

CREATIVE POTENTIAL AND
CONCEPTUAL TEMPO IN
PRESCHOOL CHILDREN

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1970

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
December, 1986

Thesis
1986
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PREFACE

Since the unique differences between children has been my life profession for the past 16 years while mothering 5 spectacular children, I approached this study of children's individual stylistic variations with much interest.

Without the continuous support and encouragement of my major professor, Dr. James D. Moran, I would never have reached the point of completion. I wish to express my sincere gratitude to him for his scholarly guidance, patience and invaluable help.

I am also deeply grateful to my "boss" and professor during the pursuit of my master's degree, Dr. John C. McCullers. I am thankful for the friendship and encouragement of two other "McCullers' Moles", Carla Goble and Anne Bomba.

I appreciate the assistance of the teachers and director of the OSU Child Development Lab School, Anne Bomba and Shari Haynie Freeland who assisted with the study, and the 61 preschoolers who participated in our research project.

The greatest appreciation for moral encouragement, understanding and consistent love and support must go to my husband John and my children, Chris, David, Susan, Kent and Janae.

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Abstract

The individual stylistic variations of creative potential and conceptual tempo were investigated in preschool children. The age-appropriate measure used for the reflective/impulsive dimension was the Kansas Reflection Impulsivity Scale for Preschoolers (KRISP), and the Multidimensional Stimulus Fluency Measure (MSFM) addressed ideational fluency, i.e. creative potential. Of the 31 boys and 30 girls (mean age = 56.9 months), who were given these measures, 15 were classified as impulsive (fast, inaccurate) and 21 as reflective (slow, accurate), via median splits on the error and latency scores of the KRISP. This study also included the 14 children who were classified as fast, accurate and the 11 slow, inaccurate children in the analysis. Contrary to expectations, no differences between reflectives and impulsives were found on the ideational fluency measure. However, analysis of all four quadrants of the conceptual tempo dimensions revealed an interreaction of KRISP latency and error scores, $F(1,57) = 12.78$, $p < .001$, with greater originality scores evidenced in the fast/accurate ($M = 20.38$) and slow/inaccurate ($M = 25.00$) groups than among the reflectives, i.e. slow/accurates ($M = 12.71$), and impulsives, i.e. fast/inaccurates ($M = 11.56$). Speculations and implications of this unusual finding were discussed in terms of the manner in which children may approach convergent and divergent tasks.

Creative Potential and Conceptual Tempo in Preschool Children

The past two decades have seen an abundance of interest in individual variation of cognitive processes in childhood and adolescence (Kogan, 1983). Kogan (1983) indicated the four areas of interest when considering cognitive stylistic variation are: metaphor, field dependence-independence, creativity, and reflection-impulsivity (i.e. conceptual tempo). These latter two individual variations provide the basis for this study.

Kagan (1965) identified a reflective/impulsive continuum, with reflectives being slow to reach decisions and impulsive responding quickly. Kagan, Rosman, Day, Albert, and Phillips (1964) developed a test for conceptual tempo called the Matching Familiar Figures Test (MFF) which has become the primary index for identification of conceptual tempo. In the past, the MFF identified reflective or impulsive children by looking at their response latencies and error scores while using a median split. The slow but accurate children were classified as reflective, and impulsives were fast, innaccurate children. Critics of the MFF have argued that the process of median splits of both latency and error scores caused two different constructs to be integrated. Several children (the slow

inaccurate and the fast accurate) were being ignored (Block, Block & Harrington, 1974). It was suggested that the reflective/impulsive dimensions be considered as continuous variables rather than using the median-split technique (Ault, Mitchell, & Harmann, 1976). The reliability of the MFF with the preschool age child has also been questioned (Wright, 1971). Wright (1971) developed a measure similar to the MFF but applicable to preschoolers, called the Kansas Reflective-Impulsivity Scale for Preschoolers (KRISP).

While considering creativity within the Guilford (1956) framework, Mednick (1962) proposed that the quantity of ideational output is related to its quality, and that a response hierarchy exists such that popular responses generally appear early in the sequence and original responses later. White (1965) also proposed an order effect of responding with his theory of "temporal stacking" by stating that "different responses become maximally 'ready' in different time zones after the stimulus has initiated the hunt for a response" (p. 189). It is a subject's response tempo or ability to inhibit initial responses which help to determine the selection of the possible responses available. The tempo of responding or conceptual tempo could conceivably affect quality and quantity of responses according to response hierarchy theories.

