budget and schedule, product quality, and market success) and that low and high levels of role ambiguity, role conflict, and pressure for performance should be associated with inferior performance:

- H4: There is an inverted U-shaped between role ambiguity and (a) adherence to budget and schedule, (b) product quality, and (c) market success.*
- H5: There is an inverted U-shaped between role conflict and (a) adherence to budget and schedule, (b) product quality, and (c) market success.*
- H6: There is an inverted U-shaped between pressure for performance and (a) adherence to budget and schedule, (b) product quality, and (c) market success.*

Effect of Team Job Satisfaction on New Product Outcomes

The foundation of the relationship between team satisfaction and new product performance lies in what has been called the "happy-productive worker hypothesis," a common-sense hypothesis (Fisher, 2003; Kluger and Tikochinsky, 2001). That is, workers who are happier or more satisfied with their jobs are also

better performers on those jobs. These workers are more likely to engage in favorable behaviors to achieve their objectives. Low job satisfaction, however, leads to increased disappointment and absenteeism and reduced performance. Despite the intuitive connection between job satisfaction and performance, extant meta-analytic studies indicate a modest correlation between satisfaction and performance (Fisher) or one that varies over a wide interval (0.03 to 0.57) (Judge et al., 2001):

- H7: Team job satisfaction influences positively new product performance (a) adherence to budget and schedule, (b) product quality, and (c) market success.*

Methodology

Sample and Data Collection

The initial sampling frame included 1,403 Spanish innovative firms operating in different sectors: consumer goods, chemical products, machinery and transport devices, and electric and electronic machinery. Data were collected through a Web-based questionnaire sent to the senior executive in charge of NPD at each company. Before collecting the data, the questionnaire was pretested with six managers and six academics. Reminder e-mails and phone calls were sent to all nonrespondents two weeks after the initial contact. A total of 197 complete questionnaires were received, yielding an effective response rate of 14%. Although this response rate is not as high as one might wish, it is comparable to those of other studies on new product development. Of note, although extensive evidence details lower costs and faster response times for online surveys than for mail surveys (e.g., Dillman, 2000; Illieva, Baron, and Healy, 2002), Web-based surveys offer no clear advantages over mail surveys in terms of response rate (Olsen, 2009).

To test for nonresponse bias, early and late respondents were compared on all the variables of interest and on their firm size (Armstrong and Overton, 1977). No significant differences were found at $p < .05$. Sample representativeness was also checked. The analyses revealed no significant differences between the present study's sample and the population it was drawn from in terms of industry distribution, employee number, and company sales. Table 1 shows the sample characteristics.

The unit of analysis was the new product project. Respondents were asked to base their answers on a new product project representative of the firm that

Table 1. Sample Characteristics^a

SIC Code and Sectors	% of Sampled Firms	Number of Employees	% of Sampled Firms	Sales Volume (mill.€)	% of Sampled Firms
20 to 27. Consumer Products	14.2	<50	20.3	<6	13.7
28. Chemical Products	27.9	51–150	25.4	6–18	20.8
35, 37. Machinery and Transport Devices	28.9	151–250	18.8	18–30	11.2
36. Electric and Electronic Machinery	28.9	251–500	19.8	30–60	21.8
		>n500	13.7	>60	21.3
		No response	2.0	No response	11.2
Total	197		197		197

^aSIC, standard industrial classification.

had been fully completed within the past three years. The new product should have been on the market for more than 12 months to ensure that the firm had sufficient data on the resulting performance. To assess quality of the responses, respondents were asked to indicate their degree of knowledge about the new product and the NPD process using a seven-point Likert scale (1 = very limited; 7 = very substantial). The mean responses were 5.98 and 5.31, respectively, thus showing a high knowledge level on the new product selected. Respondents were offered a free summary of the most relevant findings of the study for their response.

