THE EFFECTS OF CREATIVITY, INTELLIGENCE AND COMMUNICATOR EXPERTISE ON CONFORMITY

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ABSTRACT

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By

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On the basis of a theoretical framework developed by the author, this research investigated the interdependence of intelligence, creativity and communicator expertise as they affect conformity behavior. It was hypothesized that intelligence, as measured by available tests, is an index of intellectual conformity and therefore should be positively related to reliance on information provided by others, especially when they are presented as experts. Creativity, supposedly an index of independent thinking, was expected to show the reverse pattern. Similarly it was hypothesized that the effects of differential levels of expertise of a communicator would very much depend upon the intelligence and creativity of the person receiving the communication, with those of low-intelligence and high-creativity being relatively insensitive and those of high-intelligence and low creativity being highly sensitive to such variations.

On the basis of a median split on both indexes, four groups differing in their level of creativity and intelligence were formed.

The subjects in each of those groups were then assigned in equal number to either a low or high confederate expertise condition. Conformity was assessed by a perceptual judgment task developed by Crano (1970), in which the subject and a confederate give their estimates of the number of dots flashed onto a screen.

The results failed to support the hypotheses concerning the main effects and simple interactions of the three variables. However the significant ($p < .02$) three way interaction revealed a high degree of interdependence among the independent variables. When that interaction was investigated by way of a simple - effect analysis, it was found that differences in intelligence significantly affect conformity only when the subject is exposed to a high expertise communicator; and even then its effects may be reversed depending on the subject's concurrent level of creativity with a high level of creativity leading to a negative relationship and a low level of creativity leading to a positive relationship between I.Q. and conformity. Creativity significantly lowered conformity only when both intelligence and communicator expertise were low. High expertise significantly increased conformity and low expertise similarly reduced it only when the subjects displayed discrepant levels of intelligence and creativity, with the low intelligence - high creativity group behaving contrarily to predictions. An interpretation of these findings was presented in the discussion section.

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TABLE OF CONTENTS

		Page
LIST OF TABLES		vi
LIST OF FIGURES		vii
CHAPTER		
I.	INTRODUCTION	1
	General Cognitive Framework	2
	Creativity, Intelligence and Conformity	6
	Expertise and Conformity	10
	Differential Effects of Expertise Depending on Creativity and Intelligence	12
II.	METHOD	15
	Subjects	15
	Materials	15
	Procedure	20
	Design	23
III.	RESULTS	24
	Creativity and Intelligence	24
	Compliance and Conformity	26
	Acquisition and Transfer	37
	Control Subjects Differences	37
	Summary of Results	39
IV.	DISCUSSION	41
	Creativity and Intelligence	41
	Conformity	42
	Intelligence and Conformity	43

Page

Creativity and Conformity 45
Expertise and Conformity 46
Learning Conformity Dispositions 50
Implications and Suggestions 51

BIBLIOGRAPHY 54

APPENDIX

A. Correlations Between the I.Q. Tests Employed and Regression Equations 59

B. Letters, Test Booklet and Correction Keys 60

C. Reliabilities of the Creativity Tests Employed 82

D. Intelligence and Creativity Means of the Different Groups Employed 83

E. Detailed Account of the Experimental Session 84

LIST OF TABLES

Table		Page
1.	Creativity Tests Used in Three Studies	17
2.	The Relationship Between Creativity and Intelligence Test Scores	21
3.	Correlations Among Creativity, Intelligence, and Teachers'Assessments	25
4.	Summary of Analysis of Variance	27
5.	Group Mean Conformity Scores According to Conditions	32
6.	Significant Simple Interactions and Simple-Simple Main Effects for Acquisition	33
7.	Significant Simple Interactions and Simple-Simple Main Effects for Transfer	36
8.	Mean Estimates of the Confederates, the Control Group, the Total Experimental Group and the High and Low Expertise Groups in the Acquisition and Transfer Phases	38

LIST OF FIGURES

Figures Page

1. Interaction of Expertise and Trials for the Acquisition Phase 29

2. Comparison of Trial Blocks Effects for the Experimental and Control Group 30

CHAPTER I

INTRODUCTION

The concept of conformity is central in current social-psychological theory. In fact, rather than arguing that individuals in a given society come to behave in a similar manner and manifest similar views of the world because they face the same kind of reality, current theories focus on how a particular social group imposes its ways of behaving, values and attitudes on individual members. Actually, if we examine Asch type experiments, it looks as if they are right at least half of the time since, on the average, 50% of the subjects conform.

In general, social-psychological studies of conformity have manipulated such situational determinant as the ambiguity of the stimulus (Asch 1956; Patel and Gordon 1960; Kelley and Lamb, 1957), group size (Asch 1951; Gerard and Wilhelmy, 1968), size of the majority (Asch 1956; Tuddenham 1961), group acceptance (Kelley and Shapiro 1954; Harvey and Consalvi 1960) and group expertise, status or prestige (Cohn Yee and Brown, 1961). In interpreting these studies, some infer that the results should apply to most persons, if not everybody. Such a gratuitous assumption overlooks the fact that in Asch's initial experiment, only 32% of the subjects conformed. Situational manipulations have increased that percentage to 80% (Allen, 1965) but never totally.

By manipuling such personal variables as occupation however, Crutchfield's experiments (1962) have increased conformity responses to a perfect percentage (100% for army officers) and decreased it to practically zero (for scientists).

While research in the area of personality deals only indirectly with conformity, a number of studies (Crutchfield 1962; Rokeach 1960; Barron 1963; Adorno et al. 1950; Witkin et al. 1954 etc.) indicate that individual differences in conformity are sufficiently large to challenge an approach to social phenomena based primarily on the concept of conformity. Although social-psychologists espouse the view that social psychological phenomena cannot be explained unless one approaches them from the point of view of an interaction between the person and social reality, still most of the studies focus on one or the other aspect separately, thus neglecting their transactional character. The present study constitutes an attempt to investigate the transactional relationship between personal and situational variables as they affect conformity behavior.

In reviewing pertinent literature, I shall first discuss generalities regarding cognition, followed by a consideration of how certain cognitive variables may affect conformity and may interact with situational variables in such an effect.

General Cognitive Framework.[1] The interaction of external and internal factors is central in the study of cognition, especially

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[1] A more detailed theoretical treatise appears in Pépin (1971).

cognitive development. Piaget (1952, 1964), for example, shows how mature cognitive structures are attained by a constant and complex interplay between internal (schemas) structures and external (reality) features. He describes how more effective cognition develops through a progressive adaptation or equilibration of internal schemas and external structures as a subject encounters difficulties and adaptively realigns his activity. The optimum equilibrium is attained when there is an effective counter balance between the two functions of assimilation of the given to internal schemas and accommodation of the schemas to pertinent reality features. By over-emphasizing the role activity of the subject in cognitive development however, Piaget tends to consider the process as an exclusively inductive, spontaneous and maturational conceptual system formation where other persons have little to do except interfere.

Piaget's theory would be more adequate if it took into account the cultural milieu in which the human organism develops. The child is born in a society which has already constructed and imposed a conceptual system of categories over physical, as well as social, reality. Communication, one of the bases of any society, is possible only if every individual is made to learn these categories and their logical interrelationships. Most of the time, that conceptual system is so advanced, extensive and complex that an individual could not, in a life-time, discover even a small part of it if he were to personally experience every fact and induce concepts out of that

experience. So he has to be instructed and made to accept certain conceptualizations without actually being able to verify their validity.

Vigotsky (1962) presents an alternative point of view. He distinguishes between formal and spontaneous concepts; the first being those actually used in the society, the second those developed out of personal experience. He argues that instruction accelerates cognitive development because it structures cognitions by setting models. Instruction then provides formal concepts which first are empty structures that experience progressively fills in. From Vigotsky's viewpoint therefore, spontaneous concepts benefit from the high degree of structuring of the formal concepts and, at the same time, formal concepts acquire utility through actual experience.

If we apply such a framework to the theory of socialization, an interesting hypothesis emerges. We may hypothesize that socialization agents differ in the degree to which they emphasize formal or spontaneous conception when dealing with the socializee. One aspect of such a question is to what extent are they willing to let spontaneous conceptualization interfere with formal logic in the hope that the socialisee will solve the problem by himself. Another aspect is to what extent will they let the socialisee question the validity of formal concepts.

To the extent that formal concepts are emphasized in socialization, the locus of validity evaluation will shift from an internal to a cultural perspective. Because of their lack of cognitive

experience, children are apt to make errors and to be corrected frequently with the result that they may come to rely on others to evaluate their concepts. Another consequence is that they will focus their learning attempts at understanding cultural knowledge and gathering information rather than at adapting to their personal reality. Their level of self-esteem will depend on the extent to which others acknowledge their ability at the job. Schactel thus describes the long term consequences of this same phenomenon:

> In addition to the closure of the world which results from the transmission of a familial and / or cultural viewpoint, parental curbing of the child's exploratory drive can also be a factor that interferes with the world openness of the child and often leads to a more or less powerful strengthening of the tendency to avoid the unknown and remain embedded in the familiar (1959, p. 187).

Hess and Shipman (1965) found that a type of control based on formal laws (in that particular case "status oriented control") is correlated with a cognitive orientation that is geared toward social adjustment rather than objective conceptualization.

If spontaneous conceptualization is emphasized in socialisation however, the locus of validity estimation stays internal rather than external. As Piaget describes it, a feeling of competence and control thus arises from the fact that a spontaneous concept proves, for the moment at least, functional and adaptive. Intellectual development actually functions in the same way homeostatic processes do. Being less coached by socialization agents, the child will focus his learning attempts to those aspects of the environment which cause him adaptation (in the Piagetian sense) difficulties, thus

centering on the discovery of what is not understood rather than on the understanding of what is discovered. His self-esteem will depend on the degree to which he is actually effective and competent in doing so.

For purposes of exposition, I have described extremes on a differential vs. cultural control continuum. In the real world, however, we may expect to encounter different combinations of the two dispositions.

Creativity, Intelligence and Conformity. Having considered some consequences of formally vs. spontaneously oriented socialization, let me now relate those concepts to the research on intelligence and creativity. In Guilford's theory of convergent and divergent thinking (1950), as well as in Getzels and Jackson's book on Creativity and Intelligence (1962) and in Barron's (1963, 1967) Torrance's (1963), Crutchfield's (1962) and Wallach and Kogan's (1965) works, it is assumed that the creative individual is more independent, less conformist, less socially oriented and more original than the less creative person. By contrast, the highly intelligent but less creative person is pictured as a more socially dependent, conformist and less original individual. Such generalizations are plausible, since I.Q. tests consist of "a sample of the cognitive function tasks that are usual and expected in any large cultural group or subgroup" (English and English, 1958; italics not in original). In general, findings from studies regarding creativity and intelligence concur with the previously outlined consequences of what we may call "differing socialization

styles". For example, the generalizations regarding the locus of evaluation of concepts constitutes the core of Rogers' (1959) theory of creativity. Weisberg and Springer (1967), in a study of environmental factors leading to creativity, underline many family patterns which lead the child to rely on himself and to be independent of others in dealing with reality. Getzels and Jackson (1962) also present evidence indicating that socialization patterns differ markedly in the families of highly intelligent adolescents as constrasted with highly creative youth.

With reference to personal functioning, Cattel (1963) concludes that creative researchers are more schizothyme (critical, exact, precise, skeptical), have a higher level of dominance (assertiveness, independence, unconventionality) and are more self-sufficient than individuals in the average population. Crutchfield, after a study of 45 research scientists in the area of missile development, summarizes:

> Taken together, these findings from current studies of creative persons and the other findings on personality attributes of conformists offer consistent evidence for a significant empirical relationship between conformity tendencies in the person and lack of manifest creativity (1963, p. 135).

