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應用調節焦點理論探討企業工作團隊多元性、觀點採用與個人創造力:認知需求與團隊領導的角色

計畫類別：■個別型計畫　□整合型計畫

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目錄

中文摘要

本研究作者提出團隊成員間同理心的換位思考(perspective taking)為一項 關鍵的過程，藉此可促使實現多元群體內部個別團隊成員的創造力的優勢，故本研究計畫書旨於檢視職場中換位思考在團隊多元性與個別成員創造力間的中介角色。目前創造力議題研究文獻日益增加，多數聚焦在差異多元性對團隊創造力的潛在影響，然鮮少關注多元性研究構面在實際組織影響個體層次創造力的情形。根據資訊/決策制定觀點(information/decision-making perspective)與社會類化觀點(social categorization perspective)，團隊多元性於複雜資訊處理中可能導 致建設性或毀壞性潛在影響，故團隊多元性如何影響成員致力於創造力的歷程 需要被審慎探索。作者提出高層次的認知需求(need for cognition)或轉換型領導 (transformational leadership)有助於釋放多元性團隊的個體認知處理潛力，進而能促進職場上個體的創造力。本研究為求實境衡量個體創造力形成內涵，檢視 22 項[百題]之多的研究構念，以跨足職場個體員工層級與團隊層級之形式蒐集並檢視精鍊實徵資料，而經過充足的研究構面資料蒐集 與探討，將可獲得有價值的多元資料以確證影響個體成員創造力的歷程因素。本研究從台灣通訊、電子、汽車、資訊科技與製藥業等產業中蒐集超過 70 個工作團隊 500 名以上團隊成員之訪談實徵資料，透過部屬-上司之間的對應 問卷設計，避免統計分析共同方法變異(CMV)之疑慮。有效激勵組織個體創造力為產業技術升級之重要關鍵，本研究透過探討以理解團隊多元性如何引導個體創造力的歷程，細緻分析組織內部科技升級的關鍵人為因素，獲致豐碩的實用性研究結果。

關鍵字: 個體創造力; 團隊創造力; 調節焦點理論；工作團隊多元性；學習導向

Abstract

In this study, the author proposes that taking the perspectives of teammates as a key process that enables to realize the benefits of group diversity for individual team member creativity. One goal of this proposal was to examine the mediating role of perspective taking at work between team diversity and individual team member creativity. When the creativity literature have increasingly understood the potentials of different diversity on team creativity, researchers paid little attention to address how different diversity dimensions in real-life organizational team influence individual-level creativity. Basing on the information/decision-making perspective and the social categorization perspective, workgroup diversity may lead to both beneficial and destructive potentials for complex information processing such as idea generation, creative problem solving, and decision making. Research need to explore the condition under which workgroup diversity can stimulate member to engage in creativity processes. The author proposes that a high level of need for cognition or transformational leadership helps to unlock the potential for individual cognitive processing inherent in demographically and cognitively diverse team, and in turn fosters individual

creativity at work. Responding the need for more real-life measures to the individual creativity issue, this study will examine 22 research constructs cross individual-level and team-level forms that will cost two years to implement the entire research. Applying the abundant research dimensions, the author can obtain potentially valuable variety in resources such as ideas, experience, and perspective, in predicting individual member creativity. In this study, my data will be collected from a total of more than 500 employees comprising more than 70 teams in at least eight Taiwanese industries such as the telecommunication, electronics, automobile, information technology, and pharmaceutical industries. All members of the participating teams will be invited to complete my survey. The participating subordinates and their supervisors need to complete a questionnaire at the workplace during work hours. This study needs to collect data from subordinates and their supervisors to minimize the potential problems of common method. The subordinates evaluate work unit goal orientation, their individual difference in goal orientation, and information elaboration, while the supervisors reported on their subordinates' individual creativity. My contributions could be as below statements. First, understanding how different workgroup diversity types promote individual creativity through influencing member's cognitive processes is required. The research is needed that explores which factors might simultaneously help individual tap the benefits inherent in team diversity and prevent the dysfunctional effects associated with dissimilarities. Through effectively motivating organizational individual creativity, Taiwanese local firms can upgrade the industrial technologies so as to enhance the potential and capability to compete with international enterprises.

Keywords: individual creativity, team creativity, Regulatory Focus Theory, workgroup diversity, learning orientation

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Applying Regulatory Focus Theory on exploring workgroup diversity, perspective taking, and individual creativity: the role of need for cognition and team leadership

INTRODUCTION

When work becomes increasingly dynamic and knowledge-based, many organizations rely on creative ideas from employees for competitive advantages (George, 2007; Zhou, 2003). Individual creativity at work refers to the production of novel and useful ideas concerning products, procedures, and processes by individual working together at work (Amabile, 1996; Woodman et al., 1993). Scholars and practitioners share a strong interest in examining factors that influence individual creativity at work. Specifically, researchers have found that individual creativity at work is influenced by personal and contextual factors such as intrinsic motivation (Amabile, 1996) and supervisory leadership (Shin& Zhou, 2003), and work environment characteristics such as job creativity requirement and organizational control (Shalley, Gilson & Blum, 2000).

Less research has focused on how workgroup composition, particularly in workgroup diversity, influence individual creativity at work. Theoretically, a workgroup with diversity displays increased range of knowledge, skills, and perspectives available within a team, which have been very valuable sources of individual creativity (Amabile, 1996; Limpman-Blumen & Leavitt, 1999). Despite its potential value in individual creativity, it is surprising that only few studies examined how workgroup diversity influenced individual creativity (Choi, 2007; Shin, Kim, Lee & Bian, 2012). Shin et al. (2012) found that cognitive team diversity was positively associated with individual member creativity when a team member's creative self-efficacy or their leader's transformational leadership was high.

