A new look at the creativity-intelligence distinction

Michael A. Wallach, Duke University, and Nathan Kogan, Educational Testing Service

For several years we have been concerned with two modes of thinking in young children, which, it turns out, bear directly upon what has assumed the proportions of a controversy in recent psychological history. The nature of the controversy might be put somewhat as follows: Is there an aspect of cognitive functioning which can be appropriately labeled “creativity” that stands apart from the traditional concept of general intelligence? A close appraisal of the quantitative findings available on this subject led us to a pessimistic answer. We shall pass some of these findings quickly in review. Our examination of this literature opened up to us, however, the possibility of a valid distinction between creativity and intelligence that had not, in our view, been sufficiently pursued and developed. The next step, therefore, was empirical research in terms of this distinction. Finally, if creativity and intelligence could be validly distinguished, we were interested in studying the possible psychological correlates that might distinguish individual differences on these two dimensions considered jointly. Specifically, we were concerned with correlates in such areas as the child’s observed behavior in school and play settings, his aesthetic sensitivities, his categorizing and conceptualizing activities, his test anxiety and defensiveness levels. We can, of course, give but an overview of this work. For a complete presentation, see Wallach and Kogan (1965)

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We began with a simple question. Does the relevant psychological literature support the assumption of a unified dimension of individual differences describing more and less creative cognitive behavior? To put this question another way, can one demonstrate the existence of greater and lesser degrees of a cognitive capability that is like intelligence in regard to being a pervasive, broad dimension, but yet is independent of intelligence, and which can appropriately be labeled “creativity”? It is clear that to talk of “creativity” is to imply a referent different from that of the general intelligence concept. If that is not intended, then the creativity label becomes quite superfluous. The typical evidence that we found on this issue led, however, to an opposite conclusion. Let us consider an example.

The volume by Getzels and Jackson (1962), _Creativity and Intelligence_, is perhaps the best known of recent efforts in the field. Five alleged tests of creativity were administered to large samples of students ranging in class from sixth grade through the end of high school. Four of the five creativity tests correlated significantly with IQ for the girls, and all five of these tests correlated significantly with IQ for the boys. Consider next the relationships among the instruments in the creativity battery—that is, the question of whether they define a unitary dimension of individual differences. The Getzels-Jackson results showed that the five creativity tasks are virtually no more strongly correlated among themselves than they are correlated with intelligence. To give some averages, for boys the mean correlation is .26 between the creativity battery and IQ, and is .28 among the tasks in the creativity battery, in the case of the girls, the corresponding mean correlations are .27 and .32. In sum, the creativity measures correlated with intelligence on the order of .3, and also correlated with each other on the order of .3. There is no evidence, in short, for arguing that the creativity instruments are any more strongly related to one another than they are related to general intelligence. The inevitable conclusion is that little warrant exists here for talking about creativity and intelligence as if these terms refer to concepts at the same level of abstraction. The creativity indicators measure nothing in common that is distinct from general intelligence. Inspection of the creativity battery reveals a quite...
varied range of materials, including measures of the ability to
devise mathematical problems, to compose endings for fables, to
detect embedded geometric figures, to think up word definitions,
and to imagine uses for an object

Comparable examination of other research reports in the litera-
ture forced us to the same kind of conclusion. Our survey in-
cluded the study of findings reported by Torrance and his co-workers (e.g., Torrance, 1960, 1962, Torrance & Gowan, 1963),
Guilford and his collaborators (e.g., Guilford & Christensen, 1956,
Wilson, Guilford, Christensen, & Lewis, 1954), Cline, Richards,
and Needham (1963), Cline, Richards, and Abe (1962), Barron
(1963), and Flescher (1963). To give but one more example of
the kind of outcome obtained, consider a recent study by Cline,
Richards, and Needham (1963) With high school students as
Ss and seven creativity measures, the average correlation for
boys between the creativity indexes and an IQ measure is 35,
while it is 21 among the various creativity tests. For girls, the
average correlation between the creativity tests and IQ is 33,
while it is 24 among the seven creativity measures. Again and
again in reviewing the research in this area, the evidence led to
the conclusion that the various creativity measures utilized are
almost as strongly, equally strongly, or even more strongly related
to general intelligence than they are related to each other. The
evidence in hand thus seemed not to permit the very type of
conceptualization that Getzels and Jackson (1962) and other re-
searchers were proposing, namely, that there exists a pervasive
dimension of individual differences, appropriately labeled "crea-
tivity," that is quite distinct from general intelligence. We should
note that this same critical point has been made by Thorndike
(1963) in a recent article.

