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## **Working with creative leaders: Exploring the relationship between supervisors' and subordinates' creativity**

We propose that supervisors' own level of creativity is a core component of effective leadership that can be associated with subordinates' self-concept and creativity. Specifically, drawing on the identity theory framework, and role identity theory in particular, we argue that subordinates' creative role identity is an important underlying mechanism in the relationship between supervisors' level of creativity and their subordinates' creativity. Using a sample of 443 employees working with 44 supervisors in an IT firm, we hypothesized and found support for a moderated mediation model. There was a positive indirect relationship between supervisors' creativity and their subordinates' creativity via the subordinates' creative role identity, and this indirect relationship was stronger when employees perceived higher levels of organizational support for creativity.

**Keywords:** Employee creativity; supervisor creativity; creative role identity; organizational support for creativity

Employee creativity, defined as developing products and processes that are both novel and useful (Amabile, 1988; Shalley, Zhou, & Oldham, 2004), is considered to be an important determinant for organizations to innovate, survive, and thrive in a competitive, global marketplace (Zhou & Shalley, 2010). Since creativity is in part the result of social processes, others in the workplace, such as supervisors, can serve to support or stimulate one's creativity (e.g., Amabile & Pillemer, 2012; Perry-Smith, 2006). Surprisingly, despite a relatively good deal of attention to the role of leaders in influencing employees' creativity, we do not know whether supervisors' own level of creativity is associated with their employees' creativity, and if so, how this occurs.

Given their status and influence within organizations, supervisors' behaviors and characteristics are likely to be modeled and imitated by their subordinates (Bandura, 1969; 1971; Weiss, 1977). Mumford, Scott, Gaddis, & Strange (2002) argued that it is critical to have supervisors with high creative problem solving skills because these types of supervisors are capable of giving better feedback, acting as role models for creativity, and are perceived as being more credible. Also, Reiter-Palmon and Illies (2004) argued that leaders' own creative skills (e.g., abilities for creative problem construction, information retrieval and coding, alternative idea generation) are critical in facilitating subordinates' creative problem solving.

Having a creative mentor has been found to positively impact individuals' creative development during their careers (Simonton, 1975; Torrance, 1988). Studies of Nobel Prize winners in various fields illustrated that many winners were students of prior Nobel Prize winners (Zuckerman, 1977), while several Nobel Laureates have acknowledged the valuable stimulation and guidance they received from their mentors. For instance, Lawrence Klein (i.e., winner of a Prize in Economic Science) mentioned that the experience of being Paul

Samuelson's graduate assistant had been important to his own achievement. Dr. Klein stated: "I was attached to him as a graduate assistant from the outset, and I tried to maximize my contact with him, picking up insights that he scattered on every encounter" (Hirsch & Breit, 2009). The Italian anatomist and histologist Giuseppe Levi mentored three winners of the Nobel Prize in Physiology and Medicine - Luria, Dulbecco, and Levi-Montalcini (Bentivoglio, Vercelli, & Filogamo, 2006), with all three remarking that they had experienced "profound influence" (p.365) by working with Levi.

There are several cases in which creative business leaders influence followers through their creative behaviors. For example, a Facebook employee commented on Facebook's acquisition of WhatsApp by asking "What other CEO has the guts to purchase a chat company for \$19B" (Kux, 2014). The cofounder and CEO of Facebook, Mark Zuckerberg's risk taking behavior encourages Facebook employees to take risks at work and to be bold in developing new ideas (Memon, 2014). In addition, Howard Schultz, who is the returning CEO of Starbucks, is known for his willingness to always search for a better way, even though the company had regained its share value since his return. He was quoted as saying, "We are turning over rocks and looking at the things that perhaps we didn't get right and constantly beating ourselves up...if you walked into our Monday morning meeting, you would think this is a company that is still trying to transform itself" (Webb, 2011). Given these examples of business leaders inspiring and serving as role models for their employees, we seek to examine the relationship between creativity and leadership by focusing on the importance of supervisors' own level of creativity for their subordinates' creativity.

It has been argued that in order to better understand leadership effectiveness we need to examine the underlying psychological processes of followers through which leaders' influences

are enacted (van Knippenberg, van Knippenberg, De Cremer, & Hogg, 2004). One of the ways that effective leaders can influence follower behaviors and attitudes is by affecting their self-concept and self-identity (Lord, Brown, & Freiberg, 1999). Taking this perspective, we draw upon the identity theory framework (Burke, 1991; McCall & Simmons, 1978; Stryker, 1987), and role identity theory in particular (Burke, 1980; Stryker & Serpe 1982; Hogg, Terry, & White, 1995), and introduce subordinates' creative role identity as a conducting mechanism between supervisors' level of creativity and their employees' creativity. Creative role identity is defined as the extent to which an employee sees the role of being a creative employee as part of his or her work related self-identity (Farmer, Tierney, & Kung-Mcintyre, 2003). As such, creative role identity leads to an internalized set of role expectations that creativity is important to the self, and that one should be creative at work. In addition, since an identity has to be strong enough to be enacted through behavior (Farmer & Van Dyne, 2010; Lord & Brown, 2004), we argue that when the organizational context is supportive of creativity this should help to strengthen the effect of subordinates' creative role identity (Farmer et al., 2003), yielding higher creativity (see Figure 1 for our conceptual model).

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Insert Figure 1 about here  
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This study makes a number of potential contributions. First, even though the role of leader behaviors and leader-follower relationships for employee creativity has received some attention (e.g., Gong, Huang, & Farh, 2009; Liao, Liu, & Loi, 2010; Zhang & Bartol, 2010), the role of leaders' own level of creativity has been largely neglected by past research (Gilson, 2008; Huang, Krasikova, & Liu, 2016). According to an IBM report (2010) based on interviews with 1541 chief executives and general managers in 16 countries, CEOs stated that the most important

leadership quality is creativity because creative managers can find new ideas and be creative in leading and communicating with their workforce, especially in fast-paced, dynamic environments. Our study is one of the first empirical studies that seeks to examine the important role of leaders' creativity for subordinates' creativity, above and beyond other leader attributes such as leaders' demographic characteristics (i.e., supervisors' sex and tenure), leaders' personality (i.e., supervisors' proactive personality), leaders' own work motivation (i.e., supervisors' intrinsic motivation), and leaders' behaviors (i.e., supervisors' intellectual stimulation). We hope that our findings point to the potential value of considering supervisors' creativity when staffing supervisory positions if subordinates' creativity is desirable. Second, we apply identity theory (Burke, 1991; McCall & Simmons, 1978) to establish the empirical link between supervisors' creativity and their employees' creativity through how the subordinates' creative role identity is affected, since leaders can influence their followers' behaviors by altering how followers perceive themselves (van Knippenberg et al., 2004). As such, creative role identity represents a potential key conduit in transferring contextual influences to employee creativity, and deserves closer examination (Farmer & Van Dyne, 2010). We believe that working with a creative supervisor can develop or strengthen subordinates' own creative role identity and that this would be positively related to their behaving in role consistent ways, such as being creative. Finally, we examine the moderating role of perceived organizational support for creativity to examine a more comprehensive picture of when subordinates' creative role identity will be enacted, and yield higher creativity at work.