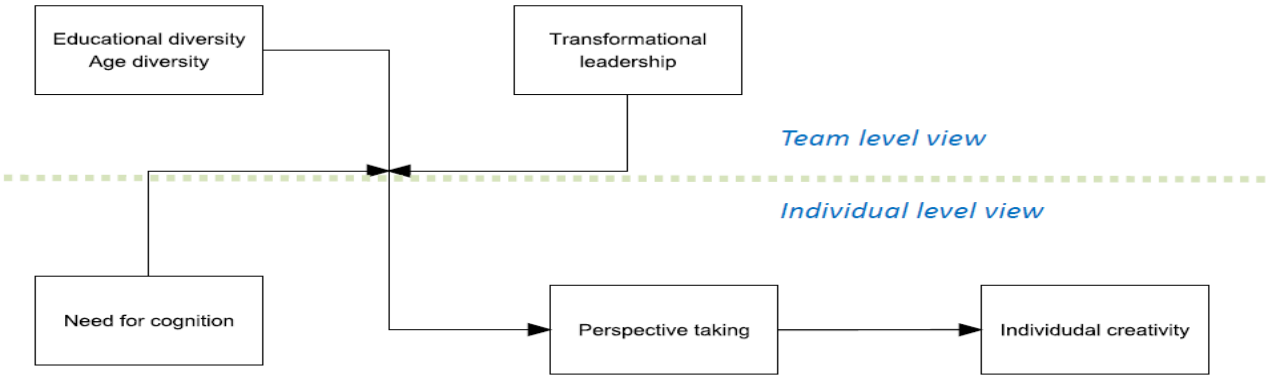
Although Shin et al. (2012) investigated the conditions under which cognitive team diversity has positive effect on individual creativity; some important issues still need to be addressed. First, few studies have paid attention to examine the link between workgroup diversity and individual employee creativity (Jackson, Joshi, & Erhardt, 2003). However, the observation that none of these studies revealed the intervening processes through which workgroup diversity influence individual creativity is quite surprising. In this study, the author proposed that taking the perspectives of teammates as a key process that enables to realize the benefits of group diversity for individual team member creativity. Perspective taking at work, as an individual attempt to understand the thoughts,

ideas, and viewpoints of another team member regarding tasks, is one of the most frequently enacted creative problem-solving strategies employed in workplace (Hoever, van Knippenberg, van Ginkel, & Barkema, 2012; Litchfield & Gentry, 2010). It enables individual member to elaborate information and perspectives from other teammates with different knowledge, skills, thinking styles, and perspectives. Thus, one goal of this article was to examine the mediating role of perspective taking at work between team diversity and individual team member creativity. Second, when the creativity literature have increasingly understood the potentials of different diversity on team creativity, researchers paid little attention to address how different diversity dimensions in real-life organizational team influence individual-level creativity (Jackson, Joshi, & Erhardt, 2003). Responding the need for more real-life measures to the individual creativity issue, the author examine educational specialization and age diversity, as examples of cognitive diversity and demographic respectively, which both reflect potentially valuable variety in resources such as ideas, experience, and perspective, in predicting individual member creativity.

Moreover, based on the information/decision-making perspective and the social categorization perspective (Williams & O'Reilly, 1998), workgroup diversity may lead to both beneficial and destructive potentials for complex information processing (van Knippenberg, De Dreu, & Homan, 2004) such as idea generation, creative problem solving, and decision making. Thus, research need to explore the condition under which workgroup diversity can stimulate member to engage in creativity processes. The author proposes that a high level of need for cognition or transformational leadership helps to unlock the potential for individual cognitive processing inherent in demographically and cognitively diverse team, and in turn fosters individual creativity at work. Figure 1 (**initial concept**) illustrates the mainly conceptual framework in this study. In the following sections, the author briefly reviewed the potential of team diversity on individual creativity and the mediating role of perspective taking, and then the author discussed the effects of transformational leadership and need for cognition on the linkage between team diversity and perspective taking. To test our model, the author plan to employ filed data from more than 350 employees and team leaders within at least 50 teams, tasked with product or process innovation and improvement in 6 different industries.

Figure 1

Conceptual framework



THEORY AND HYPOTHESES

On the basis of **self-regulation theory**, scholars have indicated and amassed considerable evidence in support of the idea that a person's goal orientation has powerful influences on creativity (Janssen & Van Yperen, 2004; Gong, Huang & Farh, 2009) because it motivates people to seek or to avoid opportunities for creativity. Based on previous studies (e.g., Amabile, 1988; Oldham & Cummings, 1996), we defined creativity as the production of novel and useful ideas concerning organizational procedures, processes, products, or services by an employee. Although being a result of cognitive and motivational processes within individuals, generating creative ideas requires access to different knowledge, expertise, and insights (Woodman, Sawyer, & Griffin, 1993). Thus, team diversity that has the increased rand of knowledge, skills, and perspective available within a team serves a key source for team members to be creative.

Diversity in a team can be conceptualized as a team characteristic that reflects the extent to which differences (e.g., age, sex, education, or tenure) exist among team members, but not whether these differences are recognizable by them (Harrison & Klein, 2007). Rather than focusing on perceived cognitive diversity, we focused on differences in educational specialization and age as examples of actual diversity dimensions.. Educational specialization diversity has been recognized as one that provides team members with an increased range of task-relevant information, knowledge, expertise, and perspectives (Dahlin, Weingart, & Hinds, 2005). Despite age diversity is not directly task-related, various ages have various experience, perspectives, and social network ties. When encountering complex tasks (e.g., idea generation), the informational resources provided by age diversity have been observed to positively influence task performance to a greater extent than other surface diversities such as gender (Wegge, Roth, Neubach, Schmidt, & Kanfer, 2008). Based on previous studies (Harrison & Klein, 2007), we assumed that both educational specialization

diversity and age diversity were indicative of variety that reflects differences in task-relevant resources such as knowledge, experience, and perspectives.

The Role of Perspective Taking

Amabile's theory of creativity processing suggests that greater exposure to different ideas is necessary but is insufficient to ensure the creativity of information seekers (Amabile, 1996). Only when seekers are open to elaborate these different ideas, exposure to diverse information may lead them to create something new (Amabile, 1996; Mueller, 2009). This argument highlights the necessity of considering factors that incorporate the different perspectives of team members in the workplace. Perspective taking from teammates is a potent and key facilitator by which team diversity exerts an effect on individual creativity.

