The effect of dysfunctional conflict on learning performance: The role of cognitive style

Min-Chih Miao  
Chinese Culture University, Taiwan, ROC

Ching-Ting Tien  
Chaoryang University of Technology, Taiwan, ROC

Huo-Tsan Chang and Yu-Yuan Ko  
National Changhua University of Education, Taiwan, ROC

The aim in this study was to determine if relationship conflict has a greater impact on learning performance than does process conflict. Inconsistent results in the relationship between dysfunctional conflict and learning performance have been found in past studies. The effects of dysfunctional conflict on learning performance in a Chinese cultural context, were explored with cognitive style as a moderator. Results show that the relationship between process conflict and learning performance is quadratic. Importantly, it was found that relationship conflict has a greater effect on learning performance than does process conflict. Cognitive style is a moderator in the relationship between process conflict and learning performance and under and analytical cognitive style, the relationship is U-shaped.

Keywords: learning performance, conflict style, cognitive style.

Although teams have been found to increase organizational competitiveness they can also be a locus of conflict and can have a negative effective on
Dysfunctional conflict and learning performance. Therefore, understanding and managing within-team conflicts is an important management task.

Three main types of conflict style have been identified: task conflict, relationship conflict, and process conflict (Jehn, 1994). Researchers have categorized task conflict as being positive, and relationship and process conflict as being dysfunctional or negative (Behfar, Peterson, Mannix, & Trochim, 2008; De Dreu & Van Vianen, 2001; De Dreu & Weingart, 2003). However, researchers have recently suggested that task conflict may be either negative or positive, depending on the nature of the task given to the team. Decision-making teams and project teams both operate under conditions of high levels of uncertainty and complexity. Task conflict in such circumstances can have a positive effect. By contrast, the result of task conflict in teams engaged in simple or routine tasks is generally negative or detrimental (Chen, 2006; De Dreu & Van Vianen, 2001; De Dreu & Weingart, 2003).

In this study we focused on research and development teams. Such teams operate under conditions of high levels of uncertainty and complexity so task conflict should have a positive effect. Previous researchers have generally found a linear relationship between process conflict and learning performance. However, some researchers have argued that the relationship is actually curvilinear, and this idea had not been tested (Pincus, Fox, Perez, Turner, & McGeehan, 2008; Robbins, 2003).

In Taiwan, internal conflicts in teams are shaped by traditional Chinese cultural patterns of conflict management as well as by modern business practices. Compared to Western societies there is a strong emphasis on maintaining or saving face in Chinese society (both one's own and that of others) and on maintaining the appearance of tranquility in interpersonal relationships (Chen & Francesco, 2000; Hwang, 1987; Park & Luo, 2001; Xin & Pearce, 1996). A crucial concept for understanding how the Chinese view interpersonal relationships is the concept of guanxi which refers to the network of interpersonal relationships including task roles, friendships and social relations, which facilitate an individual's personal and organizational goals (Wright, Szeto, & Cheng, 2002); without guanxi performance is seriously impaired (Chen & Francesco; Xin & Pearce). Guanxi not only intensifies team conflicts but its influence means that any team conflict will eventually become a relationship conflict (Chen & Francesco; Hwang; Park & Luo; Xin & Pearce). Based on this observation, in Chinese society relationship conflict can be expected to have more of an impact on learning performance than will process conflict.

Studies aimed at examining the relationship between conflict and learning performance have reached an interesting crossroad. On the one hand, some researchers have found that conflict has a positive effect on learning performance (De Dreu & Weingart, 2003; Simons & Peterson, 2000). On the other hand,
some researchers have indicated that conflict had negative effects on learning performance (Amason, 1996; Amason & Schweiger, 1994; Chen, 2006; De Dreu & Weingart, 2003; Jehn & Mannix, 2001). These inconsistent results suggest that the relationship between process and relationship conflicts and learning performance may depend on some as-yet-undetected moderators. Currently little is known about how the link between conflict and learning performance functions. Studies of conflict within teams have pointed to cognitive style being an important factor in shaping and moderating team internal conflicts (De Dreu & Weingart, 2003). In the context of dissimilar cognitive styles, conflicts will have different effects on learning performance, because of individual variations in information processing (Gardner & Korth, 1998; Hutchinson & Skinner, 2007; Kirkman & Roseb, 2000; Simons & Peterson, 2000). This research is aimed at addressing this issue by shedding light on whether cognitive styles moderate the relationship between conflict and learning performance.

