INNOVATION RESEARCH CENTRE

INTELLIGENCE, PERSONALITY, CREATIVITY AND BEHAVIOUR: THE ANTECEDENTS OF SUPERIOR TEAM PERFORMANCE

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Abstract

A recent Conference Board of Canada study concluded that the competitive edge today often comes from people-related factors (Gibb-Clark, 1995). Many organizations have tried to achieve a competitive edge by selecting creative people, putting people in teams to facilitate problem solving and offering creativity training. But what are the traits and behaviours that these organizations try to select for, facilitate and develop? Do teams that perform a variety of different tasks, perform better when they have creative people?

We studied autonomous work team members that had been working together for 13 weeks. We found that extroverted and intelligent individuals are evaluated by fellow team members as being more creative than introverted and less intelligent individuals. We did not find support for the use of openness to experience, agreeableness, conscientiousness or neutroticism as predictors of creativity in autonomous work teams. Creative team members were found to exhibit specific types of behaviours. The greater the team's creativity, as determined by averaging each team member's peer-assessed creativity score, the better the team performs. Implications of these findings for the staffing and development of effective teams are discussed.

Numerous personality measures are said to predict creative outcomes; however, there is poor validity (Mansfield and Busse, 1981) and no consensus as to what personality traits a practitioner should use. The five factor model (FFM) descriptive framework of five personality traits should allow a clearer understanding of which traits, if any, predict creativity.

Intelligence is an individual trait that can be used to predict an individual's creativity (Barron and Harrington, 1981; Gardner, 1993; Steiner, 1965). However, intelligence and creativity are related in some contexts more so than in others (Glynn and Webster, 1993). The team context differs from traditional work contexts in there is greater interpersonal interaction. Whether intelligence is predictive of creativity within intact autonomous work teams will be studied here.

Research has neglected the behavioural antecedents of creative outcomes. While we can easily recognize innovation as the outcomes of creative behaviour we are at a loss when asked to describe the ***specific behaviours*** that a person can adopt in order to be more creative.

There has been little research linking the creativity of team members and the team's performance. In particular, we found no study on the relationship between aggregated team creativity and performance of intact autonomous work teams. This study is concerned with ***autonomous work teams*** as the context within which traits are manifested in individual creativity. The use of such teams are increasingly popular in organizations (Manz and Simms, 1993; Cohen, 1993).

Autonomous work teams are characterized by the team taking responsibility for completion of a whole task, taking responsibility for team maintenance functions (e.g., conflict resolution, leadership, decision making, etc.) and having discretion over work allocation within the team

(Cannon-Bowers, Oser and Flanagan, 1992; Goodman, Devadas and Hughson, 1988).

Creativity. Essential to innovation is creativity (Wolfe, 1994). The definition of creativity presents practical difficulties (Ackoff and Vergara, 1981). Evans (1991) describes creativity as the ability to discover new relationships, to look at subjects from new perspectives, and to form new combinations from old concepts. Torrance (1981) and Treffinger (1987) have examined creativity across a broad range of individuals. Their approaches have implicitly confirmed that creativity may be unequally distributed, but nevertheless, is universally distributed. Perkins (1981) supported this universalist perspective and argued that the processes which produced great scientific or artistic achievements were in essence the same processes that lead to every day creativity. However, Simonton (1989) focused his comprehensive series of research studies on individuals of genius, emphasizing the uniqueness of the elitist few.

These differing perspectives have been labelled universalist and elitist ones. Brown and Rickards (1982) observed that human resource specialists tend to espouse a universalist view, whereas many line managers take more of an elitist view. Whereas the elitist manager asks "how can I find the most creative people?" the universalist trainer or facilitator asks "how can I create a climate which liberates more creativity from all of my people?" Rickards (1992) concludes that the research issue is not so much proving one view superior to the other, but rather that of reconciling universalist and elitist views productively. One way to shed light on both perspectives is to look at the behavioural manifestations of creativity.

Personality and Creativity

Personality is often defined as the predisposition to certain behaviours (Hogan, 1991; Hoekstra, 1993). An active area of research for some time has been the study of personality traits

associated with creativity (Helson, and Mitchell, 1978). Research has found a number of individual differences in patterns of personality traits that have strong correlations with creative outcomes (Mackinnon, 1962a, 1962b; Stein, 1968; Simonton, 1986; Meadows, 1986; Bruch, 1988). Barron and Harrington (1981), after reviewing fifteen years of research on personality characteristics of creative individuals, concluded:

> "In general, a fairly stable set of core characteristics (e.g., high valuation of aesthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgement, autonomy, intuition, self-confidence, ability to resolve anomalies or to accommodate apparently opposite or conflicting traits in one's self-concept, and, finally, a firm sense of self as 'creative') continued to emerge as correlates of creative achievement and activity in many domains." (p. 453).

Important personality traits of creative individuals may include locus of control (e.g., Bolen, and Torrance, 1978; Sawyers, and Moran, 1984; Richang, and Stimpson, 1990); dogmatism (Williams, Harlow, and Borgen, 1971), self-esteem (Dellas, 1978; Stasinos, 1984; Richang, and Stimpson, 1990), achievement orientation (e.g., Richang, and Stimpson, 1990), and narcissism (Solomon, 1985). In the 1950s, a creativity index was developed for the 16PF -- a well-known personality instrument used for personnel selection, career guidance, other counselling applications and basic research. The creative person was found to be aloof or reserved, dominant, serious, expedient or inattentive to rules, socially bold, sensitive, imaginative, liberal or open to experience, and self-sufficient as well as being intelligent (Cattell, and Drevdahl, 1955; Cattell., Eber, and Tatsuoka, 1970; Drevdahl, and Cattell, 1958; Holland, Johnston, Hughey, and Asama, 1991)[1]. Other personality traits that have been found to be associated with

1. There are also studies that have investigated the relationship of personality variables and creativity in young children. Personality variables include: playfulness (Torrance, 1963; Lieberman, 1965, 1966, 1967, 1977; Durrett, and Huffman, 1968; Truhon, 1983); initiative, independence, free play of imagination, and joy of absorption

creativity include low sociability, aggressiveness, dominance and introversion (Rushton, Murray, and Paunonen, 1987).

The FFM

Recent research has suggested that all personality traits can be reduced to the five general factors of personality referred to as the FFM. Generally, personality psychologists now agree that the FFM can serve as a meaningful descriptive framework for describing personality traits (Costa, 1996; Digman, 1990). The FFM has allowed a better understanding of the relationship between personality and job performance -- it should do the same for our understanding of the personality correlates to creativity.

The FFM factors are bipolar. *Conscientiousness* ranges from careful, responsible, self-disciplined, and organized to irresponsible, disorganized, and lacking in self-control. *Extroversion-introversion* ranges from outgoing, sociable, active, and talkative to cautious, reserved, and retiring. *Agreeableness* ranges from co-operative, good-natured, and hopeful to uncooperative, ruthless, and inflexible. *Openness to experience* ranges from sensitive, imaginative, and polished to insensitive, narrow minded, and crude. Finally, *neutroticism* (*emotional stability)* ranges from excitable, angry, insecure, and depressed to calm, poised, secure, and enthusiastic (McCrae, 1989).

