

**Improving the Measurement of Divergent Thinking Attitudes
in Organizations**

by

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ABSTRACT

Three new improved scales measuring three independent divergent thinking attitudes were developed in field research with managers and were labeled "Valuing New Ideas," "Belief that Creativity is Not for Only a Select Few," and "Not Feeling Too Busy for New Ideas." These three scales represent an improvement over three scales initially identified by Basadur and Hausdorf in previous research (1996). Two studies were done. The first was a reliability study in which higher internal consistencies and improved understanding and labeling were achieved. The second was a field experiment in which preliminary evidence of external validity of the three scales was established. The scales effectively measured the changes in these attitudes that were expected after training. Opportunities for future research are identified.

INTRODUCTION

The importance of creativity to the well being of society as a whole is becoming increasingly recognized and emphasized (e.g., Mumford & Gustafson, 1988). Creativity is a necessary requirement for organizational effectiveness. Mott's comparative research (1972) showed that effective organizations are simultaneously efficient and creative. Organizational efficiency means routinizing and optimizing well established procedures to provide goods or services with the highest quantity and quality for the organization's customers at the lowest cost possible. Organizational creativity means deliberately changing those well established procedures to make new, superior levels of quantity, quality, cost, and customer satisfaction possible. A continuous supply of both improved and new methods, goods and services result from creativity. Fortunately, there are methods for enhancing and maintaining the creativity of organizations (e.g., Amabile & Gryskiewicz, 1989; Rickards & Jones, 1991). Positive outcomes for employees from increasing organizational creativity include greater motivation, job satisfaction and teamwork (Basadur, 1993). An example of employees applying creative thinking skills and attitudes to boost profits in recessionary times is detailed in Basadur and Paton (1993).

The most effective methods for enhancing and maintaining organizational creativity recognize that creativity is multi-faceted. For one thing, there is no single agreed upon definition of creativity; this in itself makes the study and measurement of creativity difficult and complex (Besemer & O'Quin, 1993). Another reason that creativity is multi-faceted is because so many factors contribute to its development and expression. Runco (1993) classified these factors as personal (such as cognitive, motivational, and attitudinal) and social and environmental. Another popular way of approaching the study of creativity is to divide it into the "four P's" - product, person, press and process. Most research focuses on one of these four divisions. Briskman, (1980), Jackson

and Messick, (1964) and O'Quin and Besemer (1989), for example, focussed on understanding the product of creative efforts. Kirton (1976), MacKinnon (1962), and Myers (1962) addressed the relation between personality and creative behavior, and Guilford (1968) addressed the cognitive aptitudes and abilities that are associated with various kinds of (potentially creative) thinking. The study of environmental "presses" has been pursued by Albert (1983), Amabile (1990), Amabile and Grysiewicz (1989), Andrews and Farris (1972), Baker, Winkofsky, Langmeyer, and Sweeney (1976), and Harrington (1990), among others.

The focus on process is apparent in research modeling creativity as a creative problem-solving process. Divergent thinking has long been credited with being an important aspect of creative thinking and creative problem solving processes (Guilford, 1967; Meadow, Parnes & Reese, 1959; Parnes & Meadow, 1959, 1960). Some researchers and practitioners in the field of creative thinking and creative problem solving use conceptual process models that involve both divergent and convergent thinking. Rickards (1994) identified models that consider both divergent and convergent thinking in multiple phases which are called complete processes of creative problem solving (cf. Basadur, Graen & Green, 1982; Isaksen & Treffinger, 1985; Osborn, 1963; Parnes, Noller & Biondi, 1977; Treffinger, Isaksen, & Dorval, 1994).

Basadur et al.'s (1982) complete creative problem-solving process, for example, has three different phases. Organizational creativity is viewed as a continuous cycle of problem finding, problem solving, and solution implementation (see Basadur, 1992; Basadur, 1995). The word problem is interchangeable with a host of neutral, positive and negative synonyms, including trends, changes, and opportunities. All such problems are viewed as "golden eggs," that is, opportunities for innovation and improvement (Basadur, 1992). In each of these phases, a two-step thinking process

called “ideation-evaluation” occurs. Ideation is the generation of options, different points of view, and perceptions of facts and ideas without any critical judgment or analysis. This constitutes the divergent aspect of the process. Evaluation on the other hand, is the judgment and selection of these freely generated thoughts. This is the convergent aspect of the process. These two opposite kinds of thinking skills are synchronized throughout the circular three phases. As solutions are implemented, new problems (golden eggs) are discovered. Training in Basadur et al.'s model (as well as other complete process models) is typically geared toward practice and application rather than abstract discussion. Participants are trained to acquire skills in various techniques and processes of both divergent and convergent thinking in each of the three phases.

Not only do many researchers and practitioners in the field of creative problem solving use conceptual models that involve divergent thinking, but some also believe that attitudes toward divergent thinking are important antecedents to divergent thinking practice. This is consistent with Kraut's (1976) general training model that proposes a causal chain of understanding leading to attitudes leading to behavior leading to improved results. According to Basadur and Robinson (1993) and Basadur (1997), one reason that organizational development efforts, including Total Quality Management, often fall short is that no real improvements are achieved in attitudes and skills in divergent thinking. Rickards (1975) reported a field experiment in which results using creative problem solving techniques based on divergent thinking were no better than results using conventional techniques. Rickards attributed the lack of success to an inability of the experimental participants to change their attitudes toward divergent thinking, and concluded that such attitudes may be very difficult to change until procedures adequate to change long-held beliefs that work against its basic principles are found. In contrast, Basadur, Graen, and Green (1982) found that

improvements in attitudes toward divergent thinking accompanied increases in divergent thinking practice and in creative performance after appropriate training. The training provided by Basadur et al. (1982) was more intensive than that used in the Rickards (1975) study, was based on a complete process of creative problem solving as described above, and involved application to the participants' real world situations. In other words, the training was more likely to have actually impacted attitudes and behaviors of participants. Basadur and Finkbeiner (1985) offered a model describing how attitudinal processes accompany and enhance cognitive processes of divergence in creative problem solving.

