International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 16, Issue 3, 2022

The Impact of Leaders' Creative Problem-Solving Preferences on Teams

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The present study examined the degree to which leaders' cognitive style influenced creative collaboration in work teams. Specifically, the creative-thinking preferences of leaders were compared to their team members' observations of two dimensions of creative collaboration, namely Trust and Spirit of Exploration. Further analysis examined whether the match or mismatch between leaders and followers' creative-thinking preferences affected these same dimensions. Creative-thinking preferences were assessed through the FourSight inventory. The two creative collaboration dimensions were measured by an 11-item survey called the Measure of Productive Collaboration (MPC). Ninety-one managers completed FourSight, 391 direct reports were invited to compete both the FourSight and MPC measures. Overall analysis showed that leaders' Ideating preference had a significant positive relationship with Spirit of Exploration. With respect to Trust in teams, leaders' Clarifying preferences had a positive impact, while the Developing scale showed a negative relationship. When leaders and followers matched on one creative-thinking preference (i.e., matched pairs) were compared to leader-follower pairs that shared no preference in common (i.e., mismatched pairs), results showed that an increase in the leaders' Ideating preference had a significant positive relationship for both Spirit of Exploration and Trust. The theoretical and practical implications of these findings are discussed.

Keywords: *creative-thinking preferences, creativity styles, creative collaboration, work teams, leadership*

Introduction

In the main, creativity assessment has been focused on measuring individuals' capacity to be creative. Indeed, the field is replete with measures that predict an individual's creative potential by measuring such characteristics as cognitive abilities, most notably the Torrance Tests of Creative Thinking (Torrance, 1972) and the Remote Associates Test (Mednick & Mednick, 1971), personality traits associated with creative behavior, for instance the California Psychological Inventory (Gough, 1956) and the Adjective Check List (Gough & Heilbrun, 1983), biographical experiences deemed to be examples of past creative behavior, such as the Biographical Inventory (Schaefer, 1967), and, more recently, individuals' level of self-efficacy as a contributor to creative performance (Teirney & Farmer, 2002). While these assessment tools measure creativity from different perspectives, they all possess the same goal – to predict an individual's level of creativity. To be sure, the level approach to creativity assessment is the dominant measurement paradigm in the field of creativity. However, there are a small number of scholars who have adopted a distinctly different approach to creativity assessment, referred to as creativity styles. An early and perhaps most ardent proponent of the styles approach to measuring creativity was Kirton (1976).

Where creativity-level measures endeavor to assess and predict individuals' creative capacity, creativity-style measures are primarily concerned with identifying the varying ways in which people express their creativity. Conceptually, creativity styles are rooted in an area of psychology called cognitive styles (Witkin & Goodenough, 1981; Messick, 1976), which has been defined as "consistent individual differences in ways of organizing and processing information and experience" (Messick, 1984, p. 61). There are at least five conceptual characteristics that define creativity styles and distinguish this approach from the level approach. First, from a macro perspective, creativity styles are value neutral (Kirton, 2003, 1989b, 1976). One way of expressing creativity is no more valuable than another; all possess equal potential for producing creative outcomes from an individual to a societal level. Second, creativity styles, as they represent individual differences with respect to creative cognition, are most closely aligned with the creative process facet of creativity (Kirton, 1989a; Rhodes, 1961). Since creativity styles are embedded in creative process, these differences in terms of cognitive preferences are expected to interact with, and potentially influence, other fundamental dimensions of creativity, most notably person, product, and environment (Rhodes, 1961; Puccio, Murdock & Mance, 2011). Third, individual differences associated with discrete creativity styles results in consistent and stable compositions of personality traits. Fundamentally, creativity styles are "inferred to be a basic dimension of human personality with meaningful relationships to other personality characteristics" (Kirton, 1989b, p. 5). Fourth, since creativity styles are based in creative process and are associated with the formation of particular personality traits, these preferred ways of thinking and being are hypothesized to cut across all areas of human behavior, from experiences in an individual's work

life to aspects of one's personal life. Finally, while creativity styles are theoretically value neutral and, therefore, do not represent enduring strengths or deficiencies, situational demands and biases will determine what forms of creativity styles are most adaptive for specific contexts, types of problems, and areas of performance (Schneider, 1987).

FourSight is a creativity styles theory that holds all people are inherently creative and, because of evolution, are innately wired to engage in acts of creative problem solving (Puccio, 2017). More specifically, as a theory of creativity styles, FourSight posits that individuals will vary in terms of their preferences for the mental operations associated with the fundamental steps in the creative process. In short, individuals develop and express different degrees of preference for the four universal steps of the creative process, these are problem clarification, ideation, solution development, and implementation. Moreover, a series of research studies have demonstrated these creative-thinking preferences can be reliably and validly measured. The FourSight measure, a 36-item self-report inventory, identifies individuals' strength of preference along four subscales called Clarifying, Ideating, Developing, and Implementing. Again, all people, by nature, can engage in the mental operations associated with each of these steps of the creative process. However, many people will report greater proclivity for one, or some combination, of these dimensions of creative cognition.

As noted previously, creativity styles correlate with the development of a particular constellation of personality traits within the individual. Accordingly, research into the FourSight theory has highlighted theoretical distinction in personality among those who report strong preferences for Clarifying, Ideating, Developing and Implementing (Puccio et al, 2019; Campos et al, 2015; Puccio & Grivas, 2009; Puccio & Schwagler, 2008). For example, those with a high Clarifier preference have been shown to be orderly, reserved, and thorough. Individuals who reported high preferences for the Ideator scale were found to possess such personality traits as autonomy, wide interests, and need for affiliation. Strong preferences for the Developer scale correlated with conscientiousness, endurance, and perfectionism. Scores for the Implementer preference were positively correlated with social confidence, desire for closure, and low anxiety.