Research conducted outside of the team context shows that these FFM traits are related to job performance. Barrick and Mount (1991) found that conscientiousness was a valid predictor of job performance in all occupations. Extroversion is a valid predictor for occupations requiring

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(Vince-Bakonyl, 1969); nonconformity (Starkweather, and Azbill, 1964; Moustakas, 1967); self-reliance, concern for detail, variety, satisfaction, and ingenuity in explanations (Logan, and Logan, 1967, 1971).

frequent interactions with others. Openness to experience was found to be a valid predictor of training proficiency. In addition, personality traits may be useful in predicting who will "go that extra mile" for the organization (Smith, Organ, and Near, 1993, Borman and Motowildo, 1993; Ilgen, 1994).

Few studies have empirically examined the role of personality in task-oriented groups (Barry and Stewart, 1997) and fewer still have used the FFM. Extroversion, agreeableness, and conscientiousness have been related to effective performance in teams (Mount and Barrick, 1995). Thoms, Moore, and Scott (1996) found that extroversion, conscientiousness and emotional stability were positively correlated with individual attitudes toward the self-efficacy for participation in autonomous work teams. However, Barry and Stewart (1997), found that only *extroversion* and not conscientiousness was associated with group outcomes on creative problem-solving tasks.

Intelligence.

Over the past 15 years or so, a great deal of research has investigated the ability of intelligence (cognitive ability) measures to predict job performance in various occupations (e.g., Hunter and Hunter, 1984; Perlman, 1980; Schmidt, Hunter and Perlman, 1981). Evidence suggests that intelligent people are better at information processing and problem solving (Schmidt, Hunter and Perlman, 1981), prioritizing between conflicting roles and adapting to new situations through learning quickly and better applying old leanings to new situations (Hunter, 1986). Steiner (1965), found that intelligent people perform better on measures of originality, preference for complexity and conceptual fluency and flexibility.

Higher levels of intelligence do not guarantee creativity (cf. Feldman, 1982). According to

Mumford and Gustafson 1988), creative behaviour "is likely to be determined by a complex interaction between the attributes of the individual and the attributes of the environment" (p. 28). The question of concern to organizations that are implementing autonomous work teams is whether intelligence can be useful in predicting creativity of team members given the complex social interactions that occur in teams?

The Context

The environment in which individuals participate influences their creative behaviour (Mellou, 1996; Torrence, 1965; Stein, 1967; Torrance, 1970, Thomas, and Berk, 1981; Walberg, 1988; Jellen, and Urban, 1989; Soriano de Alencar, 1989). Since teams represent an increasingly common environment designed to foster creativity (Mohrman, Cohen, and Mohrman, 1995), they provide the appropriate context in which to conduct this research. Teams improve the creative capacity of the organization by bringing people together from a variety of backgrounds and experiences (Mohrman, Cohen, and Mohrman, 1995).

Situational strength. One fairly well established environmental influence on the validity of personality traits is situational strength (Mischel, 1977; Monson, Helsely and Chernick, 1982). Situations are strong to the extent that they lead individuals to interpret particular events in the same way, create uniform expectancies regarding the most appropriate behaviour, provide adequate incentives for the performance of that behaviour and require skills that every one possesses roughly to the same extent. Herriot (1981) has discussed the selection interview in this fashion noting that roles of both the interviewer and the interviewee are frequently well known and people often behave very similarly in these situations. In strong situations individual differences have low potential to vary action. Empirical evidence confirms that degree of

autonomy of action, a proxy for strength of the situation, determines the extent to which personality influences behaviour (Barrick and Mount, 1993). A weak situation is one with opposite characteristics; it is not uniformly interpreted, does not generate uniform expectations, does not offer sufficient incentives for one type of behaviour and is one in which a variety of skills may produce acceptable behaviour. Team situations could be classified as weak because they provide the worker with freedom, discretion and self-determination in planning and carrying out tasks. In the team context, therefore, traits would be expected to be an important explanation of behaviour. Accordingly, if team members are uncertain about appropriate behaviour, they are expected to act in accordance with their personality attributes in addition to team norms. The fewer restrictions that the team places on behaviour the stronger the personality-behaviour association.

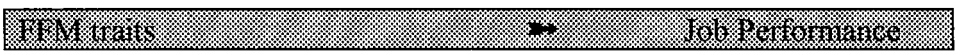
Because this study is interested in relationships between traits and creativity and between creativity and behaviour, the effect of situational strength will be statistically controlled for.

Contribution of this research. Although creativity tests are abundant (see Hocevar, and Bachelor, 1989 and Callahan, 1991 for recent overviews), the correlation between scores on creativity tests and actual creativity on the job has often been found to be low (Mansfield, and Busse, 1981). Consequently, most major theoretical approaches have relied on real-life measures of performance (i.e., products) to identify persons as creative (Stumpf, 1995). Similarly, the criterion-related validity coefficients emerging from the application of FFM measures are modest at best (Schneider, 1996). Researchers have generally focused on outcomes of behaviour as correlates of predictors (i.e., personality and creativity assessments) and have gained relatively little insight into the behaviour that intervenes between personality and the outcomes (Campbell,

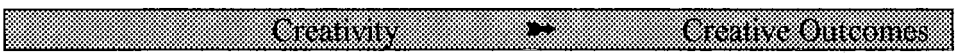
1990). Schneider (1996) notes that it seems "obvious that the reason for the consistently modest relationship between personality tests and performance outcome is because the focus has been on performance and not behaviour" (p. 292).

With a personality-creativity-behaviour-outcome mapping, practitioners will be better able to design interventions to support those behaviours directly related to desired outcomes (e.g., new products). Such interventions might be in the form of training, selection, job enrichment /enlargement, reward systems, goal setting, supervision, and so forth.

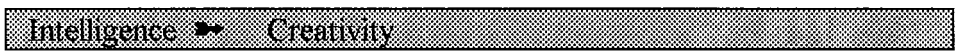
In summary, the following relationships are well established at the individual level of analysis outside of the team context:



Barrick and Mount, 1991; Tett et. al., 1991



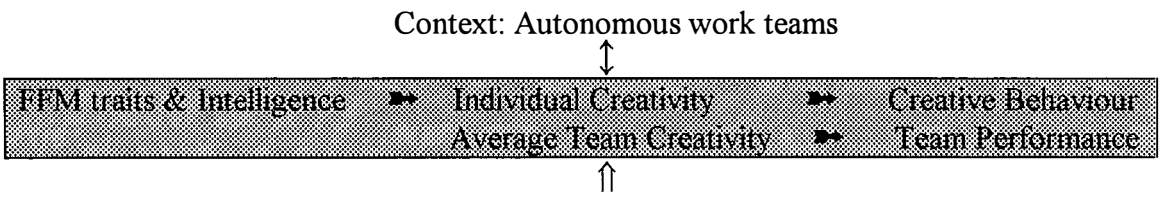
Wagner, 1996



Barron and Harrington, 1981; Gardner, 1993; Steiner, 1965; Wagner, 1996

Based upon the literature one may deduce :

In this study we shall seek to explore the following relationships:



Methodological Issues With Previous Studies

Research on trait based individual differences of group members has generally focused on the achievement of a specific task (e.g., idea generation) in a contrived experimental settings (generally laboratory settings) with data collection at the group level. In work settings teams commonly complete a variety of tasks, over extended time periods.