Taiwan has a large number of high-tech firms involved in industries that are characterized by short product life cycles, high job complexity, intense competition, rapid technological change, and emphasis on research and development (R&D). As a result, such firms operate under conditions of high uncertainty and complexity and focus on team work to promote short product R&D times in order to remain competitive (Chou & Yeh, 2007). These firms were particularly suited to the purpose of the current research in that they are set in a Chinese cultural context, involving R&D team members in high-tech firms, and, therefore, in this study, firms from this sector were used to analyze the effects of dysfunctional conflict on learning performance and the moderating role of cognitive style.

THEORETICAL BACKGROUND AND HYPOTHESES

DYSFUNCTIONAL CONFLICT AND LEARNING PERFORMANCE

Researchers have demonstrated that learning performance is a part of overall team performance (Amason, 1996; Amason & Mooney, 1999; Hackman, 1990; Vinokur-Kaplan, 1995). Hackman suggested that indices of quality of team output could be used to measure team learning performance. Vinokur-Kaplan labeled these indices as decision making, problem-solving capacity, and creative capacity. Individual learning performance has been defined as accommodation and assimilation of information to individual cognitive capacity, resulting in cognitive capacity improvement (Banks & Millward, 2000; Chen, 2006; Edmondson, 1999; Hinsz, 1995). Thus, for the purposes of this study, learning performance includes creativity, problem-solving capacity, and accommodation and assimilation of information (Banks & Millward; Edmondson; Hinsz).
Conflict among team members is divided into three types: task conflict which is functional, and process conflict and relationship conflict which are dysfunctional (Jehn & Mannix, 2001). Process conflict stems from ambiguities in the principles used to delegate tasks, responsibilities, and resources (Jehn, 1994). Relationship conflict, also called affect conflict (Jehn & Mannix), depends on individual factors in interpersonal relationships (Amason & Mooney, 1999; Cappozzoli, 1999; Jehn & Mannix; Rahim, 2002; Verderber & Verderber, 1995).

As described above, task conflict tends to be positive when the task involves high uncertainty or high complexity. Since this research was focused on R&D teams, which operate under conditions of high uncertainty and complexity, we elected not to investigate task conflict.

Researchers have found that process conflict and relationship conflict are negative or dysfunctional conflict types and both have been found to affect learning performance negatively (Amason, 1996; Amason & Schweiger, 1994; Chen, 2006; De Dreu & Weingart, 2003; Jehn & Mannix, 2001). Although the relationship between process conflict and learning performance generally has been found to be linear and negative (in terms of the effect of the former on the latter), not all researchers support this perspective (De Dreu & Weingart). Furthermore, Jehn and Mannix (2001) and Robbins (2003) have argued that this relationship may be curvilinear; however, this remains to be tested empirically.

In the model of process conflict proposed by Robbins (2003) team members clarified the problems of duty and resource delegation through mutual discussion. This represents low to middle level process conflict that can actually enhance learning performance. However, when the level of process conflict rises from mid to high level, team members begin competing with each other over resources and consequent ambiguities in task goals result in impaired learning performance (Pincus et al., 2008). Jehn and Mannix (2001) found that in some teams, individual members affirmed task goals, even as process conflict rose and this resulted in improved learning performance despite the rise in the level of conflict. Consequently, the effect of process conflict on learning performance is not necessarily linear and negative but may instead become curvilinear as the level of process conflict changes (Amason, 1996; De Dreu & Weingart, 2003; Simons & Peterson, 2000). Thus we predicted that the effect of process conflict on learning performance would be curvilinear:

**Hypothesis 1:** The relationship between process conflict and learning performance will be quadratic.

Relationship conflict is an awareness of interpersonal incompatibilities, including affective components such as feelings of tension and friction. It also involves personal issues such as disliking team members and experiencing feelings such as annoyance, frustration, and irritation (Amason & Mooney, 1999; Jehn & Mannix, 2001; Verderber & Verderber, 1995). As already described, in
Chinese societies, relationships are mainly governed by the concepts of face and guanxi, with the latter being, of itself, an important source of conflict. Given the strong emphasis on these forms of management of interpersonal relationships in Chinese societies, process conflict tends to evolve into relationship conflict. Thus we predicted that in Chinese society relationship conflict would have more of an impact on learning performance than would process conflict.