Within a broader context, perspective taking has been researched in a number of disciplines. Perspective taking is multifaceted nature, and has been variously defined as a personality trait, an ability, a process, and an outcome (Parker et al., 2008) and varied in different experiential aspects such as perception, cognition, and affect (Kurdek & Rogdon, 1975). Social psychologists have defined perspective taking as the process of imagining the world from another's vantage point (Galinsky et al., 2005). Most recent definitions have explicitly stressed perspective taking as a cognitive process that entails attempting to understand or consider another's thoughts, motives, or feelings in relation to an object or topic, as well as why they think or feel the way they do (Caruso, Epley, & Bazerman, 2006; Parker, Atkins, & Axtell, 2008). We focused exclusively on perspective taking among teammates because of our interest in the processes that help creative actors benefit from team diversity. We defined perspective taking as the cognitive process involved in attempting to understand or consider the task-relevant ideas, insights, and perspective of teammates to solve task-related problems.

According to theory of creative cognition, information-seeking efforts are the most proximal predictors of individual creativity (Amabile, 1996) that provide seekers with broader base of information that can be drawn upon to yield novel and useful approaches. We argue that perspective taking is a specific type of information-seeking (Tjosvold & Johnson, 1978). Adopting the perspectives of teammates leads seekers to access new information or ideas through active inquiry or by considering what teammates say. In contrast to general information seeking (for example, feedback seeking), perspective taking is particularly relevant to team contexts because it is inherently interpersonal, and entails attempting to understand another members' viewpoints.

Perspective taking may not only facilitate information exchange through seeking teammates' viewpoints, most importantly, but also devote cognitive energy to elaborating teammates' approaches to tasks. Taking teammates' perspectives involves elaborating these ideas by considering teammates' evaluative standards, which is prerequisite to the development of truly

creative ideas (Titus, 2000). Because of analyzing another person's viewpoint, perspective taking involves a cognitive reframing that supports creative actors in integrating these perspectives and ideas, fostering creativity (Hargadon & Bechky, 2006). To capture creative ideas, creative actors must filter out those that are least useful and retain those that are most useful. In focusing on the perspectives of others (e.g., teammates), creative actors employ various standards for elaborating which ideas are useful or less useful to channel novel possibilities (Amabile, 1996).

Employees adopt the task-relevant perspectives of others in the workplace have a clear understanding of which ideas are useful to the coworkers, supervisors, clients, and other stakeholders who evaluate and benefit from their work (Parket & Axtell, 2001). Studies of product development teams have shown that members engaged in taking coworker and customer perspectives facilitate the assimilation of novel knowledge, and infuse novel ideas into useful products (Dougherty, 1992). Perspective taking also provides creative actors with the opportunities to change their own subjective perspectives to help them decrease egocentric biases (Galinsky, Maddux, Gilin, & White, 2008). Egocentric biases may lead creative actors to fail to explore valuable information (Minson, Liberman, & Ross, 2011) that is promoted based on the usefulness standards of others. By engaging in perspective taking, creative actors avoid egocentric biases in filtering new knowledge and ideas (Yaniv & Choshen-Hillel, 2012). Actors who engage in perspective taking are thus more capable of determining which ideas to develop and how to elaborate them in useful ways by considering their teammates' evaluative standards. Perspective taking should facilitate individual creativity by allowing the individual a greater likelihood of accessing and elaborating different teammate ideas.

Hypothesis 1: Taking perspectives from teammates positively relates to individual creativity.

Focusing on perspective taking from teammates in the workplace is crucial in elucidating the mechanism by which creative actors might harness the creative resources diverse teams offer. The theory of creative processing suggests that only when seekers are open to elaborating these perspectives, greater exposure to different perspectives benefits them in integrating these ideas and then creating something new (Amabile, 1996). This is because creative actors typically solve problems by using existing problem representations and mental structures that help them to simplify problem-solving efforts (Cronin & Weingart, 2007). However, such problem representations may impede their cognition of problems their own representations do not account for (Nickerson, 1998). In other words, although seekers are exposed to information outside their problem representation, they still must consider the viewpoints of teammates to incorporate useful and relevant information in problem-solving. Perspective taking among teammates allows creative actors a greater probability of devising elaborate, new, and different perspectives, thereby breaking with existing problem representations that may diminish creativity (Amabile, 1988).

Studies of team diversity have emphasized that exposure to differences may motivate members to combine and rearrange the different perspectives and ideas they encounter (Jehn et al., 1999). This is because diversity provides creative actors with a wide range of ideas, perspectives, knowledge, and values that are likely to promote creative processes including information processing, combining different ideas, building on others' ideas, and experimenting with the ideas of those with differing perspectives (Horwitz & Horwitz, 2007; van Knippenberg et al., 2004). Taking the group conflict view, team diversity is likely to boost task conflicts toward creative solutions (Pelled et al., 1999). Because disagreements regarding job-related challenges must be resolved, team members are likely to engage in greater elaborate processing of task-relevant information (van Knippenberg et al., 2004).

We propose that considering teammate perspectives may be a crucial mechanism to explain why team diversity is related to individual creativity at work. However, we recognize that perspective taking is not the only means by which the value of workgroup diversity is realized. Therefore, we integrated creative cognition theory with group diversity studies to propose that considering teammate perspectives in the workplace partially explains why team diversity is related to individual creativity.

Hypothesis 2: Taking perspectives from teammates partially mediates the relationship between work group diversity and individual creativity.

The Moderating Role of Individual Learning Orientation

Personal attitudes, abilities, and cognitive skills guide a person's internal self-system to perceive the surrounding environment in response to various types of situations (Bandura, 1994). Therefore, a person's spontaneous inner motivation to learn new knowledge and skills is triggered by the need to increase personal competence in managing specific situations. The individual-learning orientation represents a typical inner self-motivation that increases the intrinsic desires of team members to absorb knowledge and to cultivate more individual capabilities on a work team (Dweck, 1986, 2000; Dweck & Leggett, 1988; VandeWalle, 1999). Team members whose learning motivation is activated by such an internal self-system are driven to enhance individual abilities and cognitive skills by effectively assimilating information and learned knowledge. An adequate learning orientation in the workplace strengthens individual learning capacity, which facilitates the generation of possible solutions and various alternatives and methods that arise in responding to personal task demands (Amabile & Gryskiewicz, 1987; Gardner, 1993; Hayes, 1989).