Although contrived settings allowed control over extraneous variables that could confound results, they have also restricted the "group experience" to a relatively short time period. That is, the experiment usually lasts but a few hours; in that time, groups are formed, tasks completed and outcome data collected. Since teams appear to go through different stages of development (Tuckman, 1965) the study of groups that have been together for a short period of time may have limited applicability to work teams that are intended to be on-going. At most they contribute to our understanding of early group interaction.

Further, Steven and Campion (1994) note that the "team as the level of analysis has been the predominate focus of most previous literature" (p. 504). However, most HR management systems are applied, at least in part, to the individual employee (Steven and Campion, 1994). Thus, this study ***complements*** previous literature by focusing on individuals in teams and by relating individual team member creativity attributes to overall team performance.

Method

Participants

It has been shown that measures of creativity are associated with success in a variety of domains. Creative productivity in one domain, say scholarship, is associated with productivity in other domains, say in the workplace (Guastello, and Shisslea, 1994). With this in mind, the

subjects were 480 second year undergraduate business students enrolled in a mid-sized Ontario university's Organizational Behaviour course. Of the students 48.3% were female and the average student age was 20.4 years old. Each student was randomly assigned to one of nine tutorial groups where they self-selected membership into a team of five to six individuals. This occurred during week one of a thirteen week course, so that students could participate in team assignments requiring critical thinking and problem solving. Each team met at least once a week for 50 minutes. Of a student's overall course grade, 20% was determined by the team's output. Completion of group assignments, peer evaluation and self-analysis measures was mandatory. However, students were free to indicate whether they wished to have their scores included in the study. Assurance of individual anonymity was given.

Measures

The NEO-PI-R. The revised NEO Personality Inventory (NEO-PI-R; Costa and McCrae, 1992) is a commercially available 240-item self-administered paper and pencil measure of normal personality. Item responses are coded on a five-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (5). The NEO-PI-R is the most frequently used and the best researched measure of the FFM traits (Costa and McCrae, 1992). This instrument was selected because, as noted in the test manual (Costa and McCrae, 1992) and in literature reviews (Hogan, 1989; Leong and Dollinger, 1990), the NEO-PI-R has sound psychometric properties, including impressive reliability and has been validated against most of the other commonly used personality inventories. Further, the NEO-PI-R is valid and reliable when administered to college students (Costa and McCrae, 1992). Internal consistency for the FFM traits ranges from .86 to .95 and for the eight item facets scales ranges from .56 to .81 (Costa, McCrae and Dye, 1991). The test-retest

reliability coefficients are estimated to be approximately .79, .79, .80, .75 and .83 for emotional stability, extroversion, openness to experience, agreeableness, and conscientiousness, respectively (Costa and McCrae, 1992). Correlations between factor scores and the emotional stability, extroversion, openness to experience, agreeableness, and conscientiousness domain scales have been found to be .91, .89, .95, .95 and .89 respectively (Costa, McCrae and Dye, 1991). Correlations between the NEO-PI-R, and two other operationalizations of the FFM, the Hogan Personality Inventory (Hogan, 1986) and the California Q-set (Block, 1961), support the construct validity of the NEO-PI-R (Goldberg, 1993; McCrae, Costa and Busch, 1986).

Critical incident cards. Critical incident analysis is a method often used in human resources management (Gatewood and Field, 1994). In this study it was used to gather specific examples of effective and ineffective behaviours on which attributes of team member performance were made. Each critical incident card asked team members to think about their team experience over the weeks that their team had worked together and to remember at least one example of effective (good) and at least one example of ineffective (poor) team behaviour that they ***personally*** observed. There was one card each for effective and ineffective team member behaviours. Each card asked team members to describe: (1) what circumstances lead up to the incident, (2) what exactly the team member did that was (in)effective, (3) what were the consequences of the team member's actions and (4) how they rate the incident in terms of overall effectiveness (on a five-point Likert scale ranging from "ineffective" (1) to "very effective" (5)).

Behavioural Observation Scale (BOS). The BOS was developed from the critical incident cards. It consisted of 49 statements related to observable effective or ineffective team member behaviours. Students rated, on a five-point Likert scale, the frequency with which each team

member was observed engaging in each of the behaviours.

Individual team member creativity. To determine individual team member creativity, the average of the peer assessments was utilized. Peer assessments are amongst the most accurate assessment methods (Wexley and Klimoski, 1984; Kane and Lawler, 1979; Schmidt, Gooding, Noe and Kirsch, 1984).

Overall creativity was measured by one item, which was added onto the BOS, asking how creative the team member was. Creativity was also measured by three creativity components relating to Evans (1991) definition of creativity. The components were: 1) discovers new relationships, 2) looks at subjects from new perspectives and 3) forms new combinations from old concepts. Each of these items were added onto the BOS. Responses as to the frequency with which each team member engaged in each of the events was made on a five-point Likert scale, ranging from almost never (1) to almost always (2).

Intelligence. General intelligence was measured by the commercially available Wonderlic Personnel Test; a timed, 12 minute paper and pencil test. Test-retest reliabilities reported in the test manual range from .82 to .94 and the manual also provides evidence of the validity of the measure (Wonderlic and associates, 1992). The Wonderlic correlates well (.60 to .70) with training program grades in industrial settings, .92 with the Wechsler Adult Intelligence Scale (Hawkins, Faraone, Pepple and Seidman, 1990) and .74 with the GATB (McCormick, Mecham, and Jeanneret, 1989).

Overall team performance. Each week the teams completed an exercise requiring critical thinking and/or problem solving. An independent evaluator scored all solution(s) submitted by the teams. The average score over the thirteen week period served as the measure of overall team

performance.

Situational strength. Situational strength was measured by two items included in the BOS. The first item asked respondents to evaluate the degree to which the team imposed structure and constraints on his/her *own* behaviour and the second item asked the respondent to evaluate the degree to which the team imposed structure and constraints on the behaviour of *other* team members. Responses were recorded on a five-point Likert scale ranging from "strongly agree" (1) to "strongly disagree" (5).

Procedure

BOS development. The generation of a BOS from the subjects' critical incident cards involved three steps.

1. Two people familiar with critical incident analysis were hired to work together to sort the critical incident cards into "meaningful clusters" (i.e., groups of incidents describing essentially the same behaviour). A randomly selected ten percent sample of the incidents were set aside in order to test the reliability of the clusters at a later point in time (step two). A descriptive behavioural item was written to "capture" each cluster of highly similar incidents. These "summary items" were then grouped, based on content similarity, to form the subscales of the BOS. For example, two incidents, which described a team member's development of a thorough action plan, formed one behavioural item described as "develops an action plan prior to starting the task." This item along with similar items formed an overall behavioural scale labeled, "goal setting/achievement." Thus, similar incidents were clustered together to form a behavioural item and behavioural items that were similar were clustered together to form a behavioural scale of the BOS. These behavioural scales were given descriptive dimension

labels.