**Hypothesis 2:** Relative to process conflict, relationship conflict will be a stronger predictor of learning performance.

**Moderating Effect of Cognitive Style**

Until recently, scholars argued that functional conflict, for example task conflict, had a positive effect on learning performance. In contrast, process conflict and relationship conflict were considered to be dysfunctional conflict types that inhibited learning performance.

Situational context provides only part of the conflict process; personality differences in teams also contribute significantly to how teams interact (Jensen-Campbell & Graziano, 2005). The findings of De Dreu and Weingart (2003) support those of previous research in concluding that the results to establish the relationship between conflict styles and effectiveness were mixed and confusing. Studies of conflict within teams have pointed to cognitive style as an important factor in shaping and moderating team internal conflicts (De Dreu & Weingart).

*Cognitive style* has been described as a distinctive mode of perceiving, remembering and problem solving, which reflects individual differences in preferred ways of processing information (Sadler-Smith, 1999a). Scholars have different perceptions of the exact dimensions of cognitive style. The numerous labels used to describe cognitive style actually appear to be different conceptions of a superordinate dimension, the poles of which are commonly labeled intuitive and analytic (Armstrong, Allinson, & Hayes, 2002; Sadler-Smith, Allinson, & Hayes, 2000). Analytic cognitive style is characterized by precision, reliability, efficiency, discipline, and conformity, along with a preference for breaking down a problem, situation, or issue into its constituent parts in order to deal with it (Sadler-Smith, 1999a). Intuitive cognitive style is typified by undisciplined thinking and tangential approaches to tasks and problem solving that draw on a global perspective (Allinsons & Hayes, 1996; Hutchinson & Skinner, 2007; Raisinghani, 2000; Rayner & Riding, 1997; Sadler-Smith, 1999a, 1999b). Conflicts produce different levels of learning performance, because of individual variations in information processing (Gardner & Korth, 1998; Kirkman & Roseb, 2000; Simons & Peterson, 2000). Individual cognitive styles affect the focus of data searching and problem solving when conflicts occur and thereby have an impact on learning performance (Banks & Millward, 2000; Sadler-Smith & Badger, 1998).
Relationship conflict hampers achievement of task goals and has a negative impact on learning performance (Rahim, 2002). We predicted that individuals using analytical cognitive styles would actively search for new environmental information and accommodate and assimilate it into their individual cognitive capacity. Consequently this would moderate the negative impact of relationship conflict on learning performance.

Intuitive individuals have a weaker problem-solving capacity, especially for problems that require specific and step-by-step approaches, even if they are adept at processing large quantities of information and at thinking independently (Riding & Sadler-Smith, 1992). We predicted that individuals with intuitive cognitive styles would not focus on the problem and might overlook relevant information, thereby increasing the negative impact of relationship conflict on learning performance. Consequently we predicted:

**Hypothesis 3**: People exhibiting an analytical cognitive style will buffer the negative effect of relationship conflict on learning performance more effectively than will people using an intuitive cognitive style.

Although process conflict relates to differences of opinions over the distribution of tasks, duties, and resources among team members. Simons and Peterson (2000) found that process conflict could enhance learning performance. The presence of moderating factors may be one reason for these contradictory results (De Dreu & Weingart, 2003; Simons & Peterson, 2000) and this needs to be taken into account in any investigation of conflict and learning performance.