Measures

A pool of items was generated for measuring each of the constructs using literature and interviews with practitioners. Role ambiguity and role conflict were measured with four and six items, respectively, adapted from Rizzo et al. (1970). Pressure for performance was operationalized with four items from Akgün et al. (2006). The team job satisfaction scale measured satisfaction with regard to recognition, responsibilities, supervision, and opportunities (Sarin and Mahajan, 2001). Adherence to budget and schedule and market success were measured with six and five items, respectively, from Sarin and Mahajan. Product quality was measured using eight items adapted from Garvin (1987).

Project complexity and industry dynamism were included as control variables because of prior work suggesting a relationship between these variables and adherence to budget and schedule, product quality, and new product performance (Akgün et al., 2007; Calantone, Garcia, and Dröge, 2003). Project complexity refers to the degree to which the development process was complicated and difficult. Industry dyn-

amism relates to the perceived frequency of change in marketing forces in the industry environment. The items for project complexity and industry dynamism were adopted from Sarin and Mahajan (2001). Measures and descriptive statistics of all variables are shown in Table 2.

Unidimensionality, Reliability, and Validity

Psychometrics properties of the scales were analyzed based on widely accepted procedures (Anderson and Gerbing, 1988; Bagozzi and Yi, 1988; Fornell and Larcker, 1981). The internal consistency, reliability, and convergent validity were investigated by performing a confirmatory factor analysis using AMOS 7.0. Composite reliabilities estimates exceeded the standard suggested by Bagozzi, Yi, and Phillips (1991). Values of average variance extracted (AVE) provided satisfactory results, with the exception of the variable product quality, for which the AVE was slightly below .50. Standardized item loadings for all constructs were greater than .50 and significant ($p < .05$), evidencing good convergent validity (Bagozzi et al.). An inspection of alpha coefficients revealed that all values were equal or greater than .80, which indicates good reliability. The discriminant validity was assessed across the scales by respecifying the initial measurement model in a series of constrained models in which each intertrait correlation was constrained to 1. In every instance, the constrained models showed a worse fit and the difference in χ^2 value between each of the constrained models and the baseline measurement model was found to be significant, thus providing evidence of discriminant validity. Together the results of the tests suggest that the reflective scales used in this study possess sufficient unidimensionality, reliability and validity (Table 2). Before testing the model, scale items were averaged to create a single