Golan (1963) also concludes that creative people are more independent, self-accepting, assertive, impulsive and complex than non-creative people. Wallach and Kogan (1969) also note some effects of creativity on unconventional behavior in the classroom with young children. They also mention a factor that has been observed in other

studies like Cattell's — that is, the apparent introversion of the creative person which, interestingly enough, does not hinder them from being popular (Torrance, 1963). Getzels and Jackson (1962) find the highly creative adolescent to be much more independent in setting his values, less conventional in choosing a career and more critical in evaluating cultural standards; thus creative youth appear less ready to take formal cultural conceptualization for granted. A reverse pattern is found for highly intelligent, but not so creative, students. In a more direct test of the effects of creativity on conformity, Barron (1967) reports a difference significant at the .001 level between originals and non-originals (as measured by Guilford's tests) on a modification of Asch's procedure and one at the .05 level on an Independence of Judgment scale.

However, except for Wallach and Kogan and Getzels and Jackson, the findings on the effects of intelligence on conformity are not so clear and the study of the effects of intelligence and the personality characteristics of the highly intelligent person have been biased by the value emphasis long associated with a high I.Q. Crandall et al. (1958) found no significant relation between peer compliance and I.Q. in either preschool or elementary school children. Berenda (1950) also found no significant relationship between yielding and I.Q. In another study by Iscoe, Williams and Harvey (1964), eliminating I.Q. from among the independent variables used in that study did not significantly change the efficiency of predicting conformity behavior. In a previous experiment (1963) they had computed correlations between I.Q. and conformity separately for different age and sex groups. Ten of the twelve

correlations reported were negative, but none were significantly different from zero. So, generally speaking, the relation between I.Q. and conformity is not very strong.

There is some indication in the attitude change literature that it is more difficult and requires better prepared manipulations to persuade more intelligent persons (Carment, Miles and Cervin, 1965; Hovland Janis and Kelley, 1953). Unfortunately, these studies offer no data regarding how the more intelligent subjects score on creativity measures; and since the two variables appear independent, we lack laboratory evidence regarding the effects of creativity on persuadability.[2]

In order to relate creativity, intelligence and conformity, we thus propose the following hypotheses regarding the effects of the first two factors on the third.

Hypothesis 1: Level of creativity should decrease level of conformity in a specific task (because the creative person is a usual non-conformer).

Hypothesis 2: Level of intelligence should increase level of conformity in a specific task (because the highly intelligent person is a usual conformer).

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[2] There has been a controversy regarding the relationship of intelligence and creativity. Some studies show creativity to correlate positively with intelligence whatever the criterion (Golan 1963; Mc Nemar, 1964). Even the Getzels and Jackson study is not convincing in regard to the independence of these measures; in fact, Wallach and Kogan are the only ones whose data support such an assumption. Thorndike (1963) argues that the available evidence does not permit the generalization that there exists a pervasive dimension of individual differences called "creativity" that is quite distinct from intelligence. Perhaps the most cogent, resolution of this controversy is provided by Maer and Stein (1955), who found creativity and intelligence to covary significantly up to a superior range of intelligence. Above that level, they found no correlation between the two factors.

These hypotheses lead to the conclusion that the highest level of conformity in a specific task should occur when the individual combines a high level of intelligence with a low level of creativity; and conversely conformity should be minimal when the individual combines a high level of creativity with a low level of intelligence.

With these hypotheses as a foundation, we shall now consider the interaction of personal and situational variables.

Expertise and Conformity. One of the best documented situational variables affecting conformity is the expertise of the persons with whom the subject interacts. Whether expertise presumably emanates from the general status of the person or persons to whom the individual complies or whether it involves specific expertise in a given task, this variable has consistently been found closely related to conformity.

From the status point of view, we may say that the status hierarchy of a society is that society's formal conception of expertise; that is, it gives to the individual who needs it a quick and expeditious way of assessing the expertise of another individual without actually testing that expertise. Status thus constitutes an accepted and even promoted, although oversimplified, way to evaluate the expertise of a communication source. Asch's data (1956) indicate that the more a group is perceived as prestigious, the more an individual will conform to its norms. High prestige children are particularly successful as sources of behavior contagion among their classmates and playmates (Polansky, Lippitt and Redl, 1950; Lippitt, Polansky and Rosen,

1952; Cohn, Yee and Brown, 1961). Patel and Gordon (1960), while describing a decrease in conformity from the 10th to the 12th grade, remark that this decline is much less evident when high prestige norms are involved than when subjects are exposed to low prestige norms. Manipulations of credibility in the area of attitude change are often made along a status criterion, and generally such a manipulation proves successful (e.g. Zagona and Harter 1966; Kelman and Hovland, 1953; and many others). In general, except for a few more discriminative studies that we will consider later, the high rank or prestige of a person in a social group gives him power to induce conformity in those of lower status.

Expertise may also be considered in specific context when it is related to a given task. Especially in novel and problem situations, the individual who does not bring from prior experience any immediate solution is likely to be more sensitive to social sources of information and imitate the behavior of others (Ferguson, 1970). There is much evidence that an individual who is perceived as being competent or expert at a given task will be more readily imitated (and hence will induce more conformity) than an individual who does not demonstrate such expertise (Mausner 1954; Crano 1970).

Since this aspect of expertise will be manipulated in the current investigation, the following hypothesis is proposed:

Hypothesis 3: A person who is perceived as competent in a relevant task will be more readily imitated and will induce more conformity than a person who is not perceived as competent in that relevant task.

Differential Effects of Expertise Depending on Creativity and Intelligence. Actually, the process underlying both status - produced and task-specific expertise appears to be the same. Campbell (1963) describes it as a decreased reliance on internal sources of information paralleled by an increase in reliance on interpersonal sources of information, so that responses learned by interpersonal mediation like linguistic mediation or model imitation are more likely to be conforming than responses learned by personal experience, such as trial and error. In a specific situation, any event weakening perceptually dependent or strenghtening socially dependent modes of response acquisition will increase conformity. Thus what expertise manipulations really manipulate is the quality of interpersonal sources of information.

However, the picture of the highly creative individual that emerges from the preceding discussion is one of a person who has learned throughout the circumstances of his socialization to rely upon himself and his personal experience in responding to different situations. It is likely that such an individual will tend to accord more importance to "perceptually dependent" modes relative to "socially dependent" modes than the average individual, regardless of how much the socially - dependent modes are stressed in a particular situation. On the other hand, it appears that in order to have a high I.Q., much importance must be given by the subject to social as opposed to more personally dependent types of information. Actually, the highly intelligent person has effectively internalized the cultural model of

reality and thus has learned to rely on socially - dependent modes of learning.

So it seems likely that variations in the quality of the interpersonal sources of information should not affect the highly creative person as much as the highly intelligent person, inasmuch as the creative individual attends more to the task rather than the interpersonal aspect of the situation. For example, certain personal characteristics that are theoretically as well as empirically related to creativity have been found to neutralize the effects of situational variables. Wilson (1960) found that subjects labeled as "socially accommodative" changed their attitude more when influenced by liked peers than by disliked peers. Subjects who were labeled as "concerned with information accuracy", however, did not respond differentially according to attractiveness of the source. In an experiment by Jazubczak and Walters (1959) a group of dependent subjects proved to be more responsive than less dependent subjects to social influence emanating from peers, suggesting that independent subjects vary their behavior less in accordance with the status of the source of influence. Similarly Mc David (1959) differentiated one group who were particularly attentive to the information contained in socially communicated message from another group particularly oriented to the source of the message. He found the source-oriented group to be more susceptible to peer influence, more affected by large discrepancies between their judgments and the judgments of others, and more likely to agree totally (rather than compromise) with the false norms presented when they yielded to influence.

Vidulich and Kaiman (1961) even report that low dogmatic subjects conform more readily with the judgments of the low rather than the high status source. The characteristics of the socially dependent subjects in these studies are far from being congruent with the self-sufficiency and the need for accuracy characteristic of the creative person.

Data regarding the relationship between intelligence and responsiveness to variations in the quality of social influence are scarce and inconclusive. However, because of the assumed sensitivity of the high I.Q. person to interpersonal sources of information, we would expect task specific expertise to produce more conformity in highly intelligent persons than in less intelligent persons. Thus the following hypotheses are proposed.

Hypothesis 4: Varying levels of expertise of the communicator will have more effect on the conformity responses of less creative than of the more creative persons.

Hypothesis 5: Varying levels of expertise of the communicator will have more effect on the conformity responses of more intelligent than less intelligent persons.

These hypotheses lead to the conclusion that varying levels of expertise will have the least effect on highly creative and low I.Q. persons and the most effect on low creative and high I.Q. persons.

These hypotheses were tested in an experiment combining the testing methodology of personality theorists with the more situational laboratory approach of social psychologists.

CHAPTER II

METHOD

The present study employed a factorial quasi-randomized blocks design relating intelligence, creativity, and communicator expertise to subjects' conformity responses in a laboratory situation.

Subjects. The subjects in this study were sixty male junior and senior students enrolled at Haslett High School, Michigan. All subjects volunteered to participate in the experiment.

Materials. The materials used were of three types: measures of intelligence, measures of creativity, and measures of conformity.

I.Q. scores were based on results from the Iowa Test of Basic Skills which were obtained from the students' records. Such results were not available for eight of the students involved; therefore for these subjects a comparable score was computed from a regression equation relating either the Lorge-Thorndike (verbal scale) or the DAT, which most of the students had in their files concurrently with the test employed. (See Appendix A for I.Q. test data)

The choice of creativity measures was based on several considerations[3]. Getzels and Jackson (1962) used five tests mainly derived from the works of Guilford and Cattell. Wallach and Kogan (1965) adapted Guilford's and Torrance's tests for individual testing, arguing that the limitations inherent in group testing did not allow for real creativity to show up. Barron (1963) also used the same type of instruments in experiments relevant to this one. Table 1 lists the instruments employed in those three studies.

The tests that correlate the least with intelligence in the Getzels and Jackson study are the Uses for Things Tests (r=.18), the Fables Test (r=.13) and Make up Problems (r=.24). However, their creativity tests appear to correlate no more between themselves than with intelligence. Wallach and Kogan, on the other hand, claim their tests form a reliable whole which is independent of intelligence both as a whole and as parts.

In the current study, tests measuring many of the same facets of creativity assessed in these previous investigations were incorporated in a battery for group administration. The Uses for Things Test

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[3]There is still a controversy over the criteria and the measurement of creativity as expressed by Klausmeier and Harris (1962). Several attempts to develop such criteria have been made, not the least being by Jackson and Messick (1965). This study however, used measures that have generally been used to assess creativity.

Table 1

Creativity Tests Used in Three Studies

	Getzels & Jackson	Wallach & Kogan	Barron
Uses for Things	X	X	X
Word Associations	X	X [a]	
Consequences			X
Plot Titles			X
Hidden Shapes	X		
Similarities		X	
Interpretation of Visual Patterns		X	X [b]
Fables	X		
Make-up Problems	X		
Word Rearrangement			X
Anagrams			X

[a] Variation of the test called: "Instances of class concepts."

[b] Wallach and Kogan use line forms and other visual patterns. Barron uses TAT and Rorschach figures.