### **Theory Development**

Supervisors can have a noteworthy effect on employees' creativity (Byrne, Mumford, Barrett, & Vessey, 2009; Shalley & Gilson, 2004). Leading employees to perform more creatively is argued to be different from traditional leadership approaches, because creativity

requires a unique set of conditions, such as having high autonomy and a greater degree of tolerance for failure in the organization (Vessey, Barrett, Mumford, Johnson, & Litwiller, 2014). Past research has suggested that one way leaders may affect subordinates' creativity is by serving as creative role models (Byrne et al., 2009; Jaussi & Dionne, 2003). For instance, Jaussi and Dionne (2003) found that when leaders were seen as exhibiting unconventional behaviors such as hanging ideas on clotheslines, they were more likely to be perceived as creative role models, which could improve their followers' creativity. In a qualitative study (de Jong & Hartog, 2007) that examined leaders' behaviors that could influence employee creativity, a supervisor stated that "I am always looking for ways to do things better and improve results. It stimulates some of my employees to do the same" (p. 50). Supervisors also can influence subordinates' creativity by displaying their own creative problem-solving skills (e.g., Basadur, 2004; Hemlin & Olsson, 2011; Lord & Brown, 2004; Redmond, Mumford, & Teach, 1993; Reiter-Palmon & Illies, 2004; Stenmark, Shipman, & Mumford, 2011). Specifically, supervisors' creative problem construction enables employees to engage in novel alternative generation processes (Reiter-Palmon & Illies, 2004). Finally, creative supervisors who can recognize and define problems in novel and useful ways can set specific creativity expectations and goals for their subordinates, and these can facilitate their employees' creativity (Hemlin & Olsson, 2011; Huang et al., 2016; Mainemelis, Kark, & Epitropaki, 2015; Mumford, Connelly, & Gaddis, 2003; Shalley, 1991). For instance, Huang and colleagues (2016) found that supervisors who had higher levels of creative self-efficacy were more likely to encourage employee creativity by setting higher creativity expectations for their employees, and tolerating the mistakes made by their employees while they were trying to develop new ideas.



The above research findings lead us to believe that supervisors' creativity, as a key leadership characteristic, will be positively associated with employees' creativity. However, research also suggests that working with creative leaders does not guarantee higher levels of employee creativity. For instance, Carmeli and Schaubroeck (2007) found that leaders' expectation to be creative and subordinates' actual creativity was mediated by employees' psychological involvement with creativity. According to van Knippenberg and colleagues (2005), "the essence of leadership is influence, and it's through its influence on followers' that leadership may best be observed" (p. 496). Leaders' actions have been found to prime how followers view themselves (Lord & Brown, 2001) through influencing followers' self-concepts (Lord et al., 1999). In studying leadership effects through followers' perspectives, a few studies have found support for followers' self-concepts and self-identities serving as the major mediating mechanisms of leadership effects (Brown, 2000; Paul, Costley, Howell, Dorfman, & Trafimow, 2001; van Knippenberg, et al, 2004). Following this line of logic, we propose that supervisors' creativity is an essential leader characteristic (Sternberg, 2008), influencing subordinates' attitudes and behaviors about creativity through shaping the subordinates' self-concept (Albert, Ashforth, & Dutton, 2000; Bass, 1985; Lord & Brown, 2004), specifically through stimulating their creative role identity.

### **Creative role identity and the supervisor-subordinate creativity relationship**

Identity theory explains how the social environment affects one's behavior through its influence on the self (Blumer, 1969; Hogg et al., 1995; Mead, 1934; Stets & Burke, 2000), emphasizing the reciprocal interactions between the self and the environment, through a process of self-verification and categorization (Stets & Burke, 2000; Hogg et al., 1995). The general perspective of identity theory has provided foundations for various specific theories relevant to

role-related behavior, such as role identity theory (e.g., Burke 1980; Hogg et al., 1995; Stryker 1968, 1987). A role is defined as a set of interdependent expectations for behavior (Katz & Kahn, 1978), and identity is a core self-concept that defines role-related behaviors of individuals (Hogg et al., 1995). Combining these, a role identity is defined as a self-view in relation to a specific role (Burke & Tully, 1977). In other words, role identity corresponds to the social expectations given by one's position (Burke, 1991; McCall & Simmons, 1978), and predicts individuals' intentional actions to fulfill such expectations (Charng, Piliavin, & Callero, 1988). A role identity is developed when a person categorizes himself or herself as an occupant of a position and incorporates the performance expectations associated with that role (Burke & Tully, 1977; Stets & Burke, 2000; Thoits, 1986). Role identity has been found to mediate the relationship between social influences and individuals' behavior (Hogg et al., 1995). Individuals can hold multiple role identities, with some being stronger than others, and they can be specific to different types of behaviors (Hogg, et al., 1995; Stryker & Serpe, 1982).

Building on identity theory, Petkus (1996) proposed a specific type, creative role identity, which is the extent to which an employee sees the role of being a creative employee as part of his or her work related self-identity (Farmer et al., 2003). Employees with creative role identities proactively take on the role of being creative at work, and perceive creative behaviors as a central component of the self (Tierney & Farmer, 2011). While it is true that similarity-attraction can occur in organizations, in that individuals are more likely to be attracted to and maintain membership within an organization that shares similar characteristics with themselves and supervisors might prefer to hire subordinates who share similar characteristics as them (Schneider, 1987; Schneider, Goldstein, & Smith, 1995), employees also go through a continuous socialization process during which they shape an identity by observing others and

learning from their leaders and coworkers in their organization (Bandura, 1986; Ashforth, Sluss, & Harrison, 2007; Cable & Parsons, 2001; Liao et al. 2010). According to social cognitive theory (Bandura, 1971; 1986), leaders provide employees great opportunities for social learning and modeling (Miller & Dollard, 1941), which is a critical way of forming one's self-concepts (e.g., self-efficacy and self-identity). It has been argued that leaders can serve as important primers of employees' wisdom, moral behaviors, intelligence, and creativity (Sternberg, 2008), and they can have substantial control over the activation of their subordinates' self-concepts (Liao et al., 2010; Lord & Brown, 2004; Zhu, Avolio, Riggio, & Sosik, 2011; Zhu, Riggio, Avolio, & Sosik, 2011).