Table 2. Construct Definition and Measures^a

Construct Name	Construct Measurement	Mean (S.D.)
Role Ambiguity ¹ ($\alpha = .93$, CR = .98, AVE = .75)	Team members were uncertain about how much authority they had (R).	2.49 (1.31)
	Team members were unclear of what had to be done (R).	2.35 (1.25)
	Team members do not know what their responsibilities were (R).	2.38 (1.22)
	Team members do not know exactly what was expected of them (R).	2.47 (1.30)
Role Conflict ($\alpha = .92$, CR = .91, AVE = .67)	During the development process, conflict arose because team members:	
	• Had to buck rules or policies in order to carry out their job/tasks.	2.81 (1.60)
	• Worked on unnecessary things.	3.34 (1.77)
	• Worked under conflicting directives or orders.	3.08 (1.82)
	• Received tasks that were outside their training and capabilities.	2.85 (1.76)
	• Received tasks without adequate resources and materials to execute them.	3.40 (1.83)
Pressure for performance ($\alpha = .80$, CR = .81, AVE = .55)	• Team members had to do things that should have been done differently.	3.30 (1.82)
	The team felt great pressure from company's executives to succeed on this project.	5.04 (1.63)
	The team felt great pressure to launch this product successfully.	5.27 (1.49)
	The team felt great pressure from the environment (distributors, competitors, customers) to develop this product quickly.	4.74 (1.72)
Job satisfaction ($\alpha = .91$, CR = .91, AVE = .73)	The team felt their jobs could be in jeopardy if this project failed.	5.04 (1.52)
	Team members were satisfied with:	
	• The recognition they got for their work on the project.	4.59 (1.53)
	• The amount of responsibility given during the project.	5.02 (1.33)
	• The way the team was managed.	4.94 (1.29)
Adherence to budget and schedule ($\alpha = .89$, CR = .86, AVE = .54)	• The opportunities given to use their knowledge and capabilities.	5.19 (1.29)
	The team made efficient use of its time.	4.74 (1.42)
	The team did a good job of meeting all of its schedule deadlines.	4.31 (1.63)
	The new product was launched on time.	4.39 (1.76)
	The team operated in a cost-efficient manner.	4.73 (1.46)
	The team did a good job adhering to its budget.	4.58 (1.53)
	The team's project is within budget.	4.84 (1.42)
	The product is more reliable than competing products available to the customer.	5.39 (1.25)
Product quality ($\alpha = .88$, CR = .87, AVE = .48)	The product's performance meets our expectations.	5.90 (0.96)
	The product's quality exceeds our expectations.	5.55 (1.36)
	This product delivers benefits to the customers that are not currently available	5.26 (1.32)
	The product has an excellent post-purchase service.	4.98 (1.37)
	This product is superior to competing products available to the customer.	5.52 (1.25)
	Our clients are very satisfied with this product.	5.74 (1.10)
	This product offers an important competitive advantage.	5.46 (1.24)
	Met sales expectations.	4.75 (1.48)
Market success ($\alpha = .94$, CR = .91, AVE = .72)	Met sales growth expectations.	4.76 (1.53)
	Met market share expectations.	4.62 (1.54)
	Met profit expectations.	4.71 (1.40)
	Met return on investments expectations.	4.70 (1.45)
	The product developed by our team was technically complex to develop.	4.50 (1.48)
Project complexity ($\alpha = .89$, CR = .89, AVE = .66)	Our team had to use non routine technology to develop the product.	3.96 (1.54)
	The development process was relatively complex.	4.45 (1.41)
	The product developed by our team was complex.	4.27 (1.53)
Industry dynamism ($\alpha = .84$, CR = .71, AVE = .51)	When the new product was launched, the environment was characterized by:	3.68 (1.81)
	• Very frequent changes in the mix of products/brands available.	3.78 (1.66)
	• Very frequent changes in the sales strategies.	3.97 (1.80)
	• Very frequent changes in product/technology standards	4.09 (1.73)
	• Very frequent changes in customer preferences.	3.98 (1.74)
	• Very frequent changes in the number of competitors.	

^a Seven-point Likert-type scales (1 = strongly disagree to 7 = strongly agree). α = Cronbach's alpha. CR, composite reliability. AVE, average variance extracted. R, reverse-scored item.

measure of each construct. Table 3 exhibits means, standards deviations, and zero-order correlations for the model constructs.

Common Method Bias

Most researchers agree that common method variance (CMV) is a potentially serious biasing threat in be-

havioral research, especially with single-informant surveys. According to Podsakoff et al. (2003), the two primary ways to control for method biases are through procedural or statistical remedies. Procedural remedies aim at the design of the study to reduce the potential influences of CMV, whereas statistical remedies are tests to control for common method bias.

Table 3. Means, Standard Deviations, and Zero-Order Correlations

	Mean (S.D.)	1.	2.	3.	4.	5.	6.	7.	8.
1. Role ambiguity	2.42 (1.15)								
2. Role conflict	3.09 (1.45)	0.34**							
3. Pressure for performance	5.05 (1.24)	−0.18*	0.34**						
4. Team satisfaction	4.94 (1.21)	−0.74*	−0.37**	0.09					
5. Adherence to budget schedule	4.56 (1.19)	−0.50**	−0.32**	0.05	0.55**				
6. Product quality	5.50 (0.89)	−0.47**	−0.17*	0.23**	0.48**	0.30**			
7. Market success	4.74 (1.33)	−0.42**	−0.13	0.23**	0.45**	0.46**	0.49**		
8. Project complexity	4.30 (1.29)	−0.17*	0.20**	0.34**	0.16*	0.07	0.29**	0.30**	
9. Industry dynamism	3.91 (1.36)	−0.13	0.11	0.14	0.20**	0.15*	0.16*	0.18*	0.19*

* $p < .05$ (two-tailed test).** $p < .01$.