A person with a high individual-learning orientation, working on a team with a diversity of ages, is likely to access team member perspectives, experience, or knowledge provided by team members of various ages (Wallace et al., 2013); such a person is also likely to have an enhanced mutual understanding with other team members, facilitating perspective-taking. By contrast, a person with

a low individual-learning orientation may be unmotivated to open-mindedly learn from other team members, hindering perspective-taking. A high individual-learning orientation inspires individual members to broaden their professional horizons. An individual member may be more inclined to become better acquainted with the professional knowledge of team members of diverse educational backgrounds. A team member who appropriately interprets the professions of other team members is likely to understand their knowledge or ideas and adopt their perspectives. The learning orientations of individual members introduce new knowledge and skills into a work team, reinforcing the effect of educational diversity and age diversity on perspective-taking among team members. Thus, we examined the moderating effect of individual-learning orientation on the relationship between workgroup diversity and perspective-taking, which in turn influences individual creativity.

Hypothesis 3a: Individual learning orientation moderates the mediating effect of perspective taking on the relationship between educational diversity and individual creativity. Specifically, when individual learning orientation is high rather than low, educational diversity positively relates to perspective taking, and in turn foster individual creativity.

Hypothesis 3b: Individual learning orientation moderates the mediating effect of perspective taking on the relationship between age diversity and individual creativity. Specifically, when individual learning orientation is high rather than low, age diversity positively relates to perspective taking, and in turn foster individual creativity.

The Moderating Role of Team Learning Orientation

Team learning refers to a state when most team members have shared perception of learning new and useful knowledge or technology and establishing mutual support modes for their team work units (Mehta, Field, Armenakis & Mikhil, 2013). Team learning is taken as the process of collective learning behaviors (Abbey & Dickson, 1983) that accelerate discovering, discussing, and evaluating new methods of implementing specific tasks in organizational work teams. When team learning orientation is comparatively high in a work team, members in the teams typically may tend to pursue dissimilarity of professions from different educational backgrounds and to acquire variety of life experiences from different ages. Team members with collective learning behaviros are likely to seek feedback, explore differences and commonalities, and consider appropriate expertise from diverse areas when working on an ongoing basis. Such team-learning behaviors facilitates individual cross-domain adjustment (Gong & Fan, 2006) that enhances team members in interpreting and adopting each other's perspectives. The educational and age diversity of a work team may provide for a wide range of ideas, perspectives, knowledge, and values. In the context, team members can thus more consider and adopt each other's perspectives to promote their own creativity (Horwitz & Horwitz, 2007; van Knippenberg et al., 2004). By contrast, when

team-learning orientation is low in a work team, team members fail to produce collective learning behaviors. Team members are inclined to defend their own professions tenaciously and to resist sharing their common frame of reference with each other. Limitations on the learning of new knowledge and technology within a team of employees who have diverse professions hinder the opportunity for those team members to become familiar with each other's expertise and functional areas. A low team-learning orientation may reduce perspective-taking among team members diverse in education and age. When team members are unwilling to acquire cross-domain knowledge, skills, and experiences, the professional gaps within a work team enlarge and become disadvantageous to individual creativity. Thus, we examined the moderating effect of the team-learning orientation on the relationship between workgroup diversity and perspective-taking, which in turn influences individual creativity.

Hypothesis 4a: Team learning orientation moderates the mediating effect of perspective taking on the relationship between educational diversity and individual creativity. Specifically, when team learning orientation is high rather than low, educational diversity positively relates to perspective taking, and in turn foster individual creativity.

Hypothesis 4b: Team learning orientation moderates the mediating effect of perspective taking on the relationship between age diversity and individual creativity. Specifically, when team learning orientation is high rather than low, age diversity positively relates to perspective taking, and in turn foster individual creativity.

METHODS

Sample and Procedure

Our sample included 623 team members and their immediate supervisors (team leaders) from 95 research and development (R&D) teams in 16 organizations in Taiwan. These organizations included five software development (33 teams), three electronics (20 teams), three pharmaceuticals (17 teams), three manufacturing (15 teams), and two energy (10 teams) firms. Team members interacted several times per week and closely collaborated with each other to achieve team objectives. Each member worked for one team only. All team members and leaders (a total of 623 leader–member pairs) were invited to participate. The participating team members and their team leaders completed questionnaires during work hours.

We used a time-lagged, multisource design to alleviate potential problems arising from the cross-sectional design and to reduce potential common method bias associated with using the same data source. All participants completed the surveys at three time points. At Time 1, team members responded to a survey on age, educational backgrounds, openness to experiences, individual learning orientation, team learning orientation, and control variables. One month later (Time 2),

team members responded to a survey on individual perspective taking. One month after the Time 2 survey (Time 3), team leaders rated the creativity of each of their individual team members.

The final sample comprised 515 matched members and their leaders from 79 teams. The response rates at the individual and team levels were 82.7% and 83.2%, respectively. The average team size was 6.52 members (ranging from five to eight). Members' average age was 34.4 years (SD = 6.40), and the average team tenure was about 4.80 years. Thirty one percent of the team members were women. For the team leaders, the average age was 44.70 years (SD = 4.80), and the average working experience was 20.10 years (SD = 5.90).

Measures

Team diversity. Both educational diversity and age diversity were operationalized as variety rather than separation or disparity (Harrison & Klein, 2007). We use Blau's (1977) index to calculate both types of diversity. This index was calculated as $1 - \sum p_i^2$, where p_i is the proportion of team members of a team in the *i*th category. Team members provided their ages and the academic fields in which they had obtained their highest degree. Among educational background categories, 11 different academic fields (e.g., pharmacology, chemistry, computer science, and engineering) were represented in the overall sample. The average number of educational backgrounds per team was 3.2. For age diversity, team members were categorized by 5-year increments (26–30, 31–35, 36–40, etc.). The Blau's index varies between 0 and 1, where values close to 1 indicate higher diversity among the team and values close to 0 indicate lower diversity. In our sample, all teams were on the relatively high end of educational diversity (mean = .70, ranging from .45 to .83) and age diversity (mean = .62, ranging from .28 to .73).