Research has found support for the above mentioned social learning phenomenon in the development of self-concepts and role identity. For example, in studying social exchange relationships and creativity, Liao and colleagues (2010) found that high quality interactions with leaders serve to increase employees' self-efficacy through social (vicarious) learning and social persuasion. Hence, observing and learning from leaders' behaviors during social interactions can be an important and salient source of subordinates' role identity development (Farmer et al., 2003; Sluss & Ashforth, 2008; Grant, 2012; Van Dyne & Farmer, 2004). Subordinates' mental images of their supervisors also has been found to be very effective in activating different aspects of these subordinates' self-concepts (Paul et al., 2001). For example, taking a social learning perspective to ethical leadership, Brown, Treviño, & Harrison (2005) suggested that followers observe their leaders' ethical behaviors which shapes their own ethical conduct. Furthermore, ethical leaders are seen as role models, and observing and learning from them leads to the development of followers' moral identity (Sharif & Scandura, 2014; Zhu, 2008). Similarly, Gardner and colleagues (2005) suggested that followers model their authentic leader behaviors

which triggers self-awareness and the development of authentic followership. Accordingly, we argue that interacting with a creative supervisor can influence how strongly employees define themselves with a creative role identity (Farmer et al., 2003; Farmer & Van Dyne, 2010).

According to social learning theory, vicarious learning also can take place by observing the consequences of one's actions (Brown et al., 2005). Supervisors are critical in socializing employees into their work-related roles and rewarding them for how well they fulfill these role expectations. Expectations are verified and internalized when employees are rewarded for their creative behaviors, and receive creativity-infused instructions, demonstrations, and feedback (Charng et al., 1988) from their supervisors. Since identities are developed retrospectively by interpreting past activities (Farmer et al., 2003; Grube & Piliavin, 2000), interacting with a creative supervisor could result in higher levels of employees' creative role identity (Piliavin & Callero, 1991).

In addition, individuals who have developed a particular role identity will attempt to control relevant resources in order to fulfill the expectations of that role (Stets & Burke, 2000). Effective enactment of this role identity not only confirms and validates a person's status as a role occupant, but it also reflects positively on her self-evaluation (Callero, 1985; Hogg et al., 1995). Hence, a strong creative role identity influences employees' creativity since performing role-related activity confirms the role identity held (Charng et al., 1988; Farmer et al., 2003). As a motivational force (Tierney, 2015), creative role identity drives individuals to perform creatively because they would like to see themselves, and want to be seen by others, as creative performers (Petkus, 1996). Employees with a creative role identity would find creative process engagement to be compatible with their own goals and values (Farmer et al., 2003), so they would be more likely to participate in such behaviors that are more likely to lead to creative

outcomes. In addition, a creative role identity would boost individuals' confidence in their ability to be creative (Tierney & Farmer, 2011), and this also could facilitate their actually performing more creatively. Therefore, we argue that employees' creative role identity is the mediating mechanism between supervisors' and subordinates' creativity.

*Hypothesis 1: Supervisors' creativity has a positive indirect relationship with subordinates' creativity via strengthening subordinates' creative role identity.*

### **Perceived organizational support for creativity**

Previous research has emphasized that an identity has to be activated in order to result in behaviors that are consistent with this identity (McCall & Simmons, 1978; Stryker, 1987). We argue that perceiving a work context that is supportive of creativity can play a facilitating role in helping to transfer employees' creative role identity into them actually performing creatively. Organizational support for creativity is defined as employees' perception of the extent to which their organization encourages, recognizes, respects, and rewards their creativity (Farmer et al., 2003). We expect that perceived organizational support for creativity will enhance the relationship between individuals' creative role identity and their creative behavior through increased identity salience and commitment. That is, employees who experience organizational support for creativity are likely to place creative role identity at a higher position in their identity hierarchy (Callero, 1985), and be more committed to such an identity. In order to then satisfy this highly ranked role identity (Stets & Burke, 2000), they are expected to control more resources and exhibit more relevant behaviors (e.g., being proactive in searching for new information; trying new methods to solve a problem). In addition, individuals generally place more value on socially desirable roles (Ashforth, 2001). When organizations support creativity, the recognition, rewards, and respect given to these behaviors can highlight the social desirability of the role of

being creative, thus enhancing the effects of a creative role identity on employee creativity. Also, the tolerance of risk, protection from distractions, and provision of adequate time and resources (Amabile, 1988; Mumford, 2000; Shalley, Gilson, & Blum, 2009) enacted by a supportive organizational context should reduce the perceived riskiness of trying to be creative, and potentially be beneficial for the realization of creative goals (Zhou, 1998). Therefore, in this situation employees should be motivated to engage in behaviors that fulfill their creative role identity, while when the organizational context is less supportive of their creative role identity this may remain as a behavioral intention, rather than be enacted and lead to creativity related behaviors (Fishbein & Ajzen, 1975). As such, we expect that organizational support for creativity would enhance the effect of subordinates' creative role identity on engagement in creativity facilitating behaviors, resulting in a stronger relationship with employee creativity.

*Hypothesis 2: Subordinates' creative role identity will have a stronger relationship with their creativity when they perceive that there is a high level of organizational support for creativity.*

Finally, we argue that the indirect relationship between supervisors' creativity and subordinates' creativity through subordinates' creative role identity will be moderated by having organizational support for creativity. In this proposed moderated mediation model (Preacher, Rucker, & Hayes, 2007), Hypotheses 1-2 are examined by testing the significance of individual paths in the model, but this is insufficient for establishing mediation and moderated mediation effects (Edwards & Lambert, 2007; Preacher et al., 2007). Therefore, we provide a comprehensive hypothesis specifying the overall moderated mediation effects predicted by our model.

*Hypothesis 3: Organizational support for creativity will moderate the indirect relationship between supervisors' creativity and subordinates' creativity through the subordinates' creative role identity, such that this indirect relationship will be stronger when there are higher levels of organizational support for creativity.*

### **Methods**

Our data was collected from an information technology (IT) firm in China. The primary occupations were program engineers, IT product developers and testers, and business professionals (e.g., marketing specialists and administrative staff). In this organization, top management is proud of the innovative culture they have built, and all employees are encouraged to be creative. The survey was conducted during the organization's annual employee survey period. The HR department assigned a one-hour timeslot for each participant to take the survey, if desired, in their computer classroom during work. One of the researchers was on site, and survey responses were directly saved to the researcher's web-disk.