If the relationship between process conflict and learning performance is curvilinear, then in the low to middle levels of process conflict, analytical thinkers will be at an advantage. At lower levels of conflict, the areas of conflict are often clear and can be resolved by step-by-step approaches. However when the level of conflict reaches midpoint, the learning performance of analytical individuals begins to decline and eventually becomes negative. When employing a step-by-step approach at this stage, problems are neither identified nor solved and much time is wasted in discussions and in focusing on details. As the level of conflict rises, analytical individuals tend to redouble their efforts to locate and resolve the conflict and underlying problem through detailed discussions with other members. These discussions help analytical individuals clarify the fuzzy shape of problems and enhance their learning performance.

By contrast, the intuitive individual is an affective thinker who works best when solving problems amenable to an holistic approach. Intuitive individuals prefer a rapid, open-ended approach to decision making. In lower level process conflict, intuitive individuals are good problem solvers, because the focus of conflict is clear and it is easy for them to suggest principles of job duty and resource delegation, that will enhance learning performance. However, when process conflict rises into the mid to high range those with an intuitive cognitive
Dysfunctional conflict and learning performance

style generally fail to propose specific approaches related to the management of tasks and resources. Under these circumstances the conflict-solving procedure typically comes to a halt because intuitive thinkers prefer multidimensional, global, or overall perspectives and open-ended information processing. Thus learning performance declines (Banks & Millward, 2000; Riding & Mathias, 1991; Riding & Pearson, 1994; Sadler-Smith et al., 2000; Sadler-Smith, Spicer, & Tsang, 2000). Consequently we predicted:

**Hypothesis 4:** The initial negative moderating effects on learning performance and process conflict of using an analytical cognitive style will diminish and gradually become positive.

**METHOD**

**SAMPLE AND PROCEDURE**

Study participants were selected from high-tech firms operating in Taiwan, where team approaches to research and development are the norm. The Taiwan government’s definition of “high-tech firm” was used to select such firms from among Taiwan’s Top 500 companies in the aviation (1%), medical/biotech (7%), precision instrument (2%), electronic (19%), optoelectronic (9%), semiconductor (16%), telecommunications & networking (11%), or computer systems, peripherals, and components (39%) field. A total of 237 firms were identified and from that population 100 companies were selected using random sampling that was weighted to reflect the relative proportion of firm types in the study population.

Five questionnaires per company (total N = 500) were sent with the request that members of the R&D teams complete the survey. A total of 241 questionnaires were returned (rate of return of 48.2%). Thirteen questionnaires were incomplete or otherwise invalid and so 228 (45%) responses were considered valid. The majority of the respondents were male (78.8%). In terms of education 26.8% were high school graduates whilst almost equal numbers held a bachelors’ or master’s degree (38.6% and 32.5% respectively). A small group (2.2%) doctorates.

**MEASURES**

Three questionnaires that addressed dysfunctional conflict, cognitive style and learning performance were used to collect data.

Dysfunctional conflict (i.e., relationship conflict and process conflict) was measured using items from the conflict scales of both Jehn and Mannix (2001) and Amason (1996). Five items were used to gauge the level of relationship conflict and the Cronbach’s alpha was calculated as .92 and this explained 76.9% of the variation. Three items were used to gauge the level of process conflict and responses were given on 5-point Likert scale with scores ranging from 1 = none to 5 = a great deal.
Learning performance was measured using 16 items from scales developed by Banks and Millward (2000), Hackman (1990), Hinsz (1995), and Vinokur-Kaplan (1995). The respondents gave answers based on a 5-point Likert scale with scores ranging from 1 = *none* to 5 = *a great deal*.

Cognitive style was measured using the 16 items from Allinson and Hayes’s Cognitive Style Index (1996). The response format was a 3-point scale with anchors of 0 = *false*, 1 = *uncertain*, and 2 = *true*. Higher scores represented a tendency to use a cognitive analytical style while lower scores were associated with a disposition toward using the intuitive approach.

The fact that our scales had been used in previous research gave us confidence in their reliability and validity. Furthermore, the Cronbach’s alphas for dysfunctional conflict, learning performance, and cognitive style (.87, .92, and .71 respectively) were higher than the .70 minimum suggested by Nunnally (1978), thus supporting their reliability.

**Analysis**

Hierarchical regression analysis was used to test Hypothesis 1. The level of process conflict was identified along with its related squared score. Where significant results were obtained on both the incremental $R^2$ and the $\beta$ of the squared score then the relationship between process conflict and learning performance was considered to be quadratic (Cohen & Cohen, 1983).