Procedural remedies were addressed by protecting respondent anonymity, reducing evaluation apprehension, improving item wording, and separating the measurement of the predictor and criterion variables. Further, the following statistical remedies were applied. First, the Harman's one-factor test was conducted (ibid.). In this test, evidence for CMV exists when a single factor emerges from the analysis or when one general factor accounts for the majority of the covariance in the independent and dependent variables. This analysis produced nine factors, with the first factor accounting for only 26.9% of the total variance explained (73.3%). Second, a confirmatory factor–analytic approach to Harman's single-factor test was performed. A worse fit for the one-factor model compared with the measurement model suggests that common method variance does not pose a serious threat. The CFA yielded a $\chi^2 = 5121.6$ with 989 degrees of freedom, comparative fit index (CFI) = .34, and root mean square error of approximation (RMSEA) = .14 (compared with the $\chi^2 = 1925.0$ with 953 degrees of freedom, CFI = .84, and RMSEA = .07 for the measurement model).

Although simple and straightforward, Harman's single-factor test has limitations, most significantly its well-known insufficient sensitivity to detect moderate or small levels of CMV effects (Malhotra, Kim, and Patil, 2006). To address this problem, Lindell and Whitney's (2001) marker variable technique was employed. Essentially, this technique requires researchers to identify a marker variable that should be theoretically unrelated to at least one of the other variables in the model. Because the marker variable is assumed to have no relationship with one or more variables in the study, CMV can be assessed based on the correlation between the marker variable and the theoretically unrelated variables (Malhotra et al.). Such a correlation (r_M) is treated as an indicator of

CMV. To apply Lindell and Whitney's technique, the extent to which the new product was commercialized jointly with other companies was designated as the marker variable. Data from the present study showed no statistically significant correlations between the marker variable and the variables in the theoretical framework. Following Lindell and Whitney, the second-smallest positive correlation was used as a conservative estimate of r_M . Results indicated that the correlations reported in Table 3 were still significant after partialing out the influence of the marker variable. In summary, results from the previously mentioned tests suggest that the possible impact of CMV was minimal at most.

Results

Model Estimation

Covariance-based path analysis with maximum likelihood estimation (AMOS 7.0) is used to test the model shown in Figure 1. According to Mardia's (1970) multivariate kurtosis statistic, the assumption of multivariate normality is not rigorously met, making it recommendable to apply a bootstrap resampling procedure to calculate confidence intervals and significance levels for the parameter estimates (Yung and Bentler, 1996). Furthermore, extant research demonstrates that bootstrapping outperforms traditional approaches for testing mediation (Shrout and Bolger, 2002). In this study, all reported significance levels are based on bias-corrected bootstrap confidence intervals.

Quadratic terms of team stressors were included in the model to test for curvilinear relationships. Multicollinearity is an endemic problem in regression models that simultaneously contain linear and squared terms of the same variables. To minimize this problem, role ambiguity, role conflict, and pressure for

performance were mean-centered prior to the creation of the squared terms (Jaccard, Wan, and Turrisi, 1990). The curvilinear relationships were modeled using Ping’s (1996) approach to modeling latent variables interaction in structural equation analysis.

A series of post hoc power analyses were completed using the G* POWER 3 computer software (Faul et al., 2007) to determine the *p*-values for the statistical analyses included in the study. Power values were calculated for each dependent variable in the path model. In all instances, power values for a medium effect size and Type I error (α) of .05 exceeded Cohen’s (1988) recommended criterion of .80. Hence, an alpha value of .05 seems to be appropriate to judge the statistical significance of the analysis.