2. After the grouping of critical incidents was completed, the first test of content validity was conducted. The incidents set aside in step one were examined to determine if any of them described behaviours not captured by the dimension desired. If some behaviours had not been captured then additional critical incidents were to be generated from the subjects and step one repeated. This was to be done to ensure that the BOS scales comprehensively sample the full domain of effective and ineffective individual behaviours within teams. We found all behaviours were captured, making it was not necessary to repeat step one.
3. Two new people who are familiar with critical incident analysis served as judges in establishing inter-judge agreement. They received the same critical incidents that the sorters had in step one. The incidents were in random order. The judges were asked to work together to reclassify the incidents according to the descriptive dimension labels established in step one. The ratio of inter-judge agreement was calculated by counting the number of incidents that both the sorters in step one and the judges in step three agreed should be placed in a given dimension. If the ratio of correctly classified incidents/total number of incidents, in a given dimension was 0.8 or greater, then the dimension was deemed to adequately represent the behaviours. If the hit rate was below 0.8, the dimension was examined for possible rewriting to increase specificity or the incidents were reclassified.

The BOS scale was developed so that the major dimensions and the most frequently occurring incidents under each dimension were represented. The "situational strength" items and "creativity" items were then added to the BOS. Next, BOS items were randomized. Each team member evaluated fellow team members, using the BOS, in week thirteen of the study.

Results

The data was analyzed in five steps. First, Pearson product-moment correlations between overall individual team member creativity, the three components of creativity (looks at subjects from new perspectives, discovers new relationships, forms new combinations), the FFM traits[2] and intelligence were examined. Second, the correlation analysis was repeated -- this time controlling for the effect of intelligence and situational strength through semi-partial correlation procedures. Third, confirmatory factor analysis (CFA) was conducted to test the adequacy of the BOS dimensions which were generated during the BOS development process. Forth, BOS behavioural dimensions predictive of team performance were explored through a correlation and stepwise regression analysis. Fifth, the average creativity for each team was correlated with team performance. Given the exploratory nature of this study all significance tests were two-tailed.

Trait-creativity correlations. In the correlation analysis presented in table 1 it was found that overall peer-assessed creativity is significantly correlated with each of the components of creativity (each significant at $P<0.01$).

Insert Table 1 here

Creativity components are significantly correlated with each other ($P<0.01$); the lowest Pearson product-moment coefficient being 0.40 (between "looks at subjects from new

2 The main criticism of the ***NEO-PI-R*** is its lack of orthogonality (Block, 1995; Costa and McCrae, 1995). To enhance discriminant validity while obtaining scores for each of the Big Five traits, factor scores were calculated using the scoring matrix provided in the NEO-PI-R manual (see Costa and McCrae, 1992, p 8). Factor scores are better than unit weight composites, from a psychometric point of view, because they combine information from each of the 30 facets to estimate each of the factors and because they benefit from the secondary factor loadings. In addition to factor scores being more nearly orthogonal, they tend to have somewhat higher validities against external criteria (McCrae and Costa, 1989).

perspectives" and "discovers new relationships").

Overall creativity is significantly correlated with extroversion ($P<0.05$) and intelligence ($P<0.01$). Each creativity component also significantly correlates with extroversion ($P<0.05$) and intelligence ($P<0.01$). Extroversion and intelligence were not significantly correlated ($r = -.03$)

Personality-creativity correlations controlling for intelligence and situational strength. The above analysis was repeated -- this time statistically controlling for the effect of situational strength and intelligence. The resultant correlation matrix is presented in table 2. Overall creativity remains significantly correlated with extroversion ($P<0.05$). The components of creativity also remain significantly correlated with extroversion (each at $P<0.05$). This indicates that extroversion has predictive validity over and above intelligence.

Insert Table 2 here

CFA. As part of the development of the BOS, critical incidents were gathered by independent judges into dimensions and given dimensional labels. The ***judges*** produced 15 dimensions in this manner: 1) goal setting/achievement (includes how goals are to be achieved), 2) focusing on the task-at-hand, 3) performance management (i.e., assign tasks to other team members, sets time deadlines, etc.), 4) team citizenship (involves "going beyond the call of duty" for the team), 5) participation in team problem solving, 6) synthesis of ideas, 7) commitment to the team, 8) preparation, 9) reaction to feedback, 10) providing feedback, 11) communication, 12) involvement of others, 13) reaction to conflict, 14) strategy to address conflict and 15) generating conflict. In total the BOS contained 46 behavioural items of which 16 were ineffective behaviours. Ineffective behaviours were reverse scored for all analyses.

To assess the fit of the 15 BOS factors to the 46 observed behaviours on the BOS CFA was used. Lisrel 8 produces several statistics that show the degree to which the input data fits the expected model. Although chi-square (χ^2) is sometimes used as a fit statistic, it is sensitive to sample size, departures from the multivariate normality assumption, and model complexity (Bentler and Bonnet, 1980; Oliver and Bearden, 1985). In recognition of these problems, the present study also employs: (a) a goodness-of-fit index developed by Jöreskog and Sörbom (1984), (b) a comparative fit index, a fit measure that prevents the underestimation of fit likely to occur in small samples (Bentler, 1990) and (c) Bentler's normed fit index (Bentler and Bonnet, 1980) which compares a theoretical model's chi-square value with that obtained from the null model that constrains all parameters except the error coefficient to zero.

Analysis of the measurement model yields a chi-square of 1646.208 with 902 degrees of freedom. The goodness-of-fit index is .97, which is well above the .90 generally accepted as representing an acceptable fit (Jöreskog and Sörbom, 1984). The comparative fit index[3] also has a value of .90 as the generally acceptable desired fit (Bentler, 1990) – the fit statistic for our model was .98. The normed fit index was .96 which is well above the suggested .90 cut-off for good fit suggested by Bentler and Bonnet (1980). There were no conditional codes[4] or other signs of model mispecification. Thus it is concluded that the theoretical model fit the data.

BOS dimensions predicted by creativity. The forth step in the analysis involved exploring the relationship between overall creativity and behavioural dimensions of the BOS. Table 3

3 Compares the improvement of the fit of the model to the baseline of the null model, where all the items are independent and no common factors are possible.

4 Condition codes indicate problems in the estimation process. This may be due to linear dependencies between parameters or problematic boundary parameters and may cause difficulty in the interpretation of results. See Bentler (1989) for a detailed description.

presents correlations between creativity and BOS dimensions. All dimensions but "reaction to feedback" and " reaction to conflict" were significantly correlated with creativity ($P<0.01$). Creativity is most strongly correlated with "participation in team problem solving" ($r = .67$) and "synthesis of ideas" ($r = .56$).