We examined the degree to which a variable contributed to learning performance (see Hypothesis 2) through a usefulness analysis (Darlington, 1968; Trembley, Côté, & Balkin, 2000). This involved separate and reverse order entry of the results for relationship conflict and process conflict into a hierarchical regression equation for analysis.

To test the interaction effect of cognitive style on relationship conflict and learning performance (Hypothesis 3), the independent variables were entered into the regression model in three separate steps. First we entered the level of relationship conflict, next we input the cognitive style variables, and lastly we entered the interaction effect of cognitive style with relationship conflict and learning performance.

To test the hypothesized quadratic-by-linear interaction between process conflict ($X$) and cognitive style ($Z$), we used the equation suggested by Aiken and West (1991), shown here as: $Y = B_1X + B_2X^2 + B_3Z + B_4XZ + B_5X^2Z + B_6$. The predictors were entered into the regression equation in four successive steps. In the first step, the linear ($X$) and quadratic ($X^2$) terms of process conflict were entered. In the second and third steps cognitive style, as a linear moderator ($Z$), and the linear interaction between process conflict and cognitive style ($XZ$), were entered. In the fourth and final step, the quadratic-by-linear ($X^2Z$) term was added to the test. Hypothesis 4 predicted that the curvilinear relationships
of process conflict with learning performance would vary with cognitive style. In order to further describe the curvilinear relationships between process conflict and learning performance and the way it varies according to cognitive style, differential calculus was used to find the inverse point.

RESULTS

DESCRIPTIVE STATISTICS
The means, standard deviations, and correlations for all of the variables are presented in Table 1. Many of independent variables were intercorrelated. The remedy for multicollinearity was to modify the independent variables by use of the orthogonal residual method in order to diminish statistical errors.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Relationship conflict type</td>
<td>228</td>
<td>2.20</td>
<td>.78</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Process conflict type</td>
<td>228</td>
<td>2.38</td>
<td>.80</td>
<td>.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cognitive style</td>
<td>228</td>
<td>1.16</td>
<td>.34</td>
<td>-.13</td>
<td>-.16</td>
<td></td>
</tr>
<tr>
<td>4. Learning performance</td>
<td>228</td>
<td>3.93</td>
<td>.46</td>
<td>-.34</td>
<td>-.34</td>
<td>.45</td>
</tr>
</tbody>
</table>

Note: *p < .05 (r > = .12); **p < .01 (r > = .17)

THE QUADRATIC EFFECT
The square of the coefficient of process conflict is .20, and ∆R² is 0.4 (see Table 2). Therefore Hypothesis 1 was supported in that the results show a curvilinear relationship between process conflict and learning performance.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Learning performance</th>
<th>β</th>
<th>R²</th>
<th>∆R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process conflict</td>
<td></td>
<td>.34***</td>
<td>.12</td>
<td>.12*</td>
<td>29.66***</td>
</tr>
<tr>
<td>Process conflict squared</td>
<td></td>
<td>.20**</td>
<td>.16</td>
<td>.04*</td>
<td>20.75***</td>
</tr>
</tbody>
</table>

Note: Regression coefficients (standard betas) shown are from the final equation.
* p < .05, ** p < .01, *** p < .001

THE RELATIONSHIP EFFECT
Table 3 shows the comparative effects of relationship conflict and process conflict in predicting variance in learning performance. When relationship conflict is entered first, process conflict has no significant explanatory effect on variations in learning performance (change in R² = .002). By contrast, the
relationship between relationship conflict and learning performance is significant when process conflict is entered first (change in $R^2 = .02$, $p < .05$). This shows that relationship conflict is related more strongly to learning performance than is process conflict and, therefore, Hypothesis 2 is supported.

