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A STUDY OF THE RELATIONSHIPS BETWEEN
THE WALLACH & KOGAN TESTS OF CREATIVITY,
THE BARRÓN-WELSH ART SCALE AND EGO STRENGTH

A Thesis

Presented to the

Department of Psychology

and the

Faculty of the Graduate College

University of Nebraska at Omaha

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by

Gail L. Sunderman

July, 1976

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THESIS ACCEPTANCE

Accepted for the faculty of The Graduate College of the University of Nebraska at Omaha, in partial fulfillment of the requirements for the degree Master of Arts.

Graduate Committee

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Larry J. Larson
Chairman

July 14, 1976
Date

Abstract

A test of the Wallach and Kogan Tests of Creativity was conducted using the Barron Welsh Art Scale as a criterion of creativity. The Wallach and Kogan Tests measure verbal fluency and uniqueness of ideas, supposedly the basis of creative behavior. The Barron-Welsh Art Scale, on the other hand, differentiates known creative people from non-creative along a dimension of a preference for complexity or simplicity. The Barron Ego Strength Scale was included as a measure of a trait found to be higher in creative people than in the normal population. High inter-correlations between the three measures were hypothesized. No relationship was found, which leaves unanswered the question of the validity of either the Wallach and Kogan measures or the Barron scales. One possibility for this lack of correlation is that creative people, as differentiated by the Barron scales, are people who have committed themselves to a profession and so are different from those who have not.

Table of Contents

	Page
I. Introduction.	1
Review of the Literature	
Statement of the Problem	
Hypotheses	
II. Method	
Subjects.	11
Materials and Procedure	11
III. Results	14
IV. Interpretation of Results	15
Discussion	
Summary	
Suggestions for Further Research	
V. Bibliography.	19
VI. Appendix	
Table 1 Summary Data.	21
Table 2 Intercorrelations Between Creativity	22
Measures and Ego Strength	

One approach to the study of creativity has focused on the measurement of creativity as such (Guilford, 1956, 1959; Mednick, 1962; Torrance, 1962; Wallach and Kogan, 1965) and another has focused on the assessment of personality variables correlated with creativity (MacKinnon, 1962, 1965, 1967; Barron and Welsh, 1952; Lieberman, 1965, 1967; Maddi, 1965). Within the measurement framework, the major concern has been with obtaining consistent and reliable measures of those abilities presumed to be the basis of creativity. This approach focuses on the cognitive domain of divergent thinking and its correlates (i.e. ideational fluency, uniqueness, originality, the production of associations, problem-solving). The personality approach to creativity has studied acknowledged creative adults to determine their cognitive style and the personality correlates to their creative thinking. The correlates most often found to be characteristic of creative people include perceptiveness, openness to experience, understanding self-awareness, wide ranging interests, a desire for complexity, and lowered defensiveness. In general, it has been found that creative individuals view themselves as independent and unconventional as well as creative, imaginative, and ingenious.

Wallach and Kogan have become major figures within the measurement framework. To them, the process of creating refers to the generation or production of associations. In fact, they have defined creativity as the ability to generate many cognitive associates and many that are unique (1965).

The Wallach and Kogan Tests of creativity have been devised to determine if unique associates are present or not. These response char-

acteristics have been found to be independent of the conventional measures of general intelligence ($r=.05$). It is important to establish the independence of creativity from the traditional area of general intelligence because only then can one talk about a kind of thinking ability appropriately labeled creativity, which also possesses a substantial degree of generality across task variations. Only if creativity can be established as a distinct entity in its own right can one confidently attribute output to a thinking process that is creative and not to one related to intelligence.

Wallach and Kogan's conception of creativity led them to observe the number of associational responses that a person could generate under various circumstances, and the uniqueness of these responses. They postulate that each individual possesses a hierarchy of possible responses, with more conventional, stereotyped associates higher in the hierarchy and more unique associates lower in the hierarchy. The associates in this hierarchy show sharp differences in relative availability - the stereotyped responses being highly available and the more unique responses relatively unavailable. In observing the behavior that would be expected from this model, two points are emphasized. First, responses of greater stereotypy are likely to come earlier in the sequential emission of a series of associates; responses of greater uniqueness, if they come at all, are likely to come later. Thus the individual who can produce a greater number of associates also will be the individual who can produce a greater number of unique ones. Second, associations of high stereotypy are produced at a very rapid rate, and then the ability to produce falls