(Getzels and Jackson, 1962) was selected to measure semantic spontaneous flexibility, or the subject's capacity to shift frames of reference and to use the environment in an original manner. A word association test (Thing Categories Test by ETS) was chosen to measure ideational fluency, or the facility to call up ideas wherein quantity and not quality of ideas is emphasized. The third test chosen for this study is the Hidden Figures Test (ETS), designed to measure flexibility of closure, critical exactness and, to a certain extent, field independence. As a fourth test, an adaptation of Guilford's Consequences Test was employed to measure originality in thinking, or the ability to produce remotely associated, clever or uncommon responses. Finally, on the basis of Pelletier's data on self-concept (1970), indicating that self-concept may be the result either of an inductive concept formation process or of the internalization and application to oneself of social labels and categories, an adaptation of the Who Am I Test was included, on the expectation that a creative person would produce non-stereotypic responses. Scoring guidelines for this unique adaptation of the test appear in Appendix B, along with the other creativity tests and their scoring guidelines.

A summated index of creativity was calculated by adding the subject's standardized scores on each of those five tests.

Conformity, the dependent measure in this study, was assessed in the same way as in Crano's experiment (1970), with basically the same setting and instruments.

Crano's experiment uses a perceptual judgment task in which the subject estimates the number of dots flashed onto a screen. In the "acquisition" or "compliance" phase of the experiment, the subject always precedes or follows an experimental accomplice in announcing his judgment of the number of dots. (While Crano used 5 blocks of 10 slides each in this phase, the current study shortened this to 4 blocks of 10 slides). In the "transfer" or "conformity" phase the subject and the confederate write their judgments without communicating, thus eliminating direct social influence. Demand effects are minimized by a guarantee of anonymity. Each block of slides is prearranged so that the mean number of dots on each slide is 40 and the variances do not differ significantly from block to block.

According to a preliminary study, a stimulus interval presentation of 5 seconds maximises accuracy while minimizing judgmental confidence in this situation; furthermore respondents consistently tend to underestimate the number of dots projected on each slide (1970). Since a different age grouping of students is involved in the current study, Crano's last finding was checked with a control group of 12 subjects from the same pool, who judged the stimuli without social influence. As in Crano's study, this control group also demonstrated a tendency to underestimate; therefore his procedure was adopted and all the confederate estimates were programmed to be 30% overestimations.

Thus, higher mean estimate scores tend to reflect greater influence by social sources of information and less reliance on internal sources.

Crano also reports a significant ($p < .001$) effect of response order in the acquisition phase. In order to maximize observed conformity effects in this experiment, the subject always followed the confederate in announcing his estimates.

Procedure. Upon approval of the project by the administration of Haslett High School, a letter was mailed to 136 prospective subjects and to their parents requesting their agreement to participate (see Appendix B). I.Q. scores were then obtained from the students'files. The creativity scores were obtained in a group session of 60 minutes. Only 56 subjects actually took those tests. Apparently there was some reluctance in the subject population based on previous bad experiences with psychology experiments; in addition, many were absent from classes on the morning of testing.

A median split was applied to the I.Q. and creativity distributions, and subjects were assigned to one of four possible groups depending on their scores. The distributions so obtained is illustrated in Table 2.

Table 2

The Relationship Between
Creativity and Intelligence Test Scores

		Creativity		
		Above Median	Below Median	T
Intelligence	Above Median	16	12	28
	Below Median	12	16	28
	T	28	28	56

In each of the groups which did not display a discripancy between their level of creativity and their level of intelligence, four subjects were randomly rejected and assigned to the control group, along with four other students who had not taken the creativity tests; thus the number of control subjects as well as of subjects in each cell was equal (12).

The subjects in each of the four groups were then assigned to one of two possible expertise treatments with one of three possible confederates in each condition. These subgroups were prearranged so that the means and variances in creativity and intelligence were not significantly different in the high and low expertise subgroups (see Appendix D for scores).

As in Crano's study (1970), the expertise manipulation involved influencing the subject's perception of the confederate's high or low level of competence in the task, based presumably on his prior experience in a similar experiment. A detailed account of the experimental procedures appears in Appendix E. These procedures followed Crano's very closely, with the following modification. Due to the fact that Haslett High School is a relatively small school, the students tend to know one another, at least by sight. It did not seem ethically and technically advisable to use peers as confederates; therefore young looking freshmen acted as confederates. The manipulation was planned so that each confederate would appear to the subject as a recent transfer student from a neighboring school. It appears that this procedure was successful on the basis of post-experimental interviews.

After the experimental session, the subjects were partially debriefed (especially regarding the identity of the confederate) and they were asked to cooperate with the experimenter by not discussing what had happened in the experimental room with their peers. The subjects responded favorably to this request, and several even spontaneously formulated good reasons why they should keep the secret. On the basis of post-experimental interviews it appears that no diffusion occurred. The subjects were totally debriefed by a pamphlet explaining the purpose, method and results of the experiment a few weeks following the experiment.

A control group (including the 8 subjects rejected from the experimental groups and 4 volunteer students from the same grades) judged the stimuli without social influence, so that the amount of

conformity induced by the conditions could be assessed. That control group was the first to be tested; therefore the risk of diffusion was initialy minimized by letting the first impact of the experiment on the students be of no significance for the results.

Design. With respect to the compliance phase of this experiment, a 2X2X2X3X4 (repeated measures on the fifth factor) design was used. With respect to the conformity trials, the design was 2X2X2X3X5 (repeated measures on the fifth factor). The first four factors involved two levels of intelligence, two levels of creativity, two levels of expertise and the three confederates. The last factors were the 4 Acquisition Blocks and the 5 Transfer Blocks.

CHAPTER III

RESULTS

Before discussing the analyses pertinent to the hypotheses regarding the impact of creativity, intelligence, and exposure to expert communication on conformity behavior, let us consider some of the data regarding the tests employed in categorizing subjects.

Creativity and Intelligence. As can be observed in the intercorrelation matrix provided in Table 3, the relationship between creativity and intelligence found in this study is somewhat at variance with the data reported by Getzels and Jackson (1962). An overall correlation of .46 between the summated creativity index and the intelligence test scores appears to contradict the assumption of independence between the two variables; furthermore the correlations of each particular creativity test with intelligence is higher than expected. However, except for the Hidden Figures Test, the creativity tests appear to correlate better between themselves than with intelligence — expecially the Uses for Things, Consequences and Who Am I tests. This is reflected in the reliability estimate (alpha = .79) obtained for the overall index of creativity. Also interesting are the teachers' evaluation of the creativity and intelligence of their students, which correlate much more with intelligence test scores (r=.63) than with the creativity index (r=.42). The teachers also

Table 3

Correlations Among Creativity, Intelligence, and Teachers' Assessments

		1	2	3	4	5	6	7	8	9
Category	-1		18	45	30	38	62	10	01	19
Figures	-2			46	38	40	65	43	44	52
Uses	-3				68	65	87	37	43	54
Consequences	-4					55	78	31	49	45
Who Am I	-5						80	33	36	36
Creativity TOTAL	-6							42	46	56
Creativity TEA (teacher assessment)	-7								39	63
Intelligence	-8									58
Intelligence TEA (teacher assessment)	-9									

tend to see a higher correlation between creativity and intelligence ($r=.63$) than actually exists.

Compliance and Conformity. Subject's estimates regarding the number of dots in the stimulus arrays during the acquisition and transfer trials, the two dependent variables in this study, were analyzed by means of a 2 (Intelligence) by 2 (Creativity) by 2 (Communicator expertise) by 3 (Confederate) by 4^4 (Blocks of Trials) analysis of variance. Since none of the interactions of the Confederate factor with other factors approached significance, they were pooled into the error variance. The results appear in Table 4.

We had hypothesized significant effects of intelligence, creativity and communicator expertise as well as significant first order interactions in cases where expertise was involved. A glance at Table 4 generally shows lack of support for the hypotheses as they were presented, suggesting that they are not precise enough.

Except for the expertise effect which was marginally significant ($p < .07$) in the transfer phase, none of the main effects nor simple interactions approach the significance level if we consider only the important factors in this experiment (Intelligence, Creativity, Expertise). However the absence of an expertise effect in the acquisition phase could be explained by its interaction with the Blocks of Trials factor which was marginally significant ($p < .07$). That

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[4] 5 in the case of transfer trials.

Table 4

Summary of Analysis of Variance

Source	Acquisition			Transfer		
	df	MS	F	df	MS	F
Intelligence (I)	1	17,214.19	1.74	1	234.04	< 1
Creativity (C)	1	3,152.51	< 1	1	9,487.84	216
Expertise (E)	1	4,351.02	< 1	1	15,990.34	3.63 (a)
Confederate (S)	2	10,130.10	1.03	2	1,138.44	< 1
I X C	1	1,271.02	< 1	1	53.20	< 1
I X E	1	2,745.19	< 1	1	168.34	< 1
C X E	1	1,150.52	< 1	1	1,887.20	< 1
I X C X E	1	65,638.02	6.66 (b)	1	32,132.20	7.30 (b)
Within Group	38	9,849.77	—	38	4,400.45	—
Blocks of Trials (T)	3	3,347.91	3.46 (b)	4	1,947.34	6.85 (c)
I X T	3	1,264.80	1.30	4	351.64	1.23
C X T	3	604.74	< 1	4	215.96	< 1
E X T	3	2,408.91	2.49 (a)	4	262.82	< 1
I X C X T	3	1,344.91	1.39	4	116.18	< 1
I X E X T	3	1,730.13	1.79	4	598.79	2.10
C X E X T	3	1,680.19	1.73	4	366.77	1.29
I X C X E X T	3	287.74	< 1	4	170.00	< 1
Within Subjects	120	968.25	—	160	284.13	—
Total	191	——		239	——	

(a) $p < .07$
(b) $p < .02$
(c) $p < .0005$

interaction is pictured in Figure 1. It may be seen that although the curves for low and high expertise are almost parallel for trial blocks 2, 3 and 4, the low expertise group sharply decreases its estimates on block 2 after having started higher than the high expertise group on block 1. This sharp reversal suggests that the expertise manipulation actually was effective, but some random effect occurred in block 1, which masked the expected cumulative expertise effect.

Contrary to Crano's findings (1970) the present results demonstrate a powerful effect of the Blocks of Trials factor in both acquisition ($p < .02$) and transfer phases ($p < .0005$). It is interesting to note the reversed trends of that effect in the acquisition and transfer phases. This reversal is evident in Figure 2 which also provides the corresponding curves for the control group. In the acquisition phase, the experimental subjects decrease their guesses on the second block of trials; then their conformity responses increase steadily, reaching a point slightly higher than the initial estimates on block 1. Apparently confederates' estimates lose some of their initial influence on trial block 2 [5]. However, this influence is then slowly regained until the final trial. The transfer trials, though, show a reverse pattern. The subjects guess very low on Block 1, probably because of the momentary effect of the liberation from the direct

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[5] This assertion, though, has to be considered in the light of the Expertise X Trials interaction which we examined earlier.