**TABLE 3**

**Usefulness Analysis: Effects of Relationship Conflict and Process Conflict**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Learning performance</th>
<th>$\Delta R^2$</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1. Relationship conflict</td>
<td></td>
<td>.06***</td>
<td>15.13***</td>
</tr>
<tr>
<td>Step 2. Process conflict squared</td>
<td></td>
<td>.002</td>
<td>7.82**</td>
</tr>
<tr>
<td>Step 1. Process conflict squared</td>
<td>.04**</td>
<td></td>
<td>10.42**</td>
</tr>
<tr>
<td>Step 2. Relationship conflict</td>
<td>.02*</td>
<td></td>
<td>7.82**</td>
</tr>
</tbody>
</table>

*Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

**Moderating effect of cognitive style**

As shown in Table 4, there is a negative, but not significant, buffering effect for the moderating effect of cognitive style on relationship conflict and learning performance. On this basis Hypothesis 3 was not supported.

The results shown in Table 5 provide support for the curvilinear moderating effect of cognitive style on process conflict and learning performance. Regardless of the level of process conflict, the learning performance for analytic cognitive style is greater than that for intuitive cognitive style (Figure 1). This result mirrors those of Amason (1996), Amason and Mooney (1999), Amason and Sapienza (1997), Banks and Millward (2000), Jehn and Mannix (2001), Sadler-Smith and Badger (1998), and Verderber and Verderber (1995).

**TABLE 4**

**The Moderating Effect of Cognitive Style on Relationship Conflict and Learning Performance**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Learning performance</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship conflict</td>
<td></td>
<td>-.29***</td>
<td>.11</td>
<td>.11***</td>
<td>29.01***</td>
</tr>
<tr>
<td>Cognitive style</td>
<td></td>
<td>.38***</td>
<td>.27</td>
<td>.10***</td>
<td>43.52***</td>
</tr>
<tr>
<td>Relationship conflict × cognitive style</td>
<td></td>
<td>.08</td>
<td>.28</td>
<td>.01</td>
<td>29.74***</td>
</tr>
</tbody>
</table>

*Note: Regression coefficients (standard betas) shown are from the final equation.*** $p < .001$
TABLE 5
THE MODERATING EFFECT OF COGNITIVE STYLE ON PROCESS CONFLICT AND LEARNING PERFORMANCE

<table>
<thead>
<tr>
<th>Variables</th>
<th>Learning performance</th>
<th>β</th>
<th>R²</th>
<th>ΔR²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process conflict</td>
<td></td>
<td>-.34***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process conflict squared</td>
<td></td>
<td>.20**</td>
<td>.16</td>
<td>.16***</td>
<td>20.75***</td>
</tr>
<tr>
<td>Cognitive style</td>
<td></td>
<td>.38***</td>
<td>.30</td>
<td>.14**</td>
<td>31.42***</td>
</tr>
<tr>
<td>Process conflict × Cognitive style</td>
<td></td>
<td>-.06</td>
<td>.30</td>
<td>.00</td>
<td>23.87***</td>
</tr>
<tr>
<td>Process conflict squared × Cognitive style</td>
<td></td>
<td>.13*</td>
<td>.32</td>
<td>.02</td>
<td>20.56***</td>
</tr>
</tbody>
</table>

Note: Regression coefficients (standard betas) shown are from the final equation.
** p < .01, *** p < .001

However the results from this study demonstrate that when an analytic cognitive style is employed the relationship between process conflict and learning performance functions in a U-shaped conflict process and learning curve, while the relationship between process conflict and learning performance when an intuitive cognitive style is employed results in an inverse U-shape curve. These results support Hypothesis 4. In order to examine the nature of the interaction, we followed the procedure suggested by Aiken and West (1991) to specify the interplay between process conflict and cognitive style (see Figure 1).

**Figure 1:** The interplay between cognitive style and process conflict in learning performance.
The purpose of this study was to identify the impact of dysfunctional conflict on learning performance. Our findings produced mixed support for our predictions: (1) the effect of process conflict on learning performance is quadratic; (2) relationship conflict is more significantly correlated with learning performance than is process conflict, and (3) cognitive style has a moderating effect on learning performance under situations of process conflict. The relationship between process conflict and learning performance under the condition of an analytic cognitive style functions as a U-shape, while the association between process conflict and learning performance under the condition of an intuitive cognitive style has an inverse U-shaped learning and process curve. Therefore, overall the results support Hypotheses 1, 2, and 4, but not Hypothesis 3.