Results

Path estimates are shown in Table 4. The model explained 49%, 34%, 27%, and 37%, respectively, of the variance in job satisfaction, adherence to budget and schedule, product quality, and market success.

Data in Table 4 support H1 and H2, which predicted a negative association between role ambiguity and job satisfaction ($\beta = -0.63, p < .01$) and between role conflict and job satisfaction ($\beta = -0.16, p < .01$). Results, however, show a nonsignificant effect of pressure for performance on job satisfaction. H3 is thus rejected. Literature has argued that role ambiguity has a stronger negative effect on job satisfaction than role conflict (Baroudi, 1985; Gilboa et al., 2008). To test this proposition, the following paths were compared: role ambiguity → job satisfaction and role conflict → job satisfaction. The comparison was conducted as a chi-square difference test, where the compared paths were constrained to be equal in one nested model but were freely estimated in another. Results from the chi-square difference test indicated that the negative effect of role ambiguity on job satisfaction was stronger than that of role conflict (dif $\chi^2 = 30.37, DF = 1, p < .01$).

The results reject H4a, H4b, and H4c contending an inverted U-shaped relationship between role ambiguity and new product performance outcomes. Instead, role ambiguity has a direct U-shaped effect on adherence to budget schedule ($\beta = -.28, p < .01$ linear term; $\beta = .14, p < .05$ curvilinear term) and product quality ($\beta = -.24, p < .01$ linear term; $\beta = .14, p < .05$ curvilinear term), and an indirect U-shaped effect on market success ($\beta = -.34, p < .01$

Table 4. Path Analysis: Standardized Parameter Estimates^a

Hypothesized Relationships	
Role ambiguity → Job satisfaction	-0.63**
Role conflict → Job satisfaction	-0.16**
Pressure to performance → Job satisfaction	0.02
Role ambiguity → Adherence to budget schedule	-0.28**
Role ambiguity ² → Adherence to budget schedule	0.14*
Role ambiguity → Product quality	-0.24**
Role ambiguity ² → Product quality	0.14*
Role ambiguity → Market success	-0.03
Role ambiguity ² → Market success	-0.10
Role conflict → Adherence to budget schedule	-0.14*
Role conflict ² → Adherence to budget schedule	-0.05
Role conflict → Product quality	-0.04
Role conflict ² → Product quality	-0.11*
Role conflict → Market success	-0.02
Role conflict ² → Market success	0.05
Pressure for performance → Adherence to budget schedule	0.04
Pressure for performance ² → Adherence to budget schedule	0.05
Pressure for performance → Product quality	0.18**
Pressure for performance ² → Product quality	0.15*
Pressure for performance → Market success	0.05
Pressure for performance ² → Market success	-0.08
Team satisfaction → Adherence to budget schedule	0.33**
Team satisfaction → Product quality	0.27**
Team satisfaction → Market success	0.10
Control relationships	
Adherence to budget schedule → Market success	0.31**
Product quality → Market success	0.30**
Project complexity → Adherence to budget schedule	-0.01
Project complexity → Product quality	0.15*
Project complexity → Market success	0.14*
Industry dynamism → Adherence to budget schedule	0.07
Industry dynamism → Product quality	0.04
Industry dynamism → Market success	0.02
R ² Job satisfaction	0.49
R ² Adherence to budget schedule	0.34
R ² Product quality	0.27
R ² Market success	0.37

^aSignificance levels are based on bootstrapped, bias-corrected confidence intervals.

* *p* < .05 (one-tailed test).