Appropriate wielding of Occam's razor at this juncture thus
dictated the tough-minded conclusion that little of any generality
was being measured here beyond differences in the traditional
notion of intelligence. Let us pose two issues, however, that
made it seem premature to let the matter go at that. First, a
potpourri of abilities was being assessed in the good name of
"creativity," second, all of the work that we had seen failed to
consider the implications of the social psychology of the assess-

ment situation within which measurement of "creativity" was attempted. Consider each of these points in turn.

If we return to the introspections of highly creative artists and scientists, one major focus emerges. The majority of the available introspective accounts have in common a concern with associative freedom and uniqueness. These accounts consistently stress the ability to give birth to associative content that is abundant and original, yet relevant to the task at hand rather than bizarre. The writer's classical fear of "drying up" and never being able to produce another word, the composer's worry over not having another piece of music within him, the scientist's concern that he won't be able to think of another experiment to perform—these are but indications of how preoccupied creative individuals can become with the question of associative flow. Introspections about times of creative insight also seem to reflect a kind of task-centered, permissive, or playful set on the part of the person doing the associating. Einstein refers to "associative play" or "combinatory play."" The person stands aside a bit as associative material is given freedom to reach the surface.

We would propose that the essentials of the creative process may be contained in the two elements just considered. First, the production of associative content that is abundant and that is unique, second, the presence in the associator of a playful, permissive task attitude. Given a task clear enough that bizarre associative products do not readily occur, and given a permissive context within which the person works, two variables should permit us to index individual differences in creativity: the number of associations that the person can generate in response to given tasks, and the relative uniqueness of the associations that he produces.

One implication of this view is that productivity and uniqueness of associates should be related variables. Defining uniqueness as a relative infrequency of a given associative response to the task at hand for a sample of Ss, we would then expect stereotyped associates to come earlier and unique associates to come later in a sequence of responses. Such an expectation would also be consistent with recent work by Mednick (e.g., 1962). If unique associates tend to come later in time, then it becomes
clear also that an appropriate assessment context will require freedom from the pressure of short time limits, and perhaps freedom from any temporal pressure at all. The postulated need for a permissive, playful attitude also implies the desirability of freedom from time pressure. Such temporal freedom is one aspect of what a permissive situation would involve. Permissiveness further connotes a relative lessening of evaluational pressures—that is, a focus upon the task rather than upon the self, a relaxed entertaining of the possible rather than tense insistence upon an answer that must be correct if one is not to lose face. The Taoists, as discussed by Rugg (1963), have called such a relaxed attitude a state of “letting things happen.” Clearly, we are describing a type of situation in which the individual does not feel that he is being tested, and hence does not feel that what he does will have a bearing upon his self-worth in the eyes of others.

The foregoing analysis of creativity hence suggests a concentration of assessment attempts in the area of associational processes, in contrast to the quite heterogeneous types of tasks that have received the “creativity” label in studies of the kind touched upon earlier. This theoretical analysis also suggests that the assessment context must be quite different from the kind utilized in the studies that we have reviewed, there should be freedom from time pressure and there should be a playful, game-like context rather than one implying that the person is under test. Interestingly enough, the kind of context present in the case of all of the studies on creativity that we reviewed earlier has borne strong connotations that a test or examination is at issue, the creativity procedures invariably have been referred to as “tests,” they have been administered to large groups of students in a classroom, and temporal constraint has been present—either explicitly, through the use of relatively brief time limits, or implicitly, through the use of group administration procedures. In all of this work, there has been the evident assumption that a testing context, with its implication that the respondent is being evaluated in terms of some success-failure criterion, is quite appropriate for studying creativity. The associative approach to creativity that we have taken, however, with its emphasis upon an attitude...
of playful entertaining of possibilities in a task-centered rather than ego-centered environment, suggests otherwise.