Perspective taking. Previous studies have suggested that perspective taking is an internal psychological process of adopting another's viewpoint (Caruso, Epley & Bazerman, 2006; Parker et al., 2008). Thus, we relied on member self-assessment to measure perspective taking with four items (Grant & Berry, 2011). The self-report approach has been used in the literature (Hoever, van Knippenberg, van Ginkel & Barkema, 2012) and shown to be reliable and valid. Team members were instructed to indicate the extent to which they adopted other members' perspectives at work and during the group discussion. The Cronbach's alpha for the scale was.84.

Individual learning orientation. We used VandeWalle's (1997) 5-item scale to assess the learning orientation of individual employees. A sample item included "I often look for opportunities to develop new skills and knowledge." The Cronbach's alpha for this measure was .80.

Team learning orientation. We used the 5-item scale from Bunderson and Sutcliffe (2003) adapted from the VandeWalle (1997) individual learning orientation scale. Sample items included "Our team often looks for opportunities to develop new skills and knowledge." The Cronbach's alpha for this measure (as rated by individual members) was .85. We subsequently assessed within-team

agreement and between-team differences for team learning orientation before aggregating individual members' ratings. The results supported the aggregation: the lowest rwg = .78, ICC [1] = .23, ICC [2] = .66 (James, Demaree, & Wolf, 1984).

Individual creativity. We assessed individual creativity using a 9-item measure from Tierney, Farmer and Graen (1999). The team leaders were asked to rate the extent to which each of the eight creative behaviors characterized each team member. The Cronbach's alpha for this measure was .92.

Control variables. We controlled for several individual-level and team-level variables. First, we controlled gender, education level, job tenure, and openness to experience at the individual level. Since task domain expertise may account for variance in creativity (Tierney & Farmer, 2002), job tenure (the number of years working in a specific task area) was controlled to partial out potential influences on the relationship. We controlled for educational level because of its pontential influence on job knowledge and skills, and thus creativity. Education level was measured as the number of years of post-high school education. In addition, we used a brief version of the Saucier (1994) "minimarker" measure of the "big five personality markers" to measure openness to experience.

Following previous research, we controlled for team size, average team tenure, and task type at the team level. We controlled for team size, measured as the number of members on the team, because of its potential influence on intrateam communication (Hulsheger et al., 2009), and thus creativity. Task types, which has been shown to influence the effects of our focal diversity variables (Backes-Gellner, Veen, 2013), was measured using three dummy variables to categorize R&D tasks: "Basic or non-mission research," "Applied or mission-oriented research,""New product or process development," and "Technical service or existing product development."

Analytic Strategy

Given the multilevel nature of the data, we first computed a null model for our individual-level outcome variable to examine the systematic variability of between-group variance (Raudenbush & Bryk, 2002). The null model indicated that 46.35% of the total variance in individual creativity resided between groups, providing sufficient variance to test for cross-level effects. Following the recommendation by Zhang, Zyphur, and Preacher (2009), we conducted hierarchical linear modeling to test multilevel mediation using a series of equations in intercepts- and slope-as-outcomes models. Because the teams were from different organizations (n = 16), we used three-level models with individual members at Level 1, teams at Level 2, and organizations at Level 3 to control any possible confounding effects of organization-level factors on the relationships we tested. To avoid confounding cross-level and between group interactions, we group-mean-centered all individual level (Level 1) variables except for gender (Preacher, Curran & Bauer, 2006). Team-level (Level 2) variables were not centered, to reduce possible problems with

multicollinearity (Raudenbush & Bryk, 2002). Furthermore, we applied the approach by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) to test the indirect relationships that workgroup diversity has with individual creativity through employee perspective taking. Following the approach provided by MacKinnon et al. (2004), we used the bootstrap sampling method (bootstrap sample size = 5,000) to generate asymmetric confidence intervals (CIs) for the indirect relationship.

A pilot test for developing the questionnaire items

To assess the validity of the team-level information elaboration measure, the author preliminarily collected separate data from 270 team members in 42 R&D teams in 12 Taiwanese firms in the October 2013. The author would like to measure team information elaboration (the four items in this study), team information exchange (two items), team information sharing (three items), and team cohesion measures (three items). The completed sample was randomly split into calibration (n = 118) and validation (n = 152) samples. The calibration sample was used to develop the scale whilst the validation sample was used to verify the scale dimensionality and the factor structure by exploratory factor analysis (EFA). The data for the validation sample were analyzed using confirmatory factor analysis (CFA).

In the calibration sample, the author performed an EFA with Varimax rotation for data. EFA results show that all 12 items loaded cleanly on separate and expected factors; all factor loadings were above 0.7 and cross-loading were below 0.4 (see table 1).

Table 1. The results of EFA for 12 items

Items	1	2	3	4
eoi_1	0.78			
eoi_2	0.77			
eoi_3	0.77			
eoi_4	0.75			
ie_1				0.85
ie_2				0.87
is_1		0.86		
is_2		0.83		
is_3		0.81		
coh_1			0.83	
coh_2			0.86	
coh_3			0.84	

Then, the author tested the four factor measurement model for the validated sample (n =152) with a CFA. First, all 12 items loaded significantly on the expected constructs, indicating convergent and discriminant validity of the measures. The fit indexes showed that the four factor model fit the data

reasonably well (chi-square = 43.01, df = 48, RMSEA = .00, GFI = .96, AGFI = .93, RMR = .02), and better than one-factor model (chi-square = 393.57, df = 54, RMSEA = .20, GFI = 0.68, AGFI = 0.54, RMR = .09). And then, the author conducted CFA for team information elaboration and team information exchange. The results indicated that the two factor model fit the data well (chi-square = 11.21, df = 8, RMSEA = .05, GFI = 0.98, AGFI = 0.94, RMR = .02), and better than the one-factor model (chi-square = 79.95, df = 9, RMSEA = .23, GFI = 0.89, AGFI = 0.75, RMR = .51). Whereas, CFA results also showed that the two factor model of team information elaboration and team information sharing fit the data well (chi-square = 8.26, df = 12, RMSEA = .00, GFI = 0.99, AGFI = 0.97, RMR = .01), and better than one factor model (chi-square = 137.30, df = 13, RMSEA = .24, GFI = 0.76, AGFI = 0.53, RMR = .07). The results provide evidence of discriminant validity. The three measures of team information elaboration, team information exchange, and team information sharing were moderately correlated (eoi vs. ie: r = 0.48; eoi vs. is: r = 0.37) and the team information elaboration was slightly correlated with team cohesion (r = 0.18), providing evidence of convergent validity (see table 2).