Insert Table 3 here

A ad-hoc correlation analysis was conducted to determine the items in the "participation in team problem solving" and "synthesis of ideas" BOS factors most strongly correlated with overall team member creativity. Table 4 shows the results of the correlation analysis. Creativity is significantly correlated ($P<0.01$) with all items of the two scales. The item with the weakest correlation with overall creativity is "accepts team roles and tasks as required" ($r = 0.40$). The item with the strongest correlation with personality is "builds on group's ideas by offering solutions" ($r = 0.51$).

Insert Table 4 here

Average team creativity and team performance. The fifth, and last analysis, involved relating average team creativity to team performance. The team's creativity was determined by averaging each team member's individual creativity evaluation. A Pearson correlation coefficient of .29 was obtained ($p<0.01$). Thus, the greater the team's creativity the better the team's performance.

Discussion

The results of this study support the use of intelligence as a predictor of overall creativity

and as a predictor of each dimension of creativity. The more intelligent a team member is, the higher the peer-assessed creativity of that person is. The greater the team's average creativity, based on the averaged peer-assessed creativity scores of each team member, the better the team's performance.

Mansfield and Busse (1981), suggested that personality was generally a poor predictor of a person's creativity. This study provides some support for their conclusions. Extroversion was the only FFM trait to predict creativity. The predictive validity was moderate (r =.10). Extroversion remains predictive even after controlling for the effects of intelligence. Therefore, the results suggest that there is value to using extroversion as a predictor of creativity, within autonomous work teams, along with intelligence.

Our findings are not without precedent. Barron and Harrington (1981), concluded that creative people have a high valuation of aesthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgement, autonomy and are self-confidence. Similarly, creative people have been characterised as dominant and socially bold (Cattell, and Drevdahl, 1955; Cattell., Eber, and Tatsuoka, 1970; Drevdahl, and Cattell, 1958; Holland, Johnston, Hughey, and Asama, 1991; Rushton, Murray, and Paunonen, 1987). All these are attributes of extroverts (Costa and McCrae, 1992).

Why would extroversion predict creativity? There may be two reasons for our finding. First, extroverted people are more "liked" by other team members and thus may receive a higher evaluation on the measures of the socially desirable "creativity" attribute. That is, likeability biases peer evaluations of creativity. However, likeability bias is not expected to be the primary explanation for the significant extroversion-creativity correlation because peer assessments have

been determined be an accurate measure of actual individual behaviour and performance (Wexley and Klimoski, 1984; Kane and Lawler, 1979; Schmidt, Gooding, Noe and Kirsch, 1984). More specifically, Love (1981) found that friendships do not significantly influence how highly a person is rated in peer-assessed performance appraisals.

We suspect that extroverted individuals are better able to communicate their ideas to other team members and they are therefore perceived as being more creative. However, this is probably not the complete explanation. Barry and Stewart (1997), found that extroverts do not only contribute to team outcomes through their socioemotional input, but, also through their ***task*** inputs. That is, they take work seriously, are concerned about quality, perform to expected levels, pull their weight and have high expectations. Extroverts seem to approach tasks in unique a manner. The way in which extroverts approach a task seems instrumental to being creative.

Effective and ineffective team behaviours can be grouped into 15 dimensions: 1) goal setting/achievement, 2) focusing on the task-at-hand, 3) performance management, 4) team citizenship, 5) participation in team problem solving, 6) synthesis of ideas, 7) commitment to the team, 8) preparation, 9) reaction to feedback, 10) providing feedback, 11) communication, 12) involvement of others, 13) reaction to conflict, 14) strategy to address conflict and 15) generating conflict. Of these "reaction to feedback" and " reaction to conflict" were not significantly correlated with creativity.

In particular, the "participation in team problem solving" and "synthesis of ideas" dimensions were most strongly correlated with creativity ($r = .67$ and $r =. 56$ respectively). Creative people are most likely to:

- Ask relevant questions
- Offer ideas

- Accept team roles and tasks as required
- Voice unique ideas
- Build on the group's ideas by offering solutions
- Summarize and organize the team's ideas

The greater the team's average level of creativity the better the team's performance. Creativity is therefore a valuable individual attribute to be considered when staffing teams. Organizations can select creative individuals using measures of intelligence and by measuring the level of extroversion. The more intelligent and extroverted a person the greater his/her perceived creativity. Organizations can also select creative individuals by determining the extent to which effective and ineffective team behaviours associated with creative individuals have been, may be, or are exhibited. For instance, evaluation of effective and ineffective team behaviours associated with creative individuals can be incorporated into assessment center simulations. Also, structured interviewers may wish to assess the occurrence of effective and ineffective team behaviours associated with creative individuals.

In this study we analyzed intelligence, personality, creativity, behaviour and team performance in work teams experiencing genuine performance incentives over a series of tasks. Research in this area has predominantly used laboratory methods in ad hoc-short-lived groups. The problem with laboratory studies is that there is little likelihood that meaningful and unique norms develop -- this limits the generalizability of their findings. However, in an academic setting the use of teams that disband after a few months limits generalizability. Studies of functioning intact autonomous work teams within firms are needed to ensure generalizability.

References

Ackoff, R.L., and Vergara, E. (1981). Creativity in problem-solving and planning, European Journal of Operational Research, 7, 1-3.

Barrick, M.R., and Mount, M.K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. Personnel Psychology, 44, 1-26.

Barrick, M.R., Mount, M.K. and Strauss, J.P. (1993). Conscientiousness and the performance of sales representatives: Test of the mediating effect of goal setting. Journal of Applied Psychology, 78(5), 715-722.

Barrick, M.R., and Mount, M.K. (1995). The big five personality dimensions: Implications for research and practice in human resources management. Research in Personnel and Human Resource Management, 13, 153-200.

Barry, B., and Stewart, G.L. (1997). Composition, process and performancein self-managed groups: The role of personality. Journal of Applied Psychology, 82, 62-78.

Barron, F., and Harrington, D.M. (1981). Creativity, intelligence, and personality. In M.R. Rosenzweig and Porter, L.W. (Eds.).Annual Review of Psychology, Palo Alto, CA: Annual reviews, 439-476.

Bentler, P.M., (1990). Comparative fit indexes in structural models. Psychological Bulletin, 107, pp. 238-246.

Bentler, P.M. and Bonett, D.G., (1980). Significance tests and goodness of fit in the analysis of covariance structures. Psychological Bulletin, 88(3), 588-60.

Bolen, L.M., and Torrance, E.P. (1978). The influence on creative thinking of locus of control, cooperation, and sex. Journal of Clinical Psychology, 34, 903-907.

Bollen, K. and Lennox, R. (1991). Conventional wisdom on measurement: A structural equation perspective. Psychological Bulletin, 110(2), 305-314.

Borman, W.C., and Mototwildo, S.J. (1993). Expanding the criterion domain to include elements of contextual performance. In N., Schmitt, Borman, W.C. and Associates, (Eds.).Personnel Selection in Organizations, San Francisco: Jossey-Bass Publishers, 71-98.

Brown, M., and Rickards, T. (1982). How to create creativity. Management Today, Aug., 38-41.