In summary, research suggests that unless attitudes toward divergent thinking are positive or become positive, training in creative problem solving involving divergent thinking is not likely to result in changes in behavior back on the job. Evidence suggests that many people who work in organizations have negative attitudes toward creativity, divergent thinking, and new ideas (Rickards, 1980; Shore, 1980). Moreover, Kirton (1976) found that people in organizations who have more innovative styles and are more divergent in their thinking incur more negative attitudes and mistrust by others. They encounter greater difficulty in getting their ideas accepted because they tend to propose more unusual solutions and may even redefine given problems in unexpected new ways. Others in the organization tend to have negative attitudes toward such divergent approaches inasmuch as the substantial changes they represent evoke feelings of discomfort and apprehension. Unless improvements in these attitudes toward divergent thinking can be achieved, training efforts in creative problem solving based on divergent thinking may ultimately be fruitless. For example, Basadur, Graen, and Scandura (1986) suggested that the attitudes of manufacturing engineers tend to be especially negative toward any form of divergent thinking and creative problem solving. They

tend to see little room for creativity in their structured, implementation-oriented environment where practicality is so highly valued. There is evidence that engineering education itself contributes to reducing the value of divergent thinking (Altemeyer, 1966; Doktor, 1970).

Changing attitudes of any kind is not an easy task. As noted by McGuire (1969), perhaps no area of research in social psychology has been as active as the formation and change of attitudes. In the Basadur et al. (1986) study, the presentation of a multi-phase, complete process of creative problem solving based on synchronizing divergent and convergent thinking in each phase, was an attempt to persuade manufacturing engineers to engage in divergent thinking on their jobs and overcome their negative attitudes which might be a barrier to their use of creative problem solving. Hence, it was of interest to determine the extent to which the training (as a persuasive communication attempt) was able to effect changes in the attitudes of the manufacturing engineers toward divergent thinking. If attitudes toward divergent thinking could be made more positive, then the engineers might be more open to incorporating divergent thinking into their repertoire of job-related skills. The results of the study indicated that it was possible to successfully change the attitudes of these engineers towards the use of divergent thinking and that therefore appropriate training can result in positive effects even in populations whose attitudes may be difficult to change. In a later field experiment, similar training positively affected divergent thinking attitudes in a broad cross-section of organizational members from various functions, hierarchical levels, and types of industries (Basadur, Wakabayashi, & Graen, 1990).

The linkage between attitudes and behaviors has been the subject of considerable research and controversy (see Wicker, 1969; Mischel, 1973). The belief on the part of researchers and practitioners alike that attitudes (as measured by surveys) have important implications for behavior

in organizations is implicit in various areas of human resource research. Various balance theories (Festinger, 1957; Heider, 1958; Osgood & Tannenbaum, 1955) predict that individuals who experience inconsistency among their feelings, beliefs, and behaviors are motivated to restore balance. Organizational commitment, studied as an attitude, has been related to several work relevant criteria; however, the relationship may have numerous moderators (Mathieu & Zajac, 1990). In a meta-analysis, Iaffaldano and Muchinsky (1985) investigated the relationship between an individual's job satisfaction and performance on the job and found only a small correlation (.17). In short, the relationship between attitude and behavior is complex and is an important area of research. As mentioned above, Kraut's (1976) training model suggests a causal chain whereby attitude change leads to performance change. Fishbein and Azjen's (1975) theory of reasoned action suggests that behavior can be predicted by individual attitudes and social norms. In the Basadur et al. (1982) field experiment, practice-oriented training resulted in improvements in divergent thinking attitudes that accompanied improvements in divergent thinking practice and in creative performance. In that research, multiple method measures, including on-the-job observation, demonstrated that employees made gains in attitudes and behaviors such as "less likely to jump to conclusions as to what is the real problem;" "more open-minded to new ideas and approaches"; "reacting more positively to new, unusual product ideas;" "less prone to negative evaluation during idea generation;" "achieving higher quantity and quality of problem finding;" "more likely to consider different problem definitions prior to choosing one as best;" and "more likely to pause to try new, unusual approaches."

Basadur's research program subsequently lead to modeling how divergent thinking attitudes enhance divergent thinking skills. Divergent thinking was viewed as having both cognitive and attitudinal components (Basadur & Finkbeiner, 1985). Four attitudes associated with divergent

thinking - Preference for Ideation, Tendency to (not) Make Premature Critical Evaluations of Ideas, Valuing of New Ideas and Belief that Creative Thinking is (not) Bizarre were identified and scales to measure the first two attitudes were established. The two scales were combined into one measure called the Basadur 14 Item Ideation-Evaluation Preference Scale. This scale has been used frequently in subsequent research (Basadur, Graen & Scandura, 1986; Basadur, Wakabayashi & Graen, 1990; Basadur, Wakabayashi & Takai, 1992; Runco & Basadur, 1993).

Basadur and Hausdorf (1996) picked up the investigation of the two attitudes remaining-- Valuing New Ideas and Belief that Creative Thinking is (not) Bizarre. They combined the twelve highest loading items from the scales measuring these two attitudes into a single 24 item questionnaire using a five-point Likert format. The subsequent factor analysis of this questionnaire revealed that the 24 items actually comprised three concepts rather than two, and six items should be dropped due to low factor loadings. The emerging three new scales were labeled Valuing New Ideas, Creative Individual Stereotypes, and Too Busy for New Ideas (Table 1). Basadur and Hausdorf stated that these scales measured the extent to which employees value new ideas, have negative stereotypes of creative people, and feel too busy for new ideas, respectively. Typical items for Valuing New Ideas were "ideas are fundamental to decision making, and as such should not be taken for granted" and "when I get a new idea, I really get excited." Typical items for Creative Individual Stereotypes were "really creative people are never very organized" and "truly creative people also lead unusual life styles." Typical items for Too Busy for New Ideas were "I don't have much time for thinking up wild ideas; I'm too busy just getting my job done," and "why is everybody always talking about ideas? I've got more work now than I know what to do with". All three scales so emerging were shown to have theoretical relevance for creative problem solving but the authors

strongly felt that all three needed improved reliability. The present research extends this previous research by Basadur and Hausdorf (1996). One purpose of the present study is to improve the reliability of Basadur and Hausdorf's three new Likert type scales. Another purpose of this study is to begin developing evidence of the validity of these three scales and the constructs they represent.

