THE UNIVERSITY OF CALGARY

The Impact of Problem-Solving Styles on Problem Solving Behaviour, Interpersonal Relations, and Job Satisfaction in Small Workgroups

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE

DEPARTMENT OF PSYCHOLOGY

CALGARY, ALBERTA

January, 1992

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The undersigned certify that they have read, and recommend to the Faculty of Graduate studies for acceptance, a thesis entitled "The Impact of Problem-Solving Styles on Problem-Solving Behaviour, Interpersonal Relations, and Job Satisfaction in Small Workgroups," submitted by Ross Hill in partial fulfilment for the degree Master of Science.

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ABSTRACT

The purpose of this study was to investigate the relationship between a relatively new measure of problem-solving style, the Kirton Adaption-Innovation Inventory (KAI), and each of the following: (1) problem-solving behaviour, (2) interpersonal relations, and (3) job satisfaction. Members from 15 work groups (N = 86) each completed a questionnaire comprised of the KAI and questions concerning job satisfaction, the work environment, fellow group members' problem-solving behaviour, satisfaction with fellow group members, and experience within the group. In addition, each group member was asked to provide reasons and solutions for common, recurring problems within their group. Self-reports of problem-solving style were found to be related to peer-ratings of problem-solving behaviour; however, a relationship was not found between problem-solving style and actual problem-solving behaviour. Also, relationships were not found between problem-solving style and interpersonal relations, and between problem-solving style and job satisfaction. Group members' perceptions of the number of opportunities to discuss ideas and opinions, and of the degree of autonomy in the work environment were found to be positively related to interpersonal relations and job satisfaction. It is suggested that future research regarding problem-solving styles be on groups with more

interaction among group members. Such research would be more likely to find support for a relationship between problem-solving style and interpersonal relations, and for a relationship between problem-solving style and job satisfaction, should such relationships exist.

ACKNOWLEDGEMENTS

There are several people I would like to thank for helping me get through this project. I would like to thank Janet Gibson, Keith Reimer, and Mary Visser for assisting me in my quest for participants. I would like to thank Treena Alspach, Donica Hrynchak, Terri and Al Langdon, Jeanette and Manny Langman, Nicole Langman, Jennifer Pick, and Jacquie Prouty for rating an endless number of reasons and solutions. I would like to thank Sue Crawford, Jan Dixon, Don Hill, and Jennifer Pick for helping me edit the thesis. I would like to thank my supervisor, Bob Franken, for letting me do what I wanted to do (within reason) and for the interesting conversations we had on the project.

I would also like to thank Anne-Marie Bergen, Sue Crawford, Jan Dixon, Laura Kettles, Ralph Renger, and Jeff Rutherford for making my stay at the U. of C. a fun one. I'd especially like to thank Tammy Langman for being there during the not-so-fun time during which I was finishing up on this thesis. Lastly, I'd like to thank Mom and Dad for not forgetting me while I rarely found the time to remember them.

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The purpose of this thesis is to investigate the relationship between a relatively new measure of problem-solving style, the Kirton Adaption-Innovation Inventory (KAI), and each of the following: (1) problem-solving behaviour, (2) interpersonal relations, and (3) job satisfaction.

Problem-solving is a multi-stage process (Schweiger, 1983). The process starts with the recognition of a problem. This involves the feelings of discomfort and tension that occur when customary or habitual procedures are inadequate for dealing with a task (Goldsmith & Matherly, 1986). Once a problem is recognized, the cause of the problem must be identified--this is known as defining the problem (Schweiger, 1983). Once the problem is defined, one can then identify and evaluate several possible solutions to the problem. Each solution may be evaluated in terms of factors important to the person making the decision, or each solution may be evaluated according to a good or bad "feeling" about the solution. After evaluation, a specific solution is chosen and implemented. Once implemented, one can, if one so desires, try to evaluate the success of the chosen solution in dealing with the problem (Dixon, 1991).

Problem-solving style refers to a person's preference for gathering, organizing, and analyzing information in a specific manner in order to define a problem and arrive at a solution (Goldstein & Blackman, 1978, as cited in Schweiger, 1983). In other words, problem-solving style refers to the habitual way a person goes through the process of problem-solving.

Problem-solving style is independent of ability, skill, intelligence, or problem-solving complexity (Kirton & De Ciantis, 1986). According to Payne (1987), inherent in concepts like ability, skill, etc., is the idea of "level," a relative quantity or ordering of objects, abilities, or performances. People can be ordered in terms of "how much" they have of these concepts and, generally, the more one has of these concepts the more "fortunate" one is, regardless of the circumstances. On the other hand, style refers to the manner in which something is done. Generally, there is nothing inherently "good" or "bad" about doing things one way or another. Whether one style is "better" or "worse" than another depends on the outcome of the process. For example, given two solutions to an economic problem, one could say that one solution is better than the other because it is likely to save a company more money. If the better solution was arrived at through a rational decision-making process while the poorer solution was arrived at through an intuitive decision-making process, then one would say that

the rational decision-making style was better than the intuitive decision-making style. However, had the intuitive decision-making process resulted in the better solution, then one would have said that the intuitive decision-making style was better than the rational decision-making style. Both scenarios are possible.

Problem-solving style can be considered a trait because people are inclined to use their preferred manner of problem-solving in different situations at different times (Goldstein & Blackman, 1978; Messick, 1976; both as cited in Kirton & McCarthy, 1988), even after being trained to solve problems in a different manner (Kagan & Kogan, 1970, as cited in Kirton & De Ciantis, 1986). The reason problem-solving style is defined in terms of a preference comes from observations that the environment, that is, the context of a problem, and the type of problem are likely to play a role in determining how a problem is approached (McAllister, Mitchell, & Beach, 1979; Hammond, Hamm, Grassia, & Pearson, 1987). Nevertheless, one can expect to see differences in behaviour in the same situation among people with different problem-solving styles (e. g. , Hammond, Hamm, Grassia, & Pearson, 1987). The reason problem-solving style is likely to make an impact beyond the context is that, in the real world, decision-making rarely involves a simple choice between two alternatives; instead, it involves evaluating and interpreting the environment from one's perspective

(Hunt, Krzystofiak, Meindl, & Yousry, 1989). As such, how a person interacts with and interprets a situation is going to affect which problems are "seen" and how the problems are solved (Hunt, Krzystofiak, Meindl, & Yousry, 1989).

People with different problem-solving styles tend to behave differently (Driver & Mock, 1975; Kirton, 1976; McKenny & Keen, 1974). These differences in behaviour may cause problems in interpersonal relations among those with different problem-solving styles: people with one problem-solving style are likely to get frustrated working with people with another problem-solving style (Lindsay, 1985).

Based on evidence that differences exist in the prevalence of problem-solving styles across occupations, several researchers have suggested that different problem-solving styles seem suited for different occupations (Foxall, 1986; Foxall & Payne, 1989; Hayward & Everett, 1983; Kirton & Pender, 1982). Given that one problem-solving style may be more suitable for an occupation than another, it is possible that a mismatch of problem-solving style and occupation may lead to job dissatisfaction, while a match may lead to job satisfaction.

From the preceding discussion, it is easy to see why the study of problem-solving styles is important. Managers who are knowledgeable of the relationship between problem-solving styles and behaviour should be able to effectively use employees with different problem-solving styles (Kirton,

1976). For example, several researchers have suggested that managers could match problem types with the appropriate problem-solving style (Goldsmith, 1984; Kirton & McCarthy, 1988; Schweiger, 1983). Also, since people with different problem-solving styles are likely to view the same problem from different perspectives (McKenny & Keen, 1974), managers are likely to consider more important factors than they would otherwise by soliciting information from people with different problem-solving styles. Making decisions in this fashion should minimize the chance of overlooking important information (Jaffe, 1985).

Should problem-solving styles demonstrate a relationship with job satisfaction, then the "fit" between persons and working environments could be improved (Goldsmith, 1985). This could be done by allowing employees the freedom to do a job using their preferred style (Kirton & McCarthy, 1988) or by creating working conditions that are more compatible with a person's problem-solving style (Goodenough, 1985, as cited in Clapp & De Ciantis, 1989; Root-Bernstein, 1989b).

Probably the most important aspect of research on problem-solving styles is the possibility of a relationship between differences in problem-solving styles and difficulties in interpersonal relations. Should such a relationship be found, then it would be important to get individuals to try and see situations from other people's

perspectives. This knowledge could then be used to patch up misunderstandings and increase tolerance of others. People could adjust their behaviour so that interactions between themselves and others are more positive (Foxall, 1986; Novak, 1989). In other words, people could be taught to respond to other people in terms of others' motivation and inner thoughts rather than in terms of others' behaviour. As a result, misunderstandings and the conflicts that can arise from misinterpreted behaviour might be reduced and cooperation between workers might increase (Jaffe, 1985; Kirton, 1976; Novak, 1989).

The research described in this thesis was aimed at testing the following hypotheses: (1) people with different problem-solving styles will propose qualitatively different reasons and solutions to the same or similar problems; (2) groups that are relatively heterogeneous with respect to problem-solving styles will experience more friction among group members than groups that are relatively homogeneous with respect to problem-solving styles; (3) employees whose problem-solving styles differ substantially from their co-workers' problem-solving styles will report less satisfaction with their co-workers than employees whose problem-solving styles are similar to their co-workers' problem-solving styles; (4) subordinates whose problem-solving styles differ substantially from their supervisors' problem-solving styles will report less satisfaction with

their supervision than subordinates whose problem-solving styles are similar to their supervisors' problem-solving styles; and (5) employees whose problem-solving styles differ substantially from their co-workers' problem-solving styles will report less job satisfaction than employees whose problem-solving styles are similar to their co-workers' problem-solving styles.

The measure of problem-solving style used in this thesis was Kirton's Adaption-Innovation Inventory. The next section describes Kirton's theory of problem-solving style and describes some of the research done to determine the validity of his measure. Section three discusses factors other than problem-solving style that may influence problem-solving behaviour. The fourth section discusses the theoretical impact of problem-solving style on interpersonal relations. Section five discusses factors other than problem-solving style that may influence interpersonal relations. The sixth section discusses the possible impact of problem-solving style on job satisfaction. Section seven discusses important factors other than problem-solving style that may influence job satisfaction. The eighth section summarizes the introduction, and the last section restates the hypotheses of this study.

Kirton's Theory of Problem-Solving Style

Kirton (1976) contends that people can be located along a continuum ranging from a preference for "doing things better" to a preference for "doing things differently." Those who prefer to "do things better" are labelled "adaptive," while those who prefer to "do things differently" are labelled "innovative." According to Kirton, when confronted with similar problems, those located on opposite ends of the continuum tend to define problems differently: adaptors tend not to challenge the structure of a problem, while innovators tend to treat the structure of a problem as part of the problem. "Structure" was explained by Kirton (1987) in the following manner:

> By 'structure' is meant the regulations and mores governing the whole of key elements of the problem; included are the assumptions, theories and attitudes underlying the problem, as well as the way in which key elements of the problem and its setting are perceived so as to circumscribe the problem. (p. 10)

While doing things "better" means one must do something "differently," and while doing things "differently" may result in doing things "better" (e.g., cheaper, quicker),

within Kirton's theory, it is with reference to structure that things are either better or different. Solutions which are derived logically from the assumptions surrounding a problem and which respect policies and/or customs are better, while solutions which challenge the assumptions surrounding a problem and which challenge policies and/or customs are different.

When discussing Kirton's theory of problem-solving style, it is necessary to distinguish between two possible ways of defining the term "problem." The first way to define this term is evident when Kirton states that innovators and adaptors tend to produce qualitatively different solutions to "seemingly similar problems" (Kirton, 1976, p. 622). These "similar problems" are the common difficulties encountered by adaptors and innovators as they go about doing their work within an organization. The second way of defining the term "problem" is in terms of the reasons why the difficulties occur, that is, problem definition. For example, a group of workers may find it difficult to complete their work (the common difficulty); they may feel that this is due to too much work, too many interruptions, or too many coffee breaks (the reasons why). According to Kirton, "the more that the structure surrounding a problem [difficulty] is incorporated into and treated as part of the problem [why the difficulty occurs], the more any solution is likely to be radical, innovative,

i.e. involve 'doing things differently'" (Kirton, 1987, p. 10).[1]

Kirton contends that "adaption-innovation is a basic dimension of personality relevant to the analysis of organizational change, in that some people characteristically adapt while others characteristically innovate" (Kirton, 1976, p. 622). People's preferences for different types of change will affect how an organization changes in response to the demands placed on it by the environment: adaptors will tend to refine existing methods, while innovators will tend to replace existing methods.

Kirton developed the Kirton Adaption-Innovation Inventory (KAI) in order to locate people on his proposed continuum of problem-solving style. Respondents are asked to indicate, on a five-point scale, how difficult it would be to present an image of themselves consistently and for a long time. Each of the 32 items in the KAI presents a particular behavioral characteristic that is, according to Kirton's theory, associated with adaptors or innovators.

The KAI consists of three subscales: sufficiency of originality (SO), efficiency of operation (E), and

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[1] The definitions in square brackets represent my interpretation of Kirton's theory as he does not explicitly distinguish between these two definitions of the term "problem." Kirton merely states that adaptors and innovators tend to produce qualitatively different solutions to seemingly similar problems and that they tend to define problems differently. However, it seems logical that, if two people define the same problem differently, they will tend to arrive at qualitatively different solutions (Nutt, 1984).

rule/group conformity (R). The SO subscale contains items which describe Rogers' (1959, as cited in Kirton, 1976) creative loner, a person who "has little awe of traditional knowledge or practise" and "compulsively toys with ideas" (Kirton, 1976, p. 624). The E subscale contains items which describe the type of people Weber (1948, as cited in Kirton, 1976) suggested were needed in a bureaucratic organization: people who are reliable, precise, and disciplined. The R subscale contains items which describe Merton's (1957, as cited in Kirton, 1976) bureaucratic man, a man who fits in well because he has the proper respect for authority and rules. According to Kirton (1976), people who prefer to "do things differently" tend to produce an abundance of ideas, are inefficient, and show little regard for rules or procedures. People who prefer to "do things better" tend to produce a sufficiency of ideas (i.e., quit thinking about a problem when a probable reason and solution have been found), are efficient, and honour rules and procedures.

The three subscales of the KAI are scored so that high scores represent behaviours characteristic of innovators and low scores represent behaviours characteristic of adaptors. Kirton (1976) found that the three subscales were moderately correlated (from $\underline{r}$ = .36 to $\underline{r}$ = .47, $\underline{N}$ = 532) and that, after factor analysis, the items which comprise the three subscales all loaded .29 or greater on the first factor of

an unrotated principle-factor matrix.[2] According to Kirton, these findings indicate that the general factor adaption-innovation underlies the subscales.

In theory, a valid measure of problem-solving style should have the following characteristics (Kirton, 1987): (1) It should have scores which are normally distributed in the general population; that is, most people should show little preference for either an adaptive or innovative approach to problem-solving, while a few people should show a marked preference. (2) It should be reliable, both in terms of its internal consistency and, since problem-solving style is an aspect of personality, its consistency over time. (3) It should demonstrate a relationship with other measures of problem-solving style. (4) It should not demonstrate a relationship with measures of level, be they measures of creative level, intelligence, or problem-solving complexity. And, (5) it should demonstrate a relationship with problem-solving behaviour.

A variety of studies have been conducted on the validity of the KAI. Generally, the results have been favourable. Kirton (1976) found that the frequency of scores on the KAI approaches a normal distribution in the general population, with a mean (95.33, S.D. = 17.54) very close to the theoretical mean of the measure (96). The

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[2] After varimax rotation, Kirton (1976) found three factors which corresponded to the three subscales of the KAI.

internal consistency of the measure is high (Kuder-Richardson Formula 20 coefficient = .88, Kirton, 1976). After conducting factor analyses, Hammond (1986) and Taylor (1989) also found the same three subscale factors as did Kirton (1976). Test-retest reliability coefficients have been found to be high, with values ranging from r = .82 (N = 64) to r = .86 (N = 55), at seven and five months respectively (Kirton, 1987). Goldsmith (1986) found significant correlations between the KAI and three other measures of innovative problem-solving style: an open processing scale, an innovativeness scale, and the Innovation subscale of the Jackson Personality Inventory. Kirton (1987) reports that moderate correlations have been found between the KAI and each of the following: Torrance's tests of Left Hemisphere Style of Thinking and Right Hemisphere Style of Thinking, and the Sensing-Intuition and Judgement-Perception scales of the Myers-Briggs Type Indicator. Kirton (1987) found no evidence of a relationship between the KAI and various measures of intelligence (e.g., Otis Higher, Form A; Cattell Culture Free; Shipley). Goldsmith (1985) found no evidence of a relationship between the KAI and a measure of problem-solving complexity, a role category questionnaire.

While, in most cases, the KAI has not demonstrated a relationship with level of intelligence or cognitive complexity, conflicting results have been found regarding

the relationship between the KAI and measures of creative level. Isaksen and Puccio (1988) found a relationship between the KAI and three of the Torrance Tests of Creative Thinking (Fluency, Flexibility, and Originality). Goldsmith (1987) found a relationship between the KAI and E. P. Torrance's Creative Motivation Scale and Schaefer's Creativity Scale. Mulligan and Martin (1980) found a relationship between the KAI and the sum of scores on three tests of cognitive productivity (Alternate Uses, Figural Fluency, and the Utility Test). Masten and Caldwell (1987) found a relationship between adaptors and Khatena and Torrance's (1973) measure of originality, but did not find such a relationship for innovators. These results suggest that the KAI may be confounded with level of creativity. However, Goldsmith (1985) found no evidence of a relationship between the KAI and the Remote Associates Test, and Kirton (1978) found no relationship between the KAI and three tests of creative level: Word Fluency, Utilities, and Alternate Uses.

Kirton (1987) explained these conflicting results by stressing that many tests of creative level do not distinguish between level and style, thereby making it difficult to determine whether a relationship exists between the KAI and creative level. A factor analysis of data comprised of responses to the KAI, various tests of creative level, and various tests of creative style revealed two main

factors, a style factor and a level factor (Kirton, 1987). The KAI loaded on the style factor. Several tests of creative level (Torrance's Creative Thinking--Originality, Flexibility, and Elaboration) and one test of creative style (Torrance's Creative Motivation scale) loaded on both factors, suggesting that these scales confound style and level. The conflicting results found with respect to the relationship between the KAI and measures of creative level could be caused by the use of measures of creative level which confound level and style.