Only a few researchers (Fuqua, Bartsch, & Phye, 1975; Rosenfield, Houtz, & Steffero, 1977; Ward, 1968) have investigated the interrelationship of the latter two of

these cognitive processes (creativity and conceptual tempo). All of these researchers have approached their quest for a relationship between conceptual tempo and creativity with the prediction that impulsive children, because of their nonconformity, and uninhibited, free-wheeling response style, would perform better on creativity measures. However, Fuqua et. al. (1975) found that reflectives were more creative, while Ward (1968) and Rosenfield et. al. (1977) reported no relationship between conceptual tempo and creativity.

Fuqua et. al. (1975) suggested that creativity might emphasize deliberate and systematic exploration thereby accounting for the higher scores of the reflective children on measures of creativity. Validity of these findings, however, could be challenged because the measures used may have been inappropriate for the preschool-age child. These researchers used the MFF rather than the KRISP and they used the Picture Completion task from the Torrance Tests of Creative Thinking, which is designed and normed for older children. Additionally, they looked at only the impulsive and reflective children and did not consider the groups of fast accurate and slow inaccurate children.

Using the Guilford-Mednick conceptualization of creativity, the present research investigated the pattern of original responses given by reflective and impulsive preschool children on age appropriate measures of ideational fluency. It was hypothesized that reflective children would

produce more original responses on ideational fluency measures than impulsive children, i.e. reflectives would begin further down on the response hierarchy and thus give more unusual responses early in the response sequence and greater number of total original responses than impulsive children. Since errors on the MFF have been found to be related to task persistence (Carey, Fox & McDevitt, 1977), we also expected inaccurate children to prematurely truncate the response hierarchy resulting in fewer responses overall. While primarily viewing the originality scores of reflective and impulsive children, the fast accurate and slow inaccurate subjects were also considered.

Methods

Subjects

The sample consisted of 31 boys and 30 girls, who were between the ages of 45-72 months (mean age = 56.9 months, s.d.= 7.48). These children were enrolled in a University Laboratory School and the group was 7% nonwhite and of above average IQ (mean IQ = 115).

Instruments Used as Predictors

Ideational Fluency. The Multi-dimensional Stimulus Fluency Measure (MSFM), (Moran, Milgram, Sawyers, & Fu, 1983) for ideational fluency was used. This test consists of three measures (instances, pattern meanings, and alternate uses) with two items per measure. Moran, Sawyers, Fu and

Milgram, (1984) found that this measure is a valid predictor of original thinking in that it correlates to measures of fantasy ($r = .40$, $p < .05$) and imaginative play ($r = .59$, $p < .05$). Moreover the reliability of the MSFM has been established with scores being relatively stable over a two year period (Moore & Sawyers, in press). Each test response was scored as popular or original, i.e., given by more or less than five percent of the normative group, respectively. The time until first response and the overall time in task and the responding time (from first to last response) were also recorded.

Conceptual Tempo. Form A of the KRISP test (Wright, 1971) for reflective-impulsivity was used. This is a matching-to- standard task involving 5 pretest items and 10 test items. Response latency from presentation until first response and numbers of errors were recorded.

Procedure. Testing continued over a five week period with each subject tested individually for two sessions in a private room separate from the other children and relatively free from external stimuli. Trained examiners conducted the sessions which were approached from a game-like perspective. In session one, instances and pattern meanings measures were given; and in the second session the alternate uses and the KRISP measures were administered. The two, 10 to 15 minute testing sessions, were approximately two weeks apart with no time limits for responding given. Different examiners were used in each of the two sessions. All ideational fluency

measures were tape recorded in order to record the time to first response and overall time in task. The timing of the KRISP was recorded by means of a stopwatch.

Results

A latency median split of 5.35 seconds along with an error median split of 3.60 allowed 36 of the 61 subjects (59%) to be classified as impulsive or reflective (15 impulsive, 21 reflective, 11 slow inaccurate and 14 fast accurate subjects)¹. Each of the four quadrants of the conceptual tempo continuum were analyzed, yet primary analyses focused on the differences in the impulsive and reflective groups. A two-tailed t-test revealed no significant difference for reflectives and impulsives on total originality scores on the MSFM.

Insert Table 1 about here

No difference for their total popular score, time to first response or total time for the ideational fluency tasks was evidenced for these two groups. Pearson Product Moment Correlations revealed no significant correlations between either error and latency with total original scores. The time in task and latency to first response taken during the administration of the MSFM did not correlate with the latency or the error scores of the KRISP.