In terms of the relationship between process conflict and learning performance we found the process formed a U-shaped curve. In this case the highest level of learning performance occurs at the lower and higher levels of process conflict. The lowest level of learning performance, by contrast, occurs at the midpoint of process conflict. As indicated previously process conflict can be considered to relate to frictions over task and resource allocation. On this basis, when tasks and responsibilities are more clearly understood (i.e., at lower levels of process conflict) then learning performance is also higher. However, as process conflict reaches the midpoint level then team members divide into factions that compete for resources, and this leads to reduced learning performance. At high levels of process conflict team objectives and job responsibilities will be at their most obscure, thereby forcing team members to clarify team objectives and principles of resource distribution. This, in turn, leads to increased learning performance (Gersick, 1989; Jehn, 1994; Jehn & Mannix, 2001).

In our study relationship conflict is shown to be a more significant predictor of learning performance than is process conflict. This further substantiates the findings and predictions in existing studies (e.g., Chen & Francesco, 2000; Hwang, 1987; Park & Luo, 2001; Xin & Pearce, 1996) regarding the perceived importance of relationships in Chinese society.

Jehn and Mannix (2001) found that learning performance and process conflict had either a U or an inversely U-shaped function. This result is not consistent with the findings of previous studies. Similarly, in our study we found that the relationship between process conflict and learning performance has a U-shaped function. Situational moderators have been proposed as the cause for the results reported by Jehn and Mannix (De Dreu & Weingart, 2003; Simons & Peterson, 2000). In this study we extended the findings of previous studies by testing this possibility empirically. However, we did not find any evidence that cognitive style has a moderating influence on relationship conflict and learning.
performance. This may be explained by the social preferences for handling conflict management in Chinese society. In this context great importance is attached to maintaining a façade of friendly relations saving and maintaining of face by and for both parties in a relationship. Open expression of dissatisfaction is seen as being disruptive of the placid surface that is highly valued in Chinese society. Instead, discontent is expressed in private (Chen & Francesco, 2000; Hwang, 1987) and this tends to mask and hide the effects of relationship conflict (Amason & Mooney, 1999; De Dreu & Van Vianen, 2001).

In our study, we also considered the moderating effect of cognitive style on process conflict and learning performance. In this case we found a moderating effect and this relationship was inversely U-shaped reflecting the influence of intuitive cognitive style (Figure 1). This is consistent with the findings of both Jehn and Mannix (2001) and Robbins (2003) that the relationship between process conflict and performance is an inverse U-shape in some situations.

Intuitive thinkers make rapid judgments based on feelings and an holistic approach to problem solving. When process conflict is at a low level, team members who use an intuitive cognitive style will have an overall perspective on the goal, resulting in an increased level of learning performance. However as the conflict process reaches midpoint then intuitive thinkers have increasing difficulty coping with its complexities and this results in a decline in learning performance. When experiencing high levels of process conflict, intuitive thinkers experience poor learning performance.

By contrast, analytical thinkers focus on detail and employ rational methods of analysis. At low levels of process conflict, because the focus of conflict is clear, analytical thinkers have a higher degree of learning performance. As process conflict begins to rise to midpoint the learning performance of analytical thinkers starts to fall, because the focus of conflict is ambiguous. Analytical thinkers tend to clarify team goals and approaches through detailed discussions but at this point the simultaneous presence of structure and ambiguity makes clarification difficult (Hutchinson & Skinner, 2007). However, at high levels of process conflict, where much of the structure of task and resource allocation must be created ex nihilo, the ability of analytical thinkers to clarify job tasks and resource allocation through detailed discussions and analysis pays off in higher learning performance (Amason & Mooney, 1999; Amason & Sapienza, 1997; Jehn & Mannix, 2001).