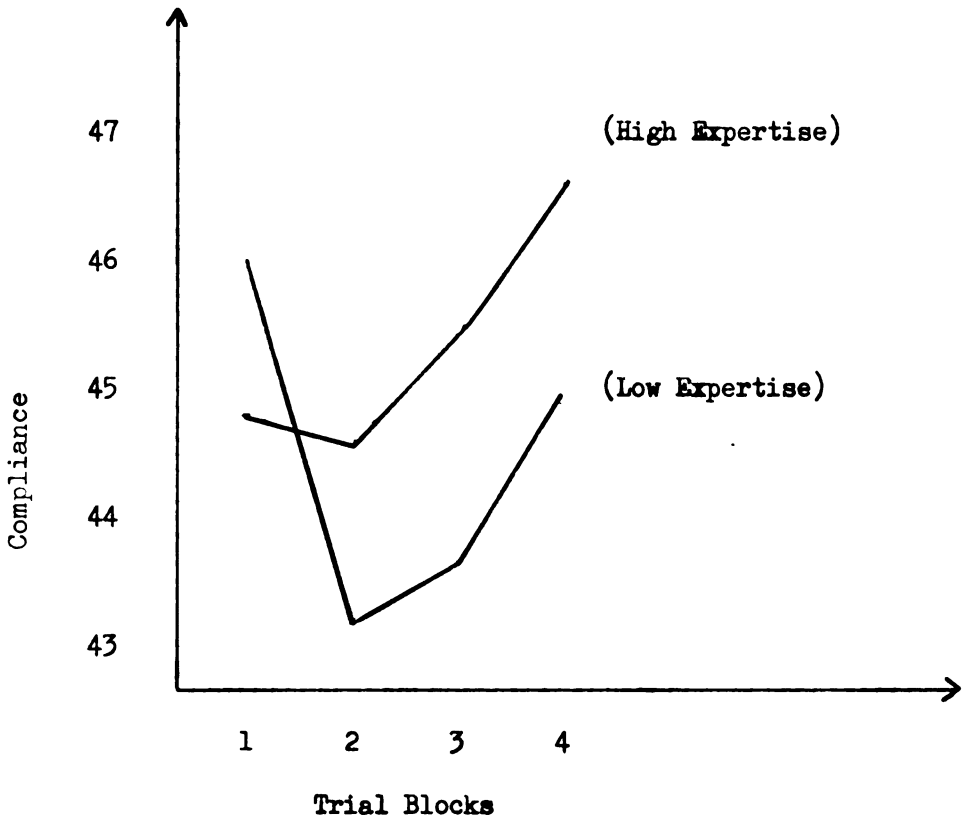

Figure 1: Interaction of Expertise and Trials For the Compliance Phase

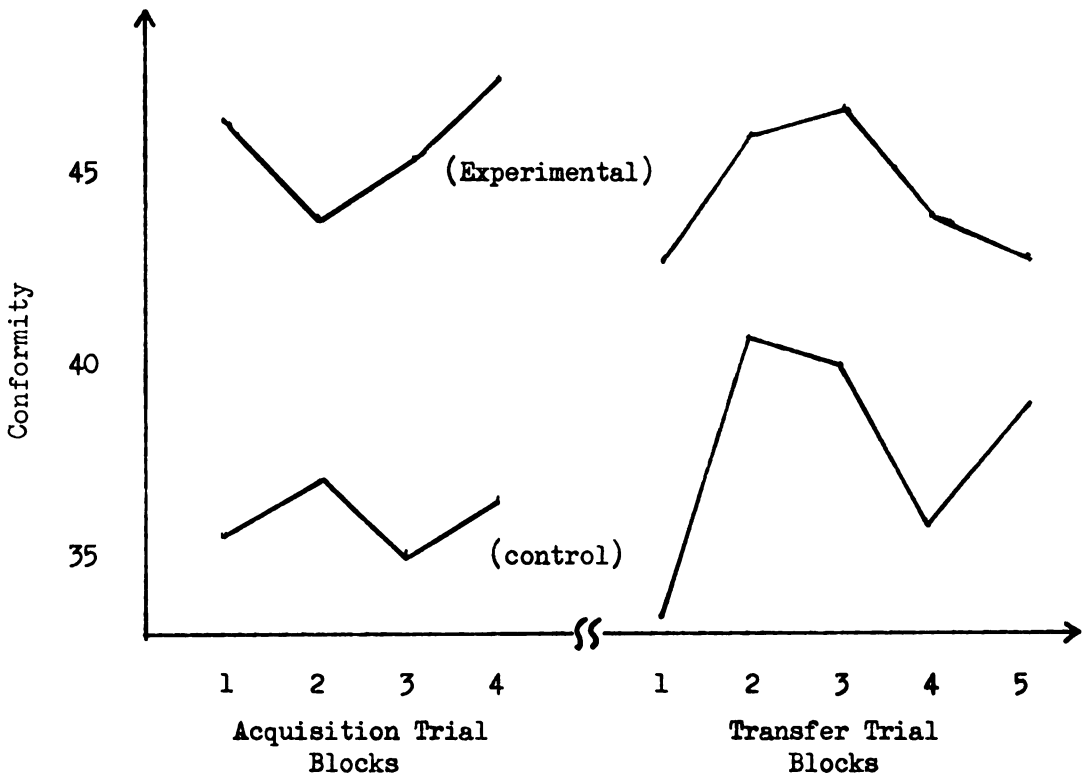

Figure 2: Comparison of Trial Blocks Effects for the Experimental and Control Group.

influence of the confederate's estimates. That liberation, though, is shortlived, and high estimates on Blocks 2 and 3 probably reflect the effect of resurging internalized standards. That influence in turn slowly wears off until the last Block of Trials is reached.

With reference to another Trial Blocks effect, we found the interaction of Intelligence, Expertise, and Trials to be marginally significant ($p < .09$). This interaction was not analyzed further, however, since this unexpected finding was not major interest to the theoretical framework of this study.

The most interesting finding however, is the significance of the three way interaction ($p < .02$) in both the acquisition and the transfer phases, especially in view of the non-significance of the main effects. This interaction generally demonstrates that intelligence, creativity and communicator expertise are highly interdependent in their effect on conformity. Differential inducement of conformity cannot be produced by manipulating one factor alone (except perhaps expertise), but only by a careful combination of the three. The interaction means appear in Table 5.

The simple effects of the interaction were examined in order to gain more insight into that complex relationship. None of the simple main effects proved significant. However some simple-interaction and simple-simple main effects reached significance.

Table 6 presents only the significant results. The interaction of intelligence and expertise when creativity is high indicates, when it is broken down into simple-simple main effects, that the expertise

Table 5

Group Mean Conformity Scores
According to Conditions

I.Q.	Creativity	Expertise	Acquisition	Transfer
High	High	High	43.13 (a)	42.56 (i)
		Low	46.14 (b)	42.46 (j)
	Low	High	45.01 (c)	48.38 (k)
		Low	41.61 (d)	41.28 (l)
Low	High	High	48.96 (e)	47.06 (m)
		Low	43.07 (f)	38.38 (n)
	Low	High	44.48 (g)	44.02 (o)
		Low	46.96 (h)	46.84 (p)

Table 6

Significant Simple Interactions and
Simple-Simple Main Effects for Acquisition

	df	MS	F	p
I X E at Ch	1	47,615	4.83	<.05
E at Il.Ch	1	41,712	4.23	<.05
I at Ch.Eh	1	40,833	4.14	<.05
C X E at Il	1	42,085	4.27	<.05
I X C at El	1	42,589	4.32	<.05
Error	38	9,849		

manipulation is effective when it is applied to a group of subjects who are both high in creativity and low in intelligence (means e and f in Table 5). This result runs contrary to our hypothesis that such subjects would not be sensitive to expertise manipulations. The intelligence X expertise interaction also indicates that when a communicator of high expertise is involved, I.Q. is inversely related to compliance within the high creative group (means a and e in Table 5). It seems that our hypothesis that the highly intelligent would comply more was not precise enough and that level of creativity may affect the trend of the relationship between intelligence and compliance. This however is restricted to cases where the communicator has high expertise.

The interaction of creativity and expertise when intelligence is low indicates that the expertise manipulation is effective when the group involved is highly creative and not so high on the intelligence measure, a simple replication of the first interaction discussed. (means e and f in Table 5)

None of the simple-simple main effects were significant for the intelligence X creativity interaction when expertise is low, indicating that the interaction is not due to any specific difference in the means involved. However, if we look at means b, d, f and h in Table 5, we see that I.Q. and Creativity interact in determining the effect of a low expertise communicator, with the high creative-low intelligent (mean f) complying less than the high creative-high intelligent (mean b), and the low creative-low intelligent (mean h) complying

more than the low creative-high intelligent (mean d). Similarly the high intelligent-low creative comply less than the high intelligent-high creative and the low intelligent-high creative comply less than the low intelligent-low creative.

When the same analysis is applied to the transfer data (see Table 7) we find another interaction of expertise and creativity when intelligence is low. It can be described in the same terms as the identical interaction occurring in the acquisition phase except that this time, there is a significant simple-simple effect of creativity when both intelligence and communicator expertise are low (means n and p in Table 5). That effect indicates that the subjects who are low in intelligence but high on creativity conform less when they have been previously exposed to a communicator of low expertise than do those who are low on both intelligence and creativity measures. To a certain extent this finding is in accord with the theoretical framework in that we generally predicted that conformity would be negatively related to creativity and positively related to intelligence. Since the two groups differ only on creativity, we may attribute the decreasing effect to that variable. However this finding is significant only in a low expertise situation.

The interaction of intelligence and expertise when creativity is low sheds further light on the relationship previously discussed. It indicates that when a communicator of high expertise is involved, the low creative subject is more likely to conform if he is also high on intelligence than if he is low on that measure (means k and o in Table 5) —

Table 7

Significant Simple Interactions and Simple-Simple Main Effects for Transfer

Source	df	MS	F	p
C X E at I1	1	23,130	5.26	<.05
C at I1.E1	1	34,484	7.83	<.01
E at I1.Eh	1	35,941	8.16	<.01
E X I at C1	1	18,475	4.20	<.05
I at C1.Eh	1	23,811	5.41	<.05
E at Ih.C1	1	18,909	4.29	<.05
Error	38	4,400		

a finding which is consonant with the theoretical framework. The interaction also indicates that the expertise manipulation was effective for the high intelligence-low creativity subjects (means k and l in Table 5), which could also be predicted from the theoretical framework. However it must be remembered that this effect is significant only in the transfer phase when the direct influence of the confederate is no longer involved.

Acquisition and Transfer. Except for the effect of the Blocks of Trials factor whose curvilinear relationship with conformity is reversed from the acquisition to the transfer phase, the results for both phases of the experiment are otherwise parallel, as indicated by the data in Table 5.

Table 8 shows that although the mean estimate for the low expertise condition as well as the total mean estimate is slightly lower in the transfer phase, those differences do not appear substantial.

These results thus indicate that the acquisition and transfer phases do not generally differ vis-à-vis the main variables; therefore they will generally be collapsed in the treatment of those variables in the discussion section.

Control Subject Differences. As illustrated in Figure 2, control group estimates were significantly different from those of experimental subjects in both acquisition ($t=13.01$, 58 df, $p < .001$) and transfer ($t=4.01$, 58 df, $p < .001$). These differences reflect the impact of exposure to the confederates' estimates, irrespective of the confederates'

Table 8

Mean Estimates of the Confederates, the Control Group, the Total Experimental Group and the High and Low Expertise Groups in the Acquisition and Transfer Phases

	(a) Confederates	(b) Control	Experimental		
			High Expertise	Low Expertise	Total
Acquisition	52.00	35.44	45.39	44.44	44.92
Transfer	(52.00)	37.06	45.50	42.24	43.86

(a) Confederates actually gave programmed (over) estimates only during the acquisition phase.

(b) Control group subjects made their estimates without social influence from a confederate.

level of expertise. As reported earlier, the effect of the expertise manipulation failed to reach significance.

Table 8 may provide more information on the effect of expertise. If we consider the magnitude of the confederates' estimates as an index of total reliance on external sources of information and the control group's estimates as an index of total reliance on internal sources, we see that there is only a slight difference between the high and low expertise groups in their weighing of those two sources. Especially interesting when we compare those means with those reported by Crano (1970) is the failure of the low expertise treatment in inducing self-reliance and rejection of influence. The negative influence of a non-expert appears to be less prominent with our subjects than it was with Crano's college level subjects; however, the expert communicator was as influential in this study as he was in Crano's.