As mentioned previously, Kirton developed the KAI in order to identify those who prefer to "do things better" and those who prefer to "do things differently." One of the few published studies to actually address whether those who score as adaptors on the KAI produce qualitatively different solutions than those who score as innovators was conducted by Keller and Holland (1978). Keller and Holland found that the KAI was significantly correlated with their two "direct measures of innovativeness" (p. 567), peer nominations and management ratings ($\underline{r}$ = .40 $\underline{p}$ < .001, $\underline{N}$ = 256, for both measures). Employees were "asked to nominate up to four co-workers who had contributed most to important innovations in the organization" (p. 564), and managers were asked to rank their subordinates on the basis of innovativeness.[3]

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[3] While Keller and Holland describe their measures as "direct," it should be kept in mind that innovative behaviours were not measured; rather, coworkers' and managers'

While Keller and Holland's results provide moderate support for the concurrent validity of the KAI, their methods may have yielded results which underestimate the actual strength of the relationship between the KAI and perceptions of problem-solving behaviour. For example, Keller and Holland do not mention whether employees and managers were given Kirton's definition of "innovative" (i.e., solutions which treat the structure of a problem as being part of the problem). Since it is likely that managers and employees may have had slightly different definitions of the term "innovative" than that proposed by Kirton, the correlation between peer nominations and the KAI, and between manager ratings and the KAI, could have been attenuated by not providing a common definition. Furthermore, it is well known that adding items to a questionnaire increases the questionnaire's reliability (Cheek, 1982). Since Keller and Holland had only one item in each of their two measures, it is likely that the correlations between these measures and the KAI represent the lower end of the range of validity coefficients between "direct" measures of innovative behaviour and the KAI.

Two further procedures may have attenuated the validity coefficients between Keller and Holland's direct measures of innovative behaviour and the KAI. With regard to peer nominations, asking employees "to nominate up to four co-

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perceptions of others' behaviours were measured.

workers who have contributed most to important innovations" (p. 564) within their respective organizations confounds value judgements with problem-solving style. By definition, innovative solutions need not be "important" to be innovative. This means that employees who had provided innovative but "unimportant" solutions were automatically grouped with adaptive employees, thereby attenuating the correlation between the KAI and the number of peer nominations. With regard to management ratings, Keller and Holland's use of only one rater may have attenuated the strength of the validity coefficient as using one rater tends to be less reliable and produce lower validity coefficients than does the use of multiple raters (Cheek, 1982).

A study by Mulligan and Martin (1980) attempted to determine the concurrent validity of the KAI as part of a larger study on the face validity of the scoring of the KAI. Forty-three successful Australian administrators, 27 of whom were described as adaptors and 16 of whom were described as innovators by colleagues (who had studied Kirton's vignettes of adaptors and innovators), were used to determine whether Kirton's method or an alternate method of scoring the KAI was more accurate in identifying adaptors and innovators. It was found that the KAI could correctly identify most of the innovators but few of the adaptors. It was argued that the SO subscale was contaminated with items that measure

cognitive productiveness--a measure of level, not style--and that these items could not distinguish between those who produced an abundance of adaptive solutions and those who produced an abundance of innovative solutions. Since those who produce an abundance of ideas are scored as innovators, productive adaptors were classified as innovators. By weighting the items of the KAI so as to make the three subscales orthogonal within a sample of 303 students, Mulligan and Martin found that the efficiency of operation (E) subscale was the only subscale that did not demonstrate a significant, positive relationship with the sum of three measures of cognitive productivity (Alternate Uses, Figural Fluency, and the Utility Test). By using the weighted E scale, Mulligan and Martin found that they could identify most of the adaptors and innovators in their criterion sample.

According to the results of the Mulligan and Martin study, it would seem that only the E subscale should be used to identify adaptors and innovators as the other two subscales confound style and level. This conclusion may be questionable on several counts. First, Mulligan and Martin did not provide information on the reliability of their raters, the people who identified the criterion sample of adaptors and innovators. Second, the criterion sample was rather small, increasing the probability of an unrepresentative sample. Third, with regards to the overall

KAI score confounding style and level, the relationships between the KAI and the measures of cognitive productiveness were all very weak (less than $\underline{r}$ = .20, $\underline{N}$ = 303, Kirton, 1987) and, as mentioned previously, it is possible that the measures of cognitive productiveness, rather than the KAI, confounded style and level.

Generally, research into the KAI has supported its claim as being a measure of problem-solving style. However, further investigation into the relationship between the KAI and actual problem-solving behaviour seems warranted. The ratings of people who have worked closely with each other would be one way, albeit an indirect way, of determining the relationship between the KAI and problem-solving behaviour. Research using peer-ratings should be wary of the weaknesses noted in Keller and Holland's study. The most direct method of determining the link between the KAI and problem-solving behaviour would be to have people solve problems. The difficulties associated with this method would be ensuring that a "structure" exists with respect to the problems used in the investigation, and ensuring that a sufficient number of problems are used to get a good index of participants' general preference for "doing things better" or "doing things differently."

Other Factors That Can Influence Problem-Solving Behaviour

If one wishes to investigate the relationship between a measure of problem-solving style and behaviour, it is important to control for additional factors that may influence problem-solving behaviour as these factors may obscure the relationship of interest. Three important factors that influence how people solve a problem are (1) the type of problem (Hammond, Hamm, Grassia, and Pearson, 1987), (2) the perspective taken when defining the problem (Root-Bernstein, 1989a; Schein, 1990), and (3) the environment in which the problem exists (Ciotta, 1987; Clapp & De Ciantis, 1989).

The type of problem being solved can influence the approach a person takes when solving the problem. For example, Hammond, Hamm, Grassia, and Pearson (1987) found that judging the aesthetic value of highways induced most of their subjects to approach this problem in an intuitive manner, while judging the capacity of a highway induced most of their subjects to approach this problem in an analytical manner. In terms of Kirton's theory, if a problem has never been encountered before by a group of co-workers and if the problem is not similar to other problems encountered by the group, then there should be no rules, practises, or common assumptions that can influence the manner in which the problem is approached. In other words, all solutions to the

problem will be innovative as the group must behave "differently" than it has in the past. On the other hand, problems which are new but similar to problems encountered previously may or may not be approached in terms of the structure surrounding the similar problems. For recurring problems or new problems which bear some resemblance to old problems, there can be innovative or adaptive solutions.

The perspective taken when defining a problem will often determine whether the eventual solution will be adaptive or innovative. Based on a ten year study which included "the reading of several hundred scientific biographies, historical research, formal and informal talks with eminent living scientists, and actual laboratory experiences" (p. 43), Root-Bernstein (1989a) suggests that innovative ideas tend to come from those who are relatively new to a group because newcomers tend to have different perspectives on problems than more experienced group members. Unlike experienced group members, newcomers are not prisoners to the prevailing assumptions of the group as they have had limited exposure to these assumptions; this often allows them to solve problems the more experienced group members, using the prevailing assumptions, seem to have difficulty resolving. Root-Bernstein suggests that the link between perspective and problem-solving is not confined to newcomers. In his research, he found that innovative people tend to have broad research interests; that is, they

do not stick exclusively to one field of research. Their broad range of interests allows them to bring new perspectives to whatever problem they are studying at the moment. The notion that perspective is important for innovation can also be found in the work of Tjosvold and McNeely (1988). Employees interviewed by Tjosvold and McNeely reported that their most innovative solutions came about in a context where common objectives with fellow employees resulted in greater cooperation which, in turn, facilitated the communication of diverse perspectives.

The behaviour of a person is the result of a complex interaction between the person and the environment. With regards to problem-solving, the environment tends to differentially reinforce innovative or adaptive styles of problem-solving, and it tends to provide more opportunities to solve problems one way than another.

In a traditional bureaucracy, procedures usually evolve to deal with common organizational problems (Bakke, 1969, as cited in Clapp & De Ciantis, 1989; House & Singh, 1987). Deviation from these procedures can invoke disciplinary action (O'Toole, 1979, as cited in Clapp & De Ciantis, 1989) and may interfere with one's chances for promotion (Merton, 1957, as cited in Clapp & De Ciantis, 1989). In other words, traditional bureaucracies tend to reinforce adaptive behaviour and punish innovative behaviour. In such an environment, one can expect most people to behave

adaptively, regardless of their problem-solving style (Clapp & De Ciantis, 1989). The obverse also holds true: environmental conditions which encourage innovative behaviour are likely to produce more innovative behaviour (Ciotta, 1987; Hage & Dewar, 1973, and Nasbeth & Ray, 1974, both as cited in Ettlie & O'Keefe, 1982; Root-Bernstein, 1989b). However, while the environment may influence behaviour, variation among individuals in problem-solving style is still likely to remain except in the most restrictive environments (e.g., Clapp & De Ciantis, 1989).

The environment tends to provide more opportunities to solve problems in one way than another. Two ways in which opportunities for innovative problem-solving can be constrained are time constraints and insufficient authority.

Time constraints often require that problems be dealt with immediately. With most problems in the business world, little time is available to the problem solver to question the structure of a problem and, as such, adaptive solutions are implemented. Looking at this notion from a different perspective, one can say that, due to time constraints, much problem-solving in the business world is centred on finding solutions to problems and not on defining problems. Such a problem-solving process is believed to restrict innovation (Nutt, 1984).

One's position in an organization can influence the opportunities one has to behave adaptively or innovatively.

For example, a person may think of an innovative solution to a common problem, but the person may not have the authority to implement the solution. Or, rules may specifically prohibit the implementation of a person's solution. (Again, the notion of behaviours being reinforced or punished comes into play.) As one progresses upwards within an organization, one's increased authority allows one to behave in a manner which reflects one's problem-solving style (Noll & Shupe, 1975, as cited in Ettlie & O'Keefe, 1982). In other words, one acquires the authority needed to act immediately or the authority required to change rules and procedures.

Difficulties in Interpersonal Relations Between Adaptors and Innovators

Individuals with different problem-solving styles behave differently. These differences in behaviour can be misinterpreted by people with contrasting problem-solving styles (Kirton, 1976). These misinterpretations of behaviour can cause difficulties in interpersonal relations (Lindsay, 1985).

Kirton (1976) provided a list of behaviours typical of adaptors and innovators. Adaptors tend to be concerned with

resolving problems[4], whereas innovators tend to discover problems.[5] Adaptors prefer to solve problems in tried and understood ways, whereas innovators tend to question traditional practices. Adaptors rarely challenge rules, whereas innovators often challenge rules. Adaptors are sensitive to group members' opinions and strive to maintain group cohesion and cooperation, whereas innovators tend to be insensitive towards group members' opinions, often threatening group cohesion and cooperation.[6] [7]

Further differences in the behaviour of adaptors and innovators have been found. Scores on the KAI demonstrate significant, moderate, positive relationships with sensation-seeking and risk-taking, suggesting that much of the behaviour of innovators and adaptors can be attributed to differences in the need for novelty, stimulation, and change (Goldsmith, 1985). Innovators seem to need more

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[4] As mentioned earlier, Nutt (1984) found that solution centred processes tend to restrict innovation.

[5] Root-Bernstein (1989a) came to the conclusion that innovative people tend to be more interested in problems than solutions.

[6] Innovators are not usually intentional "trouble-makers"; rather, innovators are less concerned with the demands of the social situation than adaptors. Innovators tend to be more straight forward in presenting their views. They prefer this approach over the more diplomatic approach of adaptors (Kirton & De Ciantis, 1986).

[7] Root-Bernstein (1989a) came to the conclusion that innovative people do not do things "differently" because they wish to be different; instead, they do things "differently" in order to try and understand the problem.

novelty, stimulation, and change than adaptors.[8] A weak, but significant, negative relationship has been found between state anxiety and the KAI, suggesting that adaptors are more likely than innovators to get anxious when completing a novel task (Elder, 1989). In addition, weak, but significant, negative relationships have been found between the KAI and dogmatism, inflexibility, conservatism, and intolerance of ambiguity (Kirton, 1987), suggesting that adaptors tend to be more dogmatic, inflexible, and conservative than innovators and that they tend to tolerate less ambiguity than innovators.

The differences in behaviour between adaptors and innovators often result in innovators and adaptors perceiving each other negatively (Kirton, 1987).[9] Adaptors tend to perceive innovators as unsound, impractical, risky, and abrasive. Innovators, on the other hand, tend to perceive adaptors as conforming, inflexible, wedded to the system, and intolerant of ambiguity. From the perspective

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[8] Root-Bernstein (1989a) found that innovative people tend to like trying new things. This is consistent with the relationship between the KAI and sensation-seeking, and between the KAI and risk-taking. The fact that innovative people tend to like trying new things may explain why innovative people tend to be interested in more than one field of study.

[9] The descriptions in this paragraph of the behaviour of innovators and adaptors as perceived by adaptors and innovators, respectively, are exaggerated in order to make a point. It should be kept in mind that most people do not have a marked preference for either an adaptive or innovative approach to problem solving and, as such, are unlikely to perceive others as negatively as the descriptions suggest.

of adaptors, innovators tend to disobey important rules and customs. From the perspective of innovators, adaptors seem unwilling to change rules and customs which have become outdated and inappropriate. Innovators may feel that their ideas are not given sufficient and/or serious consideration by adaptive management (Lindsay, 1985). From the perspective of adaptors, innovators seem to be raising issues that do not exist or are not important; therefore, addressing these issues would unnecessarily hamper the efficiency of the current system and result in unpredictable outcomes, not only in the area under scrutiny, but in areas that less obviously need to be affected (Kirton, 1984).

Both adaptors and innovators seem to overlook each others' strengths. Adaptors tend to overlook the fact that innovators may have important insights into problems that the current assumptions do not address. Innovators tend to overlook the fact that much of the smooth running of an organization depends on a system of rules and customs (Kirton, 1984).

The only published account of difficulties in interpersonal relations among innovators and adaptors is a case study conducted by Lindsay (1985). During tough economic times, an analyst in the Methods and Procedures Department of a multinational company was perceived by his superiors to be performing inadequately. However, from the perspective of the analyst, it seemed that the analyst's

superiors were not considering the pattern of business in the future and their reluctance to change was preventing the analyst from doing a good job. Specifically, the problem seemed to be a personality clash between the analyst and the second in command. The KAI scores of the manager of the department, the second in command, and the analyst were 90, 88, and 118, respectively. These are the KAI values one would expect, more or less, after analyzing the situation in terms of Kirton's theory of problem-solving styles.

Lindsay's study suggests that problem-solving styles may influence the superior-subordinate relationship. It is possible that an adaptive superior may exert too much control over an innovative subordinate's work for the subordinate's liking. Root-Bernstein (1989b) suggests that innovative people need the freedom to do their work as they please in order to be innovative. Freedom would seem to be something an adaptive manager would have trouble providing his subordinates. The obverse also seems probable: an adaptive subordinate should prefer a manager who runs things according to a strict system, a system where there is little doubt about what to do. Evidence exists which suggests that people are more likely to prefer suggestions from an advisor with a similar problem-solving style (as measured by the Myers-Briggs Type Indicator) to their own than suggestions from an advisor with a different problem-solving style than their own (Hunt, Krzystofiak, Meindl, & Yousry, 1989). It

is not much of a leap to suggest that subordinates will prefer the supervision of supervisors with problem-solving styles similar to their own.

Kirton's theory states that innovators and adaptors tend to have difficulty getting along with each other. Trainers and consultants have often reported individual and group difficulties associated with large differences in problem-solving style (Kirton & McCarthy, 1988). Unfortunately, there have been few studies investigating this phenomenon so the evidence remains mainly anecdotal. Research of an experimental nature definitely seems warranted to provide further support for the theory.

Other Factors That Can Influence Interpersonal Relations

If one wishes to investigate the relationship between a measure of problem-solving style and interpersonal relations, it is important to control for additional factors that may influence how people feel about each other as these factors may obscure the relationship of interest. An important factor that influences interpersonal relations is two-way communication. Frank, Cosey, Angevine, and Cardone (1985) found that as the degree of participative decision-making (a process that requires two-way communication) in a group increases, reports of co-worker satisfaction increase. They also found that as the influence of employees in

decision-making increases, satisfaction with supervision increases. The relationship between leader satisfaction and two-way communication has also been found by Graen, Novak, and Somerkamp (1982). Two-way communication may increase supervisor and co-worker satisfaction by reducing internal conflict and encouraging greater cooperation among staff (Gray-Toft & Anderson, 1985; Whitley, Revicki, Allison, Jr., & Landis, 1990).

With regard to Kirton's theory, it is important to control for two-way communication as the most obvious way to reduce conflicts based on contrasting problem-solving styles is to have people discuss with each other the reasons for why they behaved as they did.

Adaption-Innovation and Job Satisfaction

Research has indicated that, while the range of KAI scores within any occupation is large, different occupational groups tend to have different mean KAI scores that are consistent with Kirton's theory (Foxall, 1986; Foxall & Payne, 1987; Holland, 1989; Kirton, 1987). Those who work within a system (e.g., bankers, accountants, those involved in production) tend to be adaptive, while those who work with more than one system or who act as an interface between systems (e.g., R & D, planning, personnel, marketing) tend to be innovative. Within occupational

groups, subsets can be found that tend to deviate from the group mean. For example, among accountants, who tend to be adaptive, are financial advisors who tend to be innovative (Kirton, 1987). The fact that a relationship exists between problem-solving style and type of occupation, and that people with contrasting problem-solving styles may have trouble getting along, suggests that job satisfaction may be related to the match between a person's problem-solving style and his/her occupation (Kirton & McCarthy, 1988). In other words, job satisfaction may be related to the match between people and their environment.

One can imagine a case in which an innovator finds him/herself in a traditional bureaucracy, an "adaptive" environment. In a traditional bureaucracy, there are rules and policies which regulate how business is conducted (Bakke, 1965, as cited in Clapp & De Ciantis, 1989). Adaptors' solutions are congruent with these rules and policies and, since the solutions are based on assumptions common to others, others can see why the solutions "should" work. This means that adaptors will find little need to argue why their solutions should be implemented. The innovator's solutions, on the other hand, are likely to require that rules and policies be changed and, since the solutions are based on assumptions not shared by others, others are likely to question why they should change the system in order to try something that might not work. Even

innovators who are not directly involved in the problem may view the solutions of an innovator as unacceptable (Lindsay, 1985). Innovators are likely to be seen as trying to push unnecessary changes without considering the reasons why things are the way they are. The innovator's proposals are unlikely to be given serious thought by the rest of the group which, in turn, should lead to frustration and dissatisfaction on the part of the innovator.

The opposite situation can also be imagined. For example, an adaptor may find him/herself within an "innovative" environment, a research and development department. In such an environment, people are constantly asked to come up with radical ways to change the way things are done in order to increase the profits of an organization. In an R & D department, one is likely to be a member of a team made up of people with different areas of expertise. It is likely that the adaptor would become uncomfortable with the constant pressure for change and with having to work with people with different methods and assumptions. Also, the fact that there are likely to be few guidelines to restrict how one's work is to be done is also likely to "upset" the adaptor.

In both of the previous examples, it is possible for people to cope (that is, people can behave as the environment demands that they behave). However, in theory, such coping behaviour can only be expected to last for short

periods of time or, if less drastic coping behaviour is required, it can be expected to last for longer periods of time (Lindsay, 1985). Theoretically, over time, the stress of coping should become too much for people and they will have to look for a situation in which they can revert to their preferred manner of problem-solving (Kirton & McCarthy, 1988).

Why might a person find themselves in an environment not suited to his/her problem-solving style? Kirton and McCarthy (1988) suggest three reasons: (1) The person is a temporary member of the group (e.g., in training). (2) The person has found him/herself a "niche" within the work group that allows him/her to avoid changing his/her behaviour in order to cope with the environment. (3) The person is unhappy and is trying to leave the group (i.e., the person is unsatisfied with his/her present job). In the first case, coping behaviour is possible as the stress experienced from coping is unlikely to have accumulated to unbearable proportions. In the second case, coping behaviour is not required. In the third case, the person can no longer cope with the mismatch and is seeking a way out.