** *p* < .01.

linear term; $\beta = .08, p < .05$ curvilinear term) via team’s job satisfaction, product quality, and adherence to budget and schedule. Given that these findings seem counterintuitive, an alternative view of these relationships was examined based on General-Adaptation-Syndrome (G-A-S) theory (Selye, 1950), which proposes a three-phase model of reactions to stress (Figure 2). In the alarm phase (A to B), stress hurts performance. In the reactance phase (B to D), performance is enhanced as stress rises. In the exhaustion phase (D to E), performance drops as a result of the stress level exceeding a threshold. These three phases are depicted with a sine curve (Nygaard and Dahlstrom, 2002). To empirically contrast this perspective,

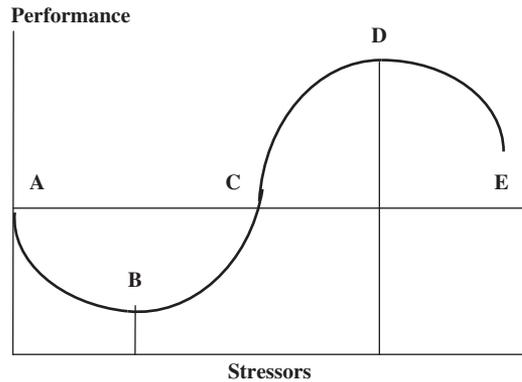


Figure 2. G-A-S Perspective

adherence to budget and schedule and product quality were modeled as sine functions of role ambiguity. The G-A-S models were not supported.

H5a examined the effect of role conflict on adherence to budget schedule. As shown in Table 4, whereas the linear term of role conflict is negative and significant ($\beta = -.14, p < .05$), the quadratic term is not significant. Therefore, H5a is rejected. As predicted by H5b, results indicate an inverted U-shaped relationship between role conflict and product quality. Thus, the quadratic term of role conflict is negative and significant ($\beta = -.11, p < .05$). Contrary to expectations (H5c), results point out a lack of direct association between role conflict and market success; instead, a significant curvilinear indirect effect of role conflict on market success is found via team's job satisfaction, product quality, and adherence to budget and schedule (linear effect: $\beta = -.10, p < .01$; quadratic effect: $\beta = -.05, p < .05$).

H6a, H6b, and H6c are not supported. As shown in Table 4, there is a lack of relationship between pressure for performance and adherence to budget and schedule. Also, contrary to expectations (H6b), results show a U-shaped relationship between pressure for performance and product quality ($\beta = .18, p < .01$ linear term; $\beta = .15, p < .05$ curvilinear term). In a similar vein to the G-A-S model specified for role ambiguity, product quality was modeled as a sine function of pressure for performance. Results support the G-A-S model for pressure for performance ($\beta_{\text{sine of pressure for performance}} = .17, p < .01$). Finally, no direct effect was found of pressure for performance on market success. Alternatively, results suggest a U-shaped indirect effect via product quality ($\beta = .07, p < .05$ linear term; $\beta = .05, p < .05$ curvilinear term).

H7a and H7b are supported. As shown in Table 4, the effect of job satisfaction on adherence to budget

and schedule and product quality is positive and significant ($\beta = .33, p < .01, \beta = .27, p < .01$). Results fail to support H7c, which contended a significant direct effect of job satisfaction on market success. In contrast, a significant indirect positive effect was found through product quality, and adherence to budget and schedule ($\beta = .18, p < .01$).

Discussion

The topic of job stressors and its impact on performance has received limited empirical attention in the NPD field. The present study draws from previous literature on stress and NPD to examine the impact of three job stressors (i.e., role ambiguity, role conflict, and pressure for performance) on team job satisfaction and three dimensions of new product performance: adherence to budget and schedule, product quality, and market success. In particular, linear and curvilinear effects of job stressors on job satisfaction and new product performance, respectively, are examined.

Work Stressors and Job Satisfaction

As predicted, findings from this research suggest that role conflict and role ambiguity are negatively related to team job satisfaction. Furthermore, in keeping with previous studies (Baroudi, 1985; Gilboa et al., 2008), the results indicate that the negative effect of role ambiguity on job satisfaction is stronger than the effect of role conflict on job satisfaction.