Table 1 about here

The method of measuring reliability used by Basadur and Hausdorf (1996) was to evaluate the internal consistency (homogeneity) of each scale--the degree to which all the items of a scale measure the same concept. Cronbach alpha is the method of determining internal consistency from the intercorrelations among all the items of the scale by correlating every possible split half combination (Cronbach, 1951; Cronbach, Schonemann, & McKie, 1965). In the Basadur and Hausdorf (1996) study, Cronbach Alphas for the three emergent scales respectively, on a large managerial sample, were 0.70, 0.64, and 0.53. It was suggested that the lower reliabilities for Creative Individual Stereotypes and Too Busy for New Ideas were due at least partly to the small number of items making up these two scales (three and four items respectively). For the Valuing New Ideas scale (11 items), it was suggested that new items needed to be created and added to or substituted for the existing eleven items to reduce transparency of the scale and to increase ability to discriminate among responses. In addition, the Creative Individual Stereotypes scale showed evidence of being somewhat less stable on test-retest reliability than the other two scales. It was suggested that there might be an additional, more conceptual explanation for this scale's need for reliability improvement and that future work should explore this notion. It was further suggested

that the five-point Likert scales be expanded to seven-point or even nine-point scales to also improve their ability to discriminate among respondents. It was suggested that such improvements would have to be made to each of the three new scales before subsequent research could be undertaken to provide evidence of external validity.

METHOD

Two studies were conducted: the first to improve the reliability of the three scales; the second to provide preliminary evidence of the validity of the three scales.

Reliability Study

The 18 items across the three scales in Table 1 were used as a base for this present study. Then 118 new items were created through consultation with a wide cross section of industry managers, expanding each of the scales. There were 49, 51 and 36 items in the expanded Valuing New Ideas (Scale #1), Creative Individual Stereotypes (Scale #2), and Too Busy For New Ideas (Scale #3) scales respectively. The resulting 136 items were then assigned to a new questionnaire in a manner that avoided items from the same scale appearing in sequence. This new questionnaire (Table 2) was administered to a managerial sample ($N = 223$) from a broad cross section of organizations, and the data were submitted to a scale refinement process. A 9-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (9) was used. The refinement of these three expanded scales is the focus of this study.

Table 2 about here

The managers in this sample ($N = 223$) were not the same managers who had helped develop the items in the 136 item questionnaire. The scale refinement process followed a strategy of optimizing the internal consistency coefficient (Cronbach alpha). First, for each expanded scale, items that correlated with the rest of the scale items with a correlation coefficient below 0.25 were dropped. Then other items with relatively low correlations with the rest of the scale items were removed if their removal improved the Cronbach alpha score. This was done in an iterative fashion until each scale's reliability was maximized as measured by the Cronbach alpha method. This resulted in a 44 item questionnaire consisting of three new scales. Each item on each scale was examined closely to increase understanding and ensure consistency with the labeling of the attitude being measured. During this process, we achieved fresh insight into the meaning of the Creative Individual Stereotypes attitude. Rather than representing a negative attitude toward "creative people," per se, we discovered that each of the items in this scale could be regarded more appropriately as simply measuring the degree to which creativity is perceived to be a special attribute of a unique group of people in organizations and out of the reach of the majority. Rather than the negative notion that such "creative people" are unable to perform very well in "non-creative" work (for example, work not requiring divergent thinking) and that somehow one cannot have it both ways, implicit in this new interpretation of this attitude is the belief that creative work is something that only a special few select people can do and that the majority of organizational members are either unable to do it or cannot learn to do it better. To reflect this change of meaning and to provide a positive orientation, the attitude/scale was labeled "Belief that creativity is not only for a select few" and all items were reverse scored. At the same time, the labelling of scale #3 was modified to provide a positive orientation, that is "Not Feeling Too Busy for New Ideas," and all of the items were reverse scored.

Since “Valuing New Ideas” (scale #1) was already positively oriented, higher scores on each of these scales would now indicate a more positive attitude toward divergent thinking. The items making up the 44 item questionnaire are included in Tables 3 and 4 in the results section.

Next, using Lisrel 8 (Joreskog & Sorbom, 1993), with generalized least squares estimates, reliability of the three scales making up the 44 item questionnaire was further assessed in a confirmatory factor analysis. That is, the items which were expected to load on each of the three factors were checked to see if they did indeed load accordingly without sizable measurement error. This checking was done in two ways. First the degree to which the data fit the three scales in expected ways is checked using fit statistics. The Lisrel 8 analysis produces several statistics that measure the degree of fit. Historically chi-square has been used as the fit measurement of choice. However it is sensitive to sample size, to departures from the multi variate normality assumption, and to a model's complexity (Bentler & Bonnet, 1980; Bearden, Subash, & Teel, 1982; Oliver & Bearden, 1985). Accordingly, in recognition of these sensitivities, and as recommended by Bollen (1989, p. 281), we used several additional fit measures: the goodness-of-fit index developed by Joreskog and Sorbom (1984), the comparative fit index (cf. Bentler, 1989, 1990), the incremental fit index (Joreskog & Sorbom, 1984), and Bentler's normed fit index (Bentler & Bonnet, 1980) which compares a theoretical model's chi-square value with that obtained from the null model that constrains all parameters except the error coefficient to zero. Second, *t*-values were calculated to check if the factor loading of each item comprising each attitude scale was statistically significant. Finally, the 44 item questionnaire was administered to a new sample of managers (*N* = 68) and reliabilities were calculated (Cronbach alpha) for each of the three new scales.

Validity Study

One possible application of the three newly developed scales measuring divergent thinking attitudes is in the pre/post testing of training workshops which are designed to improve divergent thinking skills and to increase attitudes which enhance those skills (Basadur & Finkbeiner, 1985). One important issue for practitioners is whether participants in such a training program change their attitudes toward divergent thinking significantly. If this is the case, the practitioner has some evidence that the training workshop participants have accepted the value of the attitudes and skills trained. Therefore, a measure of validity of the three new scales is the extent to which they are capable of indicating a pre-post increase in scores after a training workshop versus a placebo control group.

To investigate the validity of the three scales by this approach, a field experiment was conducted to test the following hypotheses:

Training in a multi-phase, complete process of creative problem solving based on synchronizing divergent and convergent thinking in each phase (and emphasizing divergent thinking skills and attitudes) will lead to the following attitude changes:

H₁: an increase in valuing new ideas

H₂: an increase in believing that creativity is not only for a select few

H₃: an increase in not feeling too busy for new ideas

Design

The design was a quasi-field experiment with two nonequivalent placebo control groups and pretests and posttests (Cook & Campbell, 1976). This design is well known and recommended when random assignment of subjects is not logistically possible. Only the gains are compared from pretest to posttest. The effects of the training (X) were tested by comparing the gains from O₁ (observation

before) to O_2 (observation after) for the experimental treatment group (trained) with the gains of two placebo control groups. Measures of the three divergent thinking attitudes of all the participants were taken prior to and after the training and the placebo. The three groups were unaware of each other. All of the participants in all three groups were told that the data they were providing was nonevaluative and intended primarily to help better understand and improve future training efforts. Confidentiality was assured.