off abruptly. Therefore time becomes an important variable in the creative process, the individual needing more time to produce the more creative cognitive units. (Time has been shown by subsequent studies not to be as important as originally thought, but it is brought out here because it was part of Wallach and Kogan's original theoretical model and was important in the development of their tests.) In addition, these creative cognitive units must be part of the individual's behavioral repertoire, but it is not explained how these more unique responses become part of one's behavior repertoire. This suggests a possible link between Wallach and Kogan's associative view of creativity and the personality correlates approach. The personality characteristics of creative people may be used to explain how these unique associates become part of one's behavior repertoire. If creative people are more perceptive, open to experience, less defensive, etc., it could be those traits found to be characteristic of creative people that would lead an individual to more varied experiences which in turn would give one a greater repertoire of responses and more unique responses. It would be these same traits that would enable an individual to view the world differently and to work with the cues in the environment with originality and inventiveness.

Wallach and Kogan talk of creativity developmentally, in that at some point in development creativity becomes a distinguishable entity in and of itself that can be differentiated from intelligence. They have been concerned with when this happens, and thus have concentrated their work on children, particularly young children. They have not established whether creativity, as measured by their tests, is the creativity of

adults. It is the intuitive feeling of the author that the notion of unique associates is the creativity of adults, but this has not been validated. However, in terms of a more general concept of creativity, it would seem that the Wallach and Kogan measures of creativity would not be good measures of creativity in adulthood, nor would they be very good predictors of later creativity when used with children. In order to explain this idea, it is important to distinguish between adult and child creativity. For the child, creativity may be looked at as a general way of behaving, involving fantasizing, imaginative play, the expression of curiosity, and the discovery of new things, as well as simply doing new things. With adult creativity, there is a value involved beyond just doing and discovering new things. The emphasis is on the product and its usefulness or aesthetic properties as well as originality. In addition, the creative individual is often seen as less bound by cultural conditioning (Krippner, 1972), a process which takes place during childhood - children are taught to conform and inhibit responses that are divergent or not acceptable or ordinary. As it is often the nonordinary and unusual responses that are the creative ones, this process of conditioning may work to develop uncreative adults. Those who survive this conditioning process, so to speak, may be the ones who will be the more creative in the adult sense. Support for this idea is given by Torrance (1962), who found that the children he studied showed declines in originality - as measured by creativity tests - upon entering kindergarten, fourth grade, and junior high school. It appears that when the growing child learns to perceive the world through the eyes of his culture, he

surrenders his individualistic outlook, becoming less open to new experiences, less original, less imaginative, and more stereotyped in his thinking. At best, then, tests of creativity in childhood would only be able to predict a lack of creativity in low creative children.

Some support for the relation between the Wallach and Kogan notion of creativity and adult creativity can be found in a project by Wallach and Wing (1969). They studied college students and found that non-academic accomplishments in leadership, art, writing, and science were correlated with achievement on the Wallach and Kogan Tests. They found that level of ideational output in general, rather than producing unique ideas in particular, is what matters most for the non-academic attainments studied. A lack of relationship between music and drama and the tests were explained by hypothesizing that music and drama are characterized by the performance of what has already been produced. Therefore they require what Wallach and Wing call reproductive rather than innovative modes of functioning. Their most conclusive finding, however, was that intelligence level plays no role at all in regard to non-academic accomplishments.

Another approach to creativity has been to study the personalities of creative people. At this level, creativity seems to be more a matter of personality and motivation than of measurable cognitive abilities. This approach studies adults identified as creative to determine their cognitive style and the personality correlates of creative thinking.

The primary emphasis within the area of personality and creativity has been on determining those factors that are correlated with creativity.

MacKinnon defines creativity as a process extended in time and char-

acterized by originality, adaptiveness, and realization (1962). This concept of creativity forced him to reject as indicators or criteria of creativeness the performance of individuals on tests of creativity. He felt that such tests, while they may measure the infrequency or originality of a subject's ideas as a response to specific test items, fail to reveal the extent to which the subject faced with real life problems is likely to come up with solutions that are novel and adaptive. He thus limited his research to the study of persons who had already demonstrated a high level of creative work. His research was aimed at discovering the distinguishing traits of creative persons. He chose architects as the most characteristic of creative persons.

One of the most striking characteristic revealed through MacKinnon's research, and that which distinguishes creative people most from the non-creative, is their perceptiveness and an openness to the richness and complexity of experience. This allows for greater awareness and receptiveness to both the outer and inner world. The more creative people are, the more they reveal an openness to their own feelings and emotions, a sensitive intellect, understanding self-awareness and self-acceptance, and wide-ranging interests. Creative individuals show little concern for social restraints or others' opinion, and are strongly motivated to achieve, primarily in situations requiring independent thought and action. Being more self-accepting, highly creative persons are able to speak frankly and in a more unusual way about themselves. Their openness to experiences allows them to struggle with the opposites of their nature as they strive for an effective reconciliation. They are able to tolerate

increasing amounts of tension and achieve creative solutions to the problems which they set for themselves.