At this point we were ready to begin some experimentation of our own. Following the prescriptions just stated, could one empirically define a dimension of individual differences that concerned the ability to produce many cognitive associates, and many that are unique? Would this dimension possess a substantial degree of generality across differences in types of tasks—for example, verbal vs visual kinds of procedural formats? Such a contrast was of special interest since the general intelligence concept is defined with respect to a kind of ability that manifests itself in visual (performance) as well as verbal types of tasks, and we were presuming to assess a characteristic possessing approximately the same level of generality as conventional intelligence. Finally, and most important, would the foregoing dimension of associational ability be independent of individual differences in the traditional area of general intelligence? If research findings could provide affirmative answers to these questions, then, and only then, would one be in a position to talk about a kind of thinking ability appropriately labeled creativity, with the evident implication of a characteristic different from general intelligence, but yet a characteristic which also possesses a substantial degree of generality across task variations.

Our work, conducted with 151 children comprising the entire fifth-grade population of a suburban public school system in a middle class region, took great pains to establish a game-like, non-evaluational context for the administration of procedures. The Es, two young women, were introduced as visitors interested in children’s games, and spent two initial weeks with each class gaining rapport with the children. This initial period of familiarization also provided the basis for observations leading to ratings of the children’s behavior on various dimensions, to be discussed later. Great effort was expended in communicating to the children that the presence of the Es did not concern examinations or tests. The teachers and principals, furthermore, did their utmost to dissociate the Es from any concern with intellectual evaluation. Finally, it was our view that the establishment of a game-like context required the Es to work individually with each of the
151 children. We sedulously avoided group administration with its academic testing implications.

Five procedures formed the basis for our exploration of creativity in these children. They concerned the generation of five kinds of associates. Two variables were measured in the case of each uniqueness of associates, and total number of associates. Some of the procedures were verbal, others were visual in nature. One verbal procedure, for example, requested the child to generate possible instances of a verbally specified class concept, such as “round things,” or “things that move on wheels.” Here and for every other creativity procedure, the child is given as much time on each item as he desires. Number of unique responses to an item is defined as the number of responses given by only one child in the sample of 151 to the item in question. Total number of responses offered to an item is, of course, self-defining. For “round things,” for example, “life savers” is a unique response, while “buttons” is not. Another verbal procedure requests the child to think of possible uses for various objects presented orally, such as “shoe” or “cork.” “To trap a mouse in,” is a unique use suggested for “shoe,” while “to throw at a noisy cat” is not. A third verbal procedure asks the child to propose possible similarities between two objects specified in verbal terms. For instance, one pair is “train and tractor,” another is “milk and meat.” A unique response to “milk and meat” was “they are government-inspected,” while “they come from animals” was not unique. The visual procedures, in turn, request the child to think of possible interpretations or meanings for each of various abstract visual patterns and line forms.

These procedures obviously owe a debt to the Guilford group. They are administered, however, in a carefully constructed game-like context, with each child taken individually and encouraged to spend as much time as he wishes, in a relaxed atmosphere, on every item. These administration arrangements were very different from those employed by the Guilford group. It should be emphasized, furthermore, that the use of a game-like context did not lead to a violation of the task constraints present in the various items of the procedure. Bizarre or inappropriate responses were exceedingly rare.
To assess the traditionally demarcated area of general intelligence, ten indicators were utilized. These included verbal and performance subtests from the Wechsler Intelligence Scale for Children (Wechsler, 1949), the School and College Ability Tests, which provide measures of verbal and quantitative aptitude (Cooperative Test Division, 1957a, 1957b), and the Sequential Tests of Educational Progress, which provide yardsticks of achievement in various academic content areas (Cooperative Test Division, 1957c, 1957d, 1959).

The ten creativity indicators—a uniqueness and a productivity measure for each of five procedures—proved to be highly reliable, in terms of both split-half and item-sum correlations. The reliabilities of the ten intelligence instruments, in turn, are known to be quite high. We now were in a position, therefore, to study the dimensionality of the creativity and intelligence indexes. The findings were as follows. Whether examining results for the sample as a whole, or separately for the 70 boys and the 81 girls, the ten creativity measures proved to be highly intercorrelated, the ten intelligence measures proved to be highly intercorrelated, and the correlation *between* the creativity and the intelligence measures proved to be extremely low. To provide an idea of the correlational magnitudes involved, the average correlation among the ten creativity measures is on the order of .4, the average correlation among the ten intelligence indicators is on the order of .5, and the average correlation between these two sets of measures is about .1.