Table 2. The correlations

Items	(1)	(2)	(3)
1. eoi			
2. ie	0.48*		
3. is	0.37*	0.27*	
4. coh	0.18*	0.10	0.21*

RESULTS

Table 1 presents the correlations and descriptive statistics of the study variables. The statistics in the upper portion of the table pertain to the correlations among individual-level variables and those in the lower portion pertain to the team level of analysis. Hypothesis 1 predicted that individual perspective taking would have a positive effect on individual creativity. The result of Model 3, shown in Table 2, indicated that individual perspective taking was significantly related to individual creativity ($\gamma = .37$, $p < .001$). Thus, Hypothesis 1 was supported. Hypothesis 2 stated that team diversity would have an indirect positive relationship, through individual perspective taking. The result of Model 2, shown in Table 3, indicated that both educational diversity ($\gamma = .08$, $p < .05$) and age diversity ($\gamma = .10$, $p < .05$) were significantly related to individual perspective taking. In addition, to avoid potential confounded mediation-effect estimations (Zhang, Zyphur, & Preacher, 2009), we added aggregated perspective taking (Level 2) into the equation in Model 3 of Table2. Following the procedure of MacKinnon et al. (2004) procedure, the bootstrapping test indicated that the indirect relationships that both team diversity had with individual creativity via individual perspective taking were significant. Specifically, regarding educational diversity, the 95% CI of the

indirect relationship excluded zero [.005, .054]; regarding age diversity, the 95% CI of the indirect relationship excluded zero [.006, .070]. These results supported Hypothesis 2.

Hypothesis 3 predicted that the individual learning orientation would positively moderate the indirect relationship that the team diversity has with creativity via individual perspective taking, whereby the relationship would become stronger when the individual learning orientation is higher. The interaction between age diversity and the individual learning orientation was significantly related to individual perspective taking (Model 3, Table 3: $\gamma = .10$, $p < .05$), but the interaction between educational diversity and the individual learning orientation was nonsignificant. Based on the procedures suggested by Edwards and Lambert (2007), we used the first-stage moderation model to examine whether the moderated indirect relationship was significant. The moderated path analytic procedure showed that the link between age diversity and individual perspective taking and then to individual creativity varied significantly as a function of the individual learning orientation. The simple slope of the indirect relationship that age diversity had with individual creativity via individual perspective taking was significant (simple slope = .21, $p < .05$) when the individual learning orientation was high, but was nonsignificant (simple slope = .02, n.s.) when it was low. The difference in the simple slopes for the indirect relationships at high and low levels of individual learning orientation was significant ($\Delta\gamma = .19$, $p < .05$). Furthermore, the bootstrapping test, based on MacKinnon et al. (2004), confirmed the significance of the indirect relationship that the interaction term of age diversity and individual perspective taking had with individual creativity (95% CI excluding zero: [.006, .066]). Therefore, Hypothesis 3b was supported. These moderated indirect relationships are plotted in Figures 2.

Hypothesis 4 stated that the team learning orientation positively moderates the indirect relationship that the team diversity has with creativity via individual perspective taking, whereby the relationship would become stronger when the team learning orientation is higher. The interaction between educational diversity and the team learning orientation was significantly related to individual perspective taking (Model 3, Table 3: $\gamma = .19$, $p < .05$). However, the interaction between age diversity and the team learning orientation was nonsignificant. We used the first-stage moderation model to examine whether the moderated indirect relationship was significant. The moderated path analytic procedure (Edwards & Lambert, 2007) showed that the link between educational diversity and individual perspective taking and subsequently to individual creativity varied significantly as a function of the team learning orientation. The simple slope of the indirect relationship that age diversity had with individual creativity via individual perspective taking was significant (simple slope = .28, $p < .05$) when the team learning orientation was high, but was nonsignificant (simple slope = -.14, n.s.) when it was low. The difference in the simple slopes for the indirect relationships at high and low levels of team learning orientation was significant ($\Delta\gamma = .42$, $p < .05$). Furthermore, the bootstrapping test based on MacKinnon et al. (2004) confirmed the

significance of the indirect relationship that the interaction term of age diversity and individual perspective taking had with individual creativity (95% CI excluding zero: [.008, .139]). Therefore, Hypothesis 4a was supported. These moderated indirect relationships are plotted in Figures 3.

Table 1. Correlation Matrix and Descriptive Statistics of Measures

Individual variables (Level 1)[a]	Mean	S.D.	1	2	3	4	5	6
1. Individual team member creativity	4.41	0.59						
2. Perspective taking	4.56	0.66	0.58*					
3. Individual learning orientation	4.59	0.60	0.18*	0.41*				
4. Job tenure	4.81	1.96	-0.01	0.02	0.10*			
5. Education level	5.39	1.82	0.00	-0.01	0.00	0.04		
6. Gender	0.33	0.47	-0.04	-0.02	0.02	0.03	-0.03	
7. Open to experience	4.60	0.56	-0.05	0.04	0.00	0.00	0.05	-0.02

Team variables (Level 2)[b]	Mean	S.D.	1	2	3	4	5	6	7
1. Team learning orientation	4.44	0.39							
2. Educational diversity	0.70	0.09	-0.07						
3. Age diversity	0.62	0.11	0.20*	0.02					
4. Team size	6.52	1.12	0.18	0.23*	0.44				
5. Team tenure	4.33	1.91	-0.12	0.03	-0.07	-0.02			
6. D1	0.28	0.45	-0.01	0.02	-0.06	0.07	0.20*		
7. D2	0.18	0.38	-0.06	0.07	-0.01	0.11	-0.11	-0.29*	
8. D3	0.23	0.42	0.00	-0.03	0.02	-0.12	-0.21*	-0.34*	-0.25*

Note: * $p < 0.05$. [a] $n = 515$. [b] $n = 79$. For D1: 0 "others," 1 "applied research"; D2: 0 "others," 1 "new project"; D3: 0 "others," 1 "modifying a current project."