We designed two online surveys for this study. The employee survey contained questions about their sex, creative role identity, perceptions of their direct supervisors, and attitudes toward the organization in general (e.g., organization support for creativity and some items from the organization's annual survey). The supervisor survey assessed their leadership attributes (e.g., demographics, motivation) and some items from the organization's annual survey, and they were asked to rate each of their employees' creativity. All survey items were translated and back translated into Chinese by two people independently working using the procedures suggested by Brislin (1970).

Upon arriving at the survey location, participants were greeted and invited to participate in the study. They were ensured that only the researchers would see their individual responses

and that these would be kept confidential, with the company only receiving an aggregated report of the findings. All 600 full-time employees were invited to participate, as well as the 80 supervisors. Of this group, 525 employees and 75 supervisors participated, yielding an overall response rate of 87.5% for employees and 93.8% for supervisors. However, a portion of the completed surveys were not included in the final analyses for two reasons. First, a portion of the participating supervisors were in top management ranks, with all their subordinates carrying the “supervisor” title (i.e., they were supervisors of supervisors). Therefore, the creativity of supervisors at the top management level was not evaluated by their subordinates, because their subordinates received the supervisor survey. Second, in some cases the units had multiple supervisors, because the original supervisors were on leave and some employees referred to the acting supervisors as their permanent supervisors, while others referred to their permanent supervisors. Accordingly, we removed these units where there were multiple supervisors in order to reduce any noise in our data. After matching employees’ and supervisors’ surveys and removing any that did not match, 443 employee surveys from 44 supervisors were deemed usable.

To ensure that there was no selection bias present in the data, we compared the demographic information of all participants and those included in our analyses, and found no significant differences in their age, sex, education, and tenure. For example, 57.3% of all participating employees in the organization were male, while 58.3% of the employees included in the analyses were male. For all participating supervisors, 74.6% were male and 72% has been working in the organization for over 6 years, while for those supervisors included in our analyses 73.2% were male and 75.5% of them have worked in the organization for over 6 years.

## **Measures**



**Supervisor Creativity.** In our study, leader creativity is considered to be a leader characteristic (i.e., comparable to leader personality or other trait-like attributes) that holds consistent within a group environment. That is, while different subordinates may vary in their sensitivity in observing their supervisor's creativity, a supervisor is unlikely to change his/her creativity level when interacting with different subordinates or at different times. Therefore, supervisor creativity is operationalized as a group level variable that has ambient influences among all team members (Hackman, 1992). It was rated by their subordinates using a four-item scale from Farmer et al. (2003) ( $\alpha = .95$ ; ICC1: .14; ICC2: .63) and then aggregated to the group level (i.e., level 2). The 4 items we used from the scale were: "My supervisor generated novel and workable ideas."; "My supervisor always looks for new ways to improve the effectiveness of his/her work."; "My supervisor served as a good role model for creativity"; and "My supervisor tried out new ideas and approaches to problems".

The social information processing approach (Salancik & Pfeffer, 1978) and social learning theory (Bandura, 1971) both suggest that employees' attitudes and opinions are influenced by their intermediate social context (e.g., co-workers). The leadership literature (e.g., Day, Gronin, & Salas, 2006) also has suggested that leaders' characteristics are better studied at the group level given that they are ambient stimuli toward all employees in the same work group (Hackman, 1992). In our study, the agreement between subordinates for their supervisors' creativity was high with an average inter-rater reliability (rwg) of .88, and a range of .70 to .98. This average rwg suggests that considering supervisor creativity as a group level construct is valid (Woehr, Loignon, Schmidt, Loughry, & Ohland, 2015). Therefore ratings from each of the supervisors' subordinates were aggregated to the group level using the consensual assessment technique developed by Amabile (1982). The consensual assessment procedure requires expert

judges to evaluate creativity independently (Baer, Kaufman, & Gentile, 2004), then if agreement between the judges is found to be acceptable, a creativity score is calculated by averaging their ratings (Zhou & Shalley, 2003). Research indicates that the consensual assessment technique is a well validated and reliable method for assessing creativity (Baer et al., 2004), and it has been widely used, however, only in experimental settings (e.g. Shalley, 1991, Zhou, 1998). We argue that using this technique to measure supervisor creativity provides a more objective evaluation of creativity. Amabile (1983) stated that creativity can be reliably assessed if the raters have familiarity and knowledge about the subject. In our setting, subordinates have sufficient domain relevant knowledge to assess their supervisor's creativity. Furthermore, the validity of such upward evaluation is evidenced in the leadership and feedback literatures (e.g., Atwater, Roush, & Fischthal, 1995).

**Subordinate Creativity.** We asked each supervisor to evaluate the creativity of their subordinates using the same 4 items that subordinates used to rate their supervisors ( $\alpha = .88$ ), in order to maintain consistency of measures.

**Subordinate Creative Role Identity.** We used a 4-item creative role identity scale from Farmer and colleagues (2003) ( $\alpha = .72$ ). Some sample items were: "To be a creative employee is an important part of my identity", and "I do not have any clear concept of myself as a creative employee" (reverse coded).

**Perceived Organizational Support for Creativity.** This scale measures the extent to which the organization supports creativity in general. We felt that it was best operationalized at the individual level because organizational support is likely to reflect an individual's perception rather than be based on their group membership. That is, resources, rewards, and facilities are potentially available to those who are interested in utilizing them, rather than those who belong

to certain work units. We used a 6-item scale from Farmer and colleagues (2003) ( $\alpha = .93$ ) to measure perceived organizational support for creativity. Some sample items were: “In my organization, creative work receives appropriate recognition and praise”, and “I have sufficient access to the necessary facilities and resources to do my job”.

**Control Variables.** To eliminate alternative explanations for subordinates’ creativity, we controlled for a range of leadership attributes of the supervisor, including demographic characteristics (i.e., sex and tenure), personality (i.e., proactive personality), motivation (i.e., intrinsic motivation) and behaviors (i.e., intellectual stimulation). Given this, we can better evaluate the relationships between supervisors’ creativity and subordinates’ creative role identity and subordinates’ creativity above and beyond these leadership attributes. Specifically, leader characteristics (i.e., sex and tenure), personality and motivation were self-reported by the supervisor, and were entered as group level control variables (level 2), and subordinate sex was entered as a level 1 control. Supervisors’ behavior (i.e., intellectual stimulation) was rated by the subordinates and entered as a group level control variable (level 2). Finally, we also controlled for departmental occupation, since it is possible that this would make a difference in how leaders may relate to their employees.

*Supervisor and subordinate sex.* We controlled for supervisor and subordinate sex to eliminate possible confounds of sex-role stereotypes.