Openness to experience and a desire for complexity has also been found to be characteristic of creative people in the work of Barron and Welsh. This was revealed on the Barron-Welsh Art Scale of the Welsh Figure Preference Test (Welsh, 1959), which was found to differentiate creative from non-creative people along a dimension of a preference for simplicity-complexity (Barron & Welsh, 1952). This test was developed by comparing the preferences of artists with those of nonartists as to the aesthetic appeal of certain figure drawings. Those figures liked most by artists were highly complex, asymmetrical, free-hand rather than ruled, and rather restless and moving in their general effect. The figures that were liked by people in general were relatively simple, often bilaterally symmetrical, and regularly predictable, following some cardinal principle that could be educed at a glance. These figures were described by artists as static, dull, and uninteresting.

The Art Scale revealed a psychological unity in perceptual preferences which Barron refers to as a simplicity-complexity dimension (Barron, 1953a). This was found to be true of creative artists as well as creative research scientists, architects, writers and others (Barron, 1963). Variables related to preference for complexity as opposed to simplicity included a rapid personal tempo, verbal fluency, impulsiveness, expansiveness, originality, sensuality, sentience, aesthetic interest, and femininity in men (Barron, 1953b). Barron also found that creative individuals tend to reject suppression as a mechanism for the control of

impulse, social conformity, ethnocentrism, and political-economic conservatism (Barron, 1963).

One especially intriguing finding in the study of the personality of creative people is the above average scores they earn on the Minnesota Multiphasic Personality Inventory (Barron, 1972; MacKinnon, 1962), a questionnaire designed to measure psychopathological tendencies. Specifically, creative individuals were well above the general population average on measures of schizophrenic tendency and depression, and moderately high on hysteria and psychopathic deviation. In addition, they also scored well above average in ego-strength (defined by Barron, 1963, as effective personal functioning, adaptability and personal resourcefulness), which in the general population is negatively related to the cited measures of psychopathology. According to Barron (1972), this suggests that creative people possess adequate control mechanisms and resources for coping that gives them the ability to incorporate their psychotic-like experiences and dispositional tendencies into a matrix of rationality, high conceptual intelligence, and personal effectiveness.

Two basic approaches to the study of creativity can thus be discerned. The personality correlates approach to creativity looks at the personality of the creative person and attempts to identify creative people on the basis of characteristics that may discriminate them from other, not so creative individuals. These correlates, it is hoped, will offer the beginnings of an explanation of these individuals' creativity. The psychometric approach attempts to identify cognitive characteristics thought to be indicative of creativity and involves the testing of hypo-

theses concerning these cognitive processes. The interest is in finding a measurable ability that will distinguish between individuals and call it creativity. This differs from the personality approach that studies the creative individual first. Both approaches attempt to explain creativity, but so far they have remained fairly independent of each other. In addition, many of the psychometric measures of creativity have not been validated against known creative people. This is particularly true of the Wallach and Kogan Tests, a widely used test of creativity among children.

This study was a validation of the Wallach and Kogan measures of creativity with adults. In order to do this, it was felt that individuals must first be identified as either creative or non-creative and then given the Wallach and Kogan Tests. Working from the assumption that creative individuals can be identified as ones who have those traits said to be characteristic of creative people, the Barron-Welsh Art Scale was used as a criterion measure of creativity. Barron has shown that highly creative people obtain a higher score on the Art Scale than less creative people. Although logically it doesn't follow, the assumption here was that anyone who achieves a high score on the Art Scale can be considered creative. The individuals were then given the Wallach and Kogan Tests and the correlations between the two tests was assessed. If those that were differentiated by the Art Scale are also distinguished by their performance on the Wallach and Kogan measures, the validity of the Wallach and Kogan tests as measure of creativity would be supported. In addition, if ego strength is a distinctive characteristic of creative persons, as

is claimed, then the individuals should also differ significantly on this personality trait, with the highly creative being higher in ego strength. It was therefore hypothesized that the scores on the Barron-Welsh Art Scale, the Wallach and Kogan Tests, and the Ego Strength Scale would be highly intercorrelated.