Summary of results. The test data show a higher correlation between our indexes of creativity and intelligence ($r=.46$) than was expected, thus challenging the assumption of independence between the two factors. Findings from the experimental situation also fail to support the hypotheses concerning the main effects and first-order interactions of creativity and intelligence, although marginal significance was obtained in the transfer phase for the expertise treatment.

A significant second order interaction, however, supported the general hypothesis of interdependence among the variables. When submitted to a simple-effects analysis, several simple interaction effects were uncovered. The simple-simple main effects revealed the six following relationships:

1. When intelligence is low and creativity high, a high expertise communicator induces more conformity than a low expertise communicator ($p < .05$).

2. When creativity is high and communicator expertise is high, the less intelligent conform more than the more intelligent. ($p < .05$).

3. When intelligence is low and communicator expertise is low, the more creative conform less than the less creative ($p < .01$).

4. When intelligence is low and creativity high, a high expertise communicator is more effective than a low expertise communicator ($p < .01$).

5. When creativity is low and communicator expertise high, the more intelligent conform more than the less intelligent ($p < .05$).

6. When intelligence is high and creativity low, a high expertise communicator is more effective than a low expertise communicator ($p < .05$).

Of these six significant findings, only the second set of relationships listed above seens at variance with our theoretical framework. An interpretation of these results will be presented in the next chapter.

The results also show a significant curvilinear relationship of the Blocks of Trials factor with amount of conformity. That relationship is negative in the acquisition phase and positive in the transfer phase.

Finally it was remarked that the estimates of the low expertise group were much higher than those reported by Crano (1970) whereas those of the high expertise group were similar to Crano's findings.

CHAPTER IV

DISCUSSION

Before discussing the implications of the findings just presented regarding the interdependence of creativity, intelligence, and communicator expertise in affecting conformity behavior, let us first comment on the data regarding the intelligence and creativity measures.

Creativity and Intelligence. In the introduction, we alluded to the controversy regarding the relationship between creativity and intelligence. While some authors argue that the two variables are independent, others claim that the available evidence does not permit such an assertion. The test correlation data presented in the previous chapter might be cited as evidence favoring the latter viewpoint. At this point in research on creativity and intelligence, it thus appears that the relationship observed depends very much on the tests used.

This author tends to think that cognitive functioning embeds the two general aspects of understanding cultural knowledge and ways of thinking and imposing a personal interpretation on events (Pépin, 1971). However, most tests of intelligence (especially the older tests like the Binet) operationalize intelligence in a way which is biased toward the first aspect. The fact that such intelligence tests have been criticized for being culture-bound further supports that assumption. Some I.Q. tests, though, (like the WISC) measure the second aspect of cognitive functioning — i.e., creativity — to a relative

extent. Generally speaking it may therefore be expected that the more culture-fair the I.Q. test is, the more it should correlate with creativity tests. From that point of view, an interesting picture emerges.

Wallach and Kogan (1965), who utilized an index of intelligence based on the WISC (Wechsler Intelligence Scale for Children), the SCAT (School and College Ability Test) and the STEP (Sequential Tests of Educational Progress), report that their index of intelligence was independent from their index of creativity. Getzels and Jackson (1962), however, based their measure of intelligence on the Binet and the Hemnon Nelson, and obtained borderline independence. The present study, using the Iowa Test of Basic Skills, shows a middle size relationship between intelligence and creativity.

It therefore appears that the relationship of creativity and intelligence increases as we go from what may be described as cultural achievement tests (with the exception of the WISC), to culture bound cognitive tests and finally to an I.Q. test more concerned with basic cognitive skills. Thus further research should specify the relative importance of cultural achievement in different intelligence tests and systematically relate these tests to a variety of creativity measures. Then it will be possible to test the hypothesis that there is a positive relationship between "culturally fair" I.Q. tests and tests of creative thinking.

Conformity. It appears that the relationship between the main variables and conformity are much more complex than initially expected. Thus, on the basis of current findings, most of the

hypotheses proposed have to be either refined or reworded. However the relevance and interdependence of intelligence, creativity and communicator expertise as they affect conformity is obvious, especially in view of the fact that neither the main effects nor the first order interactions were significant. Especially interesting is the fact that the cognitively non-discrepant groups (i.e., the two groups that do not display discrepancy between their level of intelligence and creativity) account for many of the significant results. Since these non-discrepant groups were relatively neglected in the theoretical section, the following discussion should clarify the implications at the findings regarding those groups.

In discussing the results, we shall consider each variable separately, looking first at how its effects are mediated by the other variables and second at how it mediates the effects of those same variables. Although this procedure may lead to redundancy, it seems warranted by the complexity of the results.

Intelligence and Conformity. It appears that there is no simple relationship between intelligence and persuasibility; and in that sense, this study replicates results reported by Crandall et al (1958), Berenda (1950) and Iscoe, Williams and Harvey (1963-1964). Contrary to predictions, that relationship remains non-significant even when creativity is controlled for. This could in part be attributed to the measures employed which yielded a higher correlation between the two variables than was expected. However, other results decrease the plausibility of that interpretation.

It appears that intelligence is significantly related to conformity only when the source of influence has high expertise. Even then its effects are very dependent on the concurrent level of creativity of the subject: if creativity is high, the relationship between I.Q. and compliance will be negative; if creativity is low, it is the most intelligent who conforms the most. The last finding accords with the theoretical framework presented previously. However, the non-conforming behavior observed in those who combine a high level of creativity with a high level of intelligence was not directly dealt with in Chapter I. The corresponding group in Wallach and Kogan's study (1965) is reported to be highly self-reliant and independent, whereas their low intelligence - high creativity group is labeled as "socially worried and defensive". Their low creativity - high intelligence group was primarily "dependent on authority" and their low non-discrepant group was described as being cognitively and affectively impaired.

In view of the preceding, it is interesting to note that in a high expertise situation the two cognitively non-discrepant groups tend to conform less than do the discrepant groups. It looks as if it is not the differential presence of creativity and intelligence but their combined presence that determines whether or not a subject will conform to a communicator of high expertise. We will come back to this striking fact later since the examination of the other variables should shed more light on it.

With regard to the mediating effect of intelligence, we observe that the manipulation of expertise is significantly effective at both I.Q. levels, suggesting no particular restriction of the expertise effect strictly depending on I.Q. However I.Q. joins with expertise in determining the effects of creativity on conformity. When expertise is low, the less creative significantly tend to conform more than the more creative, but only when they are also less intelligent.

In general, we may say that the effect of intelligence on conformity is much more mediated by the other independent variables rather than affecting their own relationship with conformity.

Creativity and Conformity. As we found for intelligence, it appears that there is no simple relationship between creativity and conformity, contrary to results reported by Barron (1963) and Crutchfield (1962). This holds true even when intelligence is controlled for. These findings thus seem to challenge the usually simplistic treatment of the relationship between creativity and conformity, as well as our own original theoretical framework.

It should be noted, nevertheless, that the only significant main effect of creativity, occurring in the low - intelligence low - expertise condition, is in the predicted direction, with the high creative subjects conforming less than the low creative individuals. The less conforming tendency of the low intelligent - high creative subjects was also predicted, although the current results narrow it to the specific case of a low expertise situation. Therefore it could

also be a side effect of the "low-low" group's lack of differential response according to the quality of the source — a topic we shall discuss further later.

This last result points to a trend in the data which is the reciprocal of a phenomenon underlined earlier: although not significant in all cases, there is a uniform tendency for the cognitively discrepant groups to conform less than the groups who display more consistency between their level of creativity and intelligence when the source of influence is of low quality. This is a reversal of what happens when communicator expertise is high, suggesting that the effect of the discrepancy vs non-discrepancy dimension is dependent on the level of expertise in the paradigm. A communicator of high expertise seems to have more influence if the subjects are discrepant in their intelligence and creativity scores, and a non-expert has more influence if the subjects are non-discrepant.

Creativity, in general thus appears to mediate the effects of intelligence; however, it does not appear to mediate the effects of expertise on conformity.

Expertise and Conformity. We cannot, on the basis of the results, completely rule out a direct relationship between communicator expertise and conformity, especially in the transfer phase of the experiment. In the acquisition trials, an apparent initial tendency to overestimate by the subjects assigned to the low expertise condition (probably a random event) could partly account for the failure of the treatment. In any event, there is a difference between the low expertise group in

this study and the corresponding group in other studies employing the same material, including Crano's experiment. The current low expertise group is more conforming. On the basis of other results (Patel and Gordon, 1960; Mc Connell, 1963) it seems unlikely that this difference is due to differences in the age of the subjects employed. A possible alternative interpretation, however, is that the confederates failed in being perceived as non - experts. Since they were actually older than the subjects, some subtle cues regarding greater maturity cannot be ruled out. Another explanation in the same vein is that their reading from the list of estimator may have conveyed a feeling of assurance which competed with the manipulation.

When the expertise effects are significant in this study, however, they always show the high expertise communicator inducing more conformity than the low expertise communicator — a finding which is consistent with results reported by Mausner (1954) and Crano (1970). However, it should be noted that those significant effects occur only with subjects whose levels of creativity and intelligence are discrepant. As predicted originally, the low creativity - high intelligence group was significantly affected by the expertise manipulation, but contrary to predictions, the high creativity - high intelligence group was also affected. So the effects of expertise appear to be mediated not by intelligence and creativity alone but by the dimension of cognitive discrepancy vs. non-discrepancy. Actually there is a uniform tendency, though not significant in any specific case, for the non-discrepant groups to be more influenced by the low quality rather than by

the high quality source of information.

This last finding seems puzzling and somewhat at odds with previous research. Since we should naturally expect (judging from the positive correlation between creativity and intelligence) that the usual study enrolls a higher proportion of non-discrepant subjects, such investigations should find a significant effect of expertise, but in the reverse direction — with the high quality expert eliciting more conformity. In our study, where we artificially rejected such subjects in order to equalize the number of subjects in each group, we find the "usual" subject tending, though not significantly, to reverse the conformity trend. An alternative explanation of our findings, suggesting that Haslett High School is not a representative population for a subject pool seems unlikely, although the principal and some teachers do point to a "flattening" of the usual normal curve on most socio-economic and academic variables.

Let us therefore consider some implications of our interpretation regarding non-discrepancy vs. discrepancy in creativity and intelligence. First it appears that neither the high-high group nor the low-low group pay attention to the level of expertise of the communicator. This identical manifest behavior, however could result from strikingly different latent reasons. The high-high group, obviously possessing the cognitive tools necessary to adapt to varied situations, might display self-reliance in any situation, thus, they do not need to attend to variations in the source of influence. This does not mean, though, that they are totally uninfluenced, as indicated by the

difference between their means and the control group's means. The high-high subjects probably pick social cues as they are, irrespective of the source.

The low-low group, on the other hand, may not have learned to respond differentially to different qualities of information sources. To say that they are not able to discriminate may be too strong, especially in view of the simplicity of the situation. But they may not respond to the expertise manipulation simply because they have not learned to pay attention to that type of cue. Thus, these subjects are influenced, apparently by "any" source. On the basis of these speculations, therefore, we suggest that the main factor in the high-high group is creativity (independence), whereas the main factor in the low-low group is intelligence (learning).