*Supervisors’ tenure.* Social learning theory (e.g., Weiss, 1977) suggests that people are more likely to imitate those they perceive as competent, and seniority is often connected to competence perceptions in the Chinese culture (Milhouse, Asante, & Nwosu, 2001). Thus, in order to eliminate such confounds, supervisors were asked how long they had been in their position and this variable was controlled for in our analysis. To ensure anonymity and

confidentiality, response options were categorical (e.g., less than 6 months and over 6 years), rather than continuous.

*Supervisors' proactive personality.* Proactive personality is defined as the tendency of people to take initiative to alter their environment (Bateman & Crant, 1993). Since supervisors' personality can impact employees' performance (Grant, Gino, & Hofmann, 2011), supervisors who are higher on proactive personality may be more likely to seek opportunities to improve the status quo (Zhang, Wang, & Shi, 2012). When followers observe such behaviors of their supervisors, this can affect subordinates' creative role identity, since they might become more likely to observe the problems around them and find creative solutions to improve their work environment. To eliminate this alternative explanation, we decided to control supervisors' proactive personality. We used the 10 item proactive personality scale developed by Seibert, Crant, & Kraimer (1999) ( $\alpha = 0.88$ ). Sample items included "I am constantly on the lookout for new ways to improve my life" and "I excel at identifying opportunities."

*Supervisors' intrinsic motivation.* Intrinsic motivation is one of the key components of creativity according to the componential model of creativity (Amabile, 1983). Supervisors with higher levels of intrinsic motivation can be more creative themselves, which can encourage subordinates' creativity. In this study, we controlled supervisors' intrinsic motivation, measured by five items adopted from Tierney and colleagues' (1999) scale of intrinsic motivation ( $\alpha = 0.85$ ). We asked the supervisors to respond to questions such as "I enjoy creating new procedures for work tasks", and "I enjoy coming up with new ideas for products."

*Supervisors' intellectual stimulation.* Intellectual stimulation is a leader behavior that is one of the components of transformational leadership that potentially has a more direct influence on employee creativity compared to the other dimensions (Zhou, Hirst, & Shipton, 2012).

Through intellectual stimulation, supervisors can encourage their subordinates to adopt exploratory thinking (Gumusluoglu & Ilsev, 2009), by setting expectations to be creative (Gong et al., 2009), and encouraging them to challenge the status quo (Shin & Zhou, 2003). We asked subordinates to evaluate their supervisors' intellectual stimulation using the 4 item scale ( $\alpha=.91$ ; ICC1: .15; ICC2: .64) developed by Bass & Avolio (1997). Some sample items were "My supervisor seeks differing perspectives when solving a problem", and "My supervisor gets me to look at problems from many different angles" ( $\alpha=0.91$ ). As part of the leadership influence that acts on all employees in a unit at the same time, and to be consistent with supervisors' creativity, we aggregated intellectual stimulation to the group level ( $rwg=.86$ ).

*Departmental occupation.* Past research (e.g., Mainemelis, Kark, & Epitropaki, 2015) suggests that occupation could affect how leaders influence employee creativity. Therefore, we controlled for the specialization of each department to eliminate this possible confound. The departments were coded as "core functional" (i.e., software development and testing) or "supportive functions" (i.e., accounting, purchasing, and administrative). 86% of the work units were in core functional positions.

All measures used 7-point Likert scales with 1=strongly disagree and 7=strongly agree, with the exception of tenure which used a 5-point categorical scale (1=less than 6 months and 5=more than 5 years), and both sex (1=male, 2=female) and departmental occupation (1=core function, 2=supportive functions) used a dichotomous scale"

## **Results**

The descriptive statistics and correlations can be seen in Table 1. As shown, supervisor creativity was positively related to subordinate creative role identity and subordinate creativity ( $r=.14, p<.05, r=.11, p<.01$ , respectively), providing initial support for the model.

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Insert Table 1 about here  
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Since our study variables were measured with self-report questions at the same time, we tested for potential common method variance effects using the CFA marker technique (Podsakoff, MacKenzie, & Podsakoff, 2012; Williams, Hartman, & Cavazotte, 2010). We chose a single-item question, “tenure with leader”, as a marker variable, since it had negligible correlations with the study variables, and yet can still be considered as a potential source of bias (Richardson, Simmering, & Sturnam, 2009). The correlation between the marker variable and the study variables, creative role identity, perceived organizational support for creativity, and supervisor creativity evaluated by each employee was -.06, .04, and -.02 respectively. The negligible correlations show that tenure with the leader is a suitable marker variable. The chi-square difference test indicated that adding factor loadings that are fixed to be equal between the marker variable and each of the study variable items did not significantly improve the baseline model where the marker variable is orthogonal to the study variable items ( $\chi^2$  difference = 1.71,  $df = 1$ ) (See Williams et al., 2010). Therefore, we found no evidence that common method variance was a significant biasing factor in our analysis.

To ensure discriminant validity of the constructs, we performed a confirmatory factor analysis with results suggesting that the 4 factor model fit the data better than a 1 or 2 factor model. When all the items associated with employee creativity, supervisor creativity, creative role identity and perceived organizational support for creativity load onto one factor, there was a very bad fit with a chi-square index of 4356.60 ( $df=209$ ), .44 CFI, and 0.21 REMSEA. The chi-square index for the 2 factor model where the items of the independent variables load on one factor, and the items of the dependent variable load onto the second factor was 2585.76

(df=209), .68 CFI, and 0.16 REMSEA, demonstrating a very bad fit too. Our results showed that the best fitting model was the four-factor model with a chi-square index of 538.47 (df=209), .97 CFI, .06 REMSEA. Given the multilevel nature of our data, Hierarchical Linear Modeling (HLM) was used to analyze the data. Table 2 reports gamma coefficients of the main and interactive effects. In all our analysis for hypothesis testing, we used 2-tailed significance test.

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Insert Table 2 about here  
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The distribution of product coefficients method was used to test Hypothesis 1 by applying the RMediation package (Tofighi & MacKinnon, 2011). Traditionally, mediation has been tested with Baron and Kenny's causal steps approach (1986). This approach has three assumptions: (1) the independent variable significantly predicts the dependent variable, (2) the independent variable significantly predicts the mediator, and (2) the mediator significantly predicts the dependent variable, controlling for the independent variable. There are a number of problems with this common approach. First of all, it is argued that this approach only yields conditions for mediation, rather than providing a statistical test for the indirect effect (MacKinnon et al., 2002; Preacher & Hayes, 2004). Second, requiring a significant direct relationship between the predictor and the outcome variables can obscure a mediated effect when the direct effect is in the opposite direction (Edwards and Lambert, 2007; MacKinnon et al., 2002). Also, the condition for a direct effect between the independent variable and the dependent variable is not necessary in order to conclude that there is an indirect effect (Preacher & Hayes, 2004). A more statistically rigorous test developed by Baron and Kenny (1986) is the Sobel test (Preacher & Hayes, 2004). This method tests the indirect effect directly, without analyzing each condition separately. The indirect effect is calculated as the product of the "independent variable-

mediator path”, and the “mediator-dependent variable path” (i.e.,  $ab$ ). The assumption that  $ab$  is normally and symmetrically distributed is the problem of this test, because the sampling distribution of  $ab$  may not be normal, and it is typically skewed (Preacher & Hayes, 2004). In addition, with small sample sizes, the test becomes less conservative.