Bruch, C.B. (1988). Metacreativity: Awareness of thoughts and feelings during creative experiences. Journal of Creative Behavior, 22, 112-122.

Callahan, C.M. (1991). The assessment of creativity. In N., Colangelo, and Davis, G.A. (Eds.).Handbook of Gifted Education, Boston, MA: Allyn and Bacon, 219-235.

Campbell, J.P. (1990). Modelling the performance prediction problem in industrial and organisational psychology. In M.D. Dunnette and L.M. Hough (Eds.).Handbook of Industrial and Organizational Psychology (2nd edition, Vol. 1). Palto Alto, CA: Consulting Psychologists Press, 687-732.

Cannon-Bowers, J.A., Oser, R. and Flanagan, D.C. (1992). Work teams in industry: A selected review and proposed framework. In R.W. Swezey and E., Salas, Teams: Their Training and Performance, 355-377. Norwood, NJ: Ablex Publishing.

Cattell, R.B., and Drevdahl, J.E. (1955). A comparison of the personality profile (16PF).of eminent researchers with that of eminent teachers and administrators, and the general population. British Journal of Psychology, 46, 248-261.

Cattell, R.B., Eber, H.W., and Tatsuoka, M.M. (1970). Handbook for the Sixteen Personality Factor Questionnaire. Champaign, Ili: Institute for Personality and Ability Testing.

Costa, P.T. (1996). Work and personality: Use of the NEO-PI-R in Industrial/Organizational Psychology. Applied Psychology: An International Review, 45(3), 225-241.

Costa, P.T., Jr. and McCrae, R.R. (1992). NEO PI-R Professional Manual. Odessa, FL: Psychological Assessment Resources.

Costa, P.T., Jr. and McCrae, R.R. and Dye, D.A. (1991). Facets scales of Agreeableness and Conscientiousness: A revision to the NEO personality inventory. Personality and Individual Differences, 12, 887-898.

Cross, P.G., Cattell, R.B., and Butcher, H.J. (1967). The personality pattern of creative artists. British Journal of Educational Psychology, 37, 292-299.

Dellas, M. (1978). Creative personality and identity. Psychological Reports, 43, 1103-1110.

Digman, J.M. (1990). Personality structure: Emergence of the five-factor model. Annual Review of Psychology, 41, 417-440.

Drevdahl, J.E., and Cattell, R.B. (1958). Personality and creativity in artists and writers. Journal of Clinical Psychology, 14, 107-111.

Durrett, E., and Huffman, W. (1968). Playfulness and divergent thinking among Mexican-American children. Journal of Home Economics, 60, 355-358.

Evans, J.R. (1991). Creativity in MS/OR: Creative thinking, a basis for MS/OR problem solving. Interfaces, 21(5), September-October, 12-15.

Feldman, H.D. (1982). Whatever Happened to the Wiz Kids? Perils and Profits of Growing up Gifted. Chicago: Chicago Review Press.

Gardner, H. (1993). Frames of Mind. New York: Basic Books.

Gatewood, R.D., and Feild, H.S. (1994). Human Resource Selection. Orlando, FL: Dryden Press.

Goldberg, L.R. (1993). The structure of phenotypic personality traits. American Psychologist, 48, 26-34.

Goodman, P.S., Ravlin, E.C., and Argote, L. (1986). Current thinking about groups: Setting the stage for new ideas. In P.S. Goodman (Ed.), Designing Effective Work Groups. San Francisco: Jossey-Bass.

Gibb-Clark, M. (1995). HR Departments Key to Success, Globe and Mail, December 4

Glynn, M. A. and Webster, J. (1993). Refining the nomological net of the adult playfulness scale: Personality, motivational, and attitudinal correlates for highly intelligent adults. Psychological Reports, 72: 1023-1026.

Hawkins, K.A., Faraone, S.V., Pepple, J.R. and Seidman, L.J. (1990). WAIS-R validation of the Wonderlic Personnel Test as a brief intelligence measure in a psychiatric sample. Psychological Assessment, 2, 198-201.

Hoekstra, H. (1993). Work and Personality. Paper presented at the 6th meeting of the International Society of the Study of Individual Differences, Baltimore, Maryland.

Hogan, R.T. (1986). Hogan Personality Inventory Manual. Minneapolis, MN: National Computer Systems.

Hogan, R.T. (1991). Personality and personality measurement. In M.D. Dunnette and L.M. Hough (Eds.), Handbook of Industrial and Organizational Psychology (2nd edition, Vol. 2). Palto Alto, CA: Consulting Psychologists Press, 873-919.

Holland, J.L., Johnston, J.A., Hughey, K.F. and Asama, N.F. (1991). Some explorations of a theory of careers: VII. A replication and some possible extension. Journal of Career Development, 19, 91-100.

Hunter, J.E. (1986). Cognitive ability, cognitive aptitudes, job knowledge and job performance. Journal of Vocational Behavior, 29, 340-362.

Hunter, J.E. and Hunter, R.F. (1984). Validity and utility of alternative predictors of job performance. Psychological Bulletin, 96, 72-98.

Oliver, R.L., Bearden, W.O., (1985). Crossover effects in the theory of reasoned action: A moderating influence attempt. Journal of Consumer Research, 12(3), 324-340.

Ilgen, D.R. (1994). Jobs and roles: Accepting and coping with the changing structure of organizations. In M.G., Rumsey, Walker, C.B. and Harris, J.H., (Eds.).Personnel Selection and Classification, Hillsdale, New Jersey: Lawrence Erlbaum Associates, 13-32.

Jöreskog, K.G., and Sörbom, D. (1993). LISREL 8: User's Reference Guide. Chicago, IL: Scientific Software International.

Lieberman, J.N. (1965). Playfulness and divergent thinking: An investigation of their relationship at the kindergarten level. Journal of Genetic Psychology, 107, 219-224.

Lieberman, J.N. (1966). Playfulness: An Attempt to Conceptualize A Quality Of Play And Of The Player, New York, Academic Press.

Lieberman, J.N. (1967). A developmental analysis of playfulness as a clue to cognitive style. Journal of Creative Behavior, 1, 3391-397.

Lieberman, J.N. (1977). Playfulness: Its Relationship To Imagination And Creativity, New York: Academic Press.

Logan, L.M., and Logan, V.J. (1967). A Dynamic Approach To Language Arts, Toronto: McGraw-Hill.

Logan, L.M., and Logan, V.J. (1971). Design for Creative Teaching, Toronto: McGraw-Hill.

Manz, C.C., and Sims, H.P., Jr. (1993). Business Without Bosses. New York, NY: John Wiley and Sons.

Mackinnon, D.W. (1962a). The Personality Correlates Of Creativity: A Study of American Architects, Proceedings of the Fourteenth International Congress of Applied Psychology, 2, 11-39.

Mackinnon, D.W. (1962b). The nature and nurture of creative talent. American Psychologist, 17, 484-495.

Mackinnon, D.W. (1964). Personality and the realization of creative potential. American Psychologist, 19, 484-495.