Looking at Kirton's theory in terms of a person-environment match, the "person" would be defined in terms of his/her score on the KAI, and the environment would be defined in terms of the average problem-solving style of the person's immediate work group, the "cognitive climate"

(Kirton & McCarthy, 1988). Kirton and McCarthy suggest that differences of less than one standard deviation between an employee and his/her group of co-workers are common and produce little stress. Anecdotal evidence suggests that differences greater than one standard deviation tend to be associated with difficulties working with the group and, as the gap increases, one can expect difficulties in communication and strained relations (Kirton & McCarthy, 1988).

Goldsmith, McNeilly, and Frederick (1989) suggest a different way of formulating the person-environment match in terms of Kirton's theory of problem-solving style. They suggest that the problem-solving style of the immediate supervisor should represent the cognitive climate of an employee, as the prevailing style of decision-making and problem-solving among a group is likely to be determined by the supervisor of the group.

Latack (1981) suggests that the effects hypothesized to result from a person-environment match or mismatch are moderated by how well defined the person is in terms of the personality trait of interest. This formulation of the person-environment match would seem to imply that hypothesized effects are also dependent on how well defined the environment is in terms of the trait of interest. Looking at Kirton's theory from this perspective, it is unlikely that one will find job dissatisfaction among those

who differ more than one standard deviation from the average problem-solving style of their work group; instead, one will tend to find job dissatisfaction among those who can definitely be described as adaptive or innovative who find themselves in an environment that can definitely be described as innovative or adaptive, respectively.

Research related to the notion of a person-environment match in the problem-solving domain suggests that a link between scores on the KAI and job satisfaction will be found. Thomson (1985, as cited in Kirton & McCarthy, 1988) asked subjects whether they felt others in the organization "approached problems in the same way as themselves." Those who answered "no" were significantly more likely to report that they had intentions to leave the job than those who answered "yes." Also, Stewart, Gudykunst, Ting-Toomey, & Nishida (1986) found that Japanese workers reported greater job satisfaction when there was congruence between their preferred decision-making style and the decision-making style of their manager.

Hayward and Everett (1983) have found some evidence for the hypothesized effect of a mismatch between problem-solving style and the cognitive climate. They found that local government employees with more experience and more seniority had more adaptive KAI scores than government employees with less experience and less seniority. Furthermore, the variance in KAI scores among more

experienced and more senior employees was less than the variance in KAI scores among less experienced and less senior employees. An analysis of the problem-solving styles of those who left the job suggested that this trend in KAI scores over time was due to the attrition of innovative employees rather than due to a relationship between age and the KAI, or due to individual changes in problem-solving style (Kirton & McCarthy, 1988). Since government employees are required to work within a relatively strict system of rules and policies, it seems that employees who stayed and succeeded within the organization had problem-solving styles that were congruent with the occupation.

While Kirton's theory and some evidence suggests that incongruence between a person's problem-solving style and the average problem-solving style of one's work group leads to job dissatisfaction, there have been no direct tests of this prediction using Kirton's measure of problem-solving style. Further research on the relationship between scores on the KAI and job satisfaction seems warranted.

Other Factors That Can Influence Job Satisfaction

In order to investigate the relationship between scores on the KAI and job satisfaction, it is important to control for additional factors that may influence job satisfaction as these factors may obscure the relationship of interest.

Some factors that have been found to influence job satisfaction are autonomy (Grunig, 1990; Loher, Noe, Moeller, & Fitzgerald, 1985, as cited in Landy, 1989), two-way communication (Graen et al., 1982), and participation in decision-making (Frank, et al., 1985; Whitley et al., 1990).

According to Hackman and Oldham (1976), autonomy should increase employees' feelings of responsibility for their work which, in turn, should increase job satisfaction. A meta-analysis of studies testing Hackman and Oldham's (1976) model of job satisfaction found a correlation of .46 between autonomy and job satisfaction (Loher et al., 1985, as cited in Landy, 1989).

Two-way communication has been found to be related to job satisfaction. Graen et al. (1982) conducted a study based on the leader-member exchange model of leadership (Graen & Cashman, 1975, as cited in Graen et al., 1982). They found that getting supervisors to talk with subordinates about each other's general concerns and job expectations significantly improved the productivity and reported job satisfaction of subordinates. Two-way communication may have a direct effect on job satisfaction or it may affect job satisfaction by increasing group cohesiveness (Oaklander and Fleishman, 1964, as cited in Gray-Toft & Anderson, 1985).

Given that two-way communication is related to job satisfaction, it is not surprising that several researchers

have found a link between participative decision-making and job satisfaction. Frank et al. (1985) and Gray-Toft and Anderson (1985) both found that as employee participation in decision-making increases, satisfaction with the job also increases. Frank et al. discovered that this effect was stronger for participation in job related decisions than for participation in administrative decisions.

There are several reasons job satisfaction may result from participative decision-making: (1) The amount of role ambiguity felt by staff is reduced through participation (Gray-Toft & Anderson, 1985). (2) Participation reduces internal conflict and encourages greater cooperation among staff (Gray-Toft & Anderson, 1985; Whitley et al., 1990). And, (3) it is assumed that participation satisfies needs for autonomy and achievement (Yukl, 1981, as cited in Landy, 1989).

With respect to Kirton's theory, it is important to control for autonomy in the present study as providing autonomy (allowing employees the freedom to do a job using their preferred problem-solving style) has been suggested as one method of improving the "fit" between people and their environment and, as such, it is assumed to increase people's job satisfaction (Kirton & McCarthy, 1988). It is also important to control for two-way communication and participative decision-making as these two factors are said to influence how well one gets along with one's co-workers.

Since co-workers are used to define the environment within Kirton's theory, how well on "fits in" with one's environment should be influenced by these factors, and this "fit" should, in turn, influence job satisfaction.

Summary

While there is a growing amount of research supporting Kirton's hypotheses regarding personality traits (Goldsmith, 1985; Kirton, 1976) and vocational preferences (Foxall, 1986; Kirton & Pender, 1982) associated with adaption-innovation as measured by the KAI, there has been little research into the validity of the KAI as a pencil and paper measure of problem-solving styles which lead people to "characteristically produce qualitatively different solutions to seemingly similar problems" (Kirton, 1976, p. 622). This was, according to Kirton (1976), the primary impetus for the development of the KAI. Furthermore, little research has been conducted into the possible relationship between scores on the KAI and interpersonal relations, and the possible relationship between scores on the KAI and job satisfaction.

The research presented in this thesis investigated the theoretical relationship between scores on the KAI and each of the following: (1) problem-solving behaviour, (2) interpersonal relations, and (3) job satisfaction. The

relationship between the KAI and problem-solving behaviour was investigated in two ways. The first way was to ask work group members to rate each other's problem-solving behaviour. The second way was to ask work group members to provide reasons and solutions to common, recurring problems within their work group. The relationship between the KAI and interpersonal relations was investigated in three ways. One way was to see if the amount of "friction" reported among work group members was related to the heterogeneity of KAI scores within work groups. Another way was to see if congruence/incongruence between work group members' problem-solving styles and the average problem-solving style of their work group was related to reports of co-worker satisfaction ("congruence/incongruence" being defined in terms of KAI scores less than or greater than one standard deviation from the average KAI score of one's co-workers, respectively). The last way was to see if congruence/ incongruence between work group members' problem-solving styles and the problem-solving style of their supervisor was related to reports of satisfaction with supervision ("congruence/incongruence" being defined in terms of KAI scores less than or greater than one standard deviation from the KAI score of one's supervisor, respectively). The relationship between the KAI and job satisfaction was investigated by looking at whether congruence/incongruence between group members' problem-solving styles and the

average problem-solving style of their work group was related to reports of job satisfaction.

Hypotheses

(1) Adaptors and innovators will be perceived by their peers as proposing qualitatively different solutions to the same or similar problems.

(2) Adaptors and innovators will produce qualitatively different reasons and solutions for the same problems.

(3) Work groups that are relatively heterogeneous in terms of preferences for adaptive or innovative problem-solving will report more friction among co-workers than groups that are relatively homogeneous with respect to preferences for adaptive or innovative problem-solving.

(4) Employees whose problem-solving styles differ substantially from the average problem-solving style of their work group will report less satisfaction with their co-workers than employees whose problem-solving styles are similar to the average problem-solving style of their work group.

(5) Employees whose problem-solving styles differ substantially from the problem-solving styles of their supervisors will report less satisfaction with their supervision than employees whose problem-solving styles are similar to the problem-solving styles of their supervisors.

(6) Employees whose problem-solving styles differ substantially from the average problem-solving style of their work group will report less job satisfaction than employees whose problem-solving styles are similar to the average problem-solving style of their work group.

Method

Participants

Eighty-six people participated in the study. Fifty-seven (66.3%) were from ten work groups located on the University of Calgary campus; nine (10.5%) were from two work groups located at Foothills Hospital in Calgary; fifteen (17.4%) were from two work groups located in downtown Calgary; and five (5.8%) were from a work group in Airdrie, Alberta. The average size of each work group was 8.47 employees, of which, on average, 5.73 (67.7%) participated in the study. Table 1 shows the number of employees in each work group and the percentage of each work group that participated in the study. The general occupational category of each work group is also presented. The work groups were chosen primarily on the basis of their accessibility.

Twenty-three of the participants were men and 63 of the participants were women. The approximate mean age of the sample was 36.67 years (N = 63, SD = 9.82, Range = 17-63). The approximate mean age of the men was 34.12 years (N = 16, SD = 7.76, Range = 21-50) and the approximate mean age of women was 37.53 years (N = 47, SD = 10.29, Range = 17-63). Twenty-three participants did not provide demographic information. It is possible that these participants viewed this information as unnecessary after reading the description of the study provided with the questionnaire

Table 1.

Work Group Sizes and Participation Rates.

Group Number	Occupation	Number of Participants	Size of Group	Percentage of group participating
1	Admin./Sec.	5	5	100.0
2	Purchasing	6	14	42.9
3	Admin./Sec.	3	6	50.0
4	Bookkeeping	4	13	30.8
5	Press Staff	8	9	88.9
6	Admin./Sec.	7	9	77.8
7	Policemen	10	11	90.9
8	Admin./Sec.	5	5	100.0
9	Recreation Programmers	6	9	66.7
10	Recreation Programmers	6	8	75.0
11	File Clerks	5	12	41.7
12	Admin./Sec.	6	6	100.0
13	Admin./Sec.	3	5	60.0
14	Admin./Sec.	7	7	100.0
15	Teachers	5	8	62.5
TOTAL		86	127	67.7

(see Appendix A). Of the fifty-three participants who provided information concerning their educational status, eight had a high school diploma or less, nineteen had attended some form of post high school education other than university or received a college diploma, twenty-three had undergraduate degrees, and three had Master degrees.

Measures

All participants, except managers, received the same questionnaire. Managers' questionnaires used the term "subordinates" instead of "co-workers" and did not contain items referring to supervisors. (An abbreviated copy of the questionnaire can be found in Appendix B. Appendix C contains examples of changes made for managers' questionnaires.)

The questionnaire used in the study was divided into seven sections: (1) KAI, (2) General Job Satisfaction, (3) The Work Environment, (4) Problem Definitions and Solutions, (5) Peer-ratings, (6) Interpersonal Relations, and (7) Group Experience. The KAI was placed first for two reasons: (1) It was deemed inappropriate to leave the KAI until last where it would be susceptible to respondent fatigue. And, (2) the KAI asks for demographic information, information that most people are familiar with entering at the beginning of such things as tests and application forms. The Problem Definitions and Solutions section was placed immediately before the Peer-ratings section in order to give

participants some idea of the behaviours they were to rate. After these considerations, the sections were more or less arranged in order from those containing the least personal questions to those containing the most personal questions.

(1) Kirton Innovation-Adaption Inventory (KAI)

This is Kirton's (1976) measure of problem-solving style (described earlier). In addition to the items in the scale, the measure asks respondents for their name, age, gender, occupation/title, department, and educational status.

(2) General Job Satisfaction

Job satisfaction was measured in two ways. The first measure was a single item ("Overall, I am satisfied with my job.") from the Union of National Defense Employees' (UNDE) Job Satisfaction Survey (1990). Participants were instructed to answer the item using the following 5-point scale: 1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree. The second measure of job satisfaction was an 18-item index of job satisfaction developed by Brayfield and Rothe (1951). This measure is based on the assumption that job satisfaction can be inferred from an individual's attitude toward his/her work.

This measure was chosen as it purports to be a measure of "over-all" job satisfaction rather than satisfaction with specific aspects of the job (e.g., pay, working conditions, etc.).[10] The 18 items of this measure were answered on the same 5-point scale mentioned previously, resulting in a theoretical range of scores from 18 to 90, with 54 indicating a neutral attitude towards one's work. Brayfield and Rothe reported an odd-even product moment reliability coefficient of .77 which, when corrected by the Spearman-Brown prophecy formula, produced a reliability coefficient of .87.

The Job Satisfaction section of the questionnaire contained two additional items. One item asked participants to identify how satisfied they were with the amount of freedom they have to carry out their work. The other item asked participants to indicate the degree to which they would prefer more or less decision-making authority. These items were selected from the Job Satisfaction Survey (UNDE, 1990).

(3) The Work Environment

The work environment was measured in four ways. The first measure consisted of a 5-item index based on Kirton's

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[10] The single-item index of job satisfaction was included in the questionnaire in order to substantiate this claim.

definition of innovative and adaptive solutions. Respondents were asked to indicate on a 5-point scale (1 = Strongly encouraged, 2 = Encouraged, 3 = Neither encouraged nor discouraged, 4 = Discouraged, 5 = Strongly discouraged) the degree to which they are encouraged to produce innovative or adaptive solutions at work. The second measure was composed of items from the Job Satisfaction Survey. The items inquired into (1) how free respondents are to exchange ideas at work and (2) how much autonomy respondents are given at work. The third measure was a single item asking participants how often common, recurring problems occur at work (once a day or less, approximately two or three times a day, approximately four or five times a day, more than five times a day). This item was placed at the end of the Problem Definitions and Solutions section in order to give participants an idea of the type of problems that were being referred to in the item. The last measure of the work environment was a single item that was placed in the Interpersonal Relations section of the questionnaire. The item asked respondents to indicate the degree to which their supervisor demands that they stick to existing ways of doing things versus encourages them to look for new ways of doing things. This item was placed among other items referring to one's supervisor, consequently, it was not included in the questionnaires given to supervisors.

(4) Problem Definitions and Solutions

Participants were presented with five common, recurring problems in their workplace (see Procedure section and the "Problems Definitions and Solutions" section of the questionnaire in Appendix B). For each problem, participants were asked to (1) identify "some possible reasons why this problem occurs," (2) identify the reason they saw "as being the most likely cause of the problem," and (3) recall how they last resolved/handled the problem.

(5) Peer-ratings

This section of the questionnaire contained a measure labelled by the researcher as the Innovative Behaviour Questionnaire (IBQ). The IBQ contains six items which are based on Kirton's definitions of adaptors and innovators (Kirton, 1976) and the concept "structure" (Kirton, 1987). The items ask respondents to rate themselves, their supervisor, and their co-workers on a 9-point scale (1 = never, 5 = sometimes, 9 = always) in terms of the nature of the solutions the ratees propose for common, recurring problems at work. (In the questionnaire given to supervisors, supervisors were asked to rate themselves and their "subordinates" rather than themselves, their co-workers, and their supervisor.) The items ask how often the

solutions proposed by ratees (1) attack problems from unexpected angles, (2) might offend others, (3) incorporate common practises within the organization, (4) are unlikely to be considered by others, (5) would radically alter the way things are done, and (6) resolve problems in customary ways.

Before responding to the IBQ, participants were asked (1) to list the name of their supervisor and the names of their co-workers and (2) to indicate how familiar they were with the way their supervisor and each co-worker tended to solve problems at work. (Supervisors were asked to list the names of their subordinates and to indicate how familiar they were with the way each subordinate tended to solve problems at work.)

(6) Interpersonal Relations

Satisfaction with co-workers and one's supervision were measured on two- and three-item scales, respectively. An additional item asked participants to indicate how much friction there was among employees in their section. All these items were selected from the Job Satisfaction Survey. (Supervisors' questionnaires did not have the items relating to satisfaction with one's supervision.)

(7) Group Experience

Participants were asked to indicate how long they had been a member of their current work group.

Procedure

Letters (see Appendix D) were sent out to supervisors of various work groups. Approximately one week later, supervisors were phoned to determine whether they and their subordinates were interested in participating in the study. Supervisors of interested work groups were interviewed briefly to identify five common, recurring difficulties among those they supervised. These difficulties were entered into the questionnaire. Copies of the questionnaire were then given to the supervisor and his/her subordinates. Each questionnaire was accompanied with (1) a cover letter, (2) information about what the study would require of participants, (3) a consent form, and (4) an envelope in which to return the completed questionnaire (see Appendix A). Supervisors were phoned one week later to determine if all participating members of the work group had completed the questionnaires. When it was determined that all those who wanted to complete the questionnaires had done so, the questionnaires were collected. Meetings were set up with participants as soon as possible after the questionnaires were collected. During the meeting, the investigator

explained the theory behind the study and gave participants feedback on how they scored on the KAI.

Results

Before addressing the hypotheses of this thesis, some evidence of the reliability and validity of the measures is presented.

Reliability and Validity of Scales

A principle components factor analysis of the items of the KAI was conducted. Nine factors with eigenvalues greater than one were extracted from the product-moment correlation matrix. The nine factors explained 67.4% of the total variance of the 32 items of the KAI. The first factor, which explained 21% of the variance among items, was clearly the problem-solving style factor described by Kirton (1976). All items loaded greater than .20 on this factor, and all but three items loaded greater than .30. Of the remaining eight factors, only one explained more than 10% of the variance (11.9%). This factor was defined by items belonging to the "SO" and "E" subscales, with the "SO" items loading positively and the "E" items loading negatively. After varimax rotation, the first three factors corresponded

to the three subscales of the KAI (see Table 2).[11] All seven items of the E subscale loaded greater than .30 on the "E" factor. Eight of the twelve items of the R subscale loaded greater than .30 on the "R" factor. Of the remaining four items of the R subscale, one loaded greater than . 25 on the "R" factor, two did not load on any of the three subscale factors,[12] and one loaded greater than .30 on the "E" factor. Nine of the thirteen items of the SO subscale loaded greater than .30 on the "SO" factor. Three of these nine items also loaded greater than .30 on the "R" subscale--one loading negatively. Of the remaining four items of the SO subscale, two loaded greater than .15 on the "SO" factor, and two did not load on any of the three subscale factors.

Cronbach's coefficient alpha was used to determine the reliability of the KAI and its three subscales. The reliability coefficients are shown in Table 3. The correlation between the R and E subscales was .47 ($p < .001$, $N = 86$). The correlation between the R and SO subscales was .41 ($p < .001$, $N = 86$). The correlation between the SO and E subscales was .13 (p = n.s., $N = 86$).