Experimental Design

Experimental group	($N = 36$)	O_1	X	O_2
Placebo Control Group 1	($N = 11$)	O_1	P	O_2
Placebo Control Group 2	($N = 35$)	O_1	P	O_2

X = Training Treatment; P = Placebo Treatment; O_1/O_2 = Before/After Measures (Observations)

The placebo design was intended to control for potential “demand” effects. A demand effect is one that occurs because subjects feel “special” due to merely having participated and thus desire to perform better in some way to justify this special treatment. The purpose of a placebo control group is to factor out such potential demand effects.

The experimental group of managers ($N = 36$) experienced a two day creativity workshop emphasizing divergent thinking similar to the training described earlier. The two placebo control groups consisted of a group of managers ($N = 11$) and a group of business students ($N = 35$) who

experienced a management course that required creativity but provided no formal training in creativity or divergent thinking. Each placebo treatment was similar in duration to the training treatment. The 44 item questionnaire was administered before and after the training treatment and the two placebo treatments (Q_1/Q_2).

Analysis

The analysis for the quasi-field experiment consisted of a Paired-Samples T-Test. This procedure computes the difference between pre- and post-values (gains) for each participant and tests if the average differs significantly from zero. This was done for each attitude scale for the experimental and control groups. The mean gains (pre- to post-treatment) were compared for each attitude scale to test hypotheses 1, 2, and 3.

RESULTS

Reliability Study

Following reliability analysis of the 136 item questionnaire ($N = 223$), 31 of the 49 items measuring Valuing New Ideas (Scale #1) were removed. A Cronbach alpha of .83 was calculated for the 18 item scale remaining (Table 3). Similarly, 37 of the 51 items measuring Belief That Creativity Is Not Only For A Select Few (Scale #2) were removed. A Cronbach alpha of .75 was calculated for the 14 item scale remaining (Table 3). Finally, 24 of the 36 items measuring Not Feeling Too Busy for New Ideas (Scale #3) were removed. A Cronbach alpha of .80 was calculated for the 12 item scale remaining (Table 3). Through this process a new 44 item questionnaire emerged comprised of the three new scales (Table 4).

Table 3 and Table 4 about here

The confirmatory factor analysis of the three new scales comprising the 44 item questionnaire is shown in Tables 5 and 6. The fit statistics for Valuing New Ideas (after allowing items to intercorrelate¹) were: Goodness of Fit Index 0.93, Comparative Fit Index 0.96, and Normed Fit Index, 0.87. The fit statistics for Belief that Creativity is Not only for a Select Few were: Goodness of Fit Index 0.95, Comparative Fit Index 0.96, and Normed Fit Index 0.86. The fit statistics for Not Feeling Too Busy for New Ideas were: Goodness of Fit Index 0.95, Comparative Fit Index 0.97, and Normed Fit Index 0.89. Thus all of these measures showed a good degree of fit. The additional fit statistics in Table 5 support these findings. That is, to a high degree, each item of each scale relates to only that scale and not to the other two scales. In addition, as shown in Table 6, calculated t-values for each item's loading on to its expected scale were all statistically significant ($p < .05$).

Table 5 and 6 about here

The orthogonal nature of the three attitudes is further illustrated by the correlational analysis² shown in Table 7. All three attitude scales correlate with each other at relatively low levels (0.21, ($p < 0.01$); 0.17 and 0.18 ($p < 0.05$)). Although the correlations are statistically significant, they are fairly moderate correlations and indicate that the attitudes are largely independent of each other. The scale means and standard deviations are also shown.

¹Several correlations among unique constructs were considerable, with off-diagonal elements in the phi-matrix exceeding .60.

²Correction for measurement errors not made.

Table 7 about here

The reliabilities calculated for the three scales using the new managerial sample ($N = 68$) are shown in Table 8. The Cronbach Alphas were 0.70, 0.77 and 0.81 respectively. These reliabilities are basically consistent with those reported in Table 3 for the sample used to develop the 44 item questionnaire (0.83, 0.75 and 0.80). Overall, these reliabilities across these two samples (0.70 - 0.83; 0.77 - 0.75; and 0.81-0.80) represent improvements when compared to the reliabilities of Basadur and Hausdorf's (1996) three scales (0.70, 0.64, and 0.53).

Table 8 about here

Validity Study Results

After training, mean scores for the managers in the experimental group ($N = 36$) were significantly higher versus the pre-training mean scores on all three scales ($p < 0.001$), whereas both placebo groups ($N = 11; 35$) showed no significant gains on any of the three scales. The results support all three hypotheses and are visually displayed in figures 1-3. Scale means, standard deviations and t-values are presented in Table 9.

Table 9 and figures 1, 2, and 3 about here

DISCUSSION AND CONCLUSIONS

Three scales measuring three independent divergent thinking attitudes labeled Valuing New Ideas, Belief that Creativity is Not for Only a Select Few and Not Feeling Too Busy for New Ideas have emerged from this research.³ These three scales and attitudes can now be added to the first two identified in Basadur's early research program (Basadur & Finkbeiner, 1985), totaling five scales/attitudes. The new scales represent an improvement over the three scales initially identified by Basadur and Hausdorf (1996). The improvements lie partly in higher reliability (internal consistency) of all three scales, and partly in a better understanding of one of the three attitudes measured. Rather than a negative stereotyping of the organization's more creative people, the second scale/attitude was re-interpreted, relabelled, and given a positive orientation as a perception that creativity is not necessarily difficult to achieve by ordinary people and that increased creative behavior and performance can be developed rather than being an attribute of just a select few. The third scale/attitude was reverse labelled as a positive feeling of not being too busy for new ideas. Furthermore, preliminary evidence of the external validity of the three scales has been established. The new scales and the improved understanding and labelling of the attitudes they measure should be useful to both researchers and practitioners. Researchers can incorporate the specific attitudes in their own theory building and the scales for theory testing. Managers who desire an increase in creative behavior among their organizational membership through processes which involve divergent thinking can now better understand how such behavior can be enhanced by specific attitudes. Both researchers and practitioners may be able to better understand what variables need to

³Two of the scales/attitudes were relabelled as we gained better understanding of the concepts that were being measured.

be managed to improve organizational creative problem solving and how to get the largest yield from their training efforts.