Our results also show that the relationship between process conflict and learning performance was U-shaped prior to analysis of the moderating effect of cognitive style. There are several possible explanations for this finding. First, almost without exception, the workforce of R&D departments in Taiwan’s high-tech firms is male and within Chinese society men are traditionally socialized into a rational and analytical mindset (Chen & Francesco, 2000). Second, the local
education system has a strong bias toward the production of analytical thinkers. Third, research has shown that personnel in the R&D departments in high-tech firms perform only one of two distinct roles: a) research or b) development (Keller, 1992, 1995; Shin & Zhou, 2003). Those who carry out research tend to be intuitive thinkers while the developers are predominately analytical in their approach. Furthermore, Taiwanese companies do more development than research work and consequently there are a greater number of analytical, than there are of intuitive thinkers.

**Implications**

Our results showed that in Chinese society relationship conflict has a greater impact on learning performance than does process conflict. Robbins (2003) argued that in order to reduce relationship conflict, managers could boost the status of their teams, promote team efficacy, and enhance interaction among team members. This should lead to increased team cohesion, create a climate of compatibility among staff and improve trust among members (Chou & Yeh, 2007). However, we are not completely convinced that increasing the closeness of relationship bond among team members will lead to reduced conflicts in a Chinese context. Relationship conflict is a definite obstacle to learning performance and in the Chinese setting relationships often involve unclear boundaries between the personal and the public (or work-related) self. Therefore, it is actually possible that more could be achieved by increasing the distance between team members (Behfar et al., 2008), in the sense of encouraging people to reduce their level of personal investment in work relationships in order to have connections characterized as more “professional” than “personal”.

Our findings indicate that the impact of process conflict on learning performance is quadratic in the form of a U-shaped curve. Therefore, it is suggested that for tasks such as clarifying organizational and departmental goals and principles of resources allocation, when process conflict is low, team leaders should reduce the time spent on these in order to prevent process conflict from harming learning performance. If team leaders sense that process conflict has reached the midpoint then management should strive to avoid destructive competitive behaviors among team members, which result in reduced learning performance (Ayoko, Callan, & Härtel, 2008). Instead team leaders should create an environment that fosters communication, even though further discussion will raise the level of process conflict. The increased levels of conflict will spur members to improve learning performance through clarification of the relevance and purpose of team goals (Jehn & Mannix, 2001).

We also found that the learning performance of analytical thinkers is greater than that of intuitive thinkers regardless of the level of process conflict. Managers should use a measure of cognitive style to select team members in cooperation
with the human resource department (Mueller-Hanson, Heggestad, & Thornton, 2003; Tett & Burnett, 2003). In the case of R&D staff, those whose job entails the carrying out of research, have been shown to have an intuitive cognitive style. Consequently managers should also train these staff to have competence in analytical cognitive style (Hutchinson, & Skinner, 2007; Jeurissen & Nyklichek, 2001; Neuman & Wright, 1999) so as to improve learning performance.

LIMITATIONS AND FURTHER RESEARCH

We used a self-report instrument to measure the research variables so common method variance may have influenced the relationships between these variables. Therefore, we randomly distributed survey items throughout the instrument in order to reduce the influence of common method variance (Podsakoff & Organ, 1986; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We also adopted Harman’s single-factor test-to-test of common method variance (as suggested by Podsakoff, Todor, Grover, & Huber, 1984). We used Korsgaard and Roberson’s method (1995) as a form of confirmatory factor analysis to conduct a model test of all items. We found that a four-factor model (GFI = 0.75; NFI = 0.82) had a better fit than a single-factor model and reflected the structure given to our data. These results made us, confident that common method variance did not significantly affect the results of our study.

We used a sample of employees in high-tech firms where most of the companies are engaged in original equipment or original design manufacture work and place a strong emphasis on the development side of R&D. Thus, our results may have wide application to high-tech industries in Taiwan, South-East Asia, and Mainland China, which are all based on a Chinese Confucian culture.

The focus of future studies could be on the composition of management teams in order to understand the effect on learning performance of the cognitive style used by senior management members. This study used cognitive style as a moderator but the effects of other moderating factors, such as team composition or job complexity (Robbins & Fredendall, 2001; Shaw, 1983; Wiersema & Bird, 1993) could be explored in subsequent studies. Finally, given the U-shaped curve, delineating the relationship between process conflict and learning performance situational factors should also be investigated given their importance as determinants of the pattern of conflict in learning performance.

REFERENCES