We may conclude, therefore, that a dimension of individual differences has been defined here which, on the one hand, possesses generality and pervasiveness, but which, on the other hand, nevertheless is quite independent of the traditional notion of general intelligence. This new dimension concerns a child’s ability to generate unique and plentiful associates, in a generally task-appropriate manner, and in a relatively playful context. It is a considerable surprise that such a dimension should prove to be quite independent of general intelligence, and it seems indeed appropriate to label this dimension “creativity.” The independence of this dimension from general intelligence seems all the more intriguing for two reasons: first, the creativity procedures
almost inevitably call upon verbal facility in some degree, and verbal facility is a very basic element of the general intelligence concept, second, the independence in question is found for elementary school children, and one would expect young children to show less differentiation in modes of cognitive functioning than adults.

In a sense, all that has been described thus far constitutes a prelude. Having isolated a mode of thinking in children that is pervasive, independent of intelligence, and appropriately described as a dimension of individual differences in “creativity,” we now wish to understand its psychological significance. The appropriate research strategy at this point seemed to require consideration of individual differences on the creativity and the intelligence dimensions taken jointly. That is, a child’s location had to be defined with respect both to general intelligence and to creativity as we have conceived of it. It was necessary, in other words, to compose four groups of children within each sex those high in both creativity and intelligence, those high in one and low in the other, and those low in both. In order to define these groups, a single creativity index score and a single intelligence index score were obtained for each child. These index scores were the summed standard scores of the ten measures in each respective domain. The distributions of creativity index scores and of intelligence index scores then were dichotomized at their respective medians, within sex, to yield the groups that exemplified the four possible combinations of creativity and intelligence levels. The two sexes, incidentally, were quite similar with regard to the distributions of these index scores. Since all cases were retained, rather than just the extremes, it is evident that the procedure used for composing creativity and intelligence combinations was a conservative one.

Consider now some of the psychological differences that we found to distinguish children who are both creative and intelligent, creative but not intelligent, intelligent but not creative, and neither creative nor intelligent.

To begin with, we turn to the behavior of these several groups of children in the school environment. The two Es made independent ratings of the children along specifically defined behavioral
dimensions during an initial two weeks of observation in each class. This work was carried out prior to any further contact with the children, so that the ratings could not be influenced by the performances of the children on the various experimental procedures used in our research. Furthermore, no other possible sources of information about the children were made available to the raters during the observation period. In short, every effort was made to insure that the ratings would be unbiased.

It should also be mentioned that these rating dimensions possess high inter-rater reliability, a very important point that the use of two independent observers permitted us to establish. Without this kind of reliability, investigation of individual differences on these behavioral dimensions would have been fruitless.

The judges rated each child's status on a given dimension in terms of a nine-point scale. For example, one characteristic was defined in terms of the following question: "To what degree does this child seek attention in unsocialized ways, as evidenced by such behavior as speaking out of turn, continually raising his hand, or making unnecessary noises?" The first, third, fifth, seventh, and ninth points on the rating scale for this question were given the verbal labels "never," "seldom," "sometimes," "usually," and "always," respectively. Other questions rated in the same manner included: "To what degree does this child hesitate to express opinions, as evidenced by extreme caution, failure to contribute, or a subdued manner in a speaking situation?" "To what degree does this child show confidence and assurance in his actions toward his teachers and classmates, as indicated by such behavior as not being upset by criticism, or not being disturbed by rebuffs from classmates?" "To what degree is this child's companionship sought by his peers?" "To what degree does this child seek the companionship of his peers?"

The preceding questions were focused upon issues of social behavior. Several questions of an achievement-centered nature also were included. These inquired about such matters as the following: "How would you rate this child's attention span and degree of concentration for academic school work?" "How would you rate this child's interest in academic school work, as indicated by such behavior as looking forward to new kinds of academic
work, or trying to delve more deeply into such work?" For these questions, the first, third, fifth, seventh, and ninth points of the rating scales were labeled "poor," "below average," "average," "good," and "superior," respectively.