Insert Table 2 about here

Additional analysis between all four quadrants defined in the reflective-impulsive dimension revealed an interesting and rather puzzling interaction between errors and latency: the slow inaccurate (S/I) and the fast accurate (F/A) groups scored significantly higher on originality than the slow accurate (reflective) and the fast inaccurate (impulsive) groups, $F(1,57) = 12.78$, $p < .001$. This interaction also held true for total time in the MSFM task, with significantly greater time in task for the S/I and F/A groups than for the reflective and impulsive groups $F(1,57) = 9.44$, $p < .003$.

Discussion

The findings clearly demonstrate the need to attend to all four quadrants of the conceptual tempo dimension and demand explanation in two areas: (a) the lack of relationship between originality and reflection-impulsivity and (b) the interaction between KRISP errors and latency, resulting in higher originality scores and longer time in task on the MSFM for the slow inaccurate and fast accurate groups. The lack of relationship between the conceptual tempo dimension of reflection-impulsivity and creativity confirms the findings of Rosenfield, Houtz, and Steffero (1977) from research with 5th grade children, and Ward

(1968) while studying preschool children, although disagrees with those of Fuqua et. al. (1975).

Kagan and Kogan (1970) warn against overgeneralization of MFF results to other tests and tasks, thus Rosenfield et. al. (1977) suggest that conceptual tempo measures should not be related to creativity or other problem solving tasks. Kagan and Messer (1975) suggest that with preschool age children conceptual tempo does not seem to have the same relationship to other variables as some research has revealed for school age children. However, this does not explain the relationship that Fuqua et. al. (1975) found between reflectivity and creativity. While studying preschool age children Fuqua and his associates used creativity scores from the Picture Completion subtest of the Torrance Test of Creative Thinking (TTCT), which has been suggested to show a correlation to convergent-thinking and general intelligence (Wallach, 1970) and which requires only a single response per stimulus item. The concept of reflectivity defines a person who is slow responding and low-error in the context of response uncertainty. The low error rate of the reflectives (perhaps related to method of approach to single response items) may account for the success of this group found in this particular Torrance Test, but not in the more divergent ideational fluency tasks used in the present study, as well as by Rosenfield, et. al. (1977) and Ward (1968).

The present study does suggest that those individuals with the greatest total original responses also have longer task persistence or willingness to stay with the task. However, there was no correlation between latency to first response on the ideational fluency measure and total originality scores. Thus highly creative individuals did not necessarily respond more slowly on their first response. Ward (1969) found that children who eventually produce more ideas tended to produce them at a greater average rate throughout the task, which could explain why the children with high total originality scores did not also have a long latency to first response. This finding is in partial concurrence with Mednick's (1962) response hierarchy, giving a flat hierarchy for high creative subjects who respond slowly and steadily and emit more original responses and a steep hierarchy for low creative subjects who respond at a higher rate and emit fewer original and total responses. It may also reflect that children approach the two types of tasks differently.

Although no difference was found between reflectives and impulsives, the interaction between KRISP errors and latency on originality scores indicated the superiority of the S/I and the F/A groups on ideational fluency measures. These findings suggest that the reflective/ impulsive description is highly complex. Factors underlying response latencies and errors may be relatively independent and as has been suggested (Kagan & Messer, 1975), the

reflection-impulsivity dimension appears to be task specific. Moreover, the findings suggest that individual differences in how children approach the task may have important implications in determining response levels and that the measures of latency and errors are indicative of other variables affecting task performance. Although no definitive explanations are forthcoming from this data, it would appear that low originality response rates would come from children characterized by higher anxiety and/or a "right" answer orientation (i.e., slow accurates who approach the divergent task as if it was a convergent task), as well as from children who lack attention to detail and/or the motivation and task persistence to perform well (i.e., fast inaccurates).

Slow inaccurate children, although they may demonstrate some anxiety over error, may not have a desire to conform, allowing them to explore more ideas. They may not transfer their anxiety and style used with the single response tasks to divergent tasks or they may approach all tasks as if they were divergent in nature and thus not worry about the correctness of their answer. It should be noted that in this study, this group is largely composed of children of at least average ability on convergent tasks, (i.e., mean errors are considerably lower than the mean of KRISP norms). The slower latencies of the slow inaccurates suggest a relaxed attitude and a willingness to continue in a task which

in creativity measures result in production of greater number of responses, as well as more original responses.