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[11] In order to get a reliable factor structure from a factor analysis, one should generally have a ratio of respondents to items of five to one. In the present case, the ratio of respondents to items was less than three to one. Despite this fact, Kirton's theoretical factor structure was produced by the factor analysis.

[12] The cutoff point for "load" or "not load" was .15.

Table 2.

Factor Structure of the KAI (N = 86).

Item No.	A person who. . .	"E" factor	"R" factor	"SO" factor
3	enjoys detailed work	.84		
21	masters all details painstakingly	.76		
13	is thorough	.69		
24	is methodical and systematic	.67		
14	is a steady plodder	.51		
16	is consistent	.50		
27	imposes strict order on matters within own control	.34		
1	conforms		.75	
6	never acts without proper authority		.70	
7	never seeks to bend or break rules		.66	
5	is prudent when dealing with authority		.66	
31	prefers colleagues who never 'rock the boat'		.48	
19	readily agrees with the team at work		.42	
28	likes the protection of precise instructions		.42	
29	fits readily into 'the system'		.33	
9	holds back ideas until obviously needed		(.25)	
8	likes bosses and work patterns which are consistent		-	
26	works without deviation in a prescribed way	.37	-	
32	is predictable		-	
22	proliferates ideas			.82
18	is stimulating			.73
20	has original ideas			.67
4	would sooner create than improve			.55
25	often risks doing things differently		.33	.54
10	has fresh perspectives on old problems		-.35	.46
15	copes with several new ideas at the same time			.45
2	will always think of something when stuck			.33
17	can stand out in disagreement against group		.34	.31
30	needs the stimulation of frequent change			(.19)
11	likes to vary set routines at a moment's notice			(.16)
12	prefers changes to occur gradually			-
23	prefers to work on one problem at a time			-

Note: Only loadings > .15 are shown.

Table 3.

Reliability Coefficients of the KAI and the SO, E, and R Subscales.

Scale	Cronbach's Coefficient Alpha
KAI	.87
SO	.81
E	.82
R	.82

A principle components factor analysis of Brayfield and Rothe's (1951) 18-item index of job satisfaction was conducted. Three factors with eigenvalues greater than one were extracted from the product-moment correlation matrix. These three factors explained 60.3% of the total variance of the items. The first factor explained 44.6% of the variance among the items. Since 17 of the 18 items loaded greater than .30 on this factor, this was obviously the job satisfaction factor. Neither of the remaining two factors explained more than 10% of the variance. The alpha coefficient for the job satisfaction scale was .91. The correlation between the 18-item scale, hereafter referred to as JOBSAT1, and the single-item index of job satisfaction, hereafter referred to as JOBSAT2, was .77 ($p < .001$, $N = 84$). This correlation suggests that Brayfield and Rothe's

(1951) index of job satisfaction does measure an individual's general attitude toward his/her job.

A principle components factor analysis was conducted on the 5-item measure of the degree to which innovative behaviours are encouraged in the workplace. Only one factor with an eigenvalue greater than one was extracted from the product-moment correlation matrix. The factor explained 57.1% of the total variance of the items. However, an item whose scoring was supposed to be reversed loaded in the same direction as the other items. The item asked whether a type of adaptive behaviour was encouraged (proposing solutions which incorporate common practices), while the other four items asked whether various types of innovative behaviours were encouraged. For purposes of later analyses, the item addressing the adaptive aspect of the environment was removed from the measure. The remaining four item scale, hereafter referred to as IBQENV, had an alpha coefficient of .75. The IBQENV had a moderate, significant correlation (r = .47, $p < .001$, N = 66) with the item that asked whether one's immediate supervisor demands that one sticks to existing ways of doing things or strongly encourages one to look for new ways of doing things (hereafter, this single-item index will be referred to as SUPENV).

A principle components factor analysis was conducted on the six items addressing (1) how free participants are to exchange ideas at work and (2) how much autonomy

participants are given at work. Two factors with eigenvalues greater than one were extracted from the product-moment correlation matrix. The two factors explained 62.4% of the total variance of the items. All items loaded greater than .50 on the first factor, a factor which explained 43.5% of the variance among the items. Varimax rotation produced the "freedom to exchange ideas" and "autonomy" factors that were expected. The alpha coefficient of the six item scale, hereafter referred to as WRKENV, was .72.

A principle components factor analysis of the IBQ was conducted on the data provided by the 51 participants who rated their supervisor. Two factors with eigenvalues greater than one were extracted from the product-moment correlation matrix. The two factors explained 65.1% of the total variance of the six items of the IBQ. Five of the six items loaded greater than .30 on the first factor, which explained 43.5% of the variance, while four of the six items loaded greater than .40 on the second factor, which explained 21.6% of the variance. The second factor was defined by items describing innovative behaviours. The two items describing adaptive behaviours loaded in the same direction as the items describing innovative behaviours. For purposes of later analyses, these two items ("common practices," "customary ways") were removed, leaving a four item IBQ with an alpha coefficient of .65.

In order to increase the reliability of the IBQ, the average ratings on the IBQ of ratees by raters were calculated. Ratings of others by, and ratings by others of, participants with less than six months experience within a work group were omitted. Also, ratings by people who said they were "not at all familiar" or "somewhat familiar" with the ratee's behaviour were omitted. Lastly, ratees with less than three raters were omitted. This resulted in only 44 participants having "acceptable" average peer-ratings. In order to estimate the reliability of the average ratings (hereafter referred to as IBQ-ave), Cronbach's coefficient alpha was calculated on a 12-item scale composed of the ratings of three raters rating ratees on the four items of the IBQ. For ratees with more than three raters, three raters were drawn at random for this analysis. The alpha coefficient of the 12-item scale was .88.

Three scales were used to assess interpersonal relations at work. The two items measuring satisfaction with one's co-workers demonstrated a significant, moderate relationship with each other ($\underline{r}$ = .63, $\underline{p}$ < .001, $\underline{N}$ = 84) (hereafter, this two-item scale will be referred to as CWKSAT). The correlation between CWKSAT and the item referring to the degree of friction among co-workers (hereafter referred to as FRICTION) was -.42 ($\underline{p}$ < .001, $\underline{N}$ = 84). A principle components factor analysis of the three items measuring satisfaction with one's supervision was

conducted. One factor with an eigenvalue greater than one was extracted from the product-moment correlation matrix. All items loaded greater than .80 on this factor which explained 73.7% of the total variance of the items. The alpha coefficient of this three-item scale, hereafter referred to as SUPSAT, was .81.

Since participants in this study were members of work groups, more than one rating of the environment was obtained per work group. The hypotheses of this study require that the effects of the environment be controlled for when investigating the relationships between scores on the KAI and several dependent variables. It was assumed that using the average of the ratings of an environment by a group of employees would give the most reliable measure of the environment. There were several measures of the environment included in this study. The estimated reliability coefficients of the averaged ratings can be seen in Table 4. The alpha coefficients of the environmental measures were based on ratings of the environment by subordinates with more than six months experience within their work group (N = 63). Only IBQENV-ave[13] attained a reasonable level of reliability. WRKENV-ave obtained a marginally acceptable

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[13] The suffix "-ave" indicates that the variable represents a group average rather than an individual's rating. For example, IBQENV represents each participant's rating of the environment and IBQENV-ave represents the average of group members' ratings of the environment.

Table 4.

Estimated Reliability of Averaged Environment Ratings.

Scale	Composition of Scale	Alpha Coefficient
IBQENV-ave	4 items x 3 raters = 12 items	.70[a]
WRKENV-ave	6 items x 3 raters = 18 items	.55
FREQUENCY-ave	1 item x 3 raters = 3 items	.46
FRICTION-ave	1 item x 3 raters = 3 items	.37
SUPENV-ave	1 item x 3 raters = 3 items	.32

a **Ratings on this scale demonstrated a relationship with the O and E subscales of the KAI; as such, the effects of these behavioral characteristics on ratings of the environment were partialled out before computing the alpha coefficient and were partialled out before conducting later analyses.**

level of reliability.

As the inter-rater reliability of the environmental measures was poor, it was decided that two types of environmental variables would be used in later analyses, "perceived environment" variables and "actual environment" variables. Each participant's rating of the environment was considered to be a measure of the "perceived environment," inasmuch as the ratings represented the environment as perceived by the rater. The averaged environment ratings were considered to be measures of the "actual environment," inasmuch as these ratings represented the best estimate of

the general work environment. Five "perceived environment" variables--IBQENV, WRKENV, FREQUENCY, FRICTION, and SUPENV--and two "actual environment" variables--IBQENV-ave and WRKENV-ave--were used in later analyses.

In summary, thirteen scales were used in the following analyses. The KAI refers to Kirton's measure of problem-solving style. JOBSAT1 refers to Brayfield and Rothe's (1951) 18-item index of job satisfaction. JOBSAT2 refers to the single item index of job satisfaction ("Overall, I am satisfied with my job."). IBQENV refers to the 4-item scale measuring the degree to which innovative behaviours are encouraged in the workplace. IBQENV-ave refers to the average of group members' ratings of the environment on IBQENV. WRKENV refers to the 6-item scale addressing (1) how free participants are to exchange ideas at work and (2) how much autonomy participants are given at work. WRKENV-ave refers to the average of group members' ratings of the environment on WRKENV. FREQUENCY refers to the item which asked participants how often common, recurring problems occur at work. IBQ-ave refers to the average peer-ratings of participants on the 4-item measure of innovative behaviour. CWKSAT refers to the 2-item measure of satisfaction with one's co-workers. FRICTION refers to the single item which inquired into the degree of friction among co-workers. SUPSAT refers to the 3-item measure of satisfaction with one's supervision. SUPENV refers to the

item which asked respondents to indicate the degree to which their supervisor demands that they stick to existing ways of doing things versus encourages them to look for new ways of doing things.

The means, standard deviations, Ns, and ranges of all the scales used in the analyses that follow are shown in Table 5. All participants filled in the measure of problem-solving style, the KAI. One participant did not complete any of the other measures; however, this participant's KAI score was still useful in determining the "cognitive climate" of others in his/her work group. One participant overlooked the JOBSAT2 item. Seven participants overlooked or chose not to answer the FREQUENCY item. Thirty-five participants chose not to rate their co-workers on the IBQ, probably because they felt that these items were too personal. After eliminating inexperienced (less than 6 months experience within a group) and unfamiliar ("not at all familiar" or "somewhat familiar" with the way the ratee solves problems at work) raters, only an N of 44 was left for IBQ-ave. One participant chose not to report his/her level of satisfaction with co-workers (CWKSAT) or the degree of friction among co-workers (FRICTION). Only 71 participants received the SUPSAT and SUPENV items (86 participants - 15 supervisors = 71 subordinates). Of these, seventeen participants chose not to report their level of satisfaction with their supervision (SUPSAT), and five chose

Table 5.

Scale Ranges, Ns, Means, and Standard Deviations.

Scale	Possible Range	N	Sample Range	Mean	Standard Deviation
KAI	32 -160	86	65 -141	93.58	15.962
SO	13 - 65	86	22 - 59	42.93	8.067
E	7 - 35	86	7 - 34	17.17	5.486
R	12 - 60	86	19 - 52	33.48	7.625
JOBSAT1	18 - 90	85	34 - 86	68.44	9.577
JOBSAT2	1 - 5	84	1 - 5	4.02	.806
IBQENV	4 - 20	85	8 - 19	13.98	2.241
IBQENV-ave	4 - 20	63	10.5- 17.5	13.52	1.219
WRKENV	6 - 30	85	14 - 30	22.38	3.764
WRKENV-ave	6 - 30	63	19.3- 25	21.62	1.603
FREQUENCY	1 - 4	78	1 - 4	1.82	.964
IBQ-ave	4 - 36	44	11 - 25.7	18.25	4.322
CWKSAT	2 - 10	84	3 - 10	7.25	1.528
FRICTION	1 - 5	84	1 - 5	3.40	.866
SUPSAT	3 - 15	54	5 - 15	11.18	2.465
SUPENV	1 - 5	66	1 - 5	3.74	.917

not to describe the type of problem-solving behaviour encouraged by their supervisor (SUPENV).

For many of the analyses described next, the evidence for a direct relationship between scores on the KAI and a dependent variable is presented first. Then, the evidence for relationships between suspected moderator variables and the dependent variable is presented. Lastly, evidence for a relationship between scores on the KAI and the dependent variable, while controlling for suspected moderator variables, is presented.

Dunn's procedure was used to control for error rates (Pedhazer, 1982): alpha, the general level of significance, was divided by the number of statistical tests conducted in each set of analyses. An alpha of .10 was chosen for this thesis to make up for the lack of power that accompanies low N's. For most analyses, three relationships were investigated: the relationship between the dependent variable and scores on the KAI, and the relationships between the dependent variable and two moderator variables. Therefore, the level of significance for most analyses was set at .10/3 = .033. (However, probabilities are reported in conventional terms, i.e., .05, .01, or .001.)

Relationship Between Scores on the KAI and Problem-Solving Behaviour

It was hypothesized that innovators and adaptors would produce qualitatively different reasons and solutions to the same or similar problems. This hypothesis was tested in two ways. The first way was to ask group members to rate each other's behaviour. The second way was to ask group members to provide reasons and solutions to common, recurring problems. Peer-ratings on the IBQ will be discussed first.

Pearson's product-moment correlation coefficients were used to evaluate the relationships between IBQ-ave and the following: scores on the KAI, and scores on the SO, E, and R subscales. A significant, positive correlation was found between IBQ-ave and scores on the KAI (r = .56, p < .001, N = 44), and significant, positive correlations were found between IBQ-ave and the subscales of the KAI (SO: r = .49, p < .001; E: r = .32, p < .05; R: r = .45, p < .001), indicating that those who described themselves as innovators or adaptors were seen by their fellow group members as solving problems innovatively or adaptively, respectively.

In the introduction, it was suggested that the environment can influence problem-solving behaviour. Pearson's product-moment correlation coefficients were used to evaluate the relationship between the IBQENV and IBQ-ave, and the relationship between IBQENV-ave and IBQ-ave. A

significant, positive correlation was found between IBQENV and IBQ-ave (r = .45, p < .001, N = 44), indicating that, as people's perceptions of the degree to which innovative behaviour is encouraged increase, the degree to which they are perceived as behaving innovatively by others increases. A significant correlation coefficient was not found between IBQENV-ave and IBQ-ave (r = .20, p = n.s., N = 33), indicating that the degree to which innovative behaviour is "actually" encouraged does not affect the degree to which one is perceived to behave innovatively.

A hierarchical multiple regression analysis was conducted to assess the significance of the amount of variance in peer-ratings accounted for by scores on the KAI beyond the variance accounted for by IBQENV and IBQENV-ave. The variables were entered into the analysis in two steps. In the first step, IBQENV and IBQENV-ave were entered and, in the second step, scores on the KAI were entered. Table 6 shows the outcome of each step of the regression analysis. The three variables explained 45% of the variance in peer-ratings. Scores on the KAI accounted for a significant increase in "explained" variance in peer-ratings beyond the variance accounted for by the environmental variables.

Participants were asked to provide reasons and solutions for common, recurring problems within their work group. The reasons and solutions to common, recurring problems provided by each work group were made into rating

Table 6.

Hierarchical Multiple Regression of IBQ-ave on IBQENV, IBQENV-ave, and the KAI.

Criterion: IBQ-ave

Predictor Step	Change in R^2	d.f.	F
1. IBQENV, IBQENV-ave	0.08	2, 30	1.27
2. KAI	0.37	1, 29	19.38***
Individual Predictor	Standardized Coefficient	t (29)	
IBQENV	0.13	0.79	
IBQENV-ave	-0.08	-0.50	
KAI	0.62	4.40***	

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

booklets. Outside raters (people who were not members of any of the work groups) were asked to rate the reasons and solutions in terms of how "unique" the reasons and solutions were when compared to other reasons and solutions provided by members of the same work group (see Appendix E). It was assumed that adaptors, since they solve problems by working with existing paradigms, would be more likely than innovators to produce reasons and solutions that are similar

to the reasons and solutions produced by their co-workers. Since innovators depart from existing paradigms, it was assumed that their reasons and solutions would be more unique than the reasons and solutions provided by their co-workers. Two sets of ratings were collected for each group so that the reliability of the rating method could be determined.

The reliability of the rating method for uniqueness was estimated by calculating the percentage of agreement between raters. Across groups, there was 71% agreement between raters regarding which reasons and solutions were unique and which reasons and solutions were similar to other reasons and solutions. However, the degree to which raters agreed with each other varied dramatically depending on which particular raters rated a group's reasons and solutions. (Rater reliability varied from 53.2% agreement to 90.7% agreement.) After controlling for chance agreement (Cohen, 1960), there was 32% agreement between raters across groups.

A reason or solution was considered unique if both raters rated the reason or solution as "not at all similar" to any other reason or solution presented by group members. This meant, however, that groups with relatively reliable raters were likely to have more unique reasons and solutions than groups with relatively unreliable raters as the raters were more likely to agree with each other.

Before the relationship between scores on the KAI and

the type of reasons and solutions provided by participants was examined, it was important to ensure that style and level were not confounded. Pearson's product-moment correlation coefficient was used to evaluate the relationship between scores on the KAI and the number of reasons produced by participants. Participants who did not provide reasons for all five difficulties presented in the questionnaire were omitted from the analysis. Across groups, scores on the KAI were not significantly related to the number of reasons produced by participants ($\underline{r}$ = .17, $\underline{p}$ = n.s., $\underline{N}$ = 69).

In order to control for differences in the types of problems presented to different groups, and to control for environmental differences across groups, subjects were ranked, within groups, in terms of the number of reasons they produced and in terms of their scores on the KAI. The correlation between the two sets of ranks across groups was .32 ($\underline{p}$ < .01, $\underline{N}$ = 69), indicating that relatively innovative group members tended to provide more reasons than relatively adaptive group members.

Since the number of reasons produced by participants was related to their problem-solving styles, level and style were confounded. In order to partial out the effects of quantity (level) on "uniqueness" (style), the number of unique reasons produced by each participant was divided by the total number of reasons produced by the participant; in

other words, the percentage of unique reasons provided by each subject was calculated.

In order to provide some control for the effect of rater reliability on the percentage of unique reasons and solutions within groups, participants were ranked within groups according to the percentage of unique reasons and solutions they provided.

Pearson product-moment correlation coefficients were used to evaluate the relationship between participants' within-group ranking on the KAI and their within-group ranking on each of the following: (1) percentage of unique reasons provided ($\underline{r}$ = .07, $\underline{p}$ = n.s., $\underline{N}$ = 50), (2) number of unique reasons chosen "most likely" ($\underline{r}$ = .27, $\underline{p}$ = n.s., $\underline{N}$ = 50), and (3) number of unique solutions provided ($\underline{r}$ = .16, $\underline{p}$ = n.s., $\underline{N}$ = 50).[14] As can be seen, none of the coefficients reached significance, although the relationship between within-group rankings on the KAI and within-group rankings on the number of unique reasons chosen "most likely" did approach significance ($\underline{p}$ = .055). For participants in this study, there was a tendency for relatively innovative group members to chose more unique reasons as being the most likely causes of problems than relatively adaptive group members. Relatively innovative

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[14] Supervisors were removed from this analysis as the problems involved were problems common to their subordinates--the problems were not necessarily problems that the supervisors had to face.

group members did not provide more unique reasons or solutions than relatively adaptive group members.