Let us look in some detail at the results for the girls. Those high in both creativity and intelligence show the least doubt and hesitation of all the groups, show the highest level of self-confidence, and display the least tendency toward depreciation of oneself and one's work. Concerning companionship, these girls are sought out by their peers more eagerly than is any other group, and this high intelligence–high creativity group also seeks the companionship of others more actively than does any other group. There is reciprocity in social relationships for the members of this group. With regard to achievement, this group shows the highest levels of attention span, concentration, and interest in academic work. In all of these respects, the high-high group obviously is reflecting highly desirable modes of conduct in both the social and the achievement spheres. Interestingly enough, however, this group also is high in regard to disruptive, attention-seeking behavior. The high-high children may well be brimming over with eagerness to propose novel, divergent possibilities in the classroom, in the face of boredom with the customary classroom routines. Against the context of classroom programs that emphasize equal participation by class members and academic values that are likely to center around the traditional intelligence dimension, the cognitive behavior reflected in high creativity levels in the case of these girls may well possess a nuisance value and exert a rather disruptive effect in the classroom situation.

Consider next the group high in creativity but low in intelligence. In many respects it turns out that this group is at the greatest disadvantage of all in the classroom—and, indeed, under more of a disadvantage than the group which is low in both creativity and intelligence. Those of high creativity but low intelligence are the most cautious and hesitant of all the groups, the least confident and least self-assured, the least sought after by their peers as companions, and in addition are quite avoidant themselves of the companionship of others. There is a mutuality of social avoidance in the case of these girls. In the academic
sphere, they are the most deprecatory of their own work and the least able to concentrate and maintain attention. In terms of the ratings for disruptive attention-seeking, however, these girls are high, and in this one respect similar to the high creativity–high intelligence group. Most likely, however, the attention-seeking of these two groups is quite different in quality, given the highly different contexts of other behaviors in the two cases. While the disruptive behaviors of the high-high group suggest enthusiasm and overeagerness, those of the high creative–low intelligent group suggest an incoherent protest against their plight.

It affords an interesting comparison to turn next to the group low in both intelligence and creativity. These girls actually seem to be better off than their high creativity–low intelligence peers. The low-low group possesses greater confidence and assurance, is less hesitant and subdued, and is considerably more outgoing toward peers in social relationships than is the high creative–low intelligent group. The low-low group members appear to compensate for their poor academic performances by activity in the social sphere, while the high creative–low intelligent individuals, possessing seemingly more delicate sensitivities, are more likely to cope with academic failure by social withdrawal and a retreat within themselves.

Finally, we turn to the group high in intelligence but low in creativity. As in the case of the high-high group, these girls show confidence and assurance. In terms of companionship patterns, however, an intriguing difference emerges. While sought quite strongly as a companion by others, the girl in this group tends not to seek companionship herself. She also is least likely to seek attention in disruptive ways and is reasonably hesitant about expressing opinions. Attention span and concentration for academic matters, in turn, are quite high. The impression that emerges, then, is of a girl who is strongly oriented toward academic achievement, is somewhat cool and aloof in her social behavior but liked by others anyway, and is unwilling to take the chance of overextending or overcommitting herself, there is a holding back, a basic reserve.

These results make it clear that one needs to know whether creativity in a child is present in the context of high or low intelli-
gence, and one needs to know whether intelligence in a child is present in conjunction with high or low creativity. It is necessary to consider a child's joint standing on both dimensions. One must seriously question, therefore, the Getzels and Jackson (1962) procedure of defining a "high creative" group as children who are high in creativity but low in intelligence, and defining a "high intelligent" group as children who are high in intelligence but low in creativity. If one wishes to establish generalizations about the nature of creativity and of intelligence as distinct characteristics, one cannot afford to ignore those children who are high in both and who are low in both.

Let us consider now some evidence in a different area—that of conceptualizing activities. This evidence will cast light on differences among the groups of boys. In one of our procedures, the child was asked to group pictures of everyday physical objects, and was requested to give the reason for his grouping in each case. Among the 50 objects pictured were, for example, a rake, a screwdriver, a telephone, a lamppost, a candle. The groupings were to be carried out in terms of putting together things that seem to belong together. When this phase was completed, reasons for grouping were obtained. These reasons later were content-analyzed—blindly, of course, with respect to the identities of the children—and the reliability of the content analysis system was evaluated by having all materials scored by two independent judges. Reliability was found to be quite high. Consider briefly now one of the content-analysis distinctions employed.