The fast accurate group (who are high on convergent ability based on their low error scores) has a rapid response style which would suggest non-censuring of responses. Ward (1968) suggests that creativity entails minimal censoring or evaluation of potential responses which leads to relatively quick responding. This style, combined with attention to detail and task persistence would promote high originality on ideational fluency tasks. The slow accurates, by comparison, provide deliberate responses and tend to experience more anxiety over error (Kogan, 1976). Their anxiety and desire to conform with correct responses when transferred to creativity measures could inhibit the quality and quantity of responses. The group of fast inaccurates (impulsives) are also non-anxious over errors, yet their rapid responding tempo implies a desire to complete the task quickly without deliberation leading them to truncate the task early, thus producing fewer responses.

The discrepancies between this study and the Fuqua et. al. (1975) study may be explained within this framework. Since these researchers did not report data for each of the four quadrants, we can only make reference to the reflectives and impulsives. The Picture Completion task of the TTCT is distinctly different than the MSFM when considered in this context. The Fuqua et. al. (1975) study used the Picture Completion task which appears to be more

compatible with the response style of reflective children who, as we categorized them, approach a task from a more convergent orientation. This framework suggests that reflectives performed better than impulsives on the TTCT, not because they were reflective, but because the task was compatible with their style, which also happens to be the same style which leads them to be classified as reflective.

It appears necessary to consider both latency and errors of the KRISP as indications of underlying variables (e.g., anxiety, attention to detail, conformity) which may affect creative potential. The data suggest that there are some children who may approach any task as a convergent task (slow accurates), some who may approach all tasks as divergent tasks (slow inaccurates), some who respond quickly without attention to detail or adequate motivation (fast inaccurates), and some who are able to switch their response styles to fit the task at hand (fast accurates).

In summary, the theoretical development of the constructs of conceptual tempo and divergent or creative thinking has argued persuasively for a definite relationship between the two; however previous studies, which examined only the reflective and impulsive children, resulted in differing conclusions. The present investigation with preschool children found no relationship between reflective and impulsive children on originality, yet when adding the other two quadrants of the reflection-impulsivity dimension, found the fast accurate and slow inaccurate children scoring

significantly higher on ideational fluency than either slow accurate (reflective) or fast inaccurate (impulsive) children. This unexpected finding is explained by postulating that children approach convergent (e.g., KRISP) and divergent (e.g., MSFM) tasks with specific response styles which may be advantageous or disadvantageous to the particular type of task. We would suggest further investigation in the areas of anxiety, conformity, attention to detail, motivation and task persistence of the children identified in the four quadrants of the conceptual tempo dimension in order to add further support to our conclusions.

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Footnote

¹ Since categories were generated by median splits these descriptions should be considered relative rather than absolute. This is especially true for error scores which in this sample are considerably lower ($\underline{M} = 3.56$) than the norms for the KRISP ($\underline{M} = 5.31$). Latency scores in seconds were comparable for this sample ($\underline{M} = 5.36$) and the normative sample ($\underline{M} = 4.89$).

Table 1

Means and Standard Deviations for the four KRISP Quadrants
on KRISP and MSFM variables

Speed Accuracy		KRISP Quadrant ^a			
		Slow Accurate	Fast Inaccurate	Fast Accurate	Slow Inaccurate
(n)		(21)	(15)	(14)	(11)
KRISP scores:					
Latency	M	6.56 ^b	3.74	4.37	6.52
	SD	1.18	.83	.70	1.42
Errors	M	1.86	5.38	2.31	5.91
	SD	1.06	1.67	.86	2.07
MSFM scores:					
Total-Original	M	12.71	11.56	20.38	25.00
	SD	7.34	6.76	11.05	17.13
Total-Popular	M	14.29	12.88	19.31	17.09
	SD	4.34	6.41	9.89	4.83
Latency 1st Response	M	6.03 ^b	5.69	5.27	6.15
	SD	3.28	3.76	1.15	4.83
Total time in Task	M	68.95 ^b	50.80	101.40	96.25
	SD	34.54	30.65	59.27	47.16

Note. KRISP = Kansas Reflective Impulsivity Scale for Preschoolers

MSFM = Multidimensional Stimulus Fluency Measure

^aCategories reflect median splits and thus descriptions of speed as "fast" or errors as "accurate" are relative rather than absolute.

^bTime is recorded in seconds.