Method

Subjects. The subjects were 23 male and 28 female undergraduate students enrolled in an introductory psychology course at the University of Nebraska at Omaha. They received extra-credit points for their participation. They ranged in age from 18 to 43, with the mean age for both males and females being 21. 61% were freshmen, 31% sophomores, and 8% were juniors. There were 9 Blacks, 1 Native American, 40 Caucasians, and 1 from India. Major areas of study were fairly representative of the UNO population. All Ss received the same battery of tests under the same conditions.

Materials and procedure. The materials used consisted of the Barron-Welsh Art Scale, the Wallach and Kogan Tests of Creativity, and the Ego Strength Scale (developed by Barron), a derivative of the Minnesota Multiphasic Personality Inventory.

The Barron-Welsh Art Scale consists of 85 black and white figures for each of which the subjects are asked to decide whether they like or do not like. The subjects indicate their preference on a standard IBM sheet. The figures range from simple geometric forms to complex and diverse patterns and designs. Of the 85 items, 62 are used for scoring purposes.

The Ego Strength measure consists of 68 items, all of which are used in scoring. The subjects are asked to indicate whether a statement "is true as applied to you or false as applied to you." IBM answer sheets were provided.

The Wallach and Kogan Tests of Creativity are concerned with the

generation of five types of associates: instances, alternate uses, similarities, pattern meanings, and line meanings. (See Wallach & Kogan, 1965 for a description of the tests.) In each case, the number of unique responses produced and the total number of responses produced by the subject was measured. The nature of these measures is considered further below. All procedures were described as games and were administered to the subjects in groups that varied from one to six people. The subjects were provided with paper to write their own responses. There were no time pressures other than a subjective judgment by the administrator to move on when most of the group seemed ready. Other than these variations, and adaptation of Wallach and Kogan's directions to fit adults, the format conformed to those given by Wallach and Kogan, 1965.

INSTANCES. This is the first of three verbal techniques. The subject is asked to generate possible instances of a class concept that is specified in verbal terms. This procedure consists of four items.

ALTERNATE USES. The second verbal technique requires the subject to generate possible uses for a verbally specified object. Eight items make up this procedure.

SIMILARITIES. In the present instrument, the subject is to generate possible similarities between two verbally specified objects. It is composed of ten items.

PATTERN MEANINGS. This is one of the two measures involving visual rather than verbal stimulus materials. The subjects are to generate possible meanings or interpretations for each of the eight abstract visual designs. The subjects are to consider each drawing as a complete entity

in producing his response. The items are presented to each individual on separate 4 in. x 6 in. cards.

LINE MEANING. In the second procedure involving visual stimulus materials, the subject is confronted with one or another kind of line and is asked to generate meanings or interpretations relevant to the form of the line in question. Each line is a single continuous unit, in contrast to the discrete elements comprising the patterns. These nine items again were presented to each individual on 4 in. x 6 in. cards.

For each of the five procedures, the two variables of uniqueness and total number of responses are measured. The variable of uniqueness is defined as follows: For each item in a procedure, a response that is provided in answer to the given item by only one subject in the entire sample of 51 is defined as unique. A subject's uniqueness score for a procedure as a whole consists of the sum of his uniqueness scores for the various items which constitute the procedure. His overall uniqueness score is the sum of the uniqueness scores for all of the items.

The variable of number is defined as the total number of responses given by a subject to a particular item. A subject's number score for a procedure as a whole consists of his number scores for the various items making up that procedure, and his total number score is the sum of all his responses.

The scores for each of the ten variables within each domain were transformed into standard score form for the sample as a whole. The result is a score distribution with a mean of 0 and a standard deviation of 1. An individual's standard scores for all ten creativity variables then were summed to yield a creativity index score.

Results

Raw score summary data is given in Table 1.

Insert Table 1 about here.

A Pearson's Product Moment correlation was calculated between each individual's T-scores for each of the three measures. A t-test was used to determine significance. The results are summarized in Table 2.

Insert Table 2 about here.

No significant correlation was found between the Wallach and Kogan Tests and the Barron-Welsh Art Scale or the Ego Strength Scale, or between the Barron-Welsh Art Scale and the Ego Strength Scale. Correlations did not differ significantly as a function of sex or race.

A median split was performed on the Barron-Welsh Art Scale and the Wallach and Kogan Test scores. Four groups were then formed consisting of those high on both measures, low on both measures, or high on one and low on the other measure. Within each group, those above and below the median on ego strength were determined. A test of Chi Square showed no significant difference in ego strength between the four groups ($\chi^2 = 4.42, .05 < p < .10$).

Discussion

The lack of any significant correlation between any of these three measures is puzzling. It can only be hypothesized as to why they are not correlated.