McCormick, E.J., Mecham, R.C., and Jeanneret, P.R. (1989). Technical Manual for the Position Analysis Questionnaire. West Lafayette, Indiana: Purdue Research Foundation.

McCrae, R.R., Costa, P.T. and Busch, C.M. (1996). Evaluation comprehensiveness in personality systems: The California Q-set and the five-factor model. Journal of Personality, 54, 430-446.

Mansfield, R.S., and Busse, T.V. (1981). The Psychology of Creativity and Discovery, Chicago, Ili: Nelson-Hall.

Martindale, C. (1989). Personality, situation, and creativity, In J.A. Glover, R.R. Ronning, and Reynolds, C.R. (Eds.).Handbook of Creativity, New York: Plenum Press, 211-232..

Meadows, S. (1986). Understanding Child Development, London: Hutchinson, Ltd.

Mehr, D.G., and Shaver, P.R. (1996). Goal structures in creative motivation. Journal of Creative Behavior, 30(2), pp. 77-104.

Mellou, E, (1996). The two conditions view of creativity. Journal of Creative Behavior, 30(2), 126-143.

Mischel, W. (1977). On the future of personality measurement. American Psychologist, 32, 246-254.

Mohrman, S.A.M., Cohen, S.G., and Mohrman, A.M. (1995). Designing Team Based Organizations, Jossey-Bass Inc.

Moran, J.D., Bomba, A.K., Broberg, G.C., Freeland, S.H. (1987). Personality Correlates Of Creative Potential In Preschool Children, Paper presented at the meeting of the Society of Research in Child Development, April, Baltimore, MD.

Monson, T.C., Hesley, J.W. and Chernick, L. (1982). Specifying when personality can and cannot predict behavior: An alternative to abandoning the attempt to predict single act criteria. Journal of Personality and Social Psychology, 43, 385-399.

Moustakas, C. (1967). Creativity and conformity in education, In R.L., Mooney, and Razik, T.A. (Eds.).Explorations in Creativity, New York: Harper and Row, 173-184.

Mumford, M.D. and Gustafson, S.B. (1988). Creativity syndrome: Integration, application, innovation. Psychological Bulletin, 103, 27-43.

Osborn, A. (1963). Applied Imagination, New York: Scribners.

Payne, D.A., Halpin, W.G., Ellett, C.D., and Dale, J.B. (1975). General personality correlates of creative personality in academically and artistically gifted youth. Journal of Special Education, 9, 105-108.

Perkins, D.N. (1981). The Mind's Best Work, Harvard University Press, Cambridge, Mass.

Perlman, K. (1980). Job families: A review and discussion of their implications for personnel selection. Psychological Bulletin, 87, 1-28.

Richang, Z., and Stimpson, D.V. (1990). A cross-cultural study of entrepreneurial attitude orientation. Information and Psychological Science, 6, 623-625.

Rickards, T. (1992). Creative product: A review of twenty years of practical experiences and theoretical implications in industrial contexts. In S.G. Isaksen, Murdock, M.C., Firestein, R.L., and Treffinger, D.J., (Eds.), Nurturing And Developing Creativity: The Emergence Of A Discipline, Vol. 2, Ablex Publishing, Norwood, N.J.

Rushton, J.P., Murray, H.G. and Paunonen, S.V. (1987). Personality characteristics associated with high reassert productivity. In D.N., Jackson, and Rushton, J.P. (Eds.). Scientific Excellence: Origins and Assessment, Newbury Park, CA: Sage, 129-148.

Sawyers, J.K. and Moran, J.D. (1984). Locus of control and ideational fluency in preschool children. Perceptual and Motor Skills, 58, 857-858.

Schmidt, F.L., Hunter, J.E. and Pearlman, K. (1981). Task differences and the validity of aptitude tests in selection: A red herring. Journal of Applied Psychology, 66, 166-185.

Schmitt, N., Gooding, R.Z., Noe, R.A. and Kirsch, M. (1984). Meta-analysis of validity studies published between 1964 and 1982 and the investigation of study characteristics. Personnel Psychology, 37, 407-422.

Schneider, B. (1996). Whither goest personality at work? Applied Psychology: An International Review, 45(3), 189-296.

Sherer, M., Maddux, J.E., Mercadante, B., Prentice-Dunn, S., Jacob, B., and Rogers, R.W. (1982). The Self-Efficacy Scale construction and validation, Psychological Reports, 51, 663-671.

Simonton, D.K. (1986). Biographical typicality, eminence and achievement styles. Journal of Creative Behavior, 20, 14-22.

Simonton, D.K. (1989). A Psychology Of Science, Cambridge University Press, Cambridge, Mass.

Singer, D.L., and Rummo, J. (1973). Ideational creativity and behavioral style in kindergarten age children. Developmental Psychology, 8, 154-161.

Smith, C.A., Organ, D.W., and Near, J.P. (1993). Organizational Citizenship Behaviour: Its Nature and Antecedents. Journal of Applied Psychology, 68, pp. 653-663.

Solomon, R. (1985). Creativity and normal narcissism. Journal of Creative Behavior, 19, 47-55.

Soriano de Alencar, E.M..L. (1989). Instructing Brazilian teachers to develop children's creative abilities. Gifted Child Today, 12, 13-14.

Starkweather, E.K. and Azbill, P.L. (1964). An exploratory study of preschool children's freedom of expression. Proceedings of Oklahoma Academy of Science, 45, 176-180.

Starkweather, E.K. (1971). Creativity research instrument designed for preschool children. Journal of Creative Behavior, 5, 245-255.

Stasinos, D.P. (1984). Enhancing the creative potential and self-esteem of mentally handicapped Greek children. Journal of Creative Behavior, 18, 117-132.

Stein, M.I. (1967). Creativity and culture, In R.L., Mooney, and Razik, T.A. (Eds.).Explorations in Creativity, New York: Harper and Row, 173-184.

Stein, M.I. (1968). Creativity, In E.F., Borgatta and Lambert, W.W. (Eds.).Handbook of Personality and Research, Chicago: Rand McNally, 900-942.

Steiner, G. (1965). The Creative Organization. Chicago: University of Chicago Press.

Stevens, M.J. and Campion, M.A. (1994). The knowledge skill and ability requirements for teamwork: Implications for human resource management . Journal of Management, 20, 503-530.

Tett, R.P., Jackson, D.N. and Rothstein, M. (1991). Personality measures as predictors of job performance: A meta-analytic review, Personnel Psychology, 44, 703-742.

Tett, R.P., Jackson, D.N., Rothstein, M. and Reddon, J.R. (1994). Meta-Analysis of Personality-Job Performance Relations: A Reply to Ones, Mount, Barrick, and Hunter, Personnel Psychology, 47, 157-172.

Thomas, A., Chess, S., Birch, H.G., Herzing, M.E., and Korn, S. (1963). Behavioral Individuality In Early Childhood, New York: University Press.

Thomas, N.G., and Berk, L.E. (1981). Effects of school environments on the development of young children's creativity, Child Development, 52, 1153-1162.