Relationship Between Scores on the KAI and Interpersonal Relations

It was hypothesized that groups that are relatively heterogeneous with respect to preferences for adaptive or innovative problem solving would report more friction among co-workers than groups that are relatively homogeneous with respect to preferences for adaptive or innovative problem solving. Pearson's product-moment correlation coefficient was used to evaluate the relationship between the standard deviation of co-workers' scores on the KAI and FRICTION. Only the responses of employees in groups in which 70% or more of the group participated were included in this analysis. This ensured that the standard deviation of KAI scores among each group of participants was a relatively good approximation of the standard deviation of KAI scores of the participants' entire group.[15] A weak and insignificant correlation coefficient was found between the standard deviation of KAI scores within groups and FRICTION (r = .05, p = n.s., N = 40), indicating that heterogeneity

[15] All following analyses involving individual differences in problem solving style among employees and their coworkers are also based on the responses of workers in groups in which 70% or more of the group participated.

of scores on the KAI is not related to perceived friction among co-workers.

In the introduction, it was suggested that the environment can influence interpersonal relations among co-workers. Pearson's product-moment correlation coefficients were used to evaluate the relationship between WRKENV and FRICTION, and the relationship between WRKENV-ave and FRICTION. A significant relationship was not found between WRKENV and FRICTION (r = .20, p = n.s., N =84), nor was a significant relationship found between WRKENV-ave and FRICTION (r = -.17, p = n.s., N = 63), indicating that the "perceived" or "actual" environment, described in terms of being able to discuss ideas and in terms of autonomy, does not seem to be related to perceived friction among co-workers.

A hierarchical regression analysis was conducted to determine if the relationship between heterogeneity of problem-solving styles and FRICTION was confounded with WRKENV and WRKENV-ave. Table 7 shows the outcome of the regression analysis. Controlling for the effects of WRKENV and WRKENV-ave did not produce a significant relationship between the standard deviation of each group's KAI scores and FRICTION. However, controlling for WRKENV and the standard deviation of KAI scores among co-workers did produce a significant relationship between FRICTION and WRKENV-ave. The results suggest that heterogeneity of

Table 7.

Hierarchical Multiple Regression of FRICTION on WRKENV, WRKENV-ave and SD of KAI Scores within Groups.

Criterion: FRICTION

Predictor Step	Change in R^2	d.f.	F
1. WRKENV, WRKENV-ave	0.19	2, 37	4.40*
2. SD of KAI Scores within Groups	0.02	1, 36	0.88
Individual Predictor	**Standardized Coefficient**	**t (36)**	
WRKENV	-0.34	-2.04*	
WRKENV-ave	0.55	2.94**	
SD of KAI Scores within Groups	-0.16	-0.94	

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

problem-solving styles is not related to perceived friction within a group of co-workers. The results also suggest that as opportunities to discuss ideas/opinions and the degree of autonomy at work increase, perceived friction among co-workers increases.

It was hypothesized that employees whose problem-solving styles differ greater than one standard deviation from the average problem-solving style of their co-workers will report less co-worker satisfaction than employees whose problem-solving styles differ less than one standard deviation from the average problem-solving style of their co-workers. Using a one tailed t-test, it was found that a difference between means on CWKSAT did not exist between employees whose problem-solving style differed greater than one standard deviation from the average problem-solving style of their co-workers and employees whose problem-solving style differed less than one standard deviation from the average problem-solving style of their co-workers ($t(39) = -0.44$, p = n.s.).[16] [17]

In the introduction, it was suggested that the environment can influence employees' satisfaction with their co-workers. Pearson's product-moment correlation coefficients were used to evaluate the relationship between WRKENV and CWKSAT, and the relationship between WRKENV-ave

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[16] For each participant, the standard deviation of KAI scores refers to the distribution of KAI scores of the group, excluding the manager's KAI score and the participant's KAI score. The manager was excluded as the manager has a different job than the subordinates and, as such, the manager's problem-solving style may not reflect the "cognitive climate" of a particular job. The participant's KAI score was excluded as one can not be one's own environment.

[17] The standard deviation of Kirton's (1976) original pilot group (17.54) was also used. While these results are not reported, the conclusions are identical to those presented throughout the results section of this thesis.

and CWKSAT. A significant, positive correlation was found between WRKENV and CWKSAT (r = .32, p < .01, N = 84), indicating that, as employees' perceptions of being able to discuss ideas and of autonomy increase, reports of co-worker satisfaction increase. A significant correlation was not found between WRKENV-ave and CWKSAT (r = -.01, p = n.s., N = 63), indicating that a relationship between the "actual" environment, described in terms of being able to discuss ideas and in terms of autonomy, and reports of co-worker satisfaction does not exist.

A hierarchical regression analysis was conducted to determine if the relationship between problem-solving style and CWKSAT was confounded with WRKENV and WRKENV-ave. For the analysis, the notion of a "fit" or "misfit" with one's environment was captured in a dummy variable called "problem-solving-style incongruence." A value of 1 indicated a "greater than 1 SD" difference from the mean KAI score of one's co-workers and a value of 0 indicated a "less than 1 SD" difference from the mean KAI score of one's co-workers. Table 8 shows the outcome of the regression analysis. Controlling for the effects of WRKENV and WRKENV-ave did not produce a significant relationship between problem-solving-style incongruence and CWKSAT. The results suggest that the difference between an employee's problem-solving style and the average problem-solving style of the employee's co-workers is not associated with co-worker

Table 8.

Hierarchical Multiple Regression of CWKSAT on WRKENV, WRKENV-ave, and Problem-Solving-Style Incongruence.

Criterion: CWKSAT

Predictor Step	Change in R^2	d.f.	F
1. WRKENV, WRKENV-ave	0.09	2, 38	1.91
2. Problem-Solving-Style Incongruence	0.00	1, 37	0.09
Individual Predictor	**Standardized Coefficient**	**t (37)**	
WRKENV	0.30	1.71	
WRKENV-ave	-0.26	-1.49	
Problem-Solving-Style Incongruence	0.05	0.29	

*p < .05, **p < .01, ***p < .001

satisfaction.

It was hypothesized that employees whose problem-solving styles differ greater than one standard deviation from the problem-solving styles of their supervisors will report less satisfaction with their supervision than

employees whose problem-solving styles differ less than one standard deviation from the problem-solving styles of their supervisors. Using a one tailed t-test, it was found that a difference between means on SUPSAT did not exist between employees whose problem-solving style differed greater than one standard deviation from the problem-solving style of their supervisors and employees whose problem-solving style differed less than one standard deviation from the problem-solving style of their supervisors (t (48) = 0.21, p = n.s.).[18]

In the introduction, it was suggested that the environment can influence employees' satisfaction with their supervision. Pearson's product-moment correlation coefficients were used to evaluate the relationship between WRKENV and SUPSAT, and the relationship between WRKENV-ave and SUPSAT. A significant, positive correlation was found between WRKENV and SUPSAT (r = .53, p < .001, N = 50), indicating that, as employees' perceptions of being able to discuss ideas and of autonomy increase, reports of satisfaction with supervision increase. An insignificant correlation was found between WRKENV-ave and SUPSAT (r = .16, p = n.s., N = 50), indicating that a relationship between the "actual" environment, described in terms of

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[18] The standard deviation used in this and the following regression analysis was based on the distribution of the differences between employees' and their supervisors' KAI scores in the current sample.

being able to discuss ideas and in terms of autonomy, and satisfaction with supervision does not exist.

A hierarchical regression analysis was conducted to determine if the relationship between problem-solving style incongruence, between employees and their supervisors, and SUPSAT was confounded with WRKENV and WRKENV-ave. Table 9 shows the outcome of the regression analysis. Controlling for the effects of WRKENV and WRKENV-ave did not produce a significant relationship between problem-solving-style incongruence, between employees and their supervisors, and SUPSAT. The results suggest that differences between the problem-solving styles of employees and supervisors are not associated with satisfaction with supervision.

Relationship Between Scores on the KAI and Job Satisfaction

It was hypothesized that employees whose problem-solving styles differ substantially from the average problem-solving style of their work group would report less job satisfaction than employees whose problem-solving styles are similar to the average problem-solving style of their work group. Using one-tailed t-tests, significant differences between means on JOBSAT1 and on JOBSAT2 were not found between employees whose problem-solving style was congruent with their co-workers' average problem-solving style and employees whose problem-solving style was

Table 9.

Hierarchical Multiple Regression of SUPSAT on WRKENV, WRKENV-ave, and Problem-Solving-Style Incongruence (Supervisor).

Criterion: SUPSAT

Predictor Step	Change in R^2	d.f.	F
1. WRKENV. WRKENV-ave	0.29	2, 47	9.43***
2. Problem-Solving-Style Incongruence (Supervisor)	0.00	1, 46	0.25
Individual Predictor	**Standardized Coefficient**	**t (46)**	
WRKENV	0.57	4.13***	
WRKENV-ave	-0.08	-0.57	
Problem-Solving Style Incongruence (Supervisor)	-0.06	-0.50	

*p < .05, **p < .01, ***p < .001

incongruent with their co-workers' average problem-solving style (JOBSAT1: t (39) = 0.88, p = n.s.; JOBSAT2: t (39) = 0.50, p = n.s.).

In the introduction, it was mentioned that the

environment can influence job satisfaction. Pearson's product-moment correlation coefficients were used to evaluate the relationships between the two measures of job satisfaction and WRKENV, and the relationships between the two measures of job satisfaction and WRKENV-ave. Significant, positive correlations were found between WRKENV and JOBSAT1 (r = .49, p < .001, N = 85) and between WRKENV and JOBSAT2 (r = .46, p < .001, N = 84), indicating that, as employees' perceptions of being able to discuss ideas and of autonomy increase, reports of job satisfaction increase. However, significant correlations were not found between WRKENV-ave and JOBSAT1 (r = .03, N = 63), and between WRKENV-ave and JOBSAT2 (r = -.02, N = 63), indicating that the "actual" environment, described in terms of being able to discuss ideas and in terms of autonomy, is not related to job satisfaction.

Hierarchical regression analyses were conducted to determine if the relationship between problem-solving style incongruence and JOBSAT1, and the relationship between problem-solving style incongruence and JOBSAT2, were confounded with WRKENV and WRKENV-ave. Table 10 and Table 11 show the outcome of the regression analyses. Controlling for WRKENV and WRKENV-ave did not produce a significant relationship between problem-solving-style incongruence and JOBSAT1, nor did it produce a significant relationship between problem-solving-style incongruence and JOBSAT2. The

Table 10.

Hierarchical Multiple Regression of JOBSAT1 on WRKENV, WRKENV-ave, and Problem-Solving-Style Incongruence.

Criterion: JOBSAT1

Predictor Step	Change in R^2	d.f.	F
1. WRKENV, WRKENV-ave	0.14	2, 38	2.99
2. Problem-Solving-Style Incongruence	0.03	1, 37	1.23
Individual Predictor	**Standardized Coefficient**	**t (37)**	
WRKENV	0.39	2.35*	
WRKENV-ave	-0.03	-0.19	
Problem-Solving-Style Incongruence	-0.17	-1.11	

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

Table 11.

Hierarchical Multiple Regression of JOBSAT2 on WRKENV, WRKENV-ave, and Problem-Solving-Style Incongruence.

Criterion: JOBSAT2

Predictor Step	Change in R^2	d.f.	F
1. WRKENV, WRKENV-ave	0.09	2, 38	1.97
2. Problem-Solving-Style Incongruence	0.01	1, 37	0.46
Individual Predictor	**Standardized Coefficient**	**t (37)**	
WRKENV	0.35	2.02	
WRKENV-ave	-0.16	-0.92	
Problem-Solving-Style Incongruence	-0.10	-0.68	

*p < .05, **p < .01, ***p < .001

results suggest that the difference between an employee's problem-solving style and the average problem-solving style of the employee's co-workers is not associated with job satisfaction.

Additional Analyses on the Relationship Between Scores on the KAI and Job Satisfaction and on the Relationship Between Scores on the KAI and Interpersonal Relations

Goldsmith, et al. (1989) suggested that the environment should be defined in terms of the problem-solving style of an employee's immediate supervisor. If this is the case, then differences from the problem-solving style of one's supervisor should influence job satisfaction. One-tailed t-tests were conducted to determine if a significant difference between means on JOBSAT1 and on JOBSAT2 existed between employees whose problem-solving styles were congruent with their supervisor's problem-solving style and employees whose problem-solving styles were incongruent with their supervisor's problem-solving style. Significant differences were not found between means on JOBSAT1 (t (62) = -0.67, p = n.s.) or between means on JOBSAT2 (t (62) = -0.07, p = n.s.).

In the introduction, it was mentioned that the environment can influence job satisfaction. Hierarchical regression analyses were conducted to determine if the relationship between problem-solving-style incongruence with one's supervisor and JOBSAT1, and the relationship between problem-solving-style incongruence with one's supervisor and JOBSAT2 were confounded with WRKENV and WRKENV-ave. Table 12 and Table 13 show the outcome of the regression analyses.

Table 12.

Hierarchical Multiple Regression of JOBSAT1 on WRKENV, WRKENV-ave, and Problem-Solving-Style Incongruence (Supervisor).

Criterion: JOBSAT1

Predictor Step	Change in R^2	d.f.	F
1. WRKENV, WRKENV-ave	0.19	2, 60	7.06**
2. Problem-Solving-Style Incongruence (Supervisor)	0.01	1, 59	0.43
Individual Predictor	**Standardized Coefficient**	**t (59)**	
WRKENV	0.49	3.73***	
WRKENV-ave	-0.19	-1.44	
Problem-solving Style Incongruence (Supervisor)	0.08	.66	

*p < .05, **p < .01, ***p < .001

Table 13.

Hierarchical Multiple Regression of JOBSAT2 on WRKENV, WRKENV-ave, and Problem-Solving-Style Incongruence (Supervisor).

Criterion: JOBSAT2

Predictor Step	Change in R^2	d.f.	F
1. WRKENV, WRKENV-ave	0.23	2, 60	8.80***
2. Problem-Solving-Style Incongruence (Supervisor)	0.00	1, 59	0.00
Individual Predictor	Standardized Coefficient	t (59)	
WRKENV	0.53	4.16***	
WRKENV-ave	-0.27	-2.07*	
Problem-solving Style Incongruence (Supervisor)	0.00	0.01	

*p < .05, **p < .01, ***p < .001

Controlling for WRKENV and WRKENV-ave did not produce a significant relationship between problem-solving-style incongruence with one's supervisor and JOBSAT1, nor did it produce a significant relationship between problem-solving-style incongruence with one's supervisor and JOBSAT2. The results suggest that the similarity or difference between an employee's problem-solving style and his/her supervisor's problem-solving style is not associated with job satisfaction.

It was suggested in the introduction that predictions arising from mismatches between persons and their environment are more likely to be accurate in situations where the person can be clearly defined as adaptive or innovative and the environment can clearly be defined as adaptive or innovative. For the present analysis, participants who scored greater than one standard deviation above the sample mean on the KAI were labelled as innovators, and participants who scored greater than one standard deviation below the mean were labelled as adaptors. The environment was measured in five ways for the present analysis: (1) ratings on IBQENV, (2) ratings on IBQENV-ave, (3) ratings on SUPENV, (4) managers' KAI scores, and (4) the mean KAI score of one's co-workers. In each case, environments rated greater than one standard deviation from the mean of the present sample were rated as innovative or adaptive depending on the direction of deviation.

Since most people and environments are "average," few members of the present sample could be described as being innovators or adaptors in innovative or adaptive environments; as such, statistical analyses were impossible. Therefore, 2 by 2 tables were made in order to determine, visually, if those who "fit in" with their environment differ substantively from those who do not "fit in" with their environment on JOBSAT1 and JOBSAT2. In addition, 2 by 2 tables were made in order to determine, visually, if those who have contrasting or similar problem-solving styles to the problem-solving styles of their supervisors and co-workers differ substantively on SUPSAT and CWKSAT, respectively. The distribution of JOBSAT1 and JOBSAT2 scores did not suggest that a person-environment fit leads to job satisfaction while a person-environment misfit leads to job dissatisfaction; in fact, for IBQENV and IBQENV-ave, the opposite situation seemed to be the case (see Table 14 through Table 17).[19] Innovators with innovative supervisors did seem to report greater satisfaction with their supervision than adaptors with innovative supervisors (see Table 18). Unfortunately, there were no cases of innovators or adaptors with adaptive supervisors. It was impossible to determine, visually, if differences from one's co-workers, with respect to scores on the KAI, were related

[19] A 2 by 2 table was not presented for the environment as defined by the average KAI score of one's coworkers as three of the four cells were empty.

to satisfaction with one's co-workers as three of four cells in the 2 by 2 table were empty.

Table 14.

KAI by IBQENV and Job Satisfaction (JOBSAT1 & JOBSAT2).

KAI	Adaptive Environment	Innovative Environment
Innovators	Mean = 79.5[a](5)[b] N = 2	Mean = 61.3 (3.7) N = 3
Adaptors	Mean = 64.3 (4) N = 3	Mean = . ( ) N = 0

IBQENV

a The mean of JOBSAT1.
b The mean of JOBSAT2.

Table 15.

KAI by IBQENV-ave and Job Satisfaction (JOBSAT1 & JOBSAT2).

KAI	Adaptive Environment	Innovative Environment
Innovators	Mean = 79[a](5)[b] N = 1	Mean = 53.5 (3) N = 2
Adaptors	Mean = 67.8 (4) N = 4	Mean = 73 (4.5) N = 2

IBQENV-ave

a The mean of JOBSAT1.
b The mean of JOBSAT2.

Table 16.

KAI by SUPENV and Job Satisfaction (JOBSAT1 & JOBSAT2).

KAI	Adaptive Environment	Innovative Environment
Innovators	Mean = 71[a](4)[b] N = 1	Mean = 57.6 (3) N = 5
Adaptors	Mean = 73.3 (4.3) N = 3	Mean = 71.3 (4.1) N = 7

SUPENV

a The mean of JOBSAT1.
b The mean of JOBSAT2.

Table 17.

KAI by Manager's KAI Score and Job Satisfaction (JOBSAT1 & JOBSAT2).

KAI	Adaptive Environment	Innovative Environment
Innovators	Mean = . ( ) N = 0	Mean = 68.8[a](4)[b] N = 6
Adaptors	Mean = . ( ) N = 0	Mean = 66 (4) N = 5

Manager's KAI Score

a The mean of JOBSAT1.
b The mean of JOBSAT2.

Table 18.

KAI by Manager's KAI Score and SUPSAT.