The high creativity - low intelligence group's susceptibility to the expertise manipulation points to a need for refinements in our hypotheses regarding that group. We saw earlier that Wallach and Kogan emphasize the social wariness of such individuals. But discomfort in interpersonal situations is not necessarily predictive of influencability. It could be argued that the usually atypical behavior of highly creative, low intelligence individuals probably results from their not having learned cultural expectations, and such behavior renders them susceptible to criticism. If this is true, as adolescents, in particular, such individuals may be particularly sensitive to social pressures. Until such individuals develop some viable way of adapting to societal norms, they are unlikely to display energetic self-reliance.

It is interesting to speculate whether that state of affairs transfers into adulthood.

Regarding the high intelligent - low creative group, it appears that our hypotheses accurately described such subjects as aware of, dependent upon, and sensitive in responding to variations in the quality of social sources of information.

As a mediating variable, level of expertise thus appears to be very important in determining the effects of I.Q. on creativity and vice-versa.

Learning Conforming Dispositions. The reversal in the curvilinear relationship of Blocks of Trials with conformity from the acquisition to the transfer phases requires further consideration. This finding suggests that conformity is more than a simple disposition which is learned from simple reinforcement and carries on once it is established, only to slowly and uniformly extinguish. It appears as if two processes are operating, both in the acquisition and the transfer phases: one is a process of reinforcement of which the subject is probably unaware and to which he reacts passively. The second process is a process of active hypothesis - testing in which the subject takes into account both the physical input and the social cues, actual or remembered. In the acquisition phase, the subject probably first picks up the confederate's estimates as the most reliable cue in view of the initial ambiguity of a situation in which accuracy is impossible and there is no initial way to have even an approximate estimate of the number of dots. With the occurence of small size stimuli, which permit

an approximate estimation, the subject, can reject the confederate's estimates and try to judge on his own. However, he seems more and more influenced as the session goes on (probably inadvertently), and he ends up conforming even more than he did at the beginning.

When the confederate is removed, the influence disappears for a moment; but suddenly the subject seems to recall the confederate's strategy and to put it into action, only to reject it once again later. Such variations cannot be explained on the basis of only one of the processes mentioned. Furthermore, it is unlikely that the variations are due to the order of the blocks, since Crano obtained no significantly different results when he varied block orders.

Implications and Suggestions. This study emphasizes the need for more sophisticated research regarding the relationship of creativity, intelligence, and conformity. In view of some current findings which are at odds with previous research, a first step toward more understanding of the area probably should involve a careful replication and expansion of this study, testing the reliability of the results obtained. Such an expanded replication should incorporate the following recommandations:

1. Use a greater number of subjects. Among other things, this would reduce the possibility of an initial systematic tendency to overestimate in one or more of the experimental groups.

2. Divide subjects into high, medium, and low groups on both intelligence and creativity measures.

3. Carefully consider the choice of the intelligence measure. Hopefully it should be a relatively culture - bound test.

4. Carefully select the confederates in an effort to achieve equivalence with the experimental subjects in age and apparent maturity.

5. Extend the expertise manipulation to four levels, including a control treatment (with no confederate present) and a treatment in which information regarding the confederate's competence is not provided.

Aside from the replication, subsequent research might investigate the hypothesis that there is positive relationship between creativity and "culture-fairness" of I.Q. tests. It would be interesting also to look at the interaction of active hypotheses testing and "unconscious" passive reinforcement in learning conforming dispositions.

The results of the current research underscore Wallach and Kogan's assertion (1965) that any research which investigates the correlates or the effects of creativity and intelligence without incorporating the non-discrepant groups (e.g. the Getzels and Jackson investigation, 1962) cannot describe accurately the relationships involved. This study also provides systematic evidence that the relationship of personal variables with behavior may be affected by situational variations and vice-versa. This implies that it is dangerous to generalize

across situational and personal variables the results obtained from experiments which manipulate only one type of variable.

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APPENDICES

APPENDIX A

CORRELATIONS BETWEEN THE I.Q. TESTS EMPLOYED AND REGRESSION EQUATIONS

---

r Iowa X Large Thorndike = .81

r Iowa X DAT = .92

Iowa' = 2.51 LT - 64.72

Iowa' = .99 DAT - 4.63

APPENDIX B

LETTERS, TEST BOOKLET AND CORRECTION KEYS

Department of Psychology
Michigan State University
September 28, 1971

Dear Student,

We are conducting a study of young people's problem solving strategies. Through this study, we hope to add to the understanding of how adolescents solve problems that they encounter in everyday life. The project has been discussed with your principal, Mr. Waldron.

We would like you to participate in the study. The first part of the study involves the administration of different skill tests to senior and junior high-school male students and will be done during class or study hours (approximately one hour). In the second part of the study, we will select 90 students from the original group and invite them to participate in individual and group problem solving situations. Should you be chosen, you would be asked to spend approximately 1/2 hour with the time to be arranged with your teachers.

If, for any reason you prefer <u>not</u> to participate in this study, please let us know by giving a note with your name and answer to the office of the school. Your wishes will be respected. If we do not hear from you before October 8, we will assume that you agree to participate. Your acceptance will be very much appreciated. When the study is over, we shall send all participants information about the results.

Sincerely yours,

Yvon Pépin
Graduate Research Office
Department of Psychology
Michigan State University

Department of Psychology
Michigan State University
September 28, 1971

Dear Parent,

We are conducting a study of young peoples' problem solving strategies. Through this study, we hope to add to the understanding of how adolescents solve problems that they encounter in everyday life. The project has been approved by the administration of your son's school.

We would like to ask your permission for your son to participate in the study. The first part of the study involves the administration of problem-solving tests to 200 students. The results of these tests will not be put in the student's CA-60 record file. A small group of students will then be selected from this large group and will be invited to participate in individual and group problem-solving situations. Should your son be chosen, he would be expected to spend approximately 1/2 hour and the time to be taken out will not interfere with the daily routine of class work.

If for any reason you prefer that your child <u>not</u> participate in this study, please let us know by sending a note to school with your son. Your wishes, of course, will be respected. If we do not hear from you before October 8, we will assume that we have your permission and will very much appreciate your cooperation.

Sincerely yours,

Yvon Pépin
Graduate Research Office
Department of Psychology
Michigan State University

GRADUATE RESEARCH OFFICE

DEPARTMENT OF PSYCHOLOGY

MICHIGAN STATE UNIVERSITY

FIVE TESTS OF COGNITIVE SKILLS

(Selected and prepared by Yvon Pépin)

To the student: On the five following pages, you will find 5 different experimental tests. Some are difficult, some are easy. Try to complete the tests as well as you can. The results will not be part of your record but will be used to select a group of students to participate later in a learning experiment.

Please print your:

Name :.....

Address :.....

Phone :.....

Grade : Junior..... Senior.....

Grade point average (optional):.....

Wait until told to turn the page.

Name: _____

THING CATEGORIES TEST — Fi-3

This is a test to see how many things you can think of that are alike in some way.

Below are two examples of things that are always red or that are red more often than any other color. Look at these examples. Then go ahead and write in the blanks more things that are always red or that are red more often than any other color. You may use one word or several words to describe each thing.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Your score will be the number of correct things that you write.

You will have 3 minutes for each of the two parts of this test. When you have finished Part 1, STOP. Please do not go on to Part 2 until you are asked to do so.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

Page 2

Part 1 (3 minutes)

The category is "round".

Go ahead and write all the things that are round or that are round more often than any other shape.

DO NOT GO ON TO THE NEXT PAGE UNTIL ASKED TO DO SO.

STOP.

Part 2 (3 minutes)

The new category is "blue".

Go ahead and write all things that are always blue or that are blue more often than any other color.

DO NOT GO BACK TO PART I AND

DO NOT GO ON TO ANY OTHER TEST UNTIL ASKED TO DO SO.

STOP.

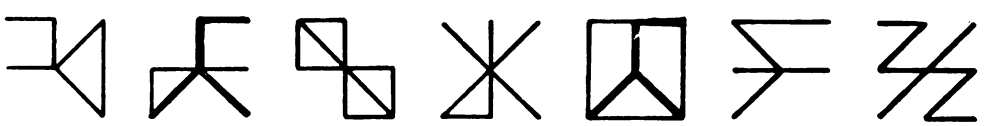
Name: _____

HIDDEN PATTERNS TEST — Cf-2

How quickly can you recognize a figure that is hidden among other lines? This test contains many rows of patterns. In each pattern you are to look for the model shown below:

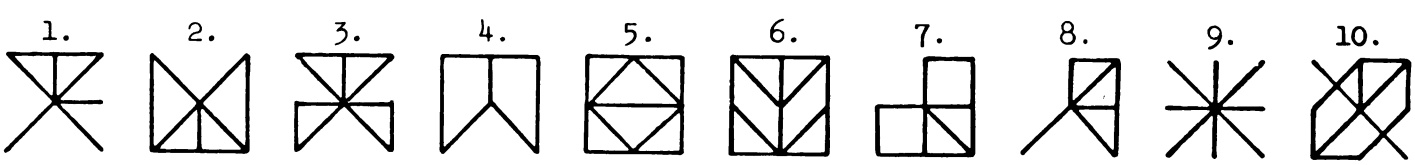
The model must always be in this position, not on its side or upside down.

In the next row, when the model appears, it is shown by heavy lines:



( ) (X) ( ) ( ) (X) ( ) ( )

Your task will be to place an X in the space below each pattern in which the model appears. Now, try this row:



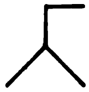
1. ( ) 2. ( ) 3. ( ) 4. ( ) 5. ( ) 6. ( ) 7. ( ) 8. ( ) 9. ( ) 10. ( )

You should have marked patterns 1, 3, 4, 8, and 10, because they contain the model.