In order to resolve the normality assumption of the “ $ab$ ” product, an alternative approach of bootstrapping the sample was developed (MacKinnon et al., 2002; Preacher & Hayes, 2004). By bootstrapping, a large number of samples are derived from the population with replacement, and the indirect effect, which is the “ $ab$ ” product, is calculated for each sample. In this way, assumptions about the shape and distributions of the variables are overcome (Preacher, Rucker, & Hayes 2007). As such, in this study, the bootstrap technique suggested by Preacher and Hayes (2004) was conducted since this approach has stronger statistical power while maintaining balanced Type-1 error rates (MacKinnon, Fritz, Williams, & Lockwood, 2007). Furthermore, it allows for testing the indirect relationship in multi-level data (Liao et al., .2010). Since the bootstrapping technique has fewer assumptions, we believe that it is a more preferred approach.

A positive significant relationship between supervisors’ creativity and subordinates’ creative role identity was found ( $\gamma = 0.34$ ,  $p < 0.05$ , Model 2), as well as a positive significant relationship between subordinates’ creative role identity and their creativity ( $\gamma = 0.10$ ,  $p < 0.001$ , Model 4). The indirect relationship was calculated by multiplying these two path coefficients calculated in Models 2 and 4 ( $\gamma = 0.03$ ). The 95% confidence interval (CI) of the indirect relationship calculated by the RMediation package excludes zero [0.004, 0.076], indicating a significant indirect relationship between supervisors’ creativity and subordinates’ creativity through subordinates’ creative role identity, fully supporting Hypothesis 1.



To test Hypothesis 2, following the stepwise regression procedure in Model 5, the main effect of organizational support for creativity was entered into the equation, and in Model 6 the interaction term was included. We found a significant interaction between the two ( $\gamma = 0.09$ ,  $p < 0.001$ ), with a simple slopes test (Aiken & West, 1991) indicating that the slope of high organizational support for creativity was different from zero ( $t = 4.46$ ,  $p < 0.001$ ), while low organizational support was not ( $t = .09$ ,  $p > 0.05$ ) (see Figure 2). This suggests that the relationship between subordinates' creative role identity and subordinates' creativity were only significant when there was high organizational support for creativity, fully supporting Hypothesis 2.

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Insert Figure 2 about here  
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The moderated path analysis procedure developed by Edwards & Lambert (2007) was used to test Hypothesis 3, based on a 10,000 bootstrap sample. The point estimates and bias corrected 95% bootstrap confidence intervals showed that there was a significant difference between the indirect relationship of supervisor creativity with employee creativity via their employees' creative role identity across different levels of organizational support for creativity ( $\Delta \gamma = .06$ , confidence interval: [.03, .17]), such that the indirect relationship was significant at higher levels of organizational support ( $\gamma = .07$ , confidence interval: [.03, .17]) but became insignificant at lower levels ( $\gamma = .01$ , confidence interval: [-.02, .04]). Thus, Hypothesis 3 was fully supported.

We also should note that at the end of each model, we reported the R-square values. Pseudo R-square is computed as the proportional reduction of level 1 and level 2 error terms upon the inclusion of predictors in each model which compare each model with the unrestricted model that contains only the level-1 intercept term (Snijder & Bosker, 1999). The R-squares

calculated in multi-level analyses are different from the R-squares computed in an ordinary least square regression analysis (Hayes, 2006). R-squares calculated in multilevel models are considered to be pseudo R-squares, and cannot be interpreted as the R-square change in ordinary least square models (Snijeder & Bosker, 1999). Therefore, the relatively low pseudo-R-square values reported here do not reflect the change in explained variance as it would in an ordinary least square model.

### **Discussion**

The majority of U.S. Nobel laureates who conducted prize-winning research had earlier worked under or been mentored by other Nobel laureates (Becker, 2013). This study is among the first to investigate whether a similar relationship occurs in organizations by highlighting the potential connection between supervisors' own level of creativity and their subordinates' creativity. Given their power and status in an organization, creative supervisors can impact their subordinates ability to be creative themselves. By looking at the relationship of supervisors' and subordinates' creativity, we took a top-down approach which should extend our understanding of employee creativity. Furthermore, by controlling leaders' characteristics (i.e., sex and tenure), leaders' personality (i.e., proactive personality), leaders' motivation (i.e., intrinsic motivation) and leaders' behavior (i.e., intellectual stimulation) we were able to provide evidence that supervisors' creativity had a positive indirect relationship with subordinates' creativity, above and beyond the effect of these other leader attributes.

There has been a call for developing new theoretical perspectives to examine underlying psychological mechanisms that fuel creativity (Zhou & Shalley, 2003), and there is a growing

trend in the literature focusing on the role of followers' self-concept and self-identity as the mediator of leaders' effectiveness on followers' behaviors (van Knippenberg et al., 2005). We contribute to this literature by examining the role of subordinates' creative role identity as the mediating mechanism between supervisors' and subordinates' creativity. Our findings suggest that observing the creative actions of their supervisors can potentially have positive effects on the strength of subordinates' creative role identity and their own creativity. Furthermore, our examination of the moderating effect of organizational support for creativity can potentially enrich our understanding of role identity theory. Theorists have emphasized that a role identity has to be salient in order to lead to the enacted behavior (Farmer & Van Dyne, 2010; Lord & Brown, 2004). When the organizational context is supportive of creativity, we argued that this could increase the likelihood that individuals will engage in creative efforts to fulfill this role identity. The results of our study indicate that the extent to which an organization supports creativity may play a significant role in facilitating the behavioral enactment of creative role identity. Specifically, some employees who were high on creative role identity were not more creative at work potentially because they viewed their work context as not being supportive of it. An unexpected finding is that while we found a positive relationship between perceived organizational support and supervisors' creativity, it was insignificant for subordinates' creativity. This could be because organizational support for creativity is a more distal contextual factor that may not always be related directly to subordinates' creativity.