For example, an organization may seek to target preferentially its training to modify whichever attitudes it diagnoses as most critically needed. Also when such training is provided, the concept of divergent thinking and how it relates to creative behavior and creative problem solving performance may now be better and more completely explained to participants. This would be especially valuable when organizational members may have substantially different interpretations of the meaning of constructs associated with creative problem solving such as divergent thinking. Some of those different interpretations seem to be represented by the three attitudes that are the focus of this research. These findings may thus reduce some of the “mystery” of creativity training and may help innovation-minded managers to convince others that factors affecting creativity can indeed be learned and improved. To the extent that employees value new ideas, believe that increased creative behavior and performance can be developed and is not the sole domain of a select few, and feel they are not too busy for new ideas, they are more likely to engage in divergent thinking and to try to improve their creative performance. To the extent that the reverse is true, this study has helped establish three potential attitudinal barriers to be overcome by organizations that want their employees to do more divergent thinking as an attempt to increase creativity and innovation. Organizations can attempt to improve these employee attitudes by training or other means (see Basadur, 1994).

Most industrial training programs do not evaluate their effectiveness (Goldstein, 1980) -- this in our experience is especially true of creativity training programs. One of the reasons is a lack of understanding of how such training actually works. Another reason is a lack of measuring tools

which can help assess how effective a creativity training program has been. The pre/post measure of attitude change using these scales is one gauge that organizations can use for this purpose. Further measures beyond attitude improvement are also needed and are discussed in the next section.

Future Research

There are several future research directions arising from this study. For example, the study should be extended beyond attitudes to include measures of behavior and performance and to check longer term persistence and portability of training effects. Basadur et al. (1986) found that improvements in the two divergent thinking attitudes called “preference for ideation” and “the tendency to (not) make premature critical evaluations of ideas” persisted at least five weeks back on the job in a manufacturing environment. Replicating these findings employing these three additional attitudes and the scales that measure them would be a good starting point. Such research could serve simultaneously to check if positive improvements on these three attitudes can be achieved even with participant groups who particularly tend to discount the value of divergent thinking and creativity such as the manufacturing engineers mentioned in Basadur et al. (1986).

Future work should also attempt to demonstrate the predictive validity and generalizability of the three new scales. For example, do higher scores on these three attitude scales positively relate to higher divergent thinking skill and higher creative performance? Furthermore, research should attempt to identify and measure the internal mechanisms by which implementation of a complete process of creative problem solving as described in this study does affect job performance. That is, the relationships or causalities among attitudes, behaviors, problem finding, problem solving and solution implementation performance and organizational outcomes (e.g., new products or processes)

need to be identified and measured for individuals and teams. In addition, test-retest reliability should be established for these scales.

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Table 1. Items comprising the scales measuring the three attitudes emerging from Basadur and Hausdorf's study

ITEM	Attitude/Scale
1. New ideas seldom work out. (R)	1
2. I really enjoy the challenge of finding a different way to solve a problem.	1
3. When I get a new idea, I really get excited.	1
4. All people have creative ideas from time to time.	1
5. Crazy sounding ideas can lead to something.	1
6. Listening to other people's ideas is a waste of time.	1
7. Only smart, knowledgeable people have good ideas.	1
8. Ideas are fundamental to decision making, and as such should not be taken for granted.	1
9. In organizations, senior management should encourage ideas by demonstrating they are willing to act on them.	1
10. The boss' idea is usually always the best since it comes from a much broader perspective.	1
11. Productive change is important to a business. New ideas foster change. Therefore, new ideas are important to business.	1
12. Creative people generally seem to have scrambled minds.	2
13. Truly creative people also have unusual lifestyles.	2
14. Really creative people are never very organized.	2
15. I don't have much time for thinking up wild ideas, I'm too busy just getting my job done.	3
16. Why is everybody always talking about new ideas? I've got more work than I know what to do with.	3
17. Ideas are only important if they impact on major projects.	3
18. If everyone is providing ideas, then no one gets any work done.	3

Attitude/Scale Key: 1 - Valuing New Ideas
 2 - Creative Individual Stereotypes
 3 - Too Busy for New Ideas

(R) denotes reverse scoring.

Table 2. The 136 item questionnaire with corresponding attitudes/scales denoted

ITEM	Attitude/Scale
1. Ideas are fundamental to decision making, and as such should not be taken for granted.	1
2. I don't have much time for thinking up wild ideas, I'm too busy just getting my job done.	3
3. Creative people generally seem to have scrambled minds.	2
4. New ideas seldom work out. (R)	1
5. Why is everybody always talking about ideas? I've got more work than I know what to do with.	3
6. Really creative people are never very organized.	2
7. In organizations, senior management should encourage ideas by demonstrating they are willing to act on them.	1
8. Ideas are only important if they impact on major projects.	3
9. Truly creative people also have unusual lifestyles.	2
10. I really enjoy the challenge of finding a different way to solve a problem. (R)	2
11. If everyone is providing ideas, then no one gets any work done.	3
12. Creative people don't fit in our department.	2
13. When I get a new idea I really get excited.	1
14. Ideas take too much time to generate.	3
15. Doers, not creative thinkers are the kind of people we need.	2
16. All people have creative ideas from time to time.	1
17. The time spent on generating good ideas saves time in solving problems. (R)	3
18. Creative people are better suited for the arts.	2
19. The boss' idea is usually always the best since it comes from a much broader perspective. (R)	1
20. Time is wasted if ideas are not generated. (R)	3
21. Creative people help us take a new perspective. (R)	2

Attitude/Scale Key: 1 - Valuing New Ideas
 2 - Creative Individual Stereotypes
 3 - Too Busy for New Ideas
 (R) denotes reverse scoring

Table 2 (continued). The 136 item questionnaire with corresponding attitudes/scales denoted