Results show a lack of association between pressure for performance and job satisfaction. There are two viable explanations for these results. On one hand, it may be that in today's competitive environment pressure for performance has become something inherent to new product development and thus NPD team members seem to accept this pressure. On the other hand, it could be that pressure for performance exerts an indirect, rather than a direct, impact on team job satisfaction via team conflict. Thus, Akgün et al. (2007) argued that high levels of pressure for performance can destroy team equilibrium and cause intragroup conflict.

Work Stressors and New Product Performance

Overall, findings indicate that different stressors have different relationships with performance, and

consequently there is a need to further theorize and examine the causes for these different effects.

Regarding role ambiguity, findings provide empirical evidence of a U-shaped relationship between role ambiguity and adherence to budget and schedule and between role-ambiguity and product quality. Thus, intermediate levels of role ambiguity are hurtful, but low and high levels of role ambiguity are helpful. The result that high levels of ambiguity are likely to increase performance outcomes, although counterintuitive, is consistent with some arguments in the literature. Thus, Singh (1998) noted that, in the absence of additional stimulating effects, high levels of role ambiguity might have intrinsic motivation potential to energize team members to put in additional efforts and focus on the task (e.g., because of its learning possibilities). In any event, it should be noted that the levels of ambiguity in the present sample are low to moderate. Therefore, these findings with regard to the impact of moderate-to-high levels of ambiguity on new product performance should be regarded as tentative.

Role conflict has a negative linear relationship with adherence to budget schedule and an inverted U-shaped relationship with product quality. As it appears, incongruity or incompatibility in the expectations or requirements communicated to a NPD team can have a detrimental effect on adherence to budget schedule yet lead to increased product quality. The inverted U-shaped relationship with product quality suggests the presence of positive effects for moderate levels of role conflict. This is in keeping with the studies of Van de Vliert and De Dreu (1994) and Nemeth (1995) indicating that moderate levels of conflict can result in new and different ideas as it encourages feedback and stimulates creativity and innovation. As suggested by Jehn (1995), for nonroutine tasks, disagreements about the task would allow a more thorough evaluation of the criteria needed for individuals and groups to make high-quality decisions. Routine and formal tasks (e.g., meeting scheduled deadlines or adhering to budget), on the other hand, do not benefit from the presentation and discussion of diverse and dissenting perspectives. In a similar vein, Amason (1996) suggested that whereas conflict can improve decision quality it hurts group consensus with the subsequent negative effects on adherence to budget and schedule.

Findings from this study support a triphasic effect of performance's pressure on product quality. Low levels of pressure are characterized by increasingly

lower levels of product quality. From moderate to high levels, performance pressure has a positive effect on product quality. As indicated by Akgün et al. (2007), stretching and challenging team members appear to address complacency and forces team members to perform proficiently and to carefully complete each product development activity. When team members feel pressured to perform, they are likely to be more careful and eager to launch the product faster with a greater focus on success. However, stretching team members too hard can have negative consequences. Under too much pressure, team members can experience high levels of anxiety, affecting performance in a negative way. Thus, it has been argued that extreme levels of anxiety may cause team members to freeze or lead to biases in judgment and distortions in sense making and information processing (*ibid.*).

Finally, results show a lack of association between pressure for performance and adherence to budget and schedule. It is possible that team members create defense mechanisms to cope with their feelings of stress and pressure and to improve the systematic effectiveness of the NPD project (Akgün et al., 2006).

Job Satisfaction and New Product Performance

Concerning team job satisfaction, the findings presented herein point out the existence of an indirect, rather than a direct, effect of job satisfaction on market success via adherence to budget and schedule and product quality. This result is consistent with literature on social psychology suggesting that attitudes toward the job should be related to behaviors on the job (Judge et al., 2001). Following this logic, job satisfaction (a positive attitude toward the job) indirectly influences market success in that it leads NPD team members to engage in core technical duties (e.g., design of a high-quality product) or in-role duties (e.g., adherence to budget schedule).