In addition, there has been growing interest in examining outcomes of being creative. For instance, it has been found that creativity can lead to enhanced job performance (Zhang & Bartol, 2010), employee sales (Gong et al., 2009), and unethical behaviors (Gino & Ariely, 2012). Our results contribute to this stream since they indicate that the creativity of one

organizational actor (i.e. supervisor) can be positively related to others' creativity (i.e., subordinates) and this may occur by influencing their subordinates' creative role identity.

A final potential contribution of this study is the application of the consensual assessment technique in a field setting to assess the creative performance of individuals. Amabile (1982) argued that expert judges should independently agree upon the creativity of an output in order to reliably state that it is creative. However, this technique only has been widely used in controlled experimental settings (Baer et al., 2004), with creativity measures in the field usually based on each supervisor's evaluation of her employees or by using some objective measures such as patents (Zhou & Shalley, 2003). This technique also has been used to evaluate creative output rather than evaluating individuals' overall level of creativity. We applied this well validated and reliable consensual assessment technique to measure supervisors' creativity by asking each employee to evaluate the creative performance of their supervisors, and then aggregating all the employees' ratings for each supervisor. We considered employees as appropriate judges to evaluate their supervisor's creativity, since they were already working with their supervisor and they should have sufficient domain relevant knowledge. We would argue that this method should be used more often in field settings in the future, especially when measuring supervisor or team member creativity, because it can be a more objective measure than using the perception of only one single person. One could argue that subordinates may not observe all the creativity related behaviors performed by their supervisors. However, we believe that by actually asking a number of subordinates to evaluate the creative performance of their supervisor, we have a stronger measure of supervisors' creativity since this evaluation is not based on the subjective observation and judgment of only one person. We argue that multiple behaviors can be perceived by asking a number of subordinates to evaluate the creativity of their supervisors', and since inter-rater

reliability among subordinates was high, we feel more confident that their observations were consistent with each other. Relatedly, in order to avoid common method bias, we used a multi-source research design (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Specifically, supervisors' creativity was based on the aggregated measure of the employees' assessment of their supervisors with a high level of agreement, while employee creative role identity and organizational support for creativity were self-rated by the subordinates, and subordinates' creativity was evaluated by their supervisors.

Our results have a number of managerial implications. Considering the IBM report (2010) on the importance of leaders' creativity, our findings can provide valuable information for managers to consider when they are choosing to promote employees from within the organization into supervisory roles. Often when managers are promoting employees into higher level roles they prefer those who do not take risks over more creative or risk taking employees (Mainemelis et al., 2015). However, our findings suggest that managers should focus on hiring creative supervisors, because supervisors' creativity alone could help to improve subordinates' creativity possibly through strengthening subordinates' creative role identity, above and beyond the role of supervisors' characteristics (i.e., sex and tenure), proactive personality, intrinsic motivation, and intellectual stimulation. Specifically, how creative these employees have been in the past may need to be considered before they are promoted to be supervisors since this may play an important role in influencing the level of all of their subordinates' creativity. van Knippenberg and colleagues (2004) argued that leaders can impact organizational, work group, and individual functioning if they can change how the followers perceive themselves. Therefore, if creativity is an important component of their jobs or if it is organizationally desired in general, it may be important for supervisors to pay attention to strengthening their subordinates' creative

role identity in order to improve their creativity. One way supervisors may be able to do this is by actually being creative at work themselves. Hence, besides evaluating supervisors' creativity before being hired or promoted, organizations also can encourage training programs for supervisors in order to improve their creativity, such as how to recognize opportunities and adapt to changes in their work environment (Stenmark, et al., 2011). As such, attributes of leaders' who are perceived to be creative could be important sources of subordinates' behavioral modeling. For instance, supervisors can influence employees' creativity by sharing their expertise, assigning appropriate tasks, providing resources and rewards, connecting the employees to external contacts, giving feedback, and stimulating their subordinates (de Jong & Hartog, 2007; Hemlin & Olsson; 2011; Mumford, Connelly, & Gaddis, 2003). Also, research has found that having creativity goals improve creative performance (Shalley, 1991; 1995). Given this, organizations could encourage supervisors to set creativity goals for themselves, since this could potentially improve the supervisors' own creativity, while at the same time it also could potentially be associated with higher levels of subordinates' creativity. Additionally, managers should pay attention to designing a work environment that their employees find to be supportive of creativity, since our findings suggest that this type of organizational support for employees with strong creative role identities may allow them to fully act on their propensity to be creative, potentially taking risks, experimenting, and trying to generate more creative ideas and products.

Despite its strengths, this study has a number of limitations that also suggest areas for future research. First, our data is cross-sectional, so we cannot infer causality. In the future, time lagged studies or controlled experiments can be conducted in order to see whether supervisors' creativity is an antecedent of subordinates' creativity. Second, although we controlled for some leadership attributes that could provide alternative explanations for our results, we did not

examine the moderating role of different leadership styles. That is, is it enough to be a creative supervisor, without also being supportive or developing good relationships? For instance, Steve Jobs was probably not the greatest boss considering his management style (Lashinsky, 2009), yet, he may have inspired his employees and possibly contributed to their creativity. Therefore, future work could examine whether supervisors' creativity explains employees' creativity over and above various leadership styles. Third, we argued and found that the relationship between supervisors' creativity and subordinates' creativity was mediated by creative role identity. To more fully understand the relationship between these two, the role of other motivational constructs, such as creative self-efficacy, could be examined. Given this, it should be stressed that we did test our model while controlling for one motivational construct, that of supervisors' intrinsic motivation. Fourth, an alternative explanation for our findings may be that creative leaders are better able to recognize creativity in their followers, and this possibility can be examined in future research. Finally, the role of supervisors' creativity across different occupations should be examined in the future. Although we controlled for departmental occupations and found no difference between two broad job categories (i.e., core technical vs. supporting functions) in the current study, past research has suggested that occupations could affect the process through which leaders influence subordinates' creativity. For example, Mainemelis and colleagues (2015) suggested that the role that leaders play in influencing employees' creativity takes place between two extremes. First, leaders can act as facilitators of employees' creativity. In this situation, they are not the primary idea generators, but they support employees' creativity by providing help to guide employees while they are generating and selecting ideas. Second, leaders can be directing in their contribution to employees' creativity. In this case, leaders are the primary actors that generate creative ideas, and they transfer their vision

to their employees. According to these researchers, this type of leadership can be seen more often among occupations such as orchestra conductors, cuisine chefs, and architects, where the followers are bounded by the creativity of the leaders but are still expected to be creative themselves. Therefore, in occupations where a directive approach is preferred, the level of leaders' creativity could be more influential for subordinates' creativity.