Table 2

Correlations between MSFM total scores and time
measurements with KRISP error and latency scores

	MSFM Total Fluency	MSFM Latency 1st Response	MSFM Total Time	KRISP Latency	KRISP Errors
MSFM Total- Original	.93*	-.06	.83*	.08	.12
Total- Fluency		-.14	.88*	.04	.06
Latency to 1st Response			-.05	.17	-.02
Total Time				.11	-.07
KRISP Latency					-.25

*p < .001

APPENDIX A

LITERATURE REVIEW

LITERATURE REVIEW

Creative Potential in Preschool Children

Creativity, as well as intelligence, is a cognitive characteristic that is highly valued as a goal in our educational system. The current emphasis on identification and nurturance of gifted and talented students within the educational system has also increased interest in identifying creative potential. Rimm (1984) stated, "An identification procedure which does not include at least one reliable and valid measure of creativity is inadequate for a gifted program which includes creative thinking as a program goal" (p. 182). As manifested by three decades of research and interest by educational and psychological researchers, the construct of creativity is very complex and no one theory or single assessment instrument of creativity has been generally accepted by all (Treffinger, 1986).

However, it has been generally accepted that creativity involves divergent thinking skills. The most widely used model is that of Guilford (1967) which suggests the different aspects of divergent thinking to be: associational fluency, expressional fluency, word fluency, adaptive flexibility, ideational fluency, spontaneous flexibility and originality. Wallach's (1970) review of the literature

indicated that only one area of the divergent thinking domain as defined by Guilford (i.e., ideational fluency) has been demonstrated as consistently separate from convergent thinking, while the other fluency factors (word fluency, associational fluency and expressional fluency) were all more closely aligned with convergent thinking skills. Moreover, different measures of ideational fluency have also been shown to be related to each other as well as being distinct from convergent thinking. Thus it appears that ideational fluency which Guilford (1967) describes as a person's ability to generate in plentiful number, ideas that are appropriate to a given task constraint, is the critical component of the divergent process leading to creativity.

In defining creativity as a process of bringing associative elements into ideational contiguity, Mednick (1962) postulated a hierarchy of responses. This hierarchy predicted that the high creative subject would respond relatively slowly and steadily and produce many responses, while the low creative subject would respond more quickly and emit fewer responses (see Figure 1). Mednick (1962) suggests that the response hierarchy would manifest more usual association or responses first in the sequence and original or creative responses later in the sequence.

Insert Figure 1 about here

Wallach and Kogan (1965) added to Guilford and Mednick's conceptualization of the creative process by stressing a

playful, gamelike, untimed attitude rather than a test or evaluative attitude in assessing creative potential. They defined the creative process as "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," (p. 289). Their measure of ideational fluency included an instances task, alternate uses task, similarities task, pattern meaning task, and line meaning task. The scoring of these tasks involved the total output of ideas as well as the uniqueness of response.

Until the past decade the measurement and assessment of ideational fluency was primarily involved with older children and adults. Only a few studies (Busse, Blum, & Gutride, 1972, Starkweather, 1971; Ward, 1968, 1969; Williams & Fleming, 1969) had addressed ideational fluency in preschool children. Measuring creative potential with the preschool age child presents certain challenges (Starkweather, 1964) and in order to procure relatively accurate results there is a need to ensure that age-appropriate measurements are used. Using the Guilford/Mednick conceptualization of creative productivity and based on the work of Wallach and Kogan (1965), Starkweather (1971), and Ward (1968, 1969), the Multidimensional Stimulus Fluency Measure (MSFM) was developed by Moran, Milgram, Sawyers, and Fu (1983) as a measure of ideational fluency. Using the MSFM these researchers found that for preschoolers: (a) the number of original responses was

distinct from intelligence (Moran, et. al., 1983); (b) an order effect was evidenced with popular responses emerging early and original responses late in the response sequence and the order effect was more pronounced with children who are high in ideational fluency (Moran, et. al., 1983); (c) there was a significant relationship between ideational fluency and naturally occurring imaginative play behavior (Moran, Sawyers, Fu, & Milgram, 1984); and (d) ideational fluency was shown to be relatively stable over a two-year period (Moore & Sawyers, in press). The reliability and construct validity of the short form of the MSFM has also been established (Godwin, 1984).

When investigating the determinants of creativity many researchers have hypothesized that individual differences may affect the expression of creative potential. Several individual characteristics such as personality (Barron & Harrington, 1981), family variables (Miller & Girard, 1979), sex (Maccoby & Jacklin, 1974) and cognitive style (Kogan, 1973) have been suggested to correlate with creativity. Kogan postulated that "cognitive processes underlying creative ability and certain cognitive styles are not fundamentally different" (p.176). When considering the timing of response within the Mednick framework, it might be suggested that a highly creative individual would response more slowly and continue responding over a longer period of time. The cognitive style which considers response tempo is referred to as conceptual tempo.

Conceptual Tempo and Preschool Children

Conceptual tempo "is concerned with the degree to which the subject reflects on the validity of