Managerial Implications

A number of important managerial implications follow from these results. First, findings from this study point out that role ambiguity has a stronger negative effect on job satisfaction than role conflict. Nonetheless, in comparison with role conflict, role ambiguity is more amenable to managerial intervention; that is,

implementing solutions that diminish role ambiguity is relatively less difficult (Singh and Rhoads, 1991). Therefore, product managers should make every effort to ensure that team members fully understand their role requirements and expectations and have adequate information about their jobs.

Second, these findings indicate that whereas role conflict is negatively related to job satisfaction and adherence to budget and schedule moderate levels of role conflict can have a positive direct effect on product quality. An important implication of these findings is that, rather than reducing the level of role conflict to zero, managers should opt for minimizing the negative effect of role conflict on job satisfaction and new product performance by manipulating variables that may moderate positively this relationship (e.g., team autonomy or team experience could help to reconcile incongruent expectations), because as shown in this study moderate levels of role conflict may be desirable to improve product quality. Nevertheless, given the predominantly negative outcomes associated with conflict, it may be best to error on the side of too little than on the side of too much conflict in the NPD team.

Third, given that moderate to high levels of pressure can improve product quality directly and market success indirectly, management should keep some tension among the team members and make sure they understand that there is a sense of urgency. Moreover, it is worth noting that contrary to role conflict and role ambiguity, which hold a negative association with job satisfaction, pressure for performance does not have a negative (or positive) impact on job satisfaction.

Finally, it is desirable that management provides NPD teams with the necessary tools to improve job satisfaction. As shown in this study, satisfaction is indirectly related to market success via adherence to budget and schedule and product quality.

Limitations and Future Research

The present study has several limitations. First, the analysis is based on retrospective data that can be subject to hindsight bias. Hindsight bias can lead individuals to alter their recollections of the past so they appear more congruent with the known outcomes or, alternately, to modify present judgments so they align better with what is remembered (Fischhoff, 1975). Future studies could mitigate this concern by measuring stress levels in current, instead of past, new

product projects. Second, a single key informant provided the data in each company. While it is not this study's intention to minimize the potential problems of common method variance derived from using a single informant, results from the tests realized in the methodology section suggest that this bias is not a major problem in the sample. Nevertheless, different key informants must provide the data for independent and dependent variables in future studies to avoid this problem. Third, the response rate is relatively low. Still, there are some reasons to believe that the response rate did not jeopardize the representativeness of the sample. Thus, Armstrong and Overton's (1977) test provided some indication of the absence of non-response error and the sample was representative of the population in terms of industry sectors and company size. Finally, Rizzo et al.'s (1970) role ambiguity and role conflict scale, which have dominated the literature about role stressors, could have problems with content validity (King and King, 1990). Replications of this work using scales that consider the multidimensional aspects of team stressors (e.g., Singh and Rhoads, 1991) are needed.

Apart from the necessary improvements in the measurement process, several lines of future research can be suggested. First, previous research has distinguished between affective and functional conflict (Menguc and Auh, 2008). Accounting for different types of conflict could help explain more effectively the effect of team conflict on job satisfaction and new product performance. Second, the empirical study was conducted in one cultural setting (Spain). However, results from Peterson et al. (1995) reveal that managers from high-power-distance and low-individualism countries report lower levels of role ambiguity than managers from low-power-distance and high-individualism countries. Therefore, to ensure generalizability of these findings beyond the Spanish context, additional research is needed in countries with different levels of power-distance and individualism. Third, given that stress affects teams as well as individuals, a multilevel analysis by using hierarchical lineal modeling can be adequate. For example, role conflict, pressure for performance, and role ambiguity can be assessed as individual-level factors and satisfaction and performance as group-level factors. Finally, future research could explore the moderating effect of team's autonomy and empowerment on the relationship between work stressors and team satisfaction. Employees who have an opportunity to participate in setting goals and the procedures for

achieving them may have higher levels of job satisfaction and exhibit lower role ambiguity and role conflict than those employees denied such thing (Thomas and Velthouse, 1990).

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