ITEM	Attitude/Scale
22. Crazy sounding ideas can lead to something.	1
23. The more ideas generated the greater the success of problem definition.	1
24. Creative people can get me to look at things differently. (R)	2
25. Listening to other people's ideas is a waste of time. (R)	1
26. Thinking of ideas takes time that I don't have.	3
27. Creative people make me feel uncomfortable.	2
28. Productive change is important to a business. New ideas foster change. Therefore, new ideas are important to business.	1
29. Getting things done and generating new ideas don't mix well.	3
30. Creative people stimulate me to think differently. (R)	2
31. Only smart, knowledgeable people have good ideas. (R)	1
32. I wish I had the time to think up some new ideas.	3
33. You cannot tell a creative person by appearance. (R)	2
34. Imposing your ideas on others inhibits the generation of new ideas.	1
35. It takes a hundred new ideas to come up with one that works, so who has the time?	3
36. Creative people are not practical.	2
37. Everyone can generate new ideas.	1
38. New ideas can save us time. (R)	3
39. Creative people are more effective in defining problems. (R)	2
40. Creative people think outside the normal boundaries. (R)	2
41. We should never be too busy to think of ideas to save us time. (R)	3
42. You cannot teach an old dog new tricks.	3
43. Everyone has some creativity for creating new ideas. (R)	2
44. We are always coming up with new ideas we just need to pay attention to them.	1

Attitude/Scale Key: 1 - Valuing New Ideas
2 - Creative Individual Stereotypes

3 - Too Busy for New Ideas

Note: (R) denotes reverse scoring.

Table 2 (continued). The 136 item questionnaire with corresponding attitudes/scales denoted

ITEM	Attitude/Scale
45. You are born with creativity. (R)	2
46. Generating new ideas can be learned.	1
47. We ought to take more time to create new ideas. (R)	3
48. Creativity can be learned. (R)	2
49. New ideas challenge our stability. (R)	1
50. New ideas take time to implement.	3
51. There's nothing really strange about creative people. (R)	2
52. In order to change to something new, new ideas need to be generated.	1
53. People don't like new ideas.	3
54. The business environment doesn't encourage the use of creativity.	3
55. New ideas "bug" me. (R)	1
56. To adjust to new ideas takes time. (R)	3
57. Creative people are really no different from anyone else. (R)	2
58. New ideas result in new solutions.	1
59. Not enough new ideas is the reason we are behind.	1
60. Creative people need a supportive environment.	2
61. New ideas are fun to generate.	1
62. New ideas don't really take much time. (R)	3
63. Under the right conditions, all people are creative. (R)	2
64. Generating new ideas expands the mind.	1
65. New ideas are a twenty four hour deal.	2
66. Taking the time to solve problems creatively can save you time. (R)	1
67. New ideas result in new problems.	1
68. New ideas pop up all the time.	1

Attitude/Scale Key: 1 - Valuing New Ideas
 2 - Creative Individual Stereotypes
 3 - Too Busy for New Ideas

(R) denotes reverse scoring

Table 2 (continued). The 136 item questionnaire with corresponding attitudes/scales denoted

ITEM	Attitude/Scale
69. Creative people are always looking for another rule to break.	2
70. Old problems can be solved with new ideas.	1
71. Ideas excite teams. (R)	3
72. Creative people are ahead of their time. (R)	2
73. New ideas are limited by our own experiences.	1
74. One good idea is worth the time it takes to generate a hundred bad ones.	1
75. Creative people wear unique glasses. (R)	2
76. New ideas are not limited by I.Q.	1
77. New ideas don't happen 9-5. (R)	3
78. Creative people are usually very humorous.	2
79. Outsiders have the best ideas.	2
80. Teams can amplify the number of ideas. (R)	3
81. Creative people become stand-up comedians.	2
82. People who do the work have good ideas about their work.	1
83. Because I spend time thinking of ideas, I often miss my bus.	3
84. Creative people have their own set of boundaries. (R)	2
85. You shouldn't pre-judge your new ideas.	1
86. An old idea must be a new idea first.	1
87. Creative people really get results. (R)	2
88. New ideas are usually a new twist on an old idea.	1
89. New ideas can be generated anywhere. (R)	3
90. Creative people bring new perspectives to problem solving. (R)	2
91. A germ of an idea can lead to a big idea.	1

Attitude/Scale Key: 1 - Valuing New Ideas
 2 - Creative Individual Stereotypes
 3 - Too Busy for New Ideas

(R) denotes reverse scoring

Table 2 (continued). The 136 item questionnaire with corresponding attitudes/scales denoted

ITEM	Attitude/Scale
92. New ideas can be generated fast. (R)	3
93. Creative people are flaky.	2
94. New ideas are old ideas reborn. (R)	1
95. New ideas cost money. (R)	1
96. Creative people are not responsible.	2
97. Most ideas we try are not really new. (R)	1
98. New ideas almost always cost more money. (R)	1
99. Creative people generate a lot of ideas. (R)	2
100. New ideas are easily killed.	1
101. New ideas always take more time.	3
102. There are enough creative people in business.	2
103. If everyone is thinking, then no one is doing.	3
104. If we had more creative people in business we would be able to solve more problems. (R)	2
105. New ideas take more time, but they are worth it. (R)	3
106. We need more people who are creative in business.	1
107. New ideas never work. (R)	1
108. Creativity cannot be taught.	2
109. Not many new ideas ever work. (R)	1
110. Creative people can energize an organization. (R)	2
111. New ideas come from creative people. (R)	2
112. Creative people can make work fun. (R)	2
113. We should all slow down and think of more new ideas. (R)	3

Attitude/Scale Key: 1 - Valuing New Ideas
 2 - Creative Individual Stereotypes
 3 - Too Busy for New Ideas

(R) denotes reverse scoring

Table 2 (continued). The 136 item questionnaire with corresponding attitudes/scales denoted

ITEM	Attitude/Scale
114. Creative people can prevent us solving the wrong problem. (R)	2
115. New ideas create more new ideas.	1
116. Creative people never get results.	2
117. New ideas are often forgotten. (R)	1
118. You never know what a creative person will say next.	2
119. Ideas that are inventive come from experience.	1
120. Creative people are stupid.	2
121. One new idea can save a life.	1
122. Creative people are more effective in solving problems. (R)	2
123. New ideas almost always take too much time.	3
124. Creative people don't know what to say.	2
125. We'll get left behind unless we spend some time on new ideas.	1
126. Only some people are creative.	2
127. New ideas save time in the long run. (R)	3
128. We really need creative people.	1
129. New ideas are spontaneous.	1
130. Manufacturing people should be creative.	1
131. Trying new ideas slows us down.	3
132. Management should be more creative.	1
133. Not many new ideas get implemented.	3
134. New ideas always take too much time.	3
135. Most people don't really have to work at creating new ideas. (R)	3
136. New ideas can happen spontaneously. (R)	3

Attitude/Scale Key: 1 - Valuing New Ideas
 2 - Creative Individual Stereotypes
 3 - Too Busy for New Ideas

(R) denotes reverse scoring

Table 3. Reliabilities and item - rest of scale items correlations for the 44 items retained from the 136 item questionnaire based on responses from the n = 223 managerial sample.