We were interested in contrasting relational or thematic reasons for grouping with reasons based upon abstracted similarities among the objects. In the latter type of reason, every object in the group is an independent instance of the label applied, whether the labels refer to shared physical properties or to shared conceptual properties. An example of the physical-descriptive type of category would be the label, "hard objects," for a group consisting of a lamppost, a door, and a hammer. An example of the conceptual-inferential type of category would be the label, "for eating," in the case of a group containing a fork, a spoon, a cup, and a glass. By a relational or thematic type of reason, on the
other hand, we refer to a label deriving from the relationship among the objects in the group, no single object is an independent instance of the concept, but rather all of the objects in the grouping are required in order to define it. An example of a thematic category is the label, "getting ready to go out," for a group consisting of a comb, a lipstick, a watch, a pocketbook, and a door.

The distinctions just made derive from work carried out by Kagan, Moss, and Sigel (1960, 1963), with certain modifications necessitated by the nature of the stimuli. It has typically been assumed by these investigators as well as by others that responding on a relational or thematic basis represents an intellectually inferior manifestation. This may well be true when the stimuli to be grouped are few in number and their thematic characteristics highly salient, as has been the case in the studies just cited. Thematizing under such circumstances may represent a passive, global approach to the materials provided. In the procedure that we employed, however, a large number of stimuli—50 in all—were present, and their nature as well as the instructional context were such as to reduce markedly the Eindringlichkeit or prominence of thematic relationships. The child was encouraged to group in terms of abstractions, since the instructions implied to him that similarity be used as the basis for sorting. In addition, the objects were commonplace physical things, and there were many of them. Under these circumstances, it might well be the case that relational or thematic grouping would constitute a free-wheeling, unconventional type of response to the given task, in contrast to the more customary practice of sorting the objects in terms of common elements, whether such elements be physical or conceptual. Constraints arising from the nature of the stimuli would be considerably stronger in the case of groupings based upon shared physical or conceptual properties. Groupings based on relationships or themes, on the other hand, would permit greater free play for the evolving of unique combinations of stimuli. With these considerations in mind, let us turn to some results.

The findings for males point to a particularly clear phenomenon. The group of high intelligence but low creativity stands
out as avoiding the use of thematic or relational bases for grouping. Rather, they concentrate on conceptual common elements. For whatever reasons—and the reasons may differ in the case of different groups—the other three groups are more willing to indulge in thematic forms of conceptualizing. It is the high intelligence–low creativity group that shows a disproportionate avoidance of thematizing. Such a finding reinforces the hypothesis that thematic responding may, under the conditions of the present procedure, represent a more playful, imaginative approach to the grouping task than does strict common-element sorting.

To suggest that the low incidence of thematizing by the high intelligence–low creativity group is evidence for an avoidance reaction, however, is to imply a further distinction. In principle, a low incidence could reflect either an inability to thematize or an avoidance of it. In another experimental procedure, however, we assessed the ability of the children to integrate a set of words into a unified theme in story telling, that is, in this new task, thematizing was required of the child. Under such conditions, the high intelligence–low creativity group thematizes as well as the group high in both creativity and intelligence. It is when the option not to thematize is available that thematizing drops out of the behavior of the high intelligent–low creative group. Such evidence, then, suggests that we are dealing with a disinclination to thematize on the part of this group, not an inability to thematize.

It has typically been proposed in work on cognitive development (e.g., Bruner & Olver, 1963) that the most mature cognitive functioning involves inferential abstraction—the kind of organizing that would be reflected in terms of sorting objects on the basis of shared conceptual properties. Thematizing has been considered a developmentally primitive response. Our findings suggest, however, that a more critical consideration may be the relative balance between conceptual-inferential and thematizing tendencies. Consider the results for the various groups of boys on the sorting task in somewhat more detail. For both of the high creativity groups, the relative incidence of thematizing and inferential-conceptual grouping is fairly high. For the high intelligence–low creativity group, the relative incidence of thematiz-
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In sum, the creative boys seem able to switch rather flexibly between thematizing and inferential-conceptual bases for grouping, the high intelligence-low creativity boys seem rather inflexibly locked in inferential-conceptual categorizing and strongly avoidant of thematic-relational categorizing, finally, the low intelligence-low creativity boys tend to be locked within thematic modes of responding and relatively incapable of inferential-conceptual behavior. Parenthetically, it might be well to offer the reminder that the incidences of thematic and inferential-conceptual groupings both can be high since there also exists the third scoring category of grouping in terms of common physical elements.