In conclusion, supervisors can play a critical role in the workplace since they manage employees, and set role expectations and performance norms. This study also indicates that supervisors' own level of creativity can be positively associated with their employees' creativity. Furthermore, we identified subordinates' creative role identity as an underlying mechanism for this effect. Specifically, when employees have a higher creative role identity they can have higher creativity, as long as the organizational context is supportive of creativity. As such, when supervisors are creative, this appears to serve as a core component of effective leadership.



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**TABLE 1**  
**Individual-level Means, Standard Deviations, and Correlations**

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1 Subordinates' creativity	4.96	.88										
2 Supervisors' creativity	4.83	.56	.11**									
3 Subordinates' creative role identity	4.99	.97	.19**	.14**								
4 Perceived organizational support for creativity	4.95	1.04	.05	.17**	.09*							
5 Subordinates' sex	1.42	.49	-.15**	-.10*	-.28**	.13**						
6 Supervisors' sex	1.24	.35	-.07	.13**	-.02	.07	-.03					
7 Supervisors' tenure	4.56	.78	.16**	.16**	-.004	-.02	-.14**	.21**				
8 Supervisors' intrinsic motivation	5.95	.56	.09	.05	.05	.03	.01	-.22**	-.33**			
9 Supervisors' proactive personality	5.11	.80	.06	-.10*	.05	.01	.07	-.33**	.23**	.69**		
10 Supervisors' intellectual stimulation	5.19	.53	.07	.68**	.09†	.12**	-.05	.15**	.20**	.11*	.02	
11 Departmental occupation	.86	.34	.05	.05	.09†	-.06	-.12*	-.07	.13**	-.05	-.04	-.12*

N=443. Variables 3-5 were reported by the individual subordinates, variables 1 and 6-9 were reported by the supervisors, and variables 2 and 10 were created at the team level from subordinate ratings.

\*\* p<0.01; \* p<0.05; † p<.10

**Table 2**

**HLM Results: Main and Interactive Effects**

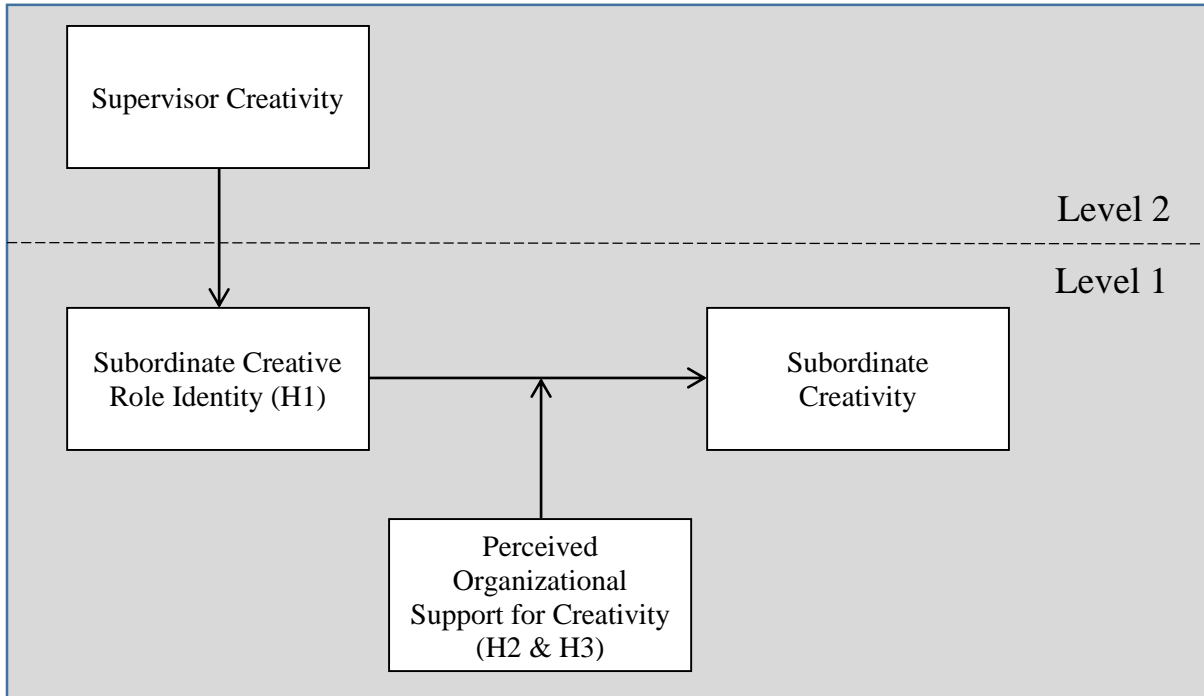
	DV: Subordinates' creative role identity		DV: Subordinate creativity			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	5.00 (.05)***	5.01 (.05)***	4.94 (.08)***	4.94 (.08)***	4.94 (.08)***	4.94 (.08)***
Level 1 controls						
Subordinates' sex	-.55 (.09)***	-.54 (.09)***	-.20 (.10)**	-.15 (.09)	-.14 (.10)	-.15 (.10)
Level 2 controls						
Supervisors' sex	-.03 (.18)	-.02 (.16)	-.01 (.23)	-.01 (.23)	-.03 (.22)	-.01 (.23)
Supervisors' tenure	-.05 (.05)	-.07 (.04)	.16 (.10)	.18 (.08)†	.18 (.09)†	.19 (.09) *
Supervisors' intrinsic motivation	-.03 (.09)	-.04 (.08)	.19 (.17)	.21 (.16)	.21 (.16)	.14 (.15)
Supervisors' proactive personality	.07 (.09)	.07 (.07)	.11 (.14)	.07 (.13)	.07 (.12)	.13 (.12)
Supervisors' intellectual stimulation	.16 (.08)*	-.18 (.17)	-.15 (.31)	-.12 (.27)	-.12 (.27)	.04 (.31)
Departmental occupation	.07 (.10)†	.11 (.11)	.06 (.27)	.07 (.27)	.07 (.27)	.04 (.26)
Level 1 Independent Variables						
Subordinates' creative role identity				.10 (.03)***	.10 (.03) ***	.11 (.03)***
Organizational support for creativity					-.01 (.04)	-.03 (.04)
Level 2 Independent Variables						
Supervisors' creativity		.34 (.15) *	.15 (.24)	.11 (.24)	.12 (.24)	.04 (.26)
Interaction effect						
Creative role identity X Perceived organizational support for creativity						.09 (.03)***
Pseudo R2	.07	.08	.01	.04	.04	.07

N (individuals) = 443, N (groups) = 44; \*\*\* p<0.001; \*\* p<0.01; \* p<0.05, † p<.10



**Figure 1**

**The Theoretical Model**



**Figure 2**

**Interaction between Subordinates' Creative Role Identity and Perceived Organizational Support for Creativity on Subordinates' Creativity**