	Correlation of Item with Rest of the Scale Items	Cronbach Alpha if Item Deleted
Valuing New Ideas (Scale 1)		
Items		
1. Ideas are fundamental to decision making, and as such should not be taken for granted.	.29	.83
5. In organizations, senior management should encourage ideas by demonstrating they are willing to act on them.	.48	.82
14. New ideas result in new solutions.	.39	.83
15. Not enough new ideas is the reason we are behind.		.32 .83
16. Generating new ideas expands the mind.	.50	.82
18. Old problems can be solved with new ideas.	.41	.83
20. One good idea is worth the time it takes to generate a hundred bad ones.	.32	.83
25. You shouldn't pre-judge your new ideas.	.42	.82
26. A germ of an idea can lead to a big idea.	.44	.82
29. Most ideas we try are not really new. (reverse scored)	.40	.83
31. New ideas are easily killed.	.35	.83
34. We need more people who are creative in business.	.64	.81
36. New ideas create more new ideas.	.54	.82
37. One new idea can save a life.	.48	.82
40. We'll get left behind unless we spend some time on new ideas.	.58	.81
41. We really need creative people.	.48	.82
42. Manufacturing people should be creative.	.51	.82
43. Management should be more creative.	.62	.81
Reliability Coefficient Alpha = .83		
Belief That Creativity is Not Only for a Select Few (Scale 2)		
Items (all reverse scored)		
4. Really creative people are never very organized.	.33	.74
6. Truly creative people also have unusual lifestyles.	.36	.74
12. Creative people think outside the normal boundaries.	.35	.74
17. Creative people are always looking for another rule to break.	.40	.74
19. Creative people are ahead of their time.		.36 .74
21. Creative people wear unique glasses.	.46	.73
22. Creative people are usually very humorous.	.35	.74
23. Outsiders have the best ideas.	.37	.74
24. Creative people become stand-up comedians.	.55	.72
27. Creative people are flaky.	.39	.74
28. Creative people are not responsible.	.30	.75
30. Creative people generate a lot of ideas.	.29	.75
35. Creative people can prevent us solving the wrong problem.	.31	.74
38. Creative people are more effective in solving problems.	.27	.75
Reliability Coefficient Alpha = .75		
Not Feeling Too Busy for New Ideas (Scale 3)		
Items (all reverse scored)		
2. I don't have much time for thinking up wild ideas, I'm too busy just getting my job done.	.53	.78
3. Why is everybody always talking about ideas? I've got more work than I know what to do with.	.44	.79
7. If everyone is providing ideas, then no one gets any work done.	.38	.80
8. Ideas take too much time to generate.	.54	.78
9. Thinking of ideas takes time that I don't have.	.51	.78
10. I wish I had the time to think up some new ideas.	.45	.79
11. It takes a hundred new ideas to come up with one that works, so who has the time?	.40	.79
13. The business environment doesn't encourage the use of creativity.	.37	.80
32. New ideas always take more time.	.40	.79
33. If everyone is thinking, then no one is doing.	.43	.79

39. New ideas almost always take too much time.	.55	.78
44. New ideas always take too much time.	.43	.79
Reliability Coefficient Alpha =	.80	

Table 4. How the items on the three scales were combined to form the 44-item Questionnaire.

Corresponding item numbers			
Scale**	Items Making up the 136-Item Questionnaire	Items Making Up the 44-Item Questionnaire	Item
1	1	1.*	Ideas are fundamental to decision making, and as such should not be taken for granted.
3	2	2.*	I don't have much time for thinking up wild ideas, I'm too busy just getting my job done. (R)
3	3	3.*	Why is everybody always talking about ideas? I've got more work than I know what to do with. (R)
2	6	4.*	Really creative people are never very organized. (R)
1	7	5.*	In organizations, senior management should encourage ideas by demonstrating they are willing to act on them.
2	9	6.*	Truly creative people also have unusual lifestyles. (R)
3	11	7.*	If everyone is providing ideas, then no one gets any work done. (R)
3	14	8.	Ideas take too much time to generate. (R)
3	26	9.	Thinking of ideas takes time that I don't have. (R)
3	32	10.	I wish I had the time to think up some new ideas. (R)
3	35	11.	It takes a hundred new ideas to come up with one that works, so who has the time? (R)
2	40	12.	Creative people think outside the normal boundaries. (R)
3	54	13.	The business environment doesn't encourage the use of creativity. (R)
1	58	14.	New ideas result in new solutions.
1	59	15.	Not enough new ideas is the reason we are behind.
1	64	16.	Generating new ideas expands the mind.
2	69	17.	Creative people are always looking for another rule to break. (R)
1	70	18.	Old problems can be solved with new ideas.
1	72	19.	Creative people are ahead of their time. (R)
1	74	20.	One good idea is worth the time it takes to generate a hundred bad ones.
2	75	21.	Creative people wear unique glasses. (R)
2	78	22.	Creative people are usually very humorous. (R)
2	79	23.	Outsiders have the best ideas. (R)
2	81	24.	Creative people become stand-up comedians. (R)
1	85	25.	You shouldn't pre-judge your new ideas.
1	91	26.	A germ of an idea can lead to a big idea.
2	93	27.	Creative people are flaky. (R)
2	96	28.	Creative people are not responsible. (R)
1	97	29.	Most ideas we try are not really new. (R)
2	99	30.	Creative people generate a lot of ideas. (R)
1	100	31.	New ideas are easily killed.
3	101	32.	New ideas always take more time. (R)
3	103	33.	If everyone is thinking, then no one is doing. (R)
1	106	34.	We need more people who are creative in business.
2	114	35.	Creative people can prevent us solving the wrong problem. (R)
1	115	36.	New ideas create more new ideas.
1	121	37.	One new idea can save a life.
2	122	38.	Creative people are more effective in solving problems. (R)
3	123	39.	New ideas almost always take too much time. (R)
1	125	40.	We'll get left behind unless we spend some time on new ideas.
1	128	41.	We really need creative people.
1	130	42.	Manufacturing people should be creative.
1	132	43.	Management should be more creative.
3	134	44.	New ideas always take too much time. (R)

R - Reversed items

* items that were retained from the original scales of the Basadur and Hausdorf (1995) study.