When we consider some of our data concerning sensitivity to the expressive potential of visual materials, a result similar to the thematizing findings is obtained for the high intelligence-low creativity group of girls. With line drawings of stick figures in various postures as stimuli, various emotional states were proposed to the child as possibilities for one or another figure, and the child indicated a willingness or disinclination to entertain each possibility. Let us focus our attention upon two kinds of affective labels for each stick figure: a label constituting a highly likely, conventional suggestion, and a label representing a quite unlikely, unconventional possibility. Unconventional and likely emotional attributions for the various stick figures were defined with reference to the consensus of adult judges. Each of some 24 stick figures was offered to the child with one affective label upon each presentation. A different type of label would be proposed each time a given figure was presented, and a given figure was repeated only after all the others had been shown. More inappropriate and more appropriate kinds of labels for the various figures would be offered on a random schedule. Note that a choice is never forced between these two classes of emotional attributions. Each presentation involves one stick figure and one
label, with the child requested to accept or reject the label as a descriptive possibility. The child thus is free to accept appropriate and unconventional emotional attributions, to reject both kinds, or to accept one kind and reject the other.

The main results with this procedure for the girls were as follows. Although the four groups did not differ in regard to their acceptance of appropriate or likely affective attributions for the stick figures, they differed in a particular way regarding acceptance of the unconventional attributions—the group high in intelligence but low in creativity exhibited a conspicuously low level of such acceptance. Although the rate of acceptance of such attributions by the other three groups was generally quite low (about 5 per cent), the high intelligence–low creativity group accepted virtually none at all. The comparability among the groups regarding acceptance of appropriate attributions acts as a control, indicating that the differential acceptance behavior just described relates to the entertainment of unconventional attributions in particular, rather than simply to the acceptance of any kind of affective labels. Furthermore, there is no relationship between degree of acceptance of unconventional and of appropriate attributions. It is safe to conclude, therefore, that an acquiescence or "yea-saying" response set cannot account for the differential acceptance of unconventional attributions.

The implications of the present findings appear to be quite similar to the thematizing results considered before in the case of the boys. In both cases, the high intelligence–low creativity group is intolerant of unlikely, unconventional, types of hypothesizing about the world. This particular group appears conspicuously loath to "stick its neck out," as it were, and try something that is far out, unconventional, and hence possibly "wrong." It is of particular interest that the high intelligence–low creativity group of girls avoids entertaining the possibility of unconventional emotional attributions under the present experiment's conditions. Recall that the entertainment of such possibilities has no effect upon the availability for acceptance of the likely and highly appropriate possibilities, it is not an "either—or" situation. The high intelligence–low creativity girls seem to be so attuned to error that even where appropriate responses are not sacrificed,
they refuse to deviate from a critical standard of "correctness."

Consider next some of the other findings in the domain of expressive sensitivity. Included in this domain were tasks requiring free descriptions of stimuli with implicit emotive significance. We content analyzed these free descriptions in order to determine the extent to which a child would confine his descriptions to comments upon the physical and geometric characteristics of the various stimuli, as contrasted with the extent to which he would "go beyond" such physical categories and discuss the affective or expressive connotations of such materials. In the case of both sexes, the ability to range beyond the physical and into the realm of affective content tended to be maximal in the group high in both creativity and intelligence. That creativity and intelligence both could contribute to such physiognomic sensitivity—responsiveness to "inner" feeling states on the basis of perceivable externals—suggested that two processes could be jointly involved in the display of this sensitivity. On the one hand, the capacity to make inferential translations from one mode of experience to another seems to be reflective of the general intelligence concept; on the other hand, the associational freedom implied by the creativity concept evidently enhances the range of experience available for making inferential linkages.

Let us turn now to some evidence on how the children describe themselves with respect to general anxiety symptoms and to those symptoms experienced under the stress of tests or examinations. Consider the findings for the boys. Standard materials for assessing manifest anxiety and test anxiety were employed, deriving from the work of Sarason, Davidson, Lighthall, Waite, and Ruebush (1960). The results are suggestive of a Yerkes-Dodson function. They are of the same nature for both general manifest anxiety and test anxiety. The level of anxiety is lowest for the group that is high in intelligence but low in creativity. Anxiety level is middling for the two groups that are high in creativity, regardless of intelligence level. Finally, anxiety level is highest for the group that is low in intelligence and low in creativity. The allusion to the Yerkes-Dodson law is made since creativity is found to be maximal in the presence of an intermediate level of anxiety. If anxiety is either too low or too high,
then creativity is reduced. Just as interesting, however, are the particular conditions under which anxiety level is lowest. It is the group high in intelligence but low in creativity who, by self-report, are least anxious. At the other end of the dimension, with the highest anxiety scores, stands the group low in both intelligence and creativity.