Table 2. Hierarchical Linear Modeling Results for Individual Creativity [a]

	Individual creativity		
Variable	Model 1	Model 2	Model 3
Intercept	4.46***	4.45***	4.45***
Level 1control variables			
Education level	.01	.00	.00
Job tenure	-.00	-.00	-.01
Gender	-.00	-.00	-.00
Open to experience	-.03	-.04	-.05
Level 2 control variables			
Team size	.18**	.10	.07*
Team tenure	.02	.02	.03
D1	-.13	-.10	-.12
D2	-.19	-.17	-.24**
D3	-.05	-.06	-.01
Level 1 independent variables			
Perspective taking			.37***
Individual learning orientation			
Level 2 independent variables			
Educational diversity		.12**	.06
Age diversity		.11*	.04
Perspective taking (group level)			.29***
Team learning orientation			
X Educational diversity			
X Age diversity			
Cross level (level 1 X level 2)			
Individual learning orientation			
X Educational diversity			
X Age diversity			
ΔR square (within-team) [b]	.00	.00	.24
ΔR square (between-teams) [b]	.20	.15	.54
Deviance	739.40	728.72	557.61

[a] n = 515 individuals, 79 teams, and 16 organizations. For D1: 0 “others,” 1 “applied research”; D2: 0 “others,” 1 “new project”; D3: 0 “others,” 1 “modifying a current project.”

[b] These are R square compared to the previous model. Model 1 was compared to the null model.

* p < 0.05, ** p<0.01, *** p<0.001

Table 3. Hierarchical Linear Modeling Results for Perspective Taking [a]

	Perspective taking		
Variable	Model 1	Model 2	Model 3
Intercept	4.56***	4.55***	4.56***
Level 1control variables			
Education level	-.00	-.01	-.02
Job tenure	.02	.02	-.02
Gender	.00	.00	-.00
Open to experience	.01	.00	-.01
Level 2 control variables			
Team size	.10*	.03	-.03
Team tenure	-.01	-.01	-.00
D1	-.05	-.02	.01
D2	.03	.05	.01
D3	-.05	-.06	-.04
Level 1 independent variables			
Perspective taking			
Individual learning orientation			.46***
Level 2 independent variables			
Educational diversity		.08*	.08
Age diversity		.10*	.13**
Perspective taking (group level)			
Team learning orientation			-.08
X Educational diversity			.19*
X Age diversity			-.05
Cross level (level 1 X level 2)			
Individual learning orientation			
X Educational diversity			.05
X Age diversity			.10*
ΔR square (within-team) [b]	.00	.00	.25
ΔR square (between-teams) [b]	.12	.13	.33
Deviance	986.01	978.29	853.93

[a] n = 515 individuals, 79 teams, and 16 organizations. For D1: 0 “others,” 1 “applied research”; D2: 0 “others,” 1 “new project”; D3: 0 “others,” 1 “modifying a current project.”

[b] These are R square compared to the previous model. Model 1 was compared to the null model.