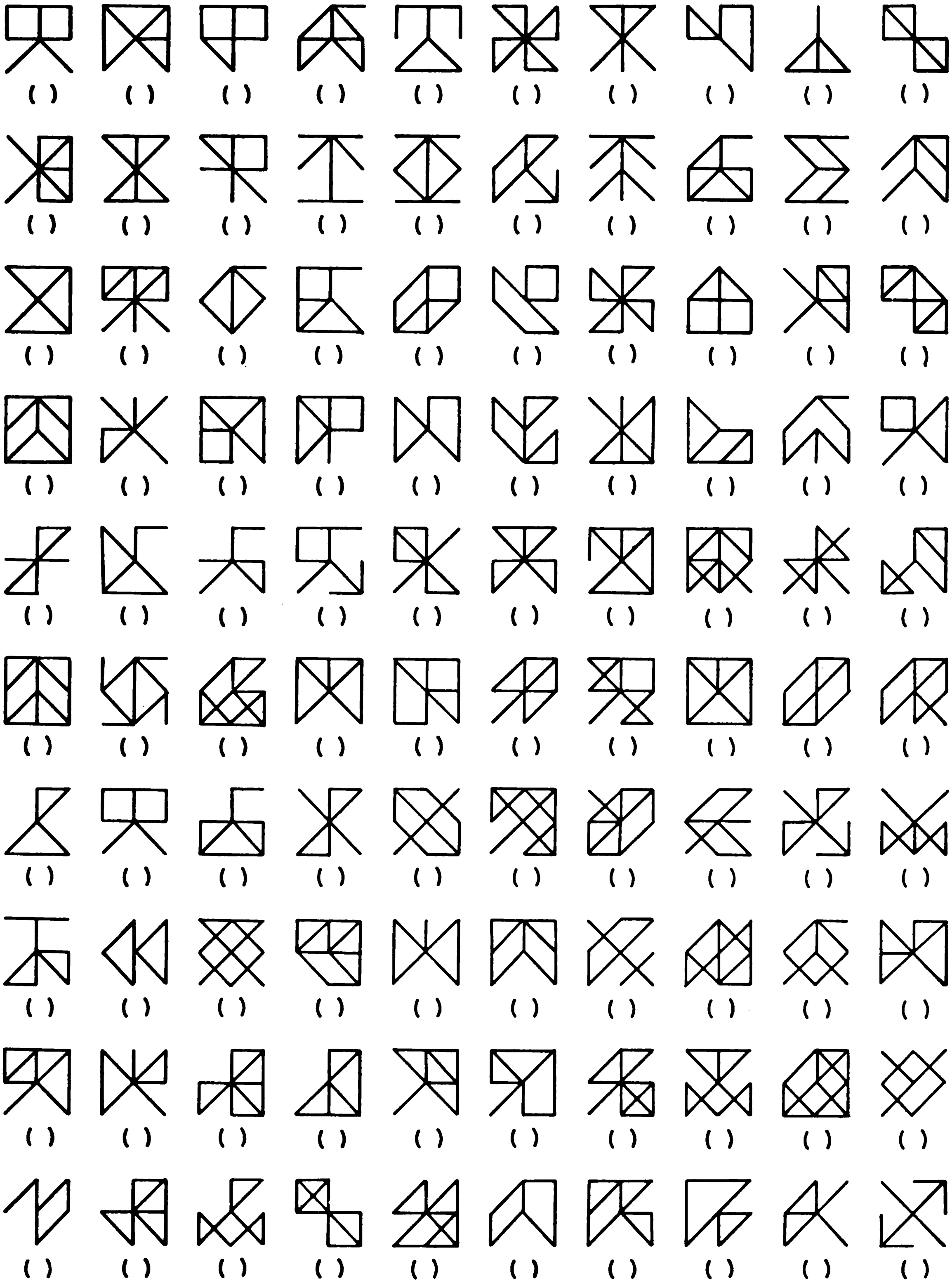
Your score on this test will be the number marked correctly minus the number marked incorrectly. Work as quickly as you can without sacrificing accuracy.

You will have 2 minutes for each of the two parts of this test. Each part has two pages. When you have finished Part 1, STOP. Please do not go on to Part 2 until you are asked to do so.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

Model: 

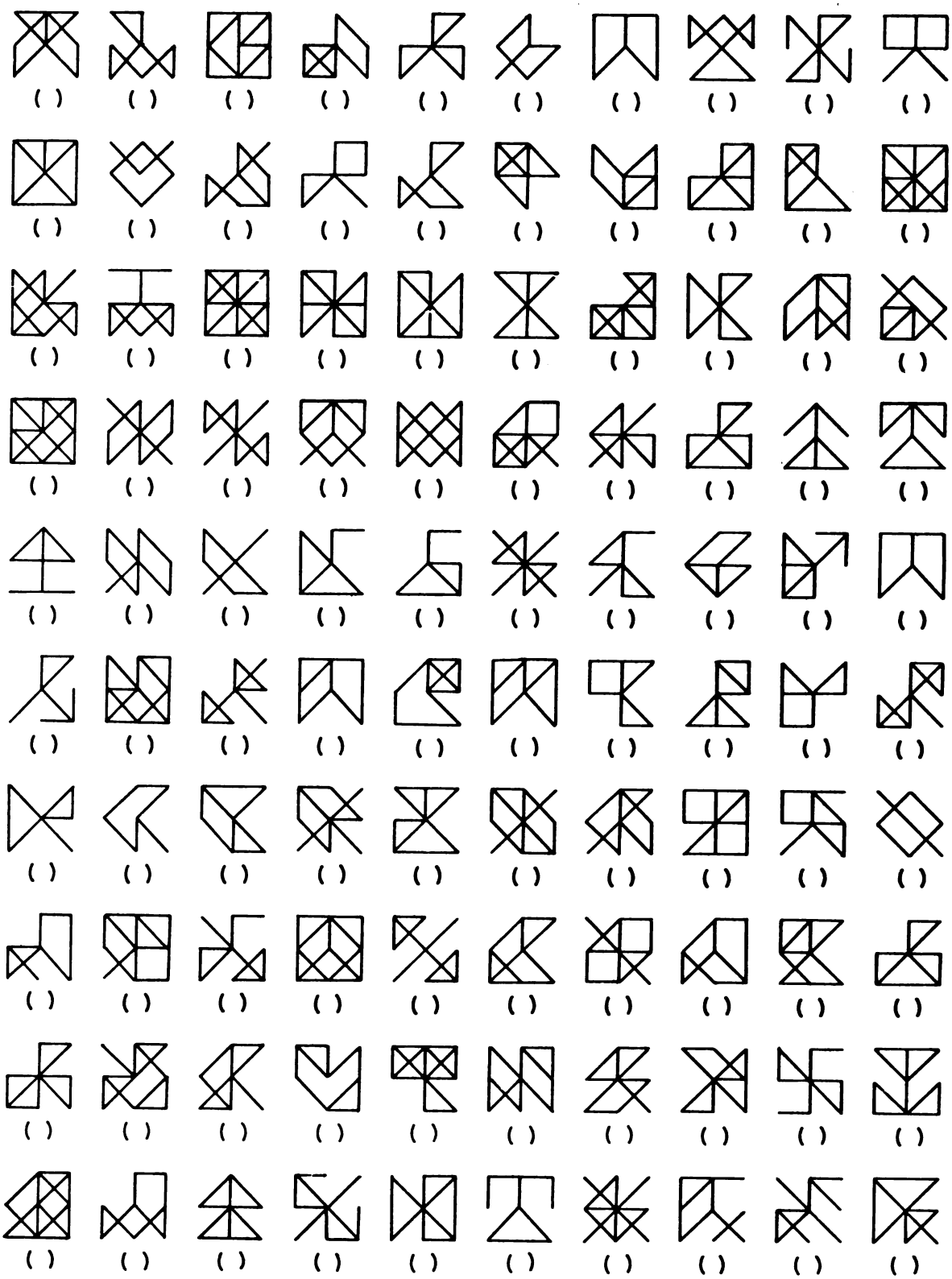
Part 1 (2 minutes)



GO ON TO THE NEXT PAGE.

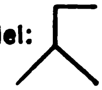
Part 1 (continued)

Model: 

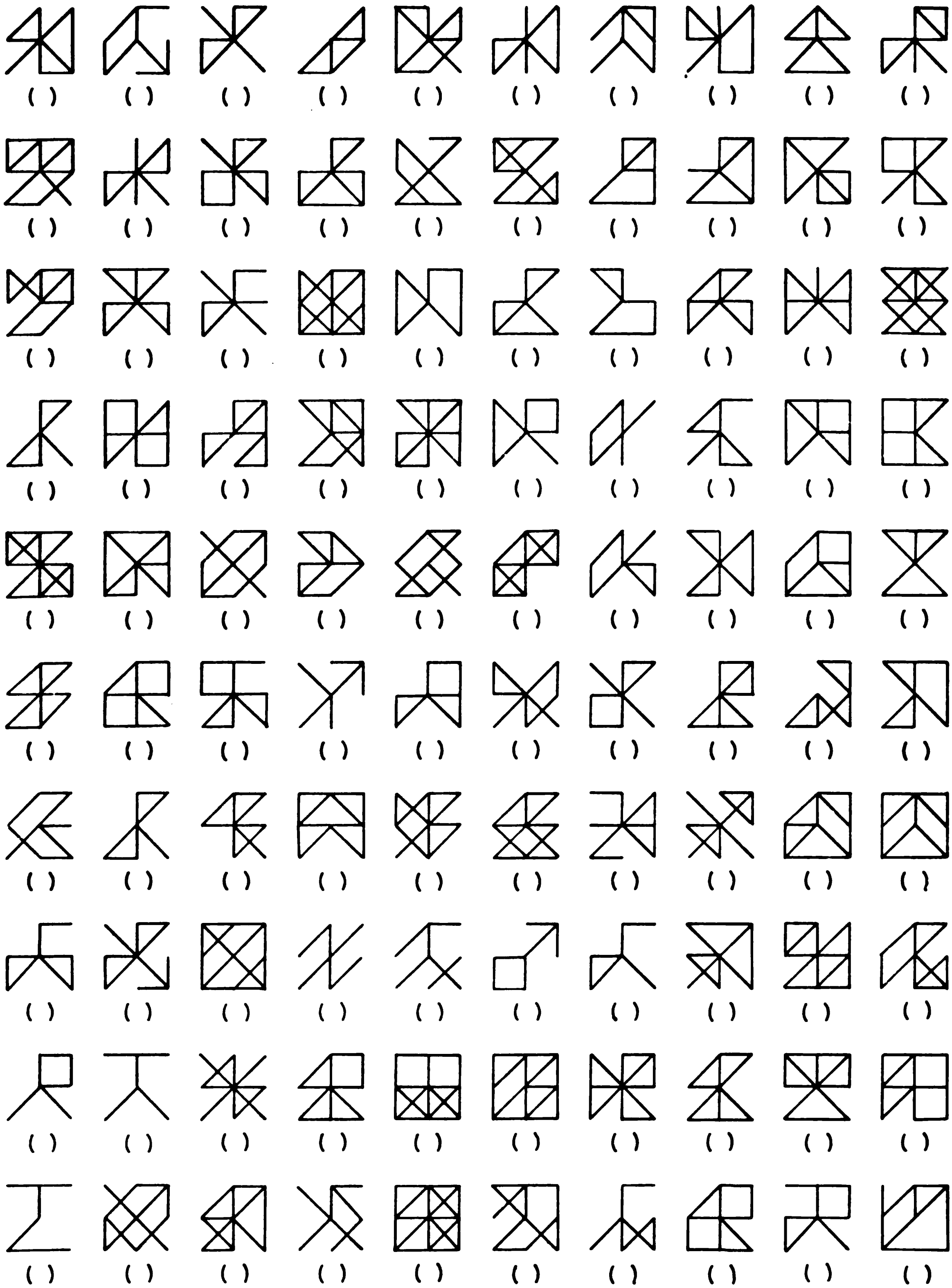


DO NOT GO ON TO THE NEXT PAGE UNTIL ASKED TO DO SO.

STOP.