KAI	Adaptive Environment	Innovative Environment
Innovators	Mean = . N = 0	Mean = 11.5 N = 2
Adaptors	Mean = . N = 0	Mean = 9 N = 2

Manager's KAI Score

Post-Hoc Analyses

Post-hoc analyses were conducted to ascertain if there were any relationships between the independent and dependent variables, between any of the demographic/group variables and dependent variables, and among the independent variables of this thesis that had not been suggested in the hypotheses. The results are shown in Table 21 and Table 22. No attempt was made to control for error rates as these relationships were not directly related to the hypotheses of this thesis. Had error rates been taken into account, all of the relationships that are significant at $p < .05$ and $p < .01$, would not have been considered significant.

Table 19.

Post-Hoc Analyses: Significant Product-Moment Correlation Coefficients.

	IBQ-ave	FRICT.	CWKSAT	SUPSAT	JOBSAT2	JOBSAT1
group size						
age						
education						
FREQUENCY					-.26*	
SUPENV				.51***		
IBQENV	(.45***)			.29*	.24*	.25*
IBQENV-ave		-.26*				
WRKENV	.41**	(-.20*)	(.32**)	(.56***)	(.46***)	(.49***)
WRKENV-ave						
FRICTION					-.22*	-.20*
CWKSAT					.25**	.38***
SUPSAT					.25*	.38**

*p < .05, **p < .01, ***p < .001

( ) planned comparisons

Table 20.

Post-Hoc Analyses: Gender Differences.[20] [21]

Variables	D.f.	T-Test
IBQ-ave	42	1.69*
FRICTION	81	-1.14
CWKSAT	81	-0.18
SUPSAT	52	-0.44
JOBSAT2	81	-0.16
JOBSAT1	82	0.73

*p < .05, **p < .01, ***p < .001

[20] Kirton (1976) found a weak, but significant, relationship between the KAI and gender (r = -.19, p < .01, N = 532). While a relationship between the KAI (or its subscales) and gender was not found in the present study, Kirton's findings suggest that men are likely to receive higher ratings on measures of innovative behaviour than women. As such, a one-tailed t-test was used to test for differences between the means of men and women on IBQ-ave. All of the other t-tests were two-tailed t-tests.

[21] IBQ-ave was regressed on gender, WRKENV, IBQENV, IBQENV-ave, and the KAI. The KAI still accounted for a significant amount of variance (p < .001) in IBQ-ave after controlling for the other variables. It also maintained its position as the strongest predictor of IBQ-ave.

Sample Characteristics

The means and standard deviations of the KAI scores of subordinates within the work groups that participated in this study are presented in Table 21. As mentioned before, the participants were not chosen randomly nor were they chosen to represent particular groups; participants were chosen on the basis of accessibility.

Two-tailed t-tests were conducted to determine if differences between means on the independent variables (KAI, WRKENV, IBQENV, WRKENV-ave, IBQENV-ave) or dependent variables (CWKSAT, FRICTION, SUPSAT, JOBSAT1, JOBSAT2) existed between those who rated their fellow group members on the IBQ and those who did not rate their fellow group members on the IBQ. Only one significant difference was found. Those who did not rate their fellow group members on the IBQ tended to have higher IBQ-ave ratings than those who did rate their fellow group members on the IBQ (t (42) = 3.08, p < .01). In other words, those who did not rate fellow group members were generally perceived as behaving more innovatively than those who did rate their fellow group members. One difference between means approached significance: those who did not rate their fellow group members tended to report greater satisfaction with their co-workers (CWKSAT) than those who did rate their fellow group members (t (82) = 2.09, p < .05).

Table 21.

Work Group KAI Means and Standard Deviations (subordinates only).

Group Number	Occupation	N	Mean KAI Score	S.D. of KAI Scores
1	Admin./Sec.	4	89.2	11.4
2	Purchasing	5	84.2	4.4
3	Admin./Sec.	2	102.5	13.5
4	Bookkeeping	3	90.3	19.7
5	Press Staff	7	86.3	13.0
6	Admin./Sec.	6	84.8	11.6
7	Policemen	9	90.2	11.2
8	Admin./Sec.	4	87.0	8.6
9	Recreation Programmers	5	104.4	17.1
10	Recreation Programmers	5	97.8	9.0
11	File Clerks	4	87.2	6.4
12	Admin./Sec.	5	81.2	10.4
13	Admin./Sec.	2	82.5	17.5
14	Admin./Sec.	6	113.7	20.4
15	Teachers	4	95.5	18.5
TOTAL		71	91.9	12.5

Two-tailed t-tests were conducted to determine if differences between means on the independent variables (KAI, WRKENV, IBQENV, WRKENV-ave, IBQENV-ave) or the dependent variables (CWKREL, FRICTION, SUPSAT, JOBSAT1, JOBSAT2) existed between members of groups in which more than 70% of the group participated and members of groups in which less than 70% of the group participated. A significant difference was found between means on WRKENV-ave. Groups with less than 70% participation had environments that permitted more freedom to exchange ideas and gave employees more autonomy than groups with more than 70% participation (t (61) = 3.47, $p < .01$).

Discussion

Problem-Solving Style and Problem-Solving Behaviour

It was hypothesized that innovators and adaptors would produce qualitatively different reasons and solutions to the same or similar problems. This hypothesis was tested in two ways. The first way was to ask group members to rate each other's problem-solving behaviour. The second way was to ask group members to provide reasons and solutions to common, recurring problems. Peer-ratings on the IBQ will be discussed first.

A moderate correlation coefficient was found between the KAI and IBQ-ave. Using several raters and several items, and controlling for experience within groups, produced a stronger validity coefficient between the KAI and peer-ratings than the validity coefficient obtained by Keller and Holland (1978). The relationship between self-ratings and peer-ratings remained even after partialling out the effects of the "actual" and "perceived" environments. These findings indicate that innovators and adaptors are perceived by their peers as providing qualitatively different solutions to the same or similar problems.

Ciota (1987), Clapp and De Ciantis (1989), and Root-Bernstein (1989b) concluded that the environment can influence innovative behaviour. This conclusion was

supported in part by the present study: it was found that group members who perceive their environment as encouraging innovative behaviour are perceived by fellow group members as behaving more innovatively than people who perceive their environment as discouraging innovative behaviour. It is important to note, however, that a relationship was not found between the actual environment and perceived behaviour; that is, across groups, peer-ratings of innovative behaviour and the average ratings of environments (IBQENV-ave) were not related. Since ratings by group members of their environment were similar, it seems unlikely that the actual environment was drastically different for each member of a group. These results suggest that behaviour, at least as it is perceived by others within one's group, may be very sensitive to slight differences in perceptions of the environment among group members.

The relationship between peer-ratings and self-ratings does not conclusively prove that people who describe themselves as having the characteristics of Kirton's innovators or adaptors "produce qualitatively different solutions to seemingly similar problems" (Kirton, 1976, p. 622). It is possible that stereotypes of group members exist within groups and that these stereotypes influence how each person within a group is seen by others (Kenrick & Funder, 1988). These stereotypes may also affect the self-reports of ratees, who may come to see themselves as others

see them. Still, these stereotypes must come from somewhere, and the most logical source is the actual behaviour of ratees. However, the stereotypes may be based on a few particularly salient acts of behaviour by ratees rather than on the general behaviour of ratees. Or, the stereotypes may be based on behaviour that is commonly thought to be associated with innovative behaviour, but the behaviour is not innovative behaviour per se (Kenrick & Funder, 1988). For example, someone may be thought to be innovative because they dress differently from everyone else in the group. However, just because a person dresses differently, does not mean that the person produces qualitatively different solutions to common problems. Finally, peer-ratings may agree with self-ratings because ratees may influence perceptions of themselves through discussions with others. In other words, ratees may convince others to perceive themselves as they wish to be perceived, and the image arrived at through negotiation may influence peer-ratings more than actual behaviour (Kenrick & Funder, 1988).

In order to determine whether self-reported behavioral characteristics were related to innovative or adaptive problem-solving, a behavioral measure was incorporated into the present study. For five common, recurring problems, participants were asked to (1) provide some possible reasons for why each problem might occur, (2) indicate which reason

they felt was the most likely cause of each problem, and (3) describe how they last resolved each problem. Reasons were asked for as it was assumed that different reasons would lead to different solutions. Furthermore, while the environment may affect which solutions are actually implemented by employees, the environment was assumed to be less likely than problem-solving style to affect the perceived causes of problems.

The reasons and solutions provided by participants were rated in terms of "uniqueness. " It was found that relatively innovative group members did not provide a greater percentage of unique reasons for common, recurring problems than relatively adaptive group members, nor did they last resolve more problems in unique ways than adaptive group members. While the relationship between problem-solving style and the uniqueness of reasons chosen as "most likely" did approach significance, the relationship was still very weak. While these results suggest that Kirton's measure of problem-solving style may not be valid, it is the investigator's opinion that the lack of validity of the criterion measures is more likely to explain the lack of a relationship between scores on the KAI and problem-solving behaviour than is the possible lack of validity of Kirton's measure.

There are several reasons why the behavioral measures in this study may have been invalid. Some of these reasons

are as follows: (1) One needs complete work groups as willing participants. (2) One needs to choose problems for which it is possible for a "structure" to exist. (3) One needs to word problems in such a way that the problem is not already defined. And, (4) one should have group members rate the reasons and solutions to problems as they are really the only people who can truly determine if reasons and solutions incorporate or challenge the assumptions and policies of the group.

It is very hard to get an entire group of employees and their manager to participate in research as participation either takes up their leisure time or interferes with their work. While getting some group members to participate is not too difficult, it is important to get most of the group to participate as the researcher needs to find problems that are common to the whole group. To ensure that the problems are common, group members should provide the problems. Without common problems, it is impossible to determine whether the problem-solving style of each participant or the type of problem presented to each participant is the cause of qualitatively different solutions among participants. For the present study, it was not possible to get all group members to participate and to provide common, recurring problems. In order to minimize the impact of the study on the work and leisure time of group members, the manager of each group was asked to provide the common, recurring

problems. Unfortunately, a few participants mentioned in the questionnaires that they had never faced some of the problems provided by their manager.

When studying problem-solving style, one needs problems for which it is possible for a structure to exist in order to determine whether reasons and solutions are innovative or adaptive. It is not necessary for a structure per se to exist as one can imagine a group of innovators all doing things their own way. However, it must be possible for a structure to develop so that one can identify adaptive behaviour. In the present study, managers were asked to provide common, recurring problems. Since these problems recur, it was possible for the departments included in this study to develop assumptions, and procedures and policies based on these assumptions, to deal with the problems.

As mentioned earlier in the thesis, there are two ways to define the term "problem," as "a difficulty" and as "a definition of why the difficulty occurs." Problem-solving style influences problem definition; therefore, it is important to present participants with the difficulty in order to let their problem-solving style influence what they perceive to be the cause of the difficulty. Unfortunately, problems are usually described in terms of why people think they occur. For example, people are much more likely to say that they have "too much work" than say, "I am not completing all my work." Asking people why they have "too

much work" is different than asking people why they "are not completing their work." In the first case, one can already see why the person thinks he/she is not completing his/her work. The reasons and solutions that will be provided to the difficulty "too much work" will already be influenced by the structure surrounding the difficulty. In the present study, managers were asked to "identify recurring things that all your subordinates have difficulty doing." This was an attempt to prevent managers' assumptions from restricting the reasons and solutions provided by participants. However, in many cases, it is probable that this did not work, as it is not easy for managers to divorce themselves from their assumptions about the common, recurring problems of their subordinates. Furthermore, it was difficult for the researcher to remove what seemed to be assumptions embedded in the phrasing of difficulties. Attempting to drastically change the wording of difficulties may have resulted in behavioral difficulties that were not faced by any of the subordinates of the manager. Or, the researcher may have offended the manager by rewording difficulties in a way that the manager did not wish to present the difficulties to his/her subordinates.

Another reason behavioral measures of innovative or adaptive problem-solving are difficult to devise is that one must eventually gather ratings of the reasons and solutions provided by participants. The only people who are going to

recognize which reasons and solutions are congruent or incongruent with the assumptions, policies, and procedures of members of a group are the group members. However, getting all participants to spend some additional time to rate reasons and solutions is difficult. Even though it may help the group solve the problems under discussion, it is difficult to get group members to rate reasons and solutions as the group members, in the best scenario, have already given some of their time to provide difficulties, and to provide possible reasons and solutions for the difficulties. Furthermore, it is hard to ensure that the ratees will be blind as to who provided each reason and each solution. Given that the participants are all members of the same work group, it is likely that they have discussed work related matters and have a good idea of how others within the group define common, recurring difficulties, and of how others within the group have resolved the difficulties. If blind ratings cannot be obtained, then "stereotypes" associated with particular group members are likely to influence the ratings.

There is another reason the behavioral measures used in this study may not have been valid. It is possible that the number of problems used in the present study was insufficient to observe individual differences in problem-solving behaviour. Perhaps more than five problems are needed to observe differences in problem-solving tendencies

among people with contrasting problem-solving styles.

Within groups, it was found that innovators tended to produce more reasons than adaptors. This does not necessarily indicate that innovators are higher in cognitive productiveness--a measure of level--than adaptors. Rather, this relationship could reflect the fact that adaptors and innovators responded to the questionnaire in terms of their problem-solving style; that is, adaptors produced a "sufficiency" of reasons, while innovators proliferated reasons.

While the present study did not prove that innovators and adaptors, as identified by the KAI, provide qualitatively different reasons and solutions to similar problems, strong evidence suggesting this is the case was found with peer-ratings.[22] Whether one takes this evidence as conclusive or not depends on one's trust in peer-ratings as indices of actual behaviour.[23] While evidence has

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[22] The individual who chose not to complete any section of the questionnaire except the KAI had the most innovative score in the present sample. Attached to this person's questionnaire was a letter which explained that he/she felt that the impersonality of surveys distorts results. The letter included an invitation to speak one-on-one with the researcher about interpersonal relations and job satisfaction. This was definitely a less conforming, less efficient, and qualitatively different way of dealing with the questionnaire than the approach taken by his/her coworkers, all of whom completed the questionnaire. The person also mentioned in the letter that he/she tries to complete his/her duties with "as much creativity as the office environment allows."

[23] The fact that peer-ratings reflected ratees' perceptions of the environment (i.e., a relationship was found between IBQ-ave and IBQENV) suggests that the ratings may have

proved that there is more to peer-ratings than stereotypical views, that is, that they can correspond to actual behaviour (Kenrick & Funder, 1988), this was not proven in the present study. However, it could be argued that actual behaviour is irrelevant. People interact with each other on the basis of perceptions of themselves and of others; as such, perceptions of problem-solving behaviour may be very important in and of themselves. For example, perceptions of others as innovators or adaptors may influence interpersonal relations and job satisfaction.

Problem-Solving Style and Interpersonal Relations

It was hypothesized that groups that are relatively heterogeneous with respect to preferences for adaptive or innovative problem-solving would report more friction among co-workers than groups that are relatively homogeneous with respect to preferences for adaptive or innovative problem-solving. The fact that group members in the present study had different perceptions of the degree of friction among group members meant that this hypothesis could not be tested directly; instead, the relationship between heterogeneity of problem-solving styles within a group and perceived friction among co-workers was investigated. No relationship was found between heterogeneity of problem-solving styles within

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reflected more than stereotypes or negotiated roles.

a group and perceived friction among co-workers. The relationship between these two variables was not confounded with the perceived or actual opportunities to discuss ideas/opinions (later referred to as "openness") and degree of autonomy in the work environment.

Based on self-report data, Frank et al. (1985) discovered a positive relationship between participative decision-making and co-worker satisfaction. A somewhat contradictory result was found in the present study: as the number of opportunities to discuss ideas/opinions and of autonomy in one's work environment increased, perceptions of friction among co-workers increased (after controlling for heterogeneity of problem-solving styles and the perceived work environment). Why there would be conflicting results is unclear. It is possible that self-report data are more likely to reflect personal theories on the relationship between variables than the actual relationship between variables (Frank, et al., 1985). It is also possible that, even though friction among employees was negatively related to co-worker satisfaction, it is distinct from co-worker satisfaction and, as such, it may have a different relationship with communication among co-workers than co-worker satisfaction. While it would seem that the actual degree of openness and autonomy increases friction among co-workers (maybe by providing the opportunity for co-workers to discover differences of opinion), it must be remembered

that there was little agreement among group members as to the degree of friction among co-workers. Therefore, a revised conclusion seems warranted: as openness in the workplace and the autonomy of employees increase, individual perceptions of the degree of friction among co-workers increase.

It was hypothesized that employees whose problem-solving styles differ greater than one standard deviation from the average problem-solving style of their co-workers will report less co-worker satisfaction than employees whose problem-solving styles differ less than one standard deviation from the average problem-solving style of their co-workers. A relationship between problem-solving-style incongruence with one's co-workers and satisfaction with one's co-workers was not found in the present study. The relationship was not confounded with the perceived or actual openness of, and degree of autonomy in, the work environment.

It was found that, as perceptions of the number of opportunities to discuss ideas/opinions and of autonomy in the work place increased, reports of co-worker satisfaction increased. This finding provides some support for the conclusions of Frank et al. (1985) who found that workers reporting more influence in job related decisions reported greater satisfaction with co-workers. The fact that the openness of, and degree of autonomy in, the actual work

environment were not associated with co-worker satisfaction implies that the findings of this study may reflect participants' personal theories as to the relationship between the work environment and co-worker satisfaction. However, the lack of reliability of the measure of the actual environment in the present study could explain why a relationship between the actual environment and co-worker satisfaction was not found. Less reliable measures provide lower estimates of the strength of a relationship between variables (Ghiselli, Campbell, & Zedeck, 1981).

It was hypothesized that employees whose problem-solving styles differ greater than one standard deviation from the problem-solving styles of their supervisors will report less satisfaction with their supervision than employees whose problem-solving styles differ less than one standard deviation from the problem-solving styles of their supervisors. A relationship between problem-solving-style incongruence with one's supervisor and satisfaction with supervision was not found. The relationship was not confounded with the perceived or actual openness of, and degree of autonomy in, the work environment.

Graen et al. (1982) found that two-way communication is associated with self-reports of supervisor satisfaction. A somewhat similar result was found in the present study: as perceptions of the number of opportunities to discuss ideas/opinions and of autonomy in the work environment

increased, reports of satisfaction with one's supervision increased. However, the actual work environment was not found to be related to self-reports of satisfaction with supervision. This could indicate that the findings of this study reflect participants' personal theories as to the relationship between the work environment and satisfaction with supervision. Still, Graen, et al. did manipulate the actual environment, which suggests that there is more to the results than the assumptions held by participants. The lack of reliability of the measure of the actual environment in the present study may explain why a relationship was not found between the actual environment and satisfaction with one's supervision.

Latack (1981) suggested that predictions arising from mismatches between persons and their environment are more likely to be accurate in situations where the person can be clearly defined as one type of trait or another. Therefore, it was suggested that this study's hypotheses may only hold in those cases where the person and the environment can clearly be classified as innovative or adaptive. While the number of participants who were clearly adaptors or innovators in adaptive or innovative environments was too small for making statements about the probability of actual differences between these groups, the means obtained for congruent person-environment matches and incongruent person-environment matches did not support Kirton's hypotheses.