As noted earlier, an attribute of a creativity styles theory is that it must demonstrate relevance across a wide range of human experiences. Recent research using the FourSight self-report measure has highlighted how the FourSight preferences operate in such domains as entrepreneurial behavior (Campos, et al, 2015), vocational choice (Puccio, Miller & Acar, 2019), well-being (Puccio et al, 2019; White & Shah, 2011), teachers' perceptions of students (Gurak-Ozdemir et al, 2019), and leadership in organizations (Puccio & Acar, 2015). It is the latter topic, leadership, that the present study sought to extend. A global IBM (2010) study of more than 1500 cross-sector executives reported that creativity is the most important leadership skill in today's volatile,

complex, and uncertain world climate. Elsewhere, several scholars have cited creative problem solving as a core leadership competence (Puccio, Mance & Murdock, 2011; Mumford et al, 2000; Zaccaro et al, 2000). Puccio and Acar (2015) conducted a large-scale study to examine how creative problem-solving preferences, as measured by FourSight, varied across the organizational hierarchies drawn from a broad range of industries and sectors. Among their results they discovered significantly stronger tendencies for the Ideating and Implementing preference for those in senior-level leadership positions. Where Puccio and Acar (2015) identified a correlation between organizational level and FourSight preferences, the present study set out to examine the effects of leaders' FourSight preferences on the psychological climate associated with creative collaboration in intact work teams.

For employees in organizations of all sizes, it is generally the small working unit to which they belong that defines and determines the nature of their work experience. It is in these contexts that the collaboration among colleagues is harnessed to solve problems, make decisions, and manage projects, all of which are enhanced through effective creative thinking and creative problem solving. As Gedik and Ozbek (2020) succinctly observed, "Organizational work teams are at the heart of creative performance because, through debate and controversy, they tend to stimulate the cross-fertilization and integration of diverse perspectives, views and approaches offered by their members" (p. 634). In short, small working teams serve as a critical source for creativity in organizations (Wong et al, 2018; Fay et al, 2015; Edmondson & Mogelof, 2006; Paulus & Nijstad, 2003; Anderson & West, 1998).

Numerous creativity scholars, most notably Ekvall (1996) and West (1997), have argued that the psychological climate, that is the behavior, attitudes, and feelings found within the organizational setting (Ekvall, 1987), plays a significant role in predicting the degree to which employees successfully engage in creative behavior and realize innovative outcomes. Fundamentally, psychological climate provides an overall sense for what it is like to work on a team or in an organization by aggregating individual employees' subjective experiences (West, 1997). Researchers who have closely examined psychological climate have identified those factors that are most conducive to creative performance (Ekvall & Ryhammar, 1998; Amabile & Gryskiewicz, 1988; Van Gundy, 1987; Rickards & Bessant, 1980). While these factors vary to some degree across research studies (Puccio & Cabra, 2010), Richards and Bessant (1980) noted "the similarity in dimensions within the field of organizational climate studies suggests that there may be a small number of basic constructs underlying this field" (p. 68). Whilst variously named, two climate dimensions that consistently receive mention in this literature are trust (Lyndon et al, 2020; Barczak et al, 2010) and the open exchange of ideas (Pillay et al, 2020; Wang et al, 2019). Indeed, a recent study conducted by Hu et al (2018) showed that increasing levels of psychological safety and information sharing significantly predicted the amount of creativity in teams.

Ekvall (1996) defined trust as the degree to which individuals report experiencing a sense of emotional safety in relationships at work. As Edmondson and Mogelof (2006) reported, "the experience of psychological safety can allow team members to relax their guard and engage openly in the behaviors that underlie learning and innovation" (p. 110). While trust is a necessary condition for creativity, it is not sufficient. Trust creates a safe space, but this space needs creative content. Here the exchange of diverse ideas and information provides the necessary impetus for creative solutions and outcomes in teams. In recognition of the significant contribution an open exchange of ideas makes to creativity in teams, Nijstand, Rietzschel and Stroebe (2006) included this form of collaboration among their four fundamental principles of group creativity. These authors called this the effective sharing principle. As these authors argued "for high levels of creativity to occur, the members of diverse groups need to share their unique ideas, information, and perspectives with the other members" (p. 168).

Ekvall's sustained program of research into psychological climate has underscored the fact that among the variables that shape climate, leadership behavior exerts the greatest impact. As Ekvall (1999) observed when accounting for distinctly different psychological climate results within the same organization:

> The cause of the climate variation between subunits of the organization occur, in spite of obvious similarities in, say, tasks, work routines, formal regulations, technology, remises, competencies of the staff, and general mission goals, is to be found in the local leadership, both formal, executed by the manager, and informal, exerted by one or more subordinates with leadership drives and competencies. (p. 404)

Empirical evidence for the significant impact of leader behavior on psychological climate has been found across industries. Ekvall and Ryhammar (1998), for example, found that faculty within a university setting reported more positive views of the psychological climate when their department heads were observed to engage in leadership behaviors in the areas of change orientation, employee orientation, and production orientation. Adopting the same measure of leadership behavior, Dackert, Loov, and Martensson (2004) studied teams within a manufacturing facility and found that a combination of employee and change-orientated leadership behaviors facilitated a team climate more conducive to creative performance. Finally, Amabile's KEYS, a measure of the work environment, features a dimension called supervisory support as a fundamental indicator of workplace creativity across industries, sectors, and functional areas (Amabile & Conti, 1999; Amabile et al, 1996; Taylor & Gryskiewicz, 1993; Amabile, & Gryskiewicz, 1989).