* p < 0.05, ** p<0.01, *** p<0.001

Figure 1

Conceptual framework

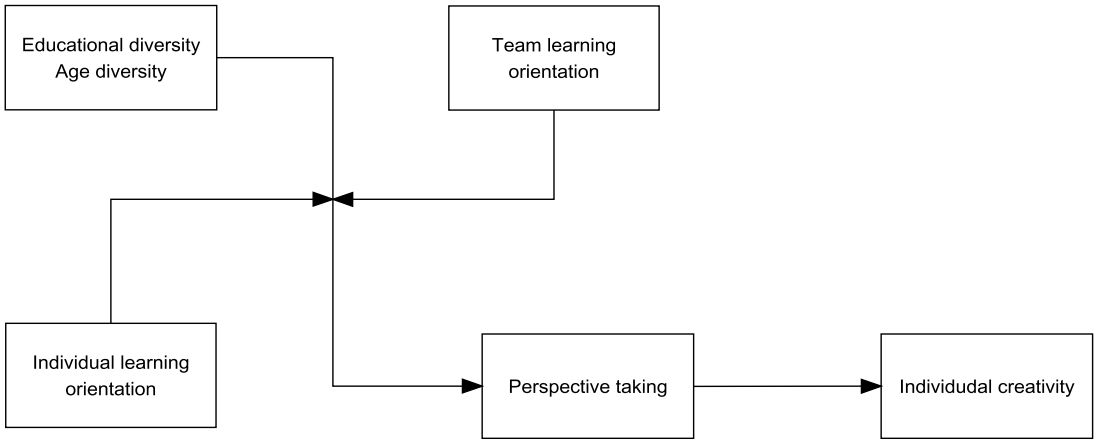


Figure 2 Moderating Effect 1

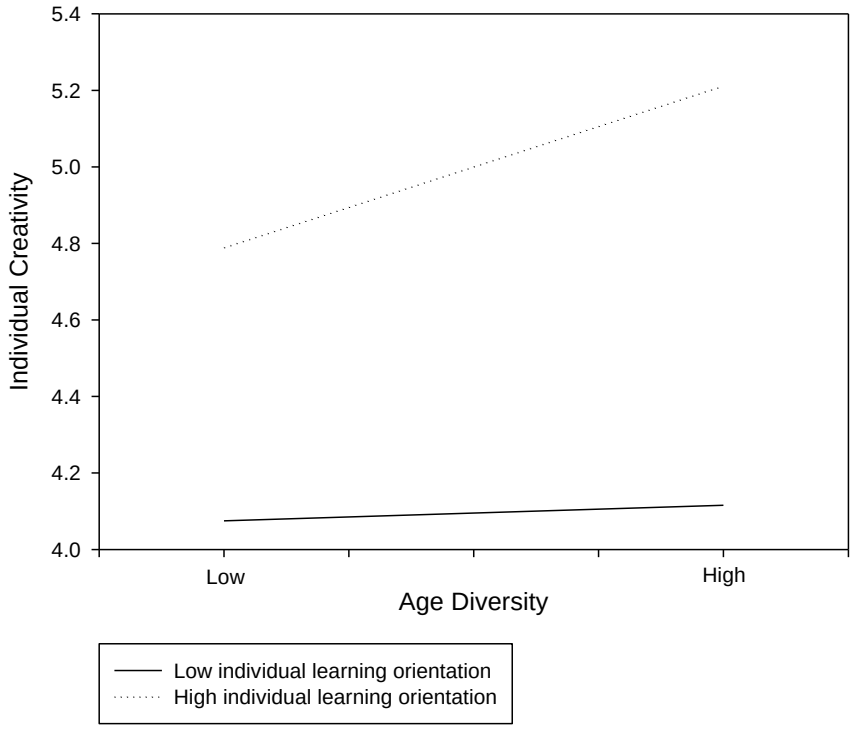
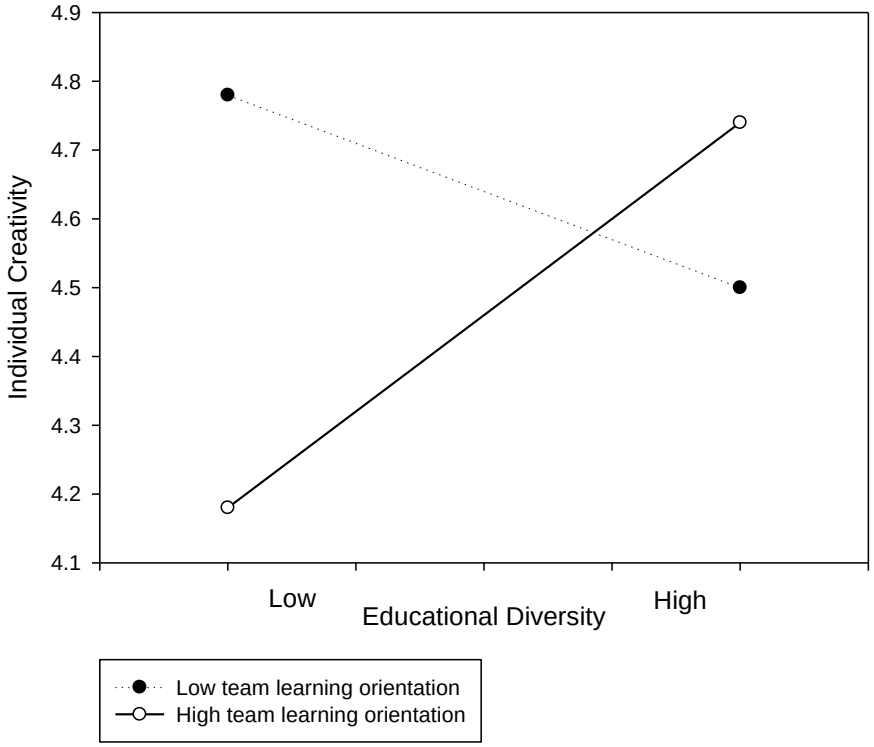


Figure 3 Moderating Effect 2



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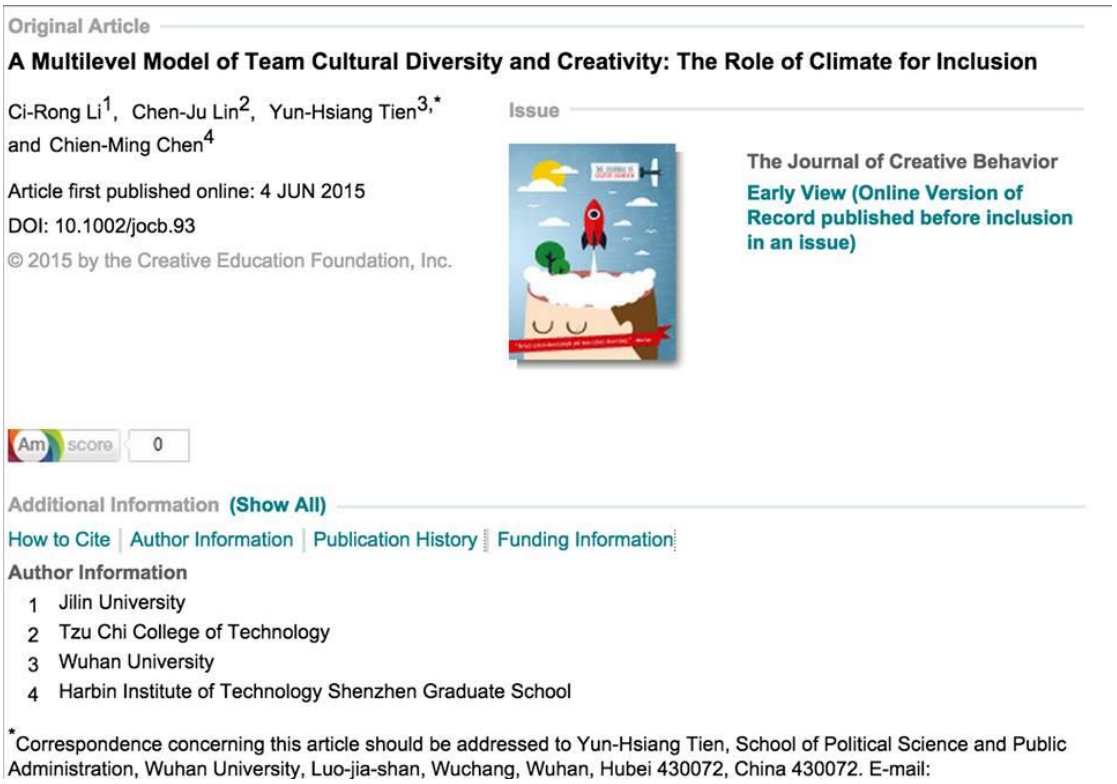

Original Article

A Multilevel Model of Team Cultural Diversity and Creativity: The Role of Climate for Inclusion

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