Innovators and adaptors who found themselves in innovative and adaptive environments, respectively--the environment being measured in terms of the average KAI score of one's co-workers--did not report greater co-worker satisfaction than innovators and adaptors who found themselves in adaptive and innovative environments, respectively. Also, innovators and adaptors who found themselves in innovative and adaptive environments, respectively--the environment being measured in terms of the KAI score of one's supervisor--did not report greater satisfaction with their supervision than innovators and adaptors who found themselves in adaptive and innovative environments, respectively.

Post-hoc analyses revealed that employees who perceived their supervisors as demanding that they stick to existing ways of doing things reported less satisfaction with their supervision than employees who perceived their supervisors as encouraging them to look for new ways of doing things. This result is in line with Kumar and Bohra's (1979) finding that employees who perceived their organizational climate to be democratic reported greater satisfaction with supervision than employees who perceived their organizational climate to be autocratic. This result, combined with the result of the peer-rating section of the study, suggests that, while adaptors may choose to behave adaptively and innovators may choose to behave innovatively, both like to be able to

choose how they solve problems.

The present study did not provide support for the hypothesis that people with contrasting problem-solving styles tend to have difficulty getting along. One reason this hypothesis may not have been supported concerns the way the majority of participants in this study worked together. Most of the group members in this study did not have to interact with each other as they completed their work. It seems likely that people with contrasting problem-solving styles are more likely to "clash" when they must work closely with each other in order to complete their work. In other words, team members with contrasting problem-solving styles are more likely to have difficulty getting along than co-workers (as in "side by side") with contrasting problem-solving styles. Within a team-like context, the decisions of one group member affect other group members. Under these conditions, preferences for solving problems in different ways among group members should be more likely to cause difficulties in interpersonal relations. For example, the department mentioned in Lindsay's (1985) study was under pressure by the organization to produce results. Under these circumstances, there was a vested interest among members of the department concerning how fellow members performed. The differences in problem-solving styles created unreconcilable differences in opinion concerning how work should be conducted. Kirton and McCarthy's (1988)

hypothesis that innovators and adaptors tend to have difficulty getting along is more likely to find support in research on teams of employees rather than in research on work groups.

Kirton (1987) states that individuals under pressure are more likely to exhibit behaviour commensurate with their problem-solving style. Evidence of the importance of situational variables on individual differences in behaviour was found by Wright and Mischel (1987). They found that individual differences in aggression were more obvious under stressful conditions than under conditions of little stress. The subjects in Lindsay's (1985) case study were also under stress. Within Lindsay's group of subjects, stress, combined with the importance of each member's behaviour to each other, likely exaggerated the frustration that can occur between people with contrasting problem-solving styles.

Problem-Solving Style and Job Satisfaction

It was hypothesized that employees whose problem-solving styles differ substantially from the average problem-solving style of their work group would report less job satisfaction than employees whose problem-solving styles are similar to the average problem-solving style of their work group. A relationship between problem-solving-style

incongruence and job satisfaction was not found. The relationship was not confounded with the perceived or actual openness of, and degree of autonomy in, the work environment.

Grunig (1990) and Loher, et al. (1985, as cited in Landy, 1989) found that job satisfaction was related to perceptions of autonomy at work. Frank, et al. (1985), Graen, et al. (1982), and Whitley, et al. (1990) found that communication in the work place was related to job satisfaction. These results found support in the present study: as perceptions of the number of opportunities to discuss ideas/opinions and of autonomy in the work place increased, reports of job satisfaction increased. The actual work environment was not related to job satisfaction. Again, this suggests that the results may reflect participants' theories of the relationship between the work environment and job satisfaction rather than the actual relationship between these variables. Graen, et al. did manipulate the actual environment, which suggests that there is more to the results than the assumptions held by participants. Again, the lack of reliability of the measure of the actual environment in the present study could explain why a relationship was not found between the actual environment and job satisfaction.

Goldsmith, et al. (1989) suggested that the environment should be defined in terms of the problem-solving style of

an employee's immediate supervisor. If this is the case, then differences from the problem-solving style of one's supervisor should influence job satisfaction. In other words, the hypothesis regarding job satisfaction would be changed to the following: employees whose problem-solving styles differ greater than one standard deviation from the problem-solving styles of their supervisors will report less job satisfaction than employees whose problem-solving styles differ less than one standard deviation from the problem-solving styles of their supervisors. A relationship between problem-solving-style incongruence with one's supervisor and job satisfaction was not found. The relationship was not confounded with the perceived or actual openness of, and degree of autonomy in, the work environment.

Latack (1981) suggested that predictions arising from mismatches between persons and their environment are more likely to be accurate in situations where the person can be clearly defined as one type of trait or another. Therefore, it was suggested that this study's hypotheses may only hold in those cases where the person and the environment could clearly be classified as innovative or adaptive. The analyses for this way of describing the person-environment fit included, in addition to the environment as defined by one's co-workers or supervisor, the environment as defined by the ratings of participants. It was thought that the degree to which innovative behaviour was encouraged or

perceived to be encouraged might prove to be a better environmental measure than the KAI scores of co-workers and supervisors. After a visual inspection of means, the hypothesized relationship between job satisfaction and congruence/ incongruence with the environment did not seem to hold, no matter how the environment was defined.

The relationships found during post-hoc analyses between perceived friction among co-workers and job satisfaction and between co-worker satisfaction and job satisfaction lend support to the findings of other researchers. Gray-Toft and Anderson (1985) found that co-worker relations contributed to job satisfaction and Schaubroeck, et al. (1989) found that co-worker support contributed to job satisfaction.

No support was found for the hypothesis that employees whose problem-solving styles are incongruent with the average problem-solving style of their co-workers will report less job satisfaction than employees whose problem-solving styles are congruent with the average problem-solving style of their co-workers. Again, the lack of support generated by the present study may reflect the fact that the majority of work conducted by group members did not require that they interact with each other. It is possible that support for this hypothesis may be generated from research on teams, especially teams under pressure to perform well.

General Discussion

Based on peer-ratings, it would appear that innovators and adaptors tend to behave differently. In the introduction, it was suggested that, if a relationship was found between problem-solving style and problem-solving behaviour, managers could match problem-solving style with the appropriate problem type (Goldsmith, 1984; Kirton & McCarthy, 1988; Schweiger, 1983). There were two reasons for this suggestion. First, employees are likely to be happier solving problems congruent with their problem-solving style. Second, employees are likely to be better solving problems congruent with their problem-solving style. In this study, little evidence was found to support the first reason. Evidence elsewhere supports the second reason. Hammond, et al. (1987), using a different measure than the KAI, found some evidence that matching problem-solving style and problem type did tend to be more efficient. Haywood and Everett (1983) found that adaptors tend to do better (attain more senior positions) than innovators within adaptive climates, and Keller and Holland (1978) found that innovators tend to do better (in terms of performance ratings, level, publications) than adaptors in innovative climates. These findings suggest that performance may be related to the match of problem-solving style and problem type.

As problem-solving style refers to a preference, everyone should be able to produce innovative or adaptive solutions. Support was found for this assertion in the present study: the perceived environment was found to be related to perceptions of problem-solving behaviour. Environments in which innovative behaviour was perceived to be encouraged tended to produce higher ratings of innovative behaviour and vice versa. This suggests that if a manager wants subordinates to produce innovative or adaptive solutions, all the manager has to do is relay this desire to his/her subordinates. However, it makes little sense to ask for input that is adaptive or innovative if one is not sure of the type of solution required. If a specific type of solution is not preferred, managers should probably ask for as much input as possible regarding difficulties since this should minimize the chance of overlooking important information.

In the introduction, it was suggested that, should problem-solving styles demonstrate a relationship with job satisfaction, then the "fit" between persons and working environments could be improved (Goldsmith, 1985). This could be done by allowing employees the freedom to do a job using their preferred style (Kirton & McCarthy, 1988) or by creating working conditions that are more compatible with a person's problem-solving style (Goodenough, 1985, as cited in Clapp & De Ciantis, 1989; Root-Bernstein, 1989). The

first method generally suggests that providing employees with autonomy will increase job satisfaction. The second method generally suggests that, to increase job satisfaction, a manager and a subordinate should communicate to determine how the subordinate would like to work. Support for both of these assertions was found in the present study. However, no support was found to suggest that problem-solving style was involved in these relationships.

Probably the most important aspect of research on problem-solving styles is the possibility of a relationship between problem-solving styles and interpersonal relations. In the introduction, it was suggested that should such a relationship be found, it would be important to get individuals to try and see things from another person's perspective. This knowledge could then be used to patch up misunderstandings and increase tolerance of others. People could adjust their behaviour so that interactions between themselves and others are more positive (Foxall, 1986; Novak, 1989). In other words, people could be taught to respond to other people in terms of their motivation and inner thoughts rather than in terms of the their behaviour. As a result, misunderstandings and the conflicts that can arise from misinterpreted behaviour might be reduced and cooperation between workers might increase (Jaffe, 1985; Kirton, 1976; Novak, 1989). This method of reducing

interpersonal conflict between group members basically suggests that people should communicate with each other in order to patch up misunderstandings. The present study found some indirect evidence for this conclusion as perceived opportunities to discuss ideas/opinions were found to be related to co-worker satisfaction. Individual problem-solving styles did not seem to influence this relationship.

Kirton's (1976) theory is based on the notion of differences in people's willingness to initiate and accept types of change. Adaptors are said to prefer to initiate and accept small, progressive changes while innovators are said to prefer to initiate and accept radical, fundamental changes. As such, adaptors are supposed to prefer jobs with adaptive environments, environments which encourage "doing things better," and innovators are supposed to prefer jobs with innovative environments, environments which encourage "doing things differently." However, given that autonomy and the chance to express one's opinions and ideas are related to job satisfaction, it might be that people, regardless of whether they are innovators or adaptors, are likely to prefer jobs in which they get to initiate change rather than have to accept changes which are thrust upon them. This may explain why no evidence for the relationship between a job/problem-solving-style match and job satisfaction was found in the present study, while evidence

elsewhere (Haywood & Everett, 1983; Keller & Holland, 1978) suggests that a job/problem-solving-style match is related to success. It would seem that as long as people are given a say in how their work is done, they will be satisfied; however, only those people who do their work in a fashion that is congruent with the environment are likely to succeed. (Congruence can mean anything from the behaviour encouraged or rewarded by an organization to behaviour that solves problems more efficiently in a given context.)

The positive relationships between adaptive and innovative items in the IBQENV and the IBQ are interesting. With regard to the IBQENV, one can picture work environments demanding both innovative and adaptive behaviour. For some problems, employees are likely to be encouraged to come up with ideas for radical change and, for other problems, employees are likely to be encouraged to stick to or refine existing policies and procedures. The relationship between innovative and adaptive items on the IBQ is less easily explained. Pretesting on university students produced the theoretical, negative relationships between items (students were asked to think of the problem-solving behaviour of two close friends); yet, in the "real" world, innovative and adaptive behaviours seem to be positively related. Since innovators, as measured by the KAI, were described as solving problems adaptively and innovatively, it would seem that innovators tend to do more general problem-solving than

adaptors. Adaptors may not be seen as solving problems as much as they are seen as "doing what we always do." In other words, adaptors may be perceived as "processors" while innovators may be seen as those who change the process, either adaptively or innovatively.

Generally, problem-solving styles do not seem to be related to interpersonal relations and job satisfaction, nor does understanding problem-solving styles seem to be necessary to devise solutions to problems in interpersonal relations and job satisfaction. At present, the notion of problem-solving styles may only be useful as an intuitively appealing theory[24] (not necessarily a valid theory) for convincing managers to increase the autonomy of their employees and to increase the amount of communication among work group members. Kirton's (1976) theory provides a non-

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[24] The majority of the participants in this study easily related to Kirton's (1976) theory. Most participants could recall people who fit Kirton's descriptions of innovators and adaptors and most could recall disagreements based on conflicting opinions about "doing things better" vs "doing things differently." After discussing the theory with one group, it became apparent that Kirton's theory may be valid at a more macro level of analysis. Members of the most innovative group in this study complained about an administrative department's reluctance to change the way things were done. Group members felt that having to do things the "old fashioned way" was hindering their ability to do their job. It seems that, in this case, Kirton's theory was valid with respect to the work-related interactions the group had with group members of another department. Given that the majority of work groups are comprised of people working side by side and not of people working together, it would seem that Kirton's theory may find more support when applied to the relations between departments. However, since "team-building" seems to be a trend in business, Kirton's theory may prove to be valid among work groups in the future.

derogatory context for interpreting differences in opinion and behaviour. It also provides an explanation for why autonomy is important for job satisfaction and why communication is important for resolving differences in opinion. Still, should research with teams demonstrate a relationship between problem-solving style and interpersonal relations and a relationship between problem-solving style and job satisfaction, then the notion of problem-solving style may become important for career decision-making.

The generalizability of the findings of this thesis may be constrained by the sample used in the study. Relatively innovative group members (in terms of peer-ratings) were more likely than relatively adaptive group members to choose not to rate fellow group members' problem-solving behaviour. There was also a tendency for group members who were satisfied with their co-workers to decline the opportunity to rate fellow group members' problem-solving behaviour. These findings suggest that the strength of the relationship between scores on the KAI and peer-ratings may only reflect the strength of such a relationship for relatively adaptive raters who are relatively less satisfied with their co-workers. It was found that members of groups with participation rates less than 70% tended to report more freedom to discuss ideas/opinions and more autonomy at work than members of groups with participation rates greater than 70%. As these participants were removed from the analyses

regarding interpersonal relations and job satisfaction, the range of work environments was restricted in these analyses. It is possible that this characteristic of the present sample may have resulted in the lack of support found for Kirton's theory with respect to interpersonal relations and job satisfaction. It is also possible that the lack of support for Kirton's theory was due to the fact that the sample was not randomly chosen; rather, participants were chosen on the basis of accessibility.

Summary and Conclusions

The research described in this thesis was aimed at testing the following hypotheses: (1) people with different problem-solving styles will propose qualitatively different reasons and solutions to the same or similar problems; (2) groups that are relatively heterogeneous with respect to problem-solving styles will experience more friction than groups that are relatively homogeneous with respect to problem-solving styles; (3) workers whose problem-solving styles differ substantially from their co-workers' problem-solving styles will report less satisfaction with their co-workers than workers whose problem-solving styles are similar to their co-workers' problem-solving styles; (4) subordinates whose problem-solving styles differ substantially from their supervisors' problem-solving styles

will report less satisfaction with their supervision than subordinates whose problem-solving styles are similar to their supervisors' problem-solving styles; and (5) people whose problem-solving styles differ substantially from the average problem-solving style of their work group will report less job satisfaction than people whose problem-solving styles are similar to the average problem-solving style of their work group. Overall, a general lack of support was found for these hypotheses.

People with different problem-solving styles were perceived by their peers as proposing qualitatively different solutions to the same or similar problems. People with different problem-solving styles were not found to produce qualitatively different reasons and solutions to the same problems, although the behavioral measures were suspect. Whether one wishes to conclude from this study that problem-solving styles are or are not related to problem-solving behaviour depends on one's faith in peer-ratings.

Groups that were relatively heterogeneous with respect to problem-solving styles did not experience more friction among group members than groups that were relatively homogeneous with respect to problem-solving styles. Employees whose problem-solving styles differed substantially from their co-workers' problem-solving styles did not report less satisfaction with their co-workers than employees whose problem-solving styles were similar to their

co-workers' problem-solving styles. Subordinates whose problem-solving styles differed substantially from their supervisors' problem-solving styles did not report less satisfaction with their supervision than subordinates whose problem-solving styles were similar to their supervisors' problem-solving styles. Employees whose problem-solving styles differed substantially from the average problem-solving style of their work group did not report less job satisfaction than people whose problem-solving styles were similar to the average problem-solving style of their work group. While these results suggest that a relationship between problem-solving style and interpersonal relations and a relationship between problem-solving style and job satisfaction do not exist, the evidence is not conclusive. Further research needs to be carried out on work groups with members who have to interact in order to complete their work.

In the present study, perceptions of the work environment demonstrated a relationship with problem-solving behaviour and had a greater influence on interpersonal relations and job satisfaction than problem-solving style. Further research is required to determine whether the actual environment has a direct effect on problem-solving behaviour, interpersonal relations, and job satisfaction, or whether it has an indirect relationship with these variables through its influence on perceptions of the environment.

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APPENDIX A

Participant's Cover Letter

May 1, 1991

Dear Madam/Sir:

Attached to this letter you will find a page labelled "additional information", a consent form, and a questionnaire entitled "The Impact of Problem Solving Styles in the Workplace". Please spend a few minutes and read the "additional information" page. Then, if you wish to participate in this study, sign the consent form and complete the questionnaire. Completing the questionnaire will take approximately 45 minutes of your time. The researcher will not be back to gather completed questionnaires until _____ _____, in order that you may complete the questionnaire at your leisure.

We would greatly appreciate your voluntary participation in this study as this study depends on the answers to the questionnaire in order to determine the validity of a new measure of problem solving style.

If you would like more information about the study before participating, please call Ross Hill at 220-7338 or Dr. Robert E. Franken at 220-5608.

Whether you choose to complete the questionnaire or not, we ask that you return the questionnaire to the researcher upon his return to your location.

Thank-you for your time.

Sincerely,

Ross Hill

Dr. Robert E. Franken

THE IMPACT OF PROBLEM SOLVING STYLES

IN THE WORKPLACE

Additional Information

We are looking for volunteers to participate in a study on the relationship between a relatively new measure of problem solving style and (1) problem solving, (2) interpersonal relations, and (3) job satisfaction.

Participants will be contacted at work and asked to fill in a questionnaire at their leisure over the following week. Completing the questionnaire will take approximately 45 minutes. Information provided by each participant will remain confidential with respect to the participant's identity.

The questionnaire asks participants to (1) fill in the KAI (a measure of problem solving style), (2) give one or more reasons for some occupational/organizational difficulties in their work place (the difficulties will be provided by the participants' manager), (3) briefly describe how they last resolved these difficulties, and (4) answer questions pertaining to their work environment, overall job satisfaction, satisfaction with coworkers, and satisfaction with supervision.

Participants in the study will receive feedback on their problem solving style and a summary of the study's results. It is hoped that, through a better understanding of their problem solving style, employees in an organization will be able to function more effectively as a team in two respects: (1) Employees will gain insight into why they find it difficult to work with some of their coworkers and not others - increased understanding of the causes of interpersonal difficulties should lead to less misunderstandings and smoother working relationships in the future. And, (2) employees will be in a better position to identify team roles that take advantage of their problem solving style.

Consent Form

Title of Investigation: **The impact of problem solving styles in the workplace.**

Investigators: **Ross Hill and Dr. Robert E. Franken**

I have read the summary of the study entitled "THE IMPACT OF PROBLEM SOLVING STYLES IN THE WORKPLACE - Additional Information."

I, _____, hereby consent to participate as a volunteer in a scientific investigation as an authorized part of the research program of the Department of Psychology at the University of Calgary under the supervision of Dr. Robert E. Franken.

I understand that my participation in the study will be to answer questions included in the questionnaire entitled "THE IMPACT OF PROBLEM SOLVING STYLES IN THE WORKPLACE."

I understand that I am free not to answer any specific item or question in the questionnaire.

I understand that my answer to each item/question will remain confidential with regard to my identity.

