

**Cognitive Style and Problem-Defining Behavior:
An Executive Summary of K. Puccio's 1987 Master's Project**

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Introduction/ Overview

Purpose of the study

This psychometric study examined the predictive validity of the *Kirton Adaption-Innovation Inventory* (KAI) in order to attempt to answer the following question, "What effect does cognitive style have on problem-defining behavior?"

The primary motivation for this study was to help creativity facilitators understand how individuals with different cognitive styles approach the Creative Problem-Solving (CPS) technique. The assumption was that an improved understanding of different styles would lead to more sophisticated facilitation techniques that would better meet the needs of different cognitive styles. In addition, Puccio (1987) anticipated that the use of helpful metacognitive strategies might be promoted if an individual could understand how cognitive style affects his or her creative behavior. Furthermore, he suggested that understanding cognitive style would allow an individual to make CPS more personally meaningful.

Pertinent Background Information/ Context

Challenges from the Creative Studies Project

Torrance (1972) and Torrance and Presbury (1984) indicated that creativity could be advanced through training. Parnes (1981) and Parnes and Noller (1972) came to similar conclusions.

These data supported the establishment of a program of creative studies at the State University College at Buffalo. As that study progressed however, a number of students dropped out of the program who were very artistic, spontaneous, novel, fluent and exhibited other typical characteristics associated with creative individuals. It became apparent that there were differences in creativity style that needed to be understood.

Kirton Adaption-Innovation Inventory

The *Kirton Adaption-Innovation Inventory* (KAI) was a measure designed to assess creativity style. It closely related to cognitive styles theory (Puccio, 1987). As opposed to cognitive strategy, cognitive style was a personality constant that training could not modify. In his observation of managers, Kirton identified two general cognitive approaches to creativity, which he placed on two ends of a personality continuum. On one end, he placed Adaptors—those who he believed solved problems within a given system and were less original. Other associated characteristics included reliability, efficiency, precision, discipline, and conformity. On the other end of the continuum, Kirton put Innovators—those who he believed would often manipulate the system in which they worked and were more radical. However, because of this, they were less successful at getting their ideas accepted. Other characteristics of innovators included lack of discipline, tangential thinking, approaching tasks from unsuspecting angles and challenging the structure. Kirton asserted there was no relationship between KAI style-measure and level of creativity (Kirton, 1977).

Creative Problem-Solving (CPS) and Problem-Finding

To test style for this study, Puccio chose one part of a contemporary approach called Creative Problem-Solving (CPS), a six-stage method that uses various divergent and convergent thinking techniques to solve almost any personal or professional problem (Osborn, 1963; Parnes, 1981; Isaksen & Treffinger 1985 as quoted in Puccio, 1987). Puccio's project explained this technique in detail.

The stage of CPS used in this study was the problem-finding stage, which is where the problem is identified. Puccio chose this stage because some believe that this is the most potentially creative part of CPS (Puccio, 1987; Einstein & Infeld, 1938; Getzels, 1975; Getzels & Csikszentmihalyi, 1976).

Previous Studies

A previous study by E. Zelwicz showed that participants of various cognitive styles considered themselves to have very different problem-solving strengths and weaknesses. It showed a connection but findings were too general and the instrument by A. F. Gregorc that was used was unreliable (Puccio, 1987).

Description of Population and Method

There were two participating groups:

- (1.) The main sample of participants consisted of 146 undergraduate students taking an introduction to creativity course. (The research was conducted before students were presented with any material that could affect their performance on tests).
- (2.) The supplemental sample consisted of 38 undergraduate business course students.

Variables Examined

- Cognitive Style (Adaptor or Innovator) using the KAI.
- Fluency (quantitative) – total number of problem statements generated by the participant.
- Originality (qualitative) – this was measured by three approaches: by coding responses to see the ability of a participant to generate statistically infrequent responses for the population of which the participant was a member; by administering the *Torrance Test of Creative Thinking* (TTCT) to the main sample; and by having a professional (from the field from which the problem-defining task came) judge and rate a subset of the responses.

General Method

Data collection

All participants were given a problem-defining task (an actual railroad industry problem) and given two minutes to read the problem. They were then told to generate as many ideas as possible.

They were stopped after seven minutes. This activity was to determine fluency and originality.

Participants from the main sample were then given Activity 4 and Activity 5 of the *Torrance Test of Creative Thinking* (TTCT). This was a measure of divergent idea production (Torrance, 1974).

Participants were then administered the KAI (no time limit) to determine style.

Two raters scored participant responses to the problem-defining task for fluency (number of responses) and originality (statistical infrequency). One additional rater randomly selected 20 responses from the main sample and repeated the procedure. Yet another rater, this time an expert rater from the railroad industry, randomly selected 99 responses and rated them for originality and quality based on his experience.

Analysis

Only the scores of participants who had a strong Innovator or strong Adaptor preference were calculated (strong preference, described as half a standard deviation from the mean on the KAI here because of smaller sample). A Pearson product-moment correlation was then used to measure inter-rater reliability between the original rater and two additional raters. Another Pearson product-moment correlation was used to measure the relationship between originality and quality. Additional statistical measures were used to assure validity and to analyze correlation between various factors.

Findings

General Results

- T-test of main sample revealed that innovators were significantly more fluent and original than adaptors.
- T-test of the smaller supplemental sample, however, revealed no significant difference in originality and fluency between innovators and adaptors.

- A 2 x 2 analysis of variance conducted on the main sample (the supplemental sample was too small for a 2 x 2 analysis of variance) responses to the problem-defining task and responses to the *Torrance Test of Creative Thinking* exposed fluency as a confounding factor:
 - Level of fluency had significant effect on originality
 - Style had no significant effect on originality

Conclusions

In the end, the effect cognitive style on problem-defining behavior could not be clearly identified. This study demonstrated, however, that innovators were more fluent. Because of the confounding effect of fluency on originality, however, it became evident that a purer measure of originality was needed. This study did not support Kirton's belief that innovators were more original than adaptors. Puccio (1987) also concluded that the KAI required further validation.

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