The most pessimistic conclusion is that there is no such thing as creativity, which makes all this worthless. Somewhat less pessimistic, and perhaps slightly more accurate, is that creativity cannot be measured, or that it is not a unitary phenomena that can be easily assessed by one instrument. However, given the assumption that there is creativity and that it can be measured, the problem is to determine which if any of these measures is valid.

One can assume, as was done for this study, that the Barron-Welsh Art Scale is a measure of creativity because it has been shown to distinguish between levels of creativity within a given profession, in which case if the Wallach and Kogan Tests measure creativity, they do not measure it in the same sense that the Art Scale does. The use of the Art Scale in the present study as a criterion was predicted on the assumption that if a test distinguishes between creative and non-creative people, it has predictive power and therefore performance on the test will indicate creativity. What these results suggests is that although the Barron-Welsh may successfully distinguish between individuals who have committed themselves to a profession, it does not necessarily have predictive power in the sense of identifying those individuals who will become committed. This sample was from essentially an occupationally non-committed population, and the factor of commitment may be more important than creativity

as such.

Given the lack of this sort of relationship, one can also consider whether the Wallach and Kogan Tests are a better measure of creativity than the Barron-Welsh. The Wallach and Wing (1969) data seem to support this notion, at least in the realm of non-academic accomplishments. But there is still no data concerning its predictive power and no convincing data as far as criterion groups used. Their work has only looked at college students and no follow-up has been done. One can even question their criterion measures, which excludes two areas (drama and music) generally thought of as creative pursuits, because there was no correlation between accomplishment in these areas and their tests. Their definition of creativity and the criterion used seems to be based on those accomplishments that correlate with their measures and include the things characteristic of the traditionally successful college student.

The validity of verbal fluency as a definition of creativity has been questioned by others. Schimek (MacKinnon, 1975) found very low inter-correlations among originality of responses on a battery of "free-expression" tests consisting of fairly unstructured stimulus materials that provided subjects an opportunity to create freely their own responses. He concluded that originality cannot be considered a generalized factor in such performances. He argued that the most valid index of originality is likely to be a subject's most original responses in areas where he is most proficient, rather than his average performance on a group of unrelated procedures. Maddi (1975) says that "these tests (such as Wallach and Kogan's) seem generally expressive of wit rather than any really

ground-breaking insight." Even Wallach (1976) seems to have become disillusioned with the prediction of creativity from verbal fluency tests.

The ego strength data need not be of concern here because it is only a characteristic found to be present in creative people who have committed themselves already. This does not mean it will be present in the uncommitted creative, but that it may be something that is developed. In addition, people other than those who are creative can be high in ego strength, which would confound the correlations.

In summary, it is clear that the area of creativity is confusing and that the simple and straight forward predictions made here were not upheld. These results suggest that creativity is much more complex and not a unitary phenomena, and that there may not be one test that will identify all creative people. All factors involved here may be completely independent. Although necessary for creativity, none of them are sufficient in themselves.

Further research in this realm needs to look at both measures. The validity of the Wallach and Kogan measures is still to be questioned, as well as their predictive power. A criterion group similar to those used by Barron or MacKinnon should be given these tests to determine how well they do. In addition, some longitudinal studies need to be done to determine the predictive power of these measures. The Barron-Welsh Art Scale should be studied in relation to the differences in scores obtained between different groups or professions. A weighted score could then be determined to make the scores between groups more comparable. From there, work could be done on randomly selected groups of subjects. In addition

the predictive power of the scale needs to be explored. Finally, the lack of relationship between these disparate measures may indicate that some combination may be necessary to predict creativity.

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Appendix
Table I
Summary Data

	Raw Score \bar{X}	SD	Range
Wallach & Kogan Tests			
Total R	193.80	60.10	94-334
Number R	182.71		92-317
Original R	11.74	7.41	0- 30
 Barron-Welsh Art Scale	 21.45	 11.15	 3- 46
 Ego Strength Scale	 42.47	 6.44	 25-57

Table 2
 Intercorrelations Between Creativity
 Measures and Ego Strength

	Total Sample (N=51)	t	p	Males (N=23)	p	Female (N=28)	p	Caucasian (N=40)	p
Barron-Welsh Art Scale & Wallach & Kogan Test	-.09	.55	ns	-.299	ns	.03	ns	-.22	ns
Barron-Welsh Art Scale & Ego Strength Scale	-.05	-.07	ns	-.06	ns	-.097	ns	-.04	ns
Wallach & Kogan Test & Ego Strength Scale	-.02	.5	ns	.098	ns	-.18	ns	-.06	ns