I understand that I am free to withdraw my consent and terminate my participation at any time without penalty.

I understand that I will receive a summary of the results of this study within six months of returning the completed questionnaire.

I recognize that all data will be kept in locked files until no longer needed, at which time the data will be destroyed.

I have been given an opportunity to ask whatever questions I may have had, and all such questions and inquiries have been answered to my satisfaction.

Participant's
Signature: _____ Date: _____

We, the undersigned, have fully explained the investigation to the above individual.

Investigators'
Signatures: _____ Date: _____

_____ Date: _____

APPENDIX B

Study Questionnaire (abbreviated)

SECTION I - The KAI

SECTION II - General Job Satisfaction

Instructions: The following items are to be answered using the following five point scale:

Strongly disagree				Strongly agree
1	Disagree 2	Undecided 3	Agree 4	5

Place the appropriate number in the space provided after each item.

1) Overall, I am satisfied with my job ____

2) My job is like a hobby to me ____

3) My job is usually interesting enough to keep me from getting bored ____

4) It seems that my friends are more interested in their jobs ____

5) I consider my job rather unpleasant ____

6) I enjoy my work more than my leisure time ____

7) I am often bored with my job ____

10) I feel fairly well satisfied with my present job ____

11) Most of the time I have to force myself to go to work ____

12) I am satisfied with my job for the time being ____

13) I feel that my job is no more interesting than others I could get ____

14) I definitely dislike my work ____

15) I feel that I am happier in my work than most other people ____

16) Most days I am enthusiastic about my work ____

17) Each day of work seems like it will never end ____

18) I like my job better than the average worker does ____

19) My job is pretty uninteresting ____

20) I find real enjoyment in my work _____

21) I am disappointed that I ever took this job _____

Instructions: Please place an "X" by the response that best reflects your opinion.

22) How satisfied are you with the amount of freedom you have in organizing and carrying out your work?

_____ Very satisfied
_____ Satisfied
_____ Neither satisfied not dissatisfied
_____ Dissatisfied
_____ Very dissatisfied

23) I would prefer to have:

_____ Much more authority over decisions
_____ A little more authority over decisions
_____ My present amount of authority over decisions maintained
_____ A little less authority over decisions
_____ Much less authority over decisions

SECTION III - The Work Environment

Instructions: The following items are to be answered using a five point scale. The items ask you to what degree you are USUALLY encouraged to do something at work. If you are strongly encouraged to do what is described, place a 1 in the space provided after the item. If you are strongly discouraged from doing what is described, place a 5 in the space provided after the item.

Strongly encouraged	Encouraged	Neither encouraged nor discouraged	Discouraged	Strongly discouraged
1	2	3	4	5

Please indicate the degree to which you are USUALLY encouraged to do the following:

1) come up with solutions to common problems which most people in the department would never have considered _____

2) take the risk of offending others within the department who might disagree with you _____

3) suggest solutions to common problems which incorporate common practices within the department _____

4) propose solutions which view problems from unexpected angles _____

5) propose radically different strategies for solving common problems within the department _____

Instructions: The following items are to be answered using the following five point scale:

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

6) In my department, people are discouraged from expressing ideas or opinions that are critical of the current ways of doing things _____

7) I am given a lot of freedom to decide how I do my work _____

8) In my section, people are encouraged to make their own decisions _____

9) There are plenty of opportunities to exchange ideas within the department _____

10) My job denies me any chance to use my personal initiative or judgement in carrying out my work _____

11) Small matters have to be referred to someone higher up for a final answer _____

SECTION IV - Problem Definitions and Solutions

In this section you will be presented with five common, recurring problems within your department. You will be asked to (1) provide one or more possible reasons for why each problem occurs, (2) identify which reason you feel is the most important, and (3) describe how you last resolved the problem.

For example,

Problem #0: LINEUPS AT THE PHOTOCOPIER.

1. In YOUR opinion, what are some possible reasons for why this problem occurs.

   a. Not enough photocopiers

   b. Photocopier keeps breaking down

   c. _____

   d. _____

   e. _____

2. Which reason presented above do you see as being the most likely cause of this problem? (Circle the letter corresponding to the reason.)

   a. b. c. d. e.

3. How did you last resolve/handle this problem?

   I waited in line.

On average, how often do common, recurring problems of one kind or another occur at work? (Keep in mind that "common" refers to problems that you and your coworkers face.)

_____ once a day or less
_____ approximately two or three times a day
_____ approximately four or five times a day
_____ more than five times a day

SECTION V - Peer Ratings

In this section, you will be asked to rate the problem solving styles of yourself, your supervisor, and your coworkers. Names are needed so that it will be possible to compare your ratings of problem solving style with your supervisor's and fellow coworkers' scores on the KAI. Your ratings will remain confidential.

Please print the names of your supervisor and coworkers in the spaces below. After each name, please indicate how familiar you are with the way the person tends to solve problems at work. Use the following scale:

1 = not at all familiar
2 = somewhat familiar
3 = fairly familiar
4 = quite familiar
5 = very familiar

For example:

Coworker 0 John Smith _____ 4

If you have more than 6 coworkers, please choose the 6 coworkers with whom you are most familiar.

Supervisor _____ _____

Coworker 1 _____ _____

Coworker 2 _____ _____

Coworker 3 _____ _____

Coworker 4 _____ _____

Coworker 5 _____ _____

Coworker 6 _____ _____

Please circle the number that best corresponds to how often you, your supervisor, and your coworkers do the following in response to common, recurring problems within your department:

1) propose solutions which view problems from unexpected angles.

	never		rarely		sometimes		usually		always
Yourself	1	2	3	4	5	6	7	8	9
Supervisor	1	2	3	4	5	6	7	8	9
Coworker 1	1	2	3	4	5	6	7	8	9
Coworker 2	1	2	3	4	5	6	7	8	9
Coworker 3	1	2	3	4	5	6	7	8	9
Coworker 4	1	2	3	4	5	6	7	8	9
Coworker 5	1	2	3	4	5	6	7	8	9
Coworker 6	1	2	3	4	5	6	7	8	9

2) propose solutions which may offend others within the department.

	never		rarely		sometimes		usually		always
Yourself	1	2	3	4	5	6	7	8	9

etc.

3) propose solutions which incorporate common practices within the department.

4) propose "unexpected solutions", solutions which most people in the department would never have considered.

5) propose solutions which, if implemented, would radically alter traditional ways of doing things.

6) propose solutions which resolve problems in customary ways.

SECTION VI - Interpersonal Relations

Instructions: Please place an "X" by the response that best reflects your opinion.

1) How do you generally feel about the employees you work with?

_____ They are the best group I could ask for
_____ I like them a great deal
_____ I like them fairly well
_____ I have no feeling one way or the other
_____ I don't particularly care for them

2) How is your OVERALL ATTITUDE toward your job influenced by the people you work with?

_____ It is very favourably influenced
_____ It is favourably influenced
_____ It is not influenced one way or the other
_____ It is unfavourably influenced
_____ It is very unfavourably influenced

3) In my section, there is:

_____ A very great deal of friction among employees
_____ Quite a bit of friction among employees
_____ Some friction among employees
_____ Little friction among employees
_____ Almost no friction among employees

4) Do you ever have the feeling you would be better off working under different supervision?

_____ I almost always feel this way
_____ I frequently feel this way
_____ I occasionally feel this way
_____ I seldom feel this way
_____ I never feel this way

5) How do you feel about the supervision you receive?

_____ I am extremely satisfied
_____ I am well satisfied
_____ I am only moderately satisfied
_____ I am somewhat dissatisfied
_____ I am very dissatisfied

6) How does the way you are treated by your immediate supervisor influence your OVERALL ATTITUDE toward your job?

_____ It has a very unfavourable influence
_____ It has a slightly unfavourable influence
_____ It has no real effect
_____ It has a favourable influence
_____ It has a very favourable influence

7) My immediate supervisor:

_____ Demands that we stick to existing ways of doing things
_____ Is somewhat reluctant to consider new ways of doing things
_____ Neither encourages nor discourages ideas for change
_____ Encourages us to look for new ways of doing things
_____ Strongly encourages us to look for new ways of doing things

SECTION VII - Group experience

How long, in general, have you been working with most of your coworkers. (Circle the letter beside the most appropriate response.)

a. 0 to 6 months
b. 7 to 12 months
c. 13 to 18 months
d. 19 to 24 months
e. more than two years

Thank-you for participating in this study. Please hand your completed questionnaire to the researcher when he returns in one week's time. You will receive a pamphlet containing your score on the KAI (the measure of problem solving style) and a description of what different scores indicate within one week of returning this questionnaire. A summary of the results of the study will be sent to you within six months.

APPENDIX C

Sample Pages from Questionnaire Given to Supervisors

Problem #1: _____

_____

_____

1. In YOUR opinion, what are some possible reasons for why this problem occurs.

   a. _____

   b. _____

   c. _____

   d. _____

   e. _____

2. Which reason presented above do you see as being the most likely cause of this problem? (Circle the letter corresponding to the reason.)

   a. b. c. d. e.

3. How do most of your subordinates resolve/handle this problem?

   _____

   _____

   _____

   _____

On average, how often do common, recurring problems of one kind or another occur at work?

____ once a day or less
____ approximately two or three times a day
____ approximately four or five times a day
____ more than five times a day

SECTION V - Subordinate Ratings

In this section, you will be asked to rate the problem solving styles of yourself and your subordinates. Names are needed so that it will be possible to compare your ratings of problem solving style with your subordinates' scores on the KAI. Your ratings will remain confidential.

Please print the names of your subordinates in the spaces below. After each name, please indicate how familiar you are with the way the person tends to solve problems at work. Use the following scale:

1 = not at all familiar
2 = somewhat familiar
3 = fairly familiar
4 = quite familiar
5 = very familiar

For example:

Subordinate 0 John Smith _____ 4

If you have more than 7 subordinates, please choose the 7 subordinates with whom you are most familiar.

Subordinate 1 _____ _____

Subordinate 2 _____ _____

Subordinate 3 _____ _____

Subordinate 4 _____ _____

Subordiante 5 _____ _____

Subordinate 6 _____ _____

Subordinate 7 _____ _____

Please circle the number that best corresponds to how often you and your subordinates do the following in response to common, recurring difficulties within your department:

1) propose solutions which view difficulties from unexpected angles.

	never		rarely		sometimes		usually		always
Yourself	1	2	3	4	5	6	7	8	9
Subordinate 1	1	2	3	4	5	6	7	8	9
Subordinate 2	1	2	3	4	5	6	7	8	9
Subordinate 3	1	2	3	4	5	6	7	8	9
Subordinate 4	1	2	3	4	5	6	7	8	9
Subordinate 5	1	2	3	4	5	6	7	8	9
Subordinate 6	1	2	3	4	5	6	7	8	9
Subordinate 7	1	2	3	4	5	6	7	8	9

2) propose solutions which may offend others within the department.

	never		rarely		sometimes		usually		always
Yourself	1	2	3	4	5	6	7	8	9
Subordinate 1	1	2	3	4	5	6	7	8	9
Subordinate 2	1	2	3	4	5	6	7	8	9
Subordinate 3	1	2	3	4	5	6	7	8	9
Subordinate 4	1	2	3	4	5	6	7	8	9
Subordinate 5	1	2	3	4	5	6	7	8	9
Subordinate 6	1	2	3	4	5	6	7	8	9
Subordinate 7	1	2	3	4	5	6	7	8	9

SECTION VI - Interpersonal Relations

Instructions: Please place an "X" by the response that best reflects your opinion.

1) How do you generally feel about the employees you work with?

_____ They are the best group I could ask for
_____ I like them a great deal
_____ I like them fairly well
_____ I have no feeling one way or the other
_____ I don't particularly care for them

2) How is your OVERALL ATTITUDE toward your job influenced by the people you work with?

_____ It is very favourably influenced
_____ It is favourably influenced
_____ It is not influenced one way or the other
_____ It is unfavourably influenced
_____ It is very unfavourably influenced

3) In my section, there is:

_____ A very great deal of friction among employees
_____ Quite a bit of friction among employees
_____ Some friction among employees
_____ Little friction among employees
_____ Almost no friction among employees

SECTION VII - Group experience

How long, in general, have you been working with most of your subordinates. (Circle the letter beside the most appropriate response.)

a. 0 to 6 months
b. 7 to 12 months
c. 13 to 18 months
d. 19 to 24 months
e. more than two years

Thank-you for participating in this study. Please hand your completed questionnaire to the researcher when he returns in one week's time. You will receive a pamphlet containing your score on the KAI (the measure of problem solving style) and a description of what different scores indicate within one week of returning this questionnaire. A summary of the results of the study will be sent to you within six months.

APPENDIX D

Contact Letter sent to Supervisors

TO:

FROM:

DATE:

THE IMPACT OF PROBLEM SOLVING STYLES

IN THE WORKPLACE

I am looking for volunteers to participate in a study on the relationship between a new measure of problem solving style and (1) problem solving, (2) interpersonal relations, and (3) job satisfaction. I was wondering whether you and your office staff would be interested in participating.

Participants in the study will receive feedback on their problem solving style and a summary of the study's results. It is hoped that, through a better understanding of their problem solving style, participants will be able to function more effectively as a team in two respects: (1) Employees will gain insight into why they find it difficult to work with some people and not others - increased understanding of the causes of interpersonal difficulties should lead to less misunderstandings and smoother working relationships in the future; and, (2) employees will be in a better position to identify team roles that take advantage of their problem solving style.

If you are interested in finding out more about the study, please call me at 220-7338 or Dr. Robert E. Franken at 220-5608. I will call you next week to find out whether you and your staff are interested in participating. Thank-you for your attention.

Sincerely,

Ross Hill
Graduate Student
Industrial/Organizational Psychology

THE IMPACT OF PROBLEM SOLVING STYLES

IN THE WORKPLACE

Additional Information

Problem solving style influences the way people solve problems. Some people prefer to solve problems by "doing things better"; that is, they tend to resolve problems in terms of commonly accepted reasons for why the problems occur. Others prefer to solve problems by "doing things differently"; that is, they tend to resolve problems in terms of less commonly accepted reasons for why problems occur. Resolving problems in terms of commonly accepted reasons tends to result in solutions which improve upon, while not drastically changing, traditional ways of doing things. Resolving problems in terms of less accepted reasons tends to result in solutions which radically alter traditional ways of doing things. NEITHER STYLE OF PROBLEM SOLVING IS BETTER THAN THE OTHER AS BOTH STYLES MAY RESOLVE, OR FAIL TO RESOLVE, THE SAME PROBLEMS.

Occupations and organizations differ with regards to the amount of flexibility people have when solving occupational, organizational, or administrative problems. People who solve problems "differently" tend to like more flexibility when solving occupational, organizational, or administrative problems than those who solve problems "better". It is believed that job satisfaction is affected by the fit between problem solving style and an employee's work environment.

People with different problem solving styles tend to behave differently. These differences in behaviour tend to cause problems in interpersonal relations among those with different problem solving styles. For example, people with one problem solving style may see their behaviour as stimulating ideas and change, while people with the opposite problem solving style may see the same behaviour as irrational and impractical.

This study is investigating the relationship between a relatively new measure of problem solving style and (1) problem solving, (2) interpersonal relations, and (3) job satisfaction. Participants will be contacted at work and asked to fill in a questionnaire at home. The questionnaire will take approximately 45 minutes to complete. In order to allow participants to respond to the questionnaire when it is most convenient for them to do so, questionnaires will be collected at work one week after they are handed out. Information provided by each participant will remain confidential with respect to the participant's identity.

A behavioral measure of problem solving is required by the study; as such, the manager of each work group will be interviewed so that five common and recurring occupational or organizational problems among the staff can be identified (these are problems that come with the job - e.g. rude customers - or are beyond the manager's control - e.g. selling products during a recession). These problems will be entered into the questionnaires distributed to the work group. The manager will also be asked to complete the questionnaire.

The study requires the participation of at least three members of a work group and their supervisor. This is necessary so that "group norms" for responding to common, recurring problems can be identified. Norms make it possible to identify "different" problem definitions and solutions. It is also necessary so that the impact of problem solving styles on interpersonal relations can be studied.

For participants wishing more feedback than that provided by the feedback pamphlet, a 30 minute in-house lecture has been prepared to explain problem solving styles and how problem solving styles might affect employee behavior. Discussion of participants' scores and what they mean would be expected and would probably require an additional 30 minutes.

APPENDIX E

Rater Instructions - "Uniqueness"

Rater Instructions

As part of a study on problem solving styles, subjects from various workgroups had to provide reasons for common, recurring problems in their workplace. They were also asked how they last dealt with these problems. It will be your job to rate their reasons and solutions in terms of "uniqueness"; that is, given all the reasons and solutions provided by members of a work group, which reasons and solutions are or are not similar to other reasons and solutions.

You will be asked to rate reasons/solutions for a problem using the following five point scale:

Not at all similar	Somewhat similar	Quite similar	Very similar	Identical
1	2	3	4	5

For each reason/solution being rated, find the reason/solution on the page that is the MOST SIMILAR to the one being rated. If you can not find a similar reason/solution, enter "1" into the space provided after the reason/solution and move on to the next reason/solution. Should you find a similar reason/solution, enter your "similarity" rating and enter the letter of the similar reason/solution in the space provided.

PLEASE READ THE ENTIRE PAGE OF REASONS/SOLUTIONS BEFORE RATING TO BE SURE THAT YOU IDENTIFY THE MOST SIMILAR REASON/SOLUTION TO THE ONE BEING RATED.

(Supervisors of the workgroups were asked how they thought most of their staff solved the problems; therefore, expect some of the solutions to be phrased from a supervisor's perspective.)

Please look at the examples on the next page.

EXAMPLE
(Do not be alarmed if you do not agree with the ratings given in these examples.)

Please read the entire page of reasons before entering your similarity rating per reason.

Problem: Difficulty learning how to work with the new management information system.

Reasons:	**1) How similar is this reason to its most similar counterpart?** (1=Not at all similar) (2=Somewhat similar) (3=Quite similar) (4=Very similar) (5=Identical)	**2) Which other reason is this reason most similar to?** (If you answered "1" to item #1, skip this item.)
a) Resistance to change.	4	f
b) Constant change, "development flux" of system.	5	e
c) Normal resistance to technology.	3	a
d) People don't like reading too many pages of written information.	1	/
e) Constant changing.	5	b
f) Reluctancy to changing from paper to computers.	4	a

PRACTICE ITEM:

Please read the entire page of reasons before entering your similarity rating per reason.

Problem: Lack of communication (resulting in such things as two people working on the same task).

Reasons:	**1) How similar is this reason to its most similar counterpart?** (1=Not at all similar) (2=Somewhat similar) (3=Quite similar) (4=Very similar) (5=Identical)	**2) Which other reason is this reason most similar to?** (If you answered "1" to item #1, skip this item.)
a) Supervisor who "needs bees buzzing around him".	_____	_____
b) Impatience on supervisor's part.	_____	_____
c) Supervisor not managing priorities properly.	_____	_____
d) Physicians forget they have assigned a task.	_____	_____
e) Secretaries do not know another one has been asked to work on a project.	_____	_____