Model: 

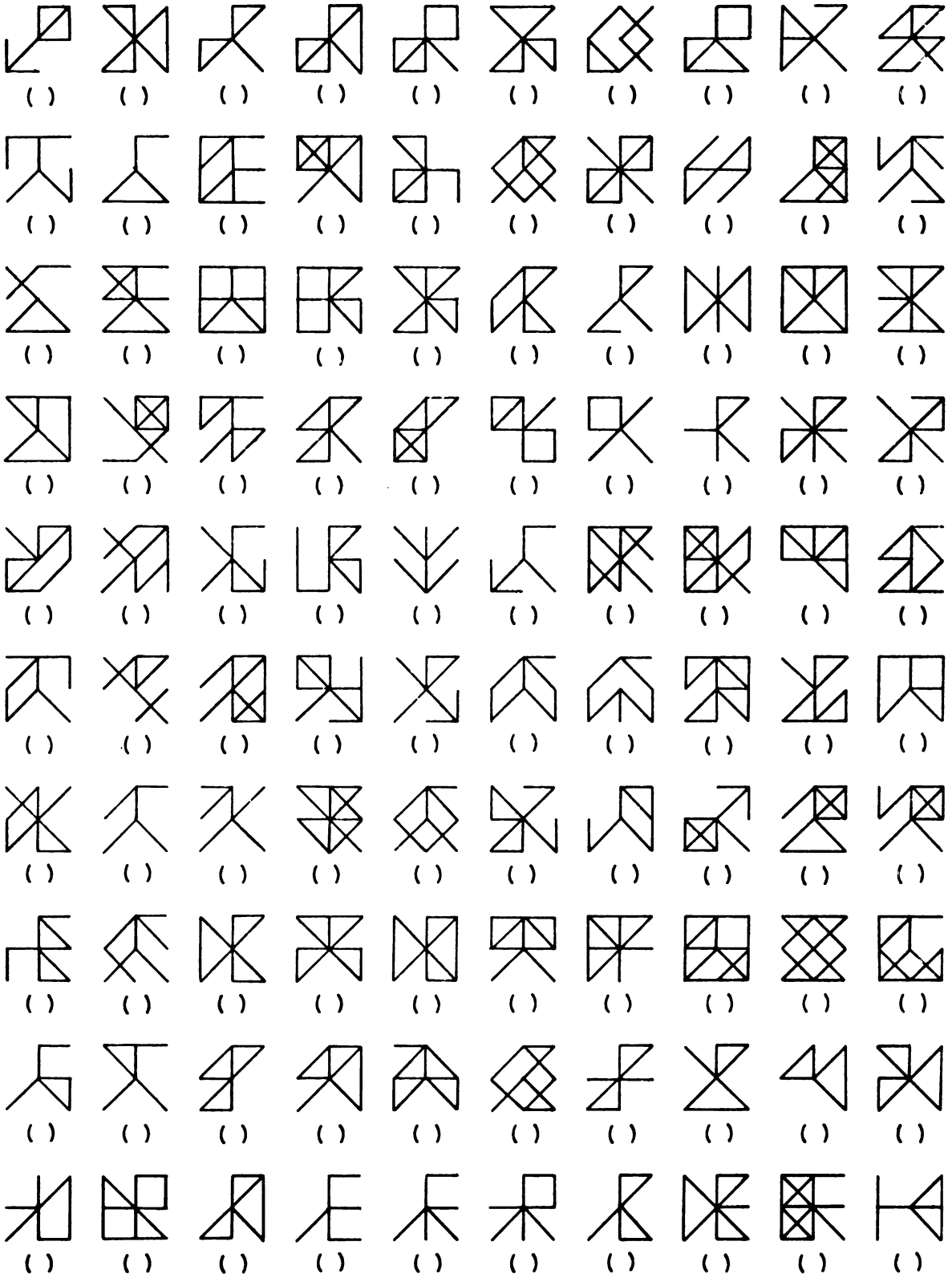
Part 2 (2 minutes)



GO ON TO THE NEXT PAGE.

Model: 

Part 2 (continued)



DO NOT GO BACK TO PART 1 AND

DO NOT GO ON TO ANY OTHER TEST UNTIL ASKED TO DO SO.

STOP.

Name: _____

USES FOR THINGS TEST

Listed below and on other pages are five objects. Your task is to write down as many different uses as you can for each object. Several examples are given in each case. You will have approximately 15 minutes. Be sure to write down some uses for each object. Write down anything that comes to mind, no matter how strange it may seem.

BRICKS can be used to or as:

Build houses	doorstop

Reproduced from Getzels J.W. and Jackson P.W.; Creativity and Intelligence; Explorations with gifted students. New York, Wiley and Sons, 1962.

PENCILS can be used to or as:

write	bookmark

PAPER CLIPS can be used to or as:

clip paper together	make a necklace

TOOTHPICKS can be used to or as:

clean teeth

test cake

SHEET OF PAPER can be used to or as:

write on

make an airplane

STOP.

Name: _____

Consequences Test

On the next two pages, you will find two questions asking you to list consequences which could follow a major change in some things we usually take for granted. Your task is to list as many consequences as you can think of but the scoring procedure emphasizes quality more than quantity. Try to avoid repeating the same consequence in different words. Try to give your answers in short but explicit sentences.

You will have 6 minutes for each question.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO

Adapted from J.P. Guilford by permission of Sheridan Psychological Services Inc.

Question 1:

What would happen if all teaching was done by television ?

Consequences

STOP...Do not turn the page until told to do so.

Question 2:

What would happen if it were discovered today that another planet would crash with earth in the year 2000 ?

Consequences

STOP...Do not turn the page until told to do so.

Name: _____

WHO AM I TEST

This is a test to see in how many ways and from how many different perspectives you can think of yourself. There is only one question: "Who Am I ?". Your task is to list on the following pages the nouns, adjectives and verbs which describe you most accurately and completely. You may use short sentences and expressions if you wish.

Your score will depend on the number and comprehensiveness of concepts you used to describe yourself.

You will have 4 minutes to complete the test.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

WHO AM I ?

STOP...Do not turn this page until asked to do so.

Correction Keys and Guidelines

1. Thing categories:

The score is obtained by a simple summation of the number of right concepts. However the same concept occuring twice or more under different forms is counted only as one.

2. Hidden Figures:

The score is obtained by adding the number of right answers minus the number of wrong answers.

3. Uses for Things:

For any of the five objects mentioned,

- a score of 1 is given for any use which is usual for the object in question.
- a score of 2 is given for any use which is unusual, but cannot be rated as very original.
- a score of 3 is given to any strikingly original and adequate use of the object in question.

The total score is calculated by adding the individual item scores.

4. Consequences:

In both problem situations,

- a score of 1 is given for a direct consequence. Direct: any consequence which is a straitforward result of the hypothesized situation.
- a score of 2 is given for an indirect consequence. Indirect: any consequence which cannot be classified as remote but is not a direct consequence of the situation.

- a score of 3 is given for a remote consequence. Remote: a consequence which demonstrates ability to think of side-effects and for reaching implications of the hypothetical situations.

- a score of 4 is given for a very remote consequence. Very remote: an insightful, comprehensive and appropriate consequence which demonstrates quality and comprehensiveness of thinking.

5. Who Am I ?

- a score of 1 is given for any self-label that may be qualified as stereotypic.

- a score of 2 is given for ways of describing one-self that are unusual, that people do not use often.

- a score of 3 is given for a strikingly original self-description.

APPENDIX C

RELIABILITIES OF THE CREATIVITY TESTS EMPLOYED

	Internal (r)	Between rater
Thing Categories	63	—
Hidden Patterns	93	—
Uses for Things	82	—
Bricks	—	.403 (a)
Pencils	—	.618 (a)
Paper-Clips	—	.430 (a)
Toothpick	—	.624 (a)
Sheet of paper	—	.651 (a)
Consequences	67	—
Television	—	.740 (b)
Planet	—	.738 (b)
Who Am I	—	.801 (c)
Total Creativity	79	—

(a) Based on a random sample of 25 uses mentioned.

(b) Based on a random sample of 40 uses mentioned.

(c) Based on a random sample of 50 descriptions mentioned.

APPENDIX D

INTELLIGENCE AND CREATIVITY MEANS OF THE DIFFERENT GROUPS EMPLOYED

	I.Q.	Creativity
Low Intelligence	33.7	—
High Intelligence	83.2	—
Low Creativity	—	221.8
High Creativity	—	280.7
Low I.Q. -Low Creativity	25.3	220.2
Low I.Q. -High Creativity	42.1	259.7
High I.Q. -High Creativity	89.1	301.7
High I.Q. -Low Creativity	77.2	223.6
Low I.Q. -Low Creativity -High Expertise	25.2	221.2
Low I.Q. -Low Creativity -Low Expertise	25.5	219.2
Low I.Q. -High Creativity -High Expertise	41.7	260.0
Low I.Q. -High Creativity -Low Expertise	41.7	259.5
High I.Q. -High Creativity -High Expertise	87.5	299.8
High I.Q. -High Creativity -Low Expertise	90.6	300.2
High I.Q. -Low Creativity -High Expertise	78.2	226.7
High I.Q. -Low Creativity -Low Expertise	76.3	220.5

APPENDIX E

DETAILED ACCOUNT OF THE EXPERIMENTAL SESSION

Each subject had a fixed appointment time so that we knew at what time each subject would arrive. The confederate, in order not to arouse suspiscion, passed the time between each experimental session reading in the library. He was instructed to comme 2 minutes later than the appointed time so that the experimenter could speak with the subject. The following was then said when the subject arrived:

"Come in, please (greeting the subject). You must be Lars (or Craig or Mark; the name of the confederate on duty)".

Upon denial by the Subject, the experimenter excused himself for his error and named the subject appropriately. He then told him that the reason for that error was that another student was supposed to be tested at the same time: "He should be here by now".

The experimenter then let time run off, often looking impatiently at the hall. Upon seeing the confederate coming, he went into the room and said:

"Well it looks like your schoolmate is not going to come. Anyway we will begin without him".

At that moment, the stooge (who was standing outside waiting for that sentence) came in and excused himself for being late. The experimenter reassured him and asked him to take a seat on the opposite side of the subject. (The table was divided by a screen so that the subjects could not see each other).

The experimenter then proceeded to give instructions for the task:

"What I want to investigate here is the relation between your performance on the tests that I gave to you last week and some of your perceptual abilities. The specific ability that I am concerned with is your capacity to quickly and accurately judge the number of elements in a figure. I will project slides on the screen. On each of the 40 slides to be projected, there is a different number of dots. Your job is to tell me aloud how many dots there are on the slide. There will be an interval of 5 seconds between each slide, during which you will be able to give me your judgment. Please say it loud and clear so that I can register your estimates on this form. Are there any questions ? ... Oh! It would be easier with me if you always responded in the same order... Let us say Craig (or Lars or Mark) will begin and (subject's name) calls second".

The experimenter then attempted to influence the Subject's perception of the confederate's expertise. Just before starting the projector, he looked suspiciously at the confederate and asked him whether he had not already served in the experiment. He explained that the teachers had made their collaboration conditional on his seeing the students only once during class time. The accomplice then answered that he had indeed participated in a similar study by the experimenter and "some other person" the year before when he was in Mason High School. After the experimenter had told him that he could participate, the stooge "spontaneously" volunteered, "You probably remember me because I was

the one who won (lost) the $9.00".

The experimenter, responding with a look of recognition, answered, "Yes! I remember now! That is why you looked so familiar". He then turned to the subject and explained, "Last year I helped one of my friends with his dissertation-research. He also used this material and his experiment was similar to this one, but subjects could either keep, lose all or only lose a part of the money they were given at the beginning, depending on their accuracy. Mark (or Lars or Craig) here did pretty well (did not do too well)". Then to the confederate, "I hope you have not lost your touch (I hope you have improved with age); however it won't cost me any money this time.

After this, the "subjects" gave their estimates for the 40 acquisition slides (4 blocks of ten slides each). Then, the experimenter told them that he wanted to assess their individual accuracy; thus their remaining estimates would be written. In order to minimize "demand" effects, subjects were told not to sign the answer sheets provided for this task and, upon completion, to deposit these anonymous forms into a file containing a number of similar sheets, ostensibly the results of tests with previous subjects.

The subjects then proceeded to write their estimates for the next 25 slides (5 blocks of 5 slides each).

Having completed that task, there was a brief post-experimental interview designed to check possibilities of diffusion, perception of the confederate, and successfulness of the manipulation in general. The subject was then told the real identity of the confederate and that

his estimates were programmed in advance (not specifying, however, that they were overestimates). He was told that the experiment dealt with sensitivity to information provided by others; and it was explained that his revealing to others the real purpose and method of the experiment could hurt the result. All subjects spontaneously pledged to keep the secret, and many manifested obvious interest in the possible results.

The subject left the experimental room. After noting the expertise treatment of the next subject, the stooge returned to the library.