**Attitude/Scale Key: 1 - Valuing New Ideas
 2 - Belief that Creativity is Not Only for a Select Few
 3 - Not Feeling Too Busy for New Ideas

Table 5. Confirmatory factor analysis fit statistics for the three scales making up the 44-item questionnaire. (n=223)

	Valuing New Ideas	Belief that Creativity is Not Only for a Select Few	Not Feeling Too Busy for New Ideas
Chi-square Statistic	116.02 ^{d.f.=88}	75.89 ^{d.f.=59}	64.22 ^{d.f.=50}
Goodness of Fit Index	.93	.95	.95
Adjusted Goodness of Fit Index	.90	.81	.92
Normed Fit Index	.87	.86	.89
Comparative Fit Index	.96	.96	.97
Incremental Fit Index	.96	.97	.97

d.f. - degrees of freedom

Table 6. Factor loadings (Lambdas) and T-Values obtained in the confirmatory factor analysis of the three new scales.

Scale Items	Lambdas ^a	t-Values ^b
Valuing New Ideas		
1. Ideas are fundamental to decision making, and as such should not be taken for granted.	.27	3.58
5. In organizations, senior management should encourage ideas by demonstrating they are willing to act on them.	.37	5.91
14. New ideas result in new solutions.	1.00	-- ^c
15. Not enough new ideas is the reason we are behind.	.21	3.69
16. Generating new ideas expands the mind.	.40	7.19
18. Old problems can be solved with new ideas.	.34	6.04
20. One good idea is worth the time it takes to generate a hundred bad ones.	.26	4.47
25. You shouldn't pre-judge your new ideas.	.39	5.38
26. A germ of an idea can lead to a big idea	.41	5.62
29. Most ideas we try are not really new.	.54	8.01
31. New ideas are easily killed.	.33	4.40
34. We need more people who are creative in business.	.69	9.84
36. New ideas create more new ideas.	.63	8.54
37. One new idea can save a life.	.59	8.09
40. We'll get left behind unless we spend some time on new ideas.	.69	9.65
41. We really need creative people.	.53	7.09
42. Manufacturing people should be creative.	.61	8.36
43. Management should be more creative.	.77	10.87
Belief that Creativity is Not Only for a Select Few		
4. Really creative people are never very organized.	1.00	-- ^c
6. Truly creative people also have unusual lifestyles.	.43	7.81
12. Creative people think outside the normal boundaries.	.26	3.47
17. Creative people are always looking for another rule to break.	.42	5.48
19. Creative people are ahead of their time.	.31	3.96
21. Creative people wear unique glasses.	.56	7.33
22. Creative people are usually very humorous	.36	4.60
23. Outsiders have the best ideas.	.44	5.73
24. Creative people become stand-up comedians.	.74	9.52
27. Creative people are flaky.	.49	6.90
28. Creative people are not responsible.	.27	4.89
30. Creative people generate a lot of ideas.	.16	2.84
35. Creative people can prevent us solving the wrong problem.	.15	2.64
38. Creative people are more effective in solving problems.	.14	2.47
Not Feeling Too Busy for New Ideas		
2. I don't have much time for thinking up wild ideas, I'm too busy just getting my job done.	1.00	-- ^c
3. Why is everybody always talking about ideas? I've got more work than to know what to do with.	.85	6.31
7. If everyone is providing ideas, then no one gets any work done.	.61	4.75
8. Ideas take too much time to generate.	.97	7.00
9. Thinking of ideas takes time that I don't have.	.98	7.08
10. I wish I had the time to think up some new ideas.	.81	6.10
11. It takes a hundred new ideas to come up with one that works, so who has the time?	.71	5.42
13. The business environment doesn't encourage the use of creativity.	.59	4.58
32. New ideas always take more time.	.49	3.85
33. If everyone is thinking, then no one is doing.	.74	5.61
39. New ideas almost always take too much time.	.80	6.01
44. New ideas always take too much time.	.58	4.53

a The Lambdas are reported from the completely standardized solution

b All t-values are significant at $\alpha = 0.05$ ($t > 1.96$)

c Fixed coefficient of 1 assigned in the relationship between the first unique construct and latent construct for scaling purposes.

Table 7. Interscale correlations and descriptive statistics for the three new scales using the sample n=223.

	Means	s.d.	Interscale Correlations		
			Valuing New Ideas	Belief that Creativity is Not Only for a Select Few	Not Feeling Too Busy For New Ideas
Valuing New Ideas	136.57	12.91			
Belief that Creativity is Not Only for a Select Few	74.62	13.27	.18*		
Not Feeling Too Busy for New Ideas	75.11	13.22	.17*	.21**	

* p<.05

** p<.01

Table 8. Reliability coefficients for the three new scales using the new managerial sample (n=68).

Scale	Cronbach Alpha
Valuing New Ideas	.70
Belief That Creativity is Not Only for a Select Few	.77
Not Feeling Too Busy for New Ideas	.81

Table 9. Mean attitude scores for the 3 scales/attitudes based on groups (training/placebo) and time (before/after).

	Valuing New Ideas			Belief that Creativity is Not Only for a Select Few			Not Feeling Too Busy for New Ideas		
	Before Training	After Training	Change	Before Training	After Training	Change	Before Training	After Training	Change
Training Group (n=36)	115.00 (19.12)	135.28 (13.34)	20.28***	67.28 (10.85)	72.06 (10.96)	4.78***	60.75 (22.94)	78.05 (12.62)	17.30***
Placebo Control Group #1 (n=11)	129.30 (9.60)	129.70 (12.15)	0.40	62.50 (14.33)	65.50 (13.70)	3.00	48.60 (13.44)	49.20 (16.36)	0.60
Placebo Control Group #2 (n=35)	124.84 (11.53)	125.03 (13.28)	0.19	62.22 (20.64)	63.50 (15.29)	1.28	45.50 (11.59)	48.19 (11.31)	2.69

Notes: Figures in parentheses denote standard deviations.

*** $p < .001$