The impact of leadership behavior on creativity has not been limited to studies strictly focused on psychological climate. Recent investigations have examined the impact of distinctly different leader characteristics on team creativity. For example, Mathisen, Einarsen and Mykletun (2012) found that a leader's own individual creativity predicted levels of creativity in their teams. Hu et al (2018) found that leader humility, in low power-distance cultures, was positively related with information sharing. Tu et al (2018) showed that ethical leadership promoted higher levels of team creativity. And Yoshida et al (2014) found that servant leadership positively affected employee creativity and promoted greater levels of team innovation.

The present investigation draws together two lines of inquiry. First, it extends the line of research into the various ways in which attributes of a leader impact creativity in intact work teams. Second, it extends FourSight as a creativity-styles theory by investigating the degree to which these creative-process preferences contribute to creative collaboration in the workplace. Specifically, the present study examined whether the creative-thinking preferences of team leaders, as measured by FourSight, contributed significantly to two dimensions of psychological climate known to contribute to creativity in teams. Namely, this study set out to determine whether leaders' creative-process preferences would promote, or undermine, trust and exploration of ideas in workplace teams.

Method

Participants

Study participants were mid-level leaders and their direct reports working in for profit enterprises (23%), nonprofit organizations (15%), education (50%), government (4%), and medicine (8%). Participants from educational organizations included leaders and their direct reports employed in public school districts, colleges, and universities. Medical included leaders and research participants working in hospitals, clinics, and university hospitals. Nonprofit and for-profit categories included organizations ranging from 20 people to over 20,000. Government included local government officials. Nineteen percent of the participants had been in their roles less than a year, 38% had been in their roles from one to three years, and 43% for more than three years.

One hundred and thirty mid-level managers were invited to participate and 91 completed the FourSight assessment. Related to this pool of leaders, a total of 391 direct reports were invited to also complete FourSight; usable data were received from 302 individuals. From the full data set of managers and direct reports, 322 provided information on their age, which showed a mean age of 40.54, while a total of 359 research participants indicated their gender (males = 159; females = 200). At the time of data collection, non-binary gender and other gender options were not presented to the research participants.

Measures

FourSight. The mid-level leaders and their direct reports' creative-thinking preferences were measured through FourSight. FourSight is a 36-item self-report measure of respondents' preferences for the four fundamental forms of cognition associated with the creative process. As such, FourSight is comprised of four scales known as Clarifying, Ideating, Developing, and Implementing. Each scale contains nine items to which respondents indicate the extent each statement represents their personal approach to creative problem solving (i.e., 5-point Likert scale ranging from 1 = 'Not like me at all' to 5 = 'Always like me'). The following represents sample items for each scale:

> Clarifying: "I like identifying the most relevant facts to the problem."
> Ideating: "I enjoy coming up with unique ways of looking at a problem."
> Developing: "I like to explore the strengths and weaknesses of a potential solution."
> Implementing: "I enjoy turning rough ideas into concrete solutions."

Various studies have provided evidence for acceptable levels of reliability for each of the four scales described above (see Acar et al, 2018). For example, a recent research study conducted by Puccio et al (2019) found indices of Cronbach alpha that ranged as follows: Clarifying .68-.72; Ideating .78-.80; Developing .77-.82; and Implementing .79-.81. There is mounting evidence for the validity of the creative-thinking preferences assessed via *FourSight*. For examples, see the studies noted in the introduction to the current study and Acar and his colleagues' (2018) monograph summarizing FourSight research studies conducted prior to 2018.

Measure of Productive Collaboration. The present investigation was concerned with how individuals in teams collaborated on projects that involved creative problem-solving effort (i.e., idea creation, concept development, producing a solution, and taking action). As a thorough literature review revealed no existing measure of creative collaboration in teams that fit the purpose of the present study, a measure was designed by the third author. The resulting 11-question survey, called the Measure of Productive Collaboration (MPC), used four statements from a section of an existing survey (used with permission), the Assessment of Interprofessional Team Collaboration Scale (AITCS; Orchard et al, 2012), plus seven additional questions pertinent to collaboration behaviors that align with the creative problem-solving process. All questions used a five-point Likert scale (1 - *never*, 2 - *seldom*, 3 - *sometimes*, 4 - *often*, and 5 - *almost always*) in response to the stem "When our team collaborates, our leader encourages us to…"

The four questions based on the AITCS were borrowed from the partnership subscale of this survey and, in several cases, were modified to ensure that the statements worked with the stem adopted for the MPC. To these four statements, additional items were created that focused on collaboration

as rooted in the creative process, as well key conditions that promote effective creative collaboration identified in the research literature (Tschannan-Moran, 2000; McGuire, 2006; Milam & Heath, 2014; Hill & Barthol, 2016; Koschmann, 2016). Content validity of the initial item pool was established through review of the proposed questions with six individuals with subject matter expertise in collaboration, Creative Problem Solving, and innovation. They were provided criteria for the analysis and judged the candidate items for clarity, relevance, and importance. Their feedback led to rewording several items. The survey was then shared with two psychometricians to ensure that the proposed items for the MPC were properly constructed and errors such as double-barreled, confusing, redundant, or leading questions had been avoided. Two questions were eliminated as a result.

The initial survey, which originally had 13 items, was administered to a purposive, convenience, sample selection of 70 members of the intended population, 35 were students from a variety of industries enrolled in a part-time MBA program; the remaining participants were managers in academic, medical, governmental, and nonprofit roles. Data collected from this sample were analyzed for internal reliability yielding a Cronbach's alpha of .74 for the 13 questions. Examination of the items revealed that two items reduced internal consistency and were removed, increasing the Cronbach Alpha to .92. The final version of the MPC used in the present study is found in Table 1.

Table 1. Final Item Set & Descriptive Statistics for the Measure of Productive Collaboration (MPC)

	N	Mean	SD
When our team collaborates, our leader encourages us to…			
1. generate multiple ideas[a]	375	4.07	.88
2. come up with new solutions for our challenge [a]	375	4.08	.88
3. share the power with one another[b]	374	3.83	1.05
4. negotiate differences of opinions[b]	373	3.80	1.01
5. prototype our proposed solutions	371	3.56	1.00
6. consider alterative ideas[a]	374	4.05	.84
7. establish agreements on goals	374	3.99	.97
8. propose a solution	372	4.24	.79
9. use each other's strengths	374	4.02	.98
10. build on one another's suggestions[b]	374	4.02	.87
11. put at least one of our ideas into practice [a]	374	4.05	.83

[a] Spirit of Exploration [b] Trust

Data Collection Procedures

Data collection proceeded over an 11-month period from December 2018 through November 2019. To ensure participants were derived from a variety of areas purposive sampling was used. Queries were sent through university alumni, professional associations, and conferences. Letters were sent to interested individuals offering them the opportunity to participate in the study. Those who opted in were sent a link to complete the FourSight profile. One hundred thirty managers were invited, 115 managers participated, and complete data was received from 91 leaders.

Selection of the direct report used single-stage sampling (Creswell, 2014). The participating leaders provided contact information for their direct reports. When the leader's FourSight profile was complete, leaders were sent a sample message to distribute to their direct reports offering the team the opportunity to participate in the collaboration study. Direct report research participants were then sent instructions for the MPC, their individual link, their rights, and a brief explanation of the study. Once the research participants completed the MPC they were sent a link to complete the FourSight assessment. Three hundred and two direct reports completed both the MPC and FourSight.

Results

Descriptive statistics for the MPC and FourSight are presented in Table 1 and Table 2, respectively. Internal reliability, as measured through Cronbach's Alpha, for all research participants who completed FourSight showed the following results: Clarifying = .74; Ideating .81; Developing = .82; and Implementing = .79. Only the direct reports completed the MPC, which yielded a Cronbach's Alpha of .92.

Table 2. Descriptive Statistics for FourSight

	Mean	SD	Alpha
Clarifying	32.81	4.57	.74
Ideating	31.31	5.76	.81
Developing	30.63	5.80	.82
Implementing	33.83	4.82	.79

PLS-SEM analysis

The researchers examined the proposed framework with a two-step process that included assessment of the measurement (i.e., the latent variables - LVs) and structural models (i.e., the relationship between LVs). Researchers employed confirmatory factor analysis (CTA) using PLS-SEM technique to identify the reflective (i.e., also known as effect; Bollen & Ting, 2000) or the formative (i.e., also known as casual or composite; Bollen & Ting, 2000; Sarstedt et al, 2016) nature of the MPC. The results showed that Spirit of Exploration, Trust, and occupation were determined to be composite variables (see Table 3). Referring to the MPC items found in Table 1, items 1, 2, 6 and 11 were found to define the Spirit of Exploration dimension of creative collaboration. The core theme among these items appeared to be the active generation and implementation of novel ideas, that is within the creative process a deliberate focus on divergent thinking. The items numbered 3, 4, and 10 formed what the researchers referred to as the Trust variable. These items appeared to be more focused on how team members developed effective interpersonal bonds as a core component of their creative collaboration. More specifically, these items were rooted in the exchange and cooperation that is necessary for effective group problem solving, such as negotiating differences, sharing power, and integrating others' suggestions.

Evaluation of the outer measurement model

Data analysis began with an examination of the impact of leaders' FourSight preference on their direct reports' observations of the Spirit of Exploration and Trust in their teams. With this in mind, the measurement model included four single-item exogeneous variables (the leaders' preference for Clarifying, Ideating, Developing, and Implementing), one formative exogeneous variable (occupation), and two formative endogenous variables (Spirit of Exploration, Trust). Figure 1 illustrates the measurement model. The researchers tested the collinearity among the three formative variables (Spirit of Exploration, Trust, and occupation). Inner variance inflation factors (VIF) between two endogenous and all independent variables were below 3.3, except the occupation construct, which was slightly higher than the threshold (Profit Business = 4.624, Not-for-Profit = 4.191, Educational = 4.889). Table 3 included the outputs related to the measurement model.

Table 3. Measure Model Outputs

Constructs/Items	Type	Weights	VIF
Sprint of Exploration	Composite		
Generate multiple ideas.		0.342	2.739
Come up with new solutions for our challenge.		0.258	2.226
Consider alternative ideas.		0.223	1.905
Put at least one of our ideas into practice.		0.378	1.581
Trust	Composite		
Share the power with one another.		0.520	2.315
Negotiate differences of opinions.		0.342	2.315
Build on one another's suggestions		0.268	1.808
Occupation	Composite		
Profit business		0.660	4.624
Not for profit		0.198	4.191
Educational		-0.408	4.889

Evaluation of the Inner Structural Model

Results of the structural model assessment, see Figure 1, showed that the model accounted for 6% of the variance in Spirit of Exploration (R^2 = .06) and accounted for 7% in Trust (R^2 = .07) (Hair et al, 2017). Table 4 summarizes the results of structural model assessment using SmartPLS. Related to the endogenous variable Spirit of Exploration, the Ideating FourSight preference for leaders had a direct positive relationship (β = .178, p = .046). No other exogenous variable significantly influenced this endogenous variable. Related to the endogenous variable Trust, results showed that leaders with a Clarifying *FourSight* preference had a positive direct relationship (β = .266, p = .018), while leaders with a Developing thinking preference had a negative effect (β = -.250, p = .019). No other exogenous variable significantly influenced this endogenous variable. Stone-Gteisser's Q2 value for Spirit of Exploration was 0.026 and for Trust it was 0.015, indicating that the model met the criteria (> 0) for predictive relevance (Geisser,1974).

Figure 1: Structural Model

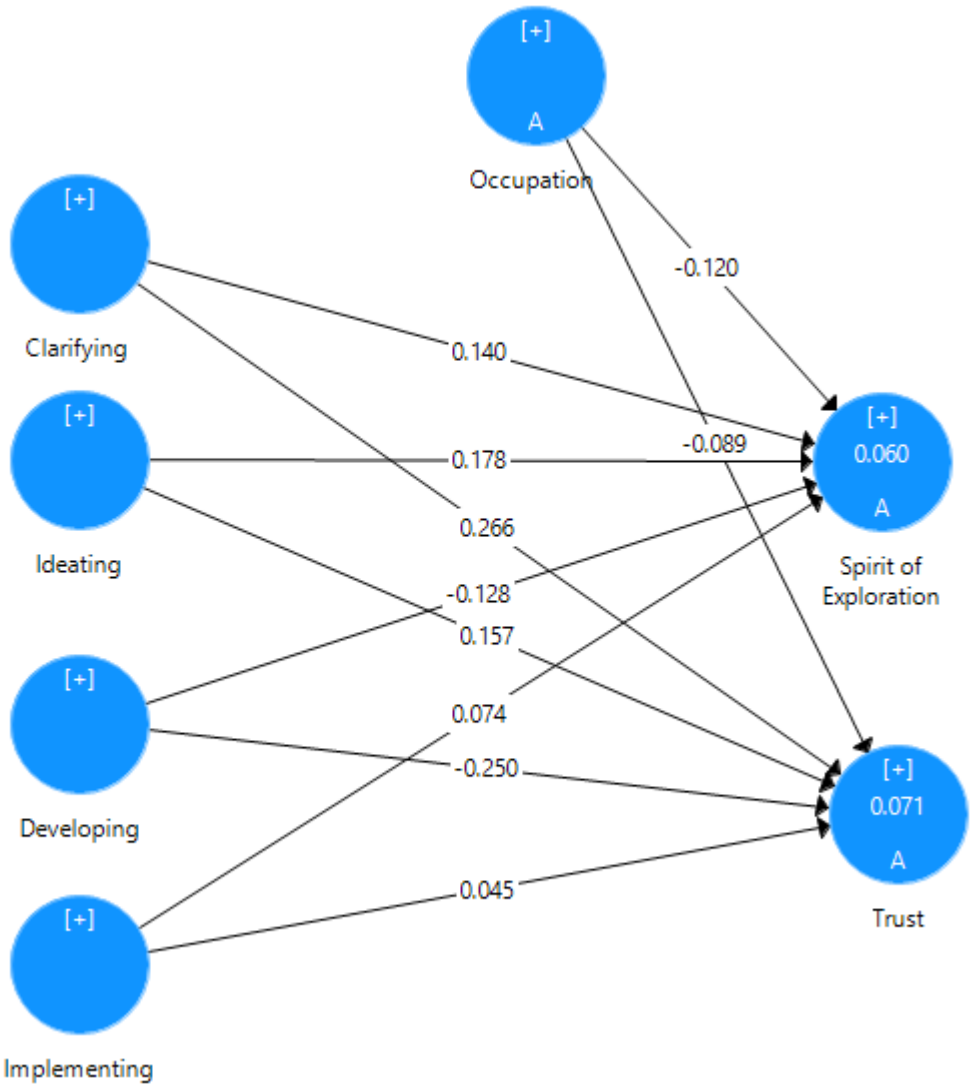


Table 4: Structural Model Outputs

Relationship	Path coefficient	T-value	95% Bias Corrected CI	p-value	Supported
Clarifying -> Spirit of Exploration	0.14	1.306	[-0.076,0.346]	0.192	No
Clarifying -> Trust	0.266	2.409	[0.056,0.459]	0.016	Yes
Ideating -> Spirit of Exploration	0.178	2.067	[-0.031,0.333]	0.046	Yes
Ideating -> Trust	0.157	1.627	[-0.041,0.333]	0.104	No
Developing -> Spirit of Exploration	-0.128	1.216	[-0.41, 0.35]	0.224	No
Developing -> Trust	-0.25	2.296	[-0.307,0.084]	0.022	Yes
Implementing -> Spirit of Exploration	0.074	0.77	[-0.115,0.249]	0.442	No
Implementing -> Trust	0.045	0.507	[-0.116,0.213]	0.613	No
Occupation -> Spirit of Exploration	-0.12	1.668	[-0.2590.06]	0.096	No
Occupation -> Trust	-0.089	1.278	[-0.206,0.099]	0.202	No

Assessment of Measurement Model and Invariance Measurement Across Two Groups (match & mismatch)

Multigroup analyses (MGA) or between-group analyses allows researchers to compare the existence of significant differences across group-specific parameter estimates such as loadings, intercepts, and error terms in the groups' measurement model. A multigroup model is applied across the entire structural equation model. In other words, it asks if not just one, but all coefficients are the same or different across groups (Hair et al, 2017). Through MGA the researchers compared two types of leader-follower pairs relative to their FourSight scale scores. One group, referred to as the match group, included those leader-follower pairs in which the leader and direct report shared at least one high preference within the creative problem-solving process (i.e., Clarifying, Ideating, Developing, and Implementing). Included in the match group were leader-follower pairs in which the leader and the followers showed no high preference, referred to as the Integrator profile. The second group, referred to as the mismatch group, included all leader-follower pairs for which the leader and the direct report shared no creative problem-solving

preference. High preferences, also referred to as peak preferences, were calculated by finding the mean score for an individual's highest and lowest scales and then adding 2.5 to that mean score (approximately one-half standard deviation). Any score above the mean +2.5 in that individual's profile is considered a high preference. This approach was adopted as it is the convention used by the FourSight (2014) company to assist individuals in identifying their peak preferences within their FourSight profile and the researchers wished to mirror this applied practice for purposes of identifying matched (n = 84) and mismatched (n = 90) leader-follower pairs.

The measurement model used in this study included four single-item exogeneous variables (Clarifying, Ideating, Develping, and Implementing) and two formative endogenous variables (Spirit of Exploration, Trust). In assessing a model's collinearity, inner variance inflation factors (VIF) should be calculated and compared to threshold. To perform MGA to compare the path coefficients between matched and mismatched leader-follower groups, the adequacy of the measurement models and measurement invariance needed to be established (Hair et al, 2017; Henseler et al, 2016; Sarstedt et al, 2011). Researchers assessed the measurement invariance using the measurement invariance of composites (MICOM) method. The MICOM procedure involves three steps: (a) the configural invariance assessment, (b) the establishment of compositional invariance assessmen,t and (c) an assessment of equal means and variances. This study established partial measurement invariance of the two groups to follow the MICOM procedures, which is a condition for comparing and interpreting the MGA group-specific differences of PLS-SEM results (Henseler et al, 2016). The formative exogeneous variable, occupation, was excluded from the MGA because there was a significant difference in the measurement model's equality of mean values and variances across groups, then that occupation removed from the analysis. The rest of constructs all pass this portion of the test for invariance.

Assessment of the Structural Model and Multi Group Analysis

Once MICOM was established, researchers continued by examining group comparisons using MGA. Table 5 shows the results of the structural model assessment (Hair et al, 2012), Henseler's bootstrap-based the permutation test (Chin & Dibbern, 2010) used to assess the differences between the path coefficients of two groups (Sarstedt et al, 2011). Henseler's MGA directly evaluates group-specific bootstrap estimates from each bootstrap sample. According to this method, significance for the analyses was accepted at an alpha level of $p \leq 0.05$ between specific path coefficients across two groups (Sarstedt et al, 2011; Henseler et al, 2009). The permutation test also returns a p value. Here, differences are only at the 5% level significant, if the p value is smaller than 0.05. Table 5 shows the results of a multi-method MGA using Henseler's MGA and the permutation method, revealed significant differences between match and mismatch leader-follower pairs with respect to the effect of Ideating on Spirit of Exploration and Trust. That is there

was a significant and marked difference between the leaders' Ideating scale score when the dependent variables, Spirit of Exploration and Trust, were compared between the matched and mismatched leader-follower groups. Specifically, the leaders' Ideating preference had a positive and significant effect on Spirit of Exploration and Trust for the matched leader-follower pairs, while Ideating had no appreciative effect on Spirit of Exploration and Trust in mismatch leader-follower pairs.

Table 5: Multigroup Analysis

Comparison of Leader-Follower Match/Mismatch on *FourSight* Preferences							
	Path Coefficient		Confidence interval (95%) bias corrected		p-value difference (two-tailed)		
Relationships	Match	Mismatch	Match	Mismatch	Henseler's MGA	Permutation test	Supported
Clarifying -> Spirit of Exploration	0.084	0.069	[-0.153, 0.317]	[-0.422, 0.3	0.379	0.776	No
Clarifying -> Trust	0.151	0.343	[-0.094, 0.447]	[0.108, 0.49	0.165	0.338	No
Ideating -> Spirit of Exploration	0.334*	-0.141	[0.137, 0.462]	[-0.422, 0.1	0.026	0.029	Yes
Ideating -> Trust	0.356*	-0.093	[0.151, 0.494]	[-0.293, 0.1	0.012	0.025	Yes
Developing -> Spirit of Exploration	-0.002	-0.035	[-0.309, 0.212]	[-0.311, 0.3	0.297	0.616	No
Developing -> Trust	-0.163	-0.182	[-0.452, 0.057]	[-0.433, 0.0	0.380	0.785	No
Implementing -> Spirit of Exploration	-0.061	0.189	[-0.236, 0.159]	[-0.156, 0.3	0.192	0.367	No
Implementing -> Trust	-0.103	0.086	[-0.269, 0.099]	[-0.096, 0.2	0.125	0.289	No

When compared to the overall analysis of the relationship between leaders' FourSight preferences and creative collaboration in teams, this comparison of matched and mismatched leader-follower pairs provides a more nuanced understanding of the more general trends reported earlier for Spirit

of Exploration and Trust. Recall the broader analysis showed a positive relationship between leaders' Clarifying preference and Trust, while the Ideating scale for leaders showed a positive relationship with Spirit of Exploration. An examination of the path coefficients shown in Table 5 highlight the varying slopes found between leaders' FourSight preferences and the dependent variables, thus highlighting a more complex relationship between creative-thinking preferences and creative collaboration in teams with leaders who have a peak preference for Ideating. While the earlier analysis showed that leaders' Ideating scores increased team members' perceptions of Spirit of Exploration, the comparison between matched and mismatched pairs showed that this creative problem-solving preference led to much more positive views of Spirit of Exploration for those leader-follower pairs that shared at least one high FourSight preference. And where the leaders' Clarifying score in general promoted more positive perceptions of Trust, reflected in the positive path coefficients for Clarifying for both matched and mismatched groups in Table 5, the group comparison for the Ideating scale revealed that a leaders' penchant to play with possibilities can positively effect perceptions of Trust when the leader shares at least one FourSight preference with that team member. Figure 2 illustrates the total variance explained with respect to two creative collaboration dimensions for the matched leader-follower pairs and Figure 3 shows the same variables for the mismatched leader-follower pairs.

Figure 2: Structural Model for Matched Leader-Follower Pairs

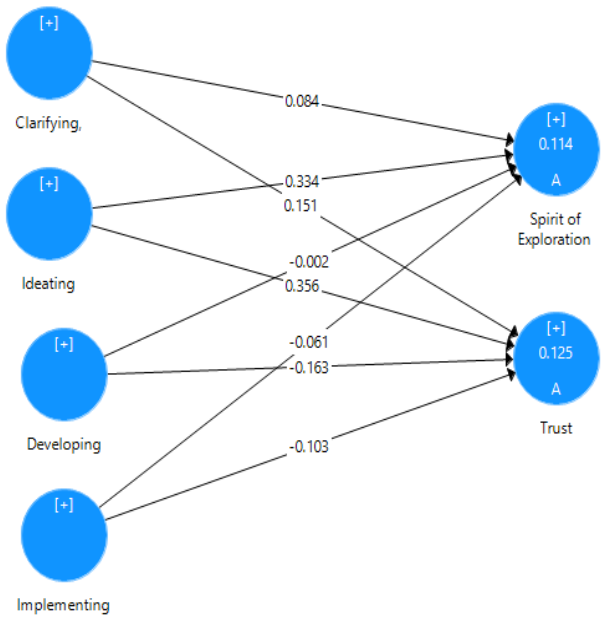
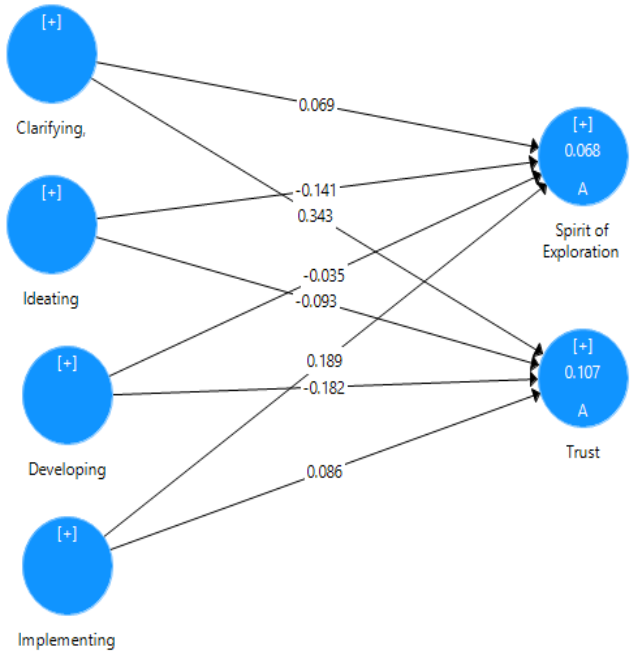


Figure 3: Structure Model for Mismatched Leader-Follower Pairs



Discussion and Conclusions

The purpose of the present study was to bring together two streams of research within the field of creativity studies. The first relates to the well-established interest in examining the diverse ways in which people engage in creative thinking and display creative behavior, specifically known as creativity styles (Kirton, 1976). The second stream of research relates to the psychological climate that supports creative collaboration in the workplace, with a specific emphasis on how leaders influence work climates that promote team members creativity (Ekvall, 1996). The confluence of these two lines of research shaped the main question under investigation in the present study. Namely, how do leaders' creativity styles, as measured by FourSight, influence the climate for collaboration in work teams? While the creative-thinking preferences identified by FourSight have been examined in a wide range of studies, and the impact of leadership on the climate for creativity and innovation has been highlighted in numerous investigations, heretofore no study has analyzed the degree to which leaders' creative-thinking preferences have a perceptible influence on shaping the climate for creative collaboration in intact work teams. With respect to team members' perceptions of creative collaboration, two dimensions were examined. They were Trust, which in this study related to the degree to which team members were open to differences and built on each other's thinking, and Spirit of Exploration, which was concerned with the degree which team members reported open pursuing novel ideas.

The level of Trust team members reported experiencing, was positively related to the Clarifying preference of the leader. To be clear, when the leader's preference for Clarifying was high, there was a corresponding increase in the amount of Trust reported by that leader's direct reports. Conversely, low leader preference for the Clarifying thinking style was associated with lower amounts of Trust. Why might this be? The high Clarifying preference is associated with a clear understanding of the current reality, a sense for the details, and a firm grasp of a problematic or challenging situation. It may be that leaders who embody this form of thinking convey a sense of stability and security to their direct reports, thus promoting a psychological climate of Trust. While leaders less inclined towards these Clarifying-thinking tendencies may unknowingly convey to direct reports a sense of uncertainty that might serve to undermine Trust.

Interestingly, where the Clarifying scale in FourSight showed a positive relationship with Trust, the Developing scale produced a negative relationship with the same creative-collaboration dimension. That is, our analysis showed that as the leader's preference for Developing increased, there was a corresponding decrease in Trust. This raises an obvious question, what might be a theoretical explanation for this inverse relationship between the leader's creative-thinking preference and the extent to which direct reports experience Trust? The Clarifying and Developing preference are both analytical in nature. As such, past investigations have found that these thinking preferences often produce similar relationships with other variables; however, that was not the case in the present study. Where Clarifying reflects the application of analytical thinking to understand the present situation, the Developing preference uses analytical thinking to examine and refine work outcomes and prospective solutions. It is this distinction that might account for the fact that high-Clarifying promotes Trust, while high-Developing undermines a sense of Trust. To be sure, there are many benefits to a high preference for Developing; however, each of the four creative-thinking preferences assessed by FourSight have their attendant downsides and potential shortcomings. For instance, a rigid tendency towards Developing has been associated with premature critical evaluation and a tendency towards perfectionism. If such behavior were to be found among leaders with a proclivity for high Developing, it may be possible that their direct reports might experience some reluctance with respect to openly sharing power, negotiating differences, and blending their ideas.

Divergent thinking, or the ability to freely generate a wide range of original options, has long been identified as a key cognitive foundation to creativity. With respect to creative collaboration in teams, the present study examined the degree to which divergent thinking was present in small work teams through the Spirit of Exploration dimension found in the MPC. Here the relationship found between levels of Spirit of Exploration in teams and leaders' creative thinking preference seems decidedly aligned with FourSight theory. The Ideating mindset is associated with an

ongoing search for possibilities, thinking laterally, attraction to novelty, and visionary thinking. Our findings showed, not surprisingly, that as leaders' preferences increase for Ideating, there is an increasing probability that their direct reports observed higher levels of Spirit of Exploration in their teams. It would seem a leader's tendency to engage in divergent thinking has a strong influence on the degree to which generative thinking is infused in the creative collaboration within the team. As Kouzes and Posner's (2006) observed about the practices of transformational leaders, their behavior often serves as a model for others.

Further analysis revealed a more nuanced relationship between the Ideating preference of leaders and the nature of creative collaboration in their respective teams. To assess the interplay more closely between leaders and their direct reports, we analyzed the two dimensions of creative collaboration, Trust and Spirit of Exploration, as an outcome of the alignment, or lack thereof, between the leader and the follower's creative problems-solving preferences. In this analysis leader-follower pairs in which at least one peak FourSight preference was shared between the team leader and the team member (i.e., matched group) were compared to leader-follower pairs in which the team leader and the team member had no peak FourSight preference in common (i.e., mismatched group). This analysis revealed significant results for only one creative-thinking preference, that was Ideating, for both Trust and Spirit of Collaboration. Here, there was a strong positive slope between the Ideating scale and the two dimensions of creative collaboration. That is, team members who shared at least one peak creative-thinking preference in common with their team leader, reported increased amounts of Trust and Spirit of Exploration as leaders' Ideating score increased. The nuanced nature of these findings might be viewed, and interpreted, as an interaction effect.

Why might Ideating preference for leaders yield different relationships when comparing matched and mismatched leader-follower pairs, that is a clear positive effect in matched pairs and no clear pattern of relationship for those in the mismatched leader-follower group? Such differences might be explained by the perceptions people hold with respect to the more open-ended, original, and divergent thinking associated with the Ideating preference. Mueller, Goncalo, and Kamdar's (2011) experimental study showed that when individuals pitched novel ideas as potential solutions to a problem, others rated the idea "pitchers'" leadership potential in a negative manner. In short, creative idea generation was associated with diminished leadership potential in the eyes of the observers. However, in the same investigation these researchers found that the negative relationship between novel thinking and leadership potential could be reversed when observers were primed to think about leadership via a "charismatic" leadership paradigm. Under this condition, observers rated the leadership potential of candidates who communicated novel ideas as being significantly higher than those candidates who presented ideas that were less novel and more useful.

Mueller and her colleagues' findings may explain why increasing Ideating preferences had a positive effect only for those leader-follower pairs in the matched group. A shared creative-thinking preference, as was the case for the matched leader-follower group, might enhance the relationship between leaders and followers. Like the priming effect found by Mueller et al, this bond may have facilitated a more positive view of leaders who possess a penchant for high Ideating; therefore, resulting in greater perceptions of Trust and Spirit of Collaboration on the part of the members of their teams. If this is true, given the increased demand for the kind of thinking associated with the ideational mindset among senior leaders in organizations (Puccio & Acar, 2015), it would behoove leaders with an Ideating mindset, or who frequently engage in Ideating behavior, to form relationships with their direct reports in a way that develops an appreciation for more divergent and novel thinking.

Given the groundbreaking nature of the present study, that is the first study to examine how leaders' creativity styles impact their teams, the findings and concomitant interpretations should be taken with some caution. Future work should attempt to replicate and extend these findings. As such, future studies might wish to address some of the limitations associated with the present study, in particular increasing the sample size and testing the validity of the MPC. With respect to the latter, the MPC was purposefully designed for use in the present study, to increase confidence in the veracity of this measure future research is needed to test the degree to which the MPC meaningfully reflects the collaborative behaviors in teams that it purports to assess. Finally, analysis of the structural model demonstrated the FourSight preferences of leaders made a small, yet significant, overall contribution to Trust and Spirit of Exploration in teams. While the variance explained was statistically significant, much remains to be discovered in terms of how leaders impact creative collaboration in teams. Given the array of valuable contributions creativity makes to success in the workplace (Puccio & Schwartz, in press; Puccio & Cabra, 2010), it is imperative for further work to distill how leaders can actively improve creative collaboration in their teams.

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