Thoms, P., Moore, K.S., and Scott, K.S. (1996). The relationship between self-efficacy for participating in self-managed work groups and the Big Five personality dimensions. Journal of Organizational Behaviour, 17, 349-362.

Torrance, E.P. (1963). Education and Creative Potential, Minneapolis: University of Minnesota Press.

Torrance, E.P. (1965). Rewarding Creative Behavior, Eaglewood Cliffs, NJ: Prentice-Hall.

Torrance, E.P. (1970). Influence of dyadic iteration on creative functioning, Psychological Report, 26, 391-394.

Torrance, E.P. (1975). Creativity research in education: Still alive, In I.A. Taylor, and Getzels, J.W. (Eds.).Perspectives in Creativity, Chicago: Aldine, 278-296.

Torrance, E.P. (1981). Teaching for creativity, In S.G. Isaksen (Ed.).Frontiers of Creativity Research: Beyond the Basics, Bearly, Buffalo, 189-215.

Treffinger, D.J. (1987). Research on creativity assessment, In S.G. Isaksen (ED.).Frontiers of Creativity Research: Beyond the Basics, Bearly, Buffalo, pp. 103-119.

Truhon, S.A. (1983). Playfulness, play, and creativity: A path analytic model, The Journal of Genetic Psychology, 143, 19-28.

Tuckman, B.W. (1965). Developmental sequence in small groups. Psychological Bulletin, 63, 384-399.

Vince-Bakonyi, A. (1969). Self-made toys in children's games, International Journal of Early Childhood, 1, 15-18.

Wagner, C. (1996). Creative behavior through basic inferences, Journal of Creative Behavior, 30(2), 105-118.

Williams, J.D., Harlow, S.D., and Borgen, J.S. (1971). Creativity, dogmatism, and arithmetic achievement. Journal of Psychology, 78, 217-222.

Wolfe, R.A. (1994). Organizational innovation: Review, critique and suggested research directions, Journal of Management Studies, 31, 405-431.

Table 1

Correlation Matrix of Creativity, Personality Traits and Cognitive Ability

	1	2	3	4	5	6	7	8	9	10
1. Overall creativity	1.00									
2. Looks at subjects from new perspectives	.75 **	1.00								
3. Discovers new relationships	.82**	.40**	1.00							
4. Forms new combinations from old concepts	.83**	.49**	.50**	1.00						
5. Neuroticism	-.01	-.01	-.02	.01	1.00					
6. Extroversion	.10*	.10*	.11*	.11*	.20**	1.00				
7. Openness to experience	.03	.03	-.04	.09	-.12*	.15*	1.00			
8. Agreeableness	.03	-.03	.02	.06	.13*	.36**	.04	1.00		
9. Conscientiousness	.03	.02	-.01	.06	.21**	-.05	.18*	.01	1.00	
10. Intelligence	.22**	.20**	.14*	.19**	-.18**	-.03	.09	-.13*	-.00	1.00

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

N=467 after listwise deletion.

Table 2

Partial Correlation Coefficients Matrix Of Creativity and Personality Controling for Siutuational Strength and Cognitive Ability

	1	2	3	4	5	6	7	8	9
1.Looks at subjects from new perspectives	1.00								
2.Discovers new relationships	.38**	1.00							
3. Forms new combinations from old concepts	.47**	.48**	1.00						
4.Overall creativity	.74**	.81**	.82**	1.00					
5.Neuroticism	.02	.01	.05	.03	1.00				
6.Extroversion	.10*	.11*	.11*	.11*	.21**	1.00			
7.Openness to experience	.02	-.05	.07	.01	-.10*	.15**	1.00		
8.Agreeableness	-.00	.03	.09	.05	.11*	.36**	.05	1.00	
9.Conscientiousness	.02*	-.01	.06	.03	.22**	-.05	.19**	.01	1.00

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

N=467 after listwise deletion.

Table 3

BOS Dimensions Predicted by Creativity

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.Overall creativity	1.00															
2.Bos factor 1	.27**	1.00														
3.Bos factor 2	.47**	.24**	1.00													
4.Bos factor 3	.45**	.30**	.33**	1.00												
5.Bos factor 4	.67**	.33**	.52**	.61**	1.00											
6.Bos factor 5	.56**	.35**	.48**	.67**	.75**	1.00										
7.Bos factor 6	.48**	.32**	.41**	.69**	.74**	.77**	1.00									
8.Bos factor 7	.11**	.13**	.10**	.10*	.19**	.21**	.10*	1.00								
9.Bos factor 8	.12**	.10*	.17**	.12*	.27**	.27**	.14*	.09	1.00							
10.Bos factor 9	.01	.10	.05*	-.07	.02	.05	.04*	.12	.01*	1.00						
11.Bos factor 10	.39**	.28**	.27**	.27**	.42**	.34**	.34**	.19**	.09*	.15**	1.00					
12.Bos factor 11	.19**	.13**	.11*	.08*	.20**	.23**	.16**	.12**	.09*	.21**	.26**	1.00				
13.Bos factor 12	.56**	.31**	.46**	.60**	.74**	.82**	.74**	.14**	.26*	.01**	.36**	.22	1.00			
14.Bos factor 13	.03	.00	.07	.04	.01	.01	-.02	.04	-.05*	.09	-.00	.11	-.01	1.00		
15.Bos factor 14	.55**	.33**	.50**	.52**	.71**	.61**	.61**	.11**	.09*	.06	.35**	.22**	.62**	.10*	1.00	
16.Bos factor 15	.23**	.20**	.17	.07**	.19**	.18*	.09*	.09**	.14*	.10**	.29**	.19**	.20	-.00	.21**	1.00

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

N=463 after listwise deletion.

Factor Key:

1) goal setting/achievement (includes how goals are to be achieved),
2) focusing on the task-at-hand,
3) performance management (i.e., assign tasks to other team members, sets time deadlines, etc.),
4) team citizenship (involves "going beyond the call of duty" for the team),
5) participation in team problem solving,
6) synthesis of ideas,
7) commitment to the team,
8) preparation,
9) reaction to feedback,
10) providing feedback,
11) communication,
12) involvement of others,
13) reaction to conflict,
14) strategy to address conflict and
15) generating conflict.

Table 4

Correlation Matrix If Creativity and Items Making up the "Participates in Team Problem Solving" and "Synthesis of Ideas" BOS Dimensions

BOS Dimensions	Dimension item	1	2	3	4	5	6	7
Participates in Team Problem Solving	1.Overall creativity	1.000						
	2.Asks relevant questions	.49**	1.00					
	3.Offers ideas	.43**	.57**	1.00				
	4.Accepts team roles and tasks as required	.40**	.51**	.53**	1.00			
	5.Voices unique ideas	.51**	.51**	.67**	.50**	1.000		
Synthesis of Ideas	6.Builds on group's ideas by offering solutions	.47**	.60**	.71**	.56**	.63**	1.000	
	7.Summarizes and organizes the team's ideas	.42**	.45**	.63**	.42**	.60**	.70**	1.00

** Correlation is significant at the 0.01 level (2-tailed).

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