What are the implications of these findings? First of all, they force us to question whether creativity should be conceptually associated with a state of maximal freedom from anxiety symptoms. It is not those children who are lowest in anxiety level, but those who report a moderate degree of anxiety, whom we find to be most creative in their thinking processes. Traditional conceptions of mental health place considerable emphasis upon anxiety as a debilitator of cognitive performance and as a signal of inappropriate or ineffectively adjustment. This no doubt is true when anxiety reaches quite high levels. We need only remember that the strongest degree of anxiety is found in the most cognitively deprived group of children—those who are low both in general intelligence and creativity. However, it may also be the case that a modicum of anxiety is reflecting more the presence of sensitivity to internal states than the presence of disturbance. This should not be construed, of course, as acceptance of the old saw that neuroticism breeds creativity. However, the data in hand do suggest that it is equally unrealistic to assume that the most creative children are the happiest children. There may well be elements of obsessiveness present in the kind of associative freedom that leads to high creativity status. A playful contemplation of the possible, but also an obsessive, task-centered reluctance to put a problem aside may be involved in the production of many associates and of a large number of unique associates. Creativity need not be all sweetness and light, therefore, but may well involve a tolerance for and understanding of sadness and pain. To think otherwise is to fall prey to the rather widespread American stereotype that suffering is always a bad thing and is to be avoided at all costs.

One possible cost of the avoidance of suffering is evident in the group whose levels of general anxiety and of test anxiety are lowest—the group high in intelligence but low in creativity. This
result may well stem from the fact that the group in question is the most closely attuned to the demands of the classroom environment. In that environment, traditionally defined intelligence and its manifestations in the form of high academic achievement most likely are heavily rewarded, while creativity may well be viewed as more of a disruption than a boon. The mode of operation of the high intelligence–low creativity child, therefore, may be such as to minimize the sources of possible conflict between himself and the school environment and to maximize the sources of reward from that environment. It is not surprising that such a close fit between individual and social context would be reflected in a minimal level of anxiety.

From the kinds of results that have been passed in review, pictures begin to emerge concerning the psychological nature of the children in the four cognitive groupings: high creativity–high intelligence, high creativity–low intelligence, low creativity–high intelligence, and low creativity–low intelligence. In addition to our quantitative studies, clinical accounts describing various children in the sample also have been prepared, and these clinical materials have tended to reinforce the conclusions derived from the experimental work. The case studies can be summarized in terms of the generalizations presented below. These will also serve to underline the major points of congruence between the clinical and the experimental sources of information concerning the four creativity and intelligence groupings.

High creativity–high intelligence These children can exercise within themselves both control and freedom, both adult-like and child-like kinds of behavior.

High creativity–low intelligence These children are in angry conflict with themselves and with their school environment, and are beset by feelings of unworthiness and inadequacy. In a stress-free context, however, they can blossom forth cognitively.

Low creativity–high intelligence These children can be described as “addicted” to school achievement. Academic failure would be perceived by them as catastrophic, so that they must continually strive for academic excellence in order to avoid the possibility of pain.
Low creativity–low intelligence. Basically bewildered, these children engage in various defensive maneuvers ranging from useful adaptations such as intensive social activity to regressions such as passivity or psychosomatic symptoms.

In conclusion, this presentation has traced in outline form the history of our research on two modes of thinking in young children, modes which constitute quite different, but yet quite pervasive, dimensions of individual differences. Our work progressed from the definition and operationalization of the cognitive types in question to an investigation of their correlates in such areas as observable social and achievement-relevant behaviors, ways of forming concepts, physiognomic sensitivities, and self-described levels of general anxiety and test anxiety. From the findings obtained, it seems fair to conclude that the present definition of creativity denotes a mode of cognitive functioning that matters a great deal in the life of the child. Most critical of all for advancing our understanding is a consideration of the child’s joint status with regard to the conventional concept of general intelligence and creativity as here defined.

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Creativity-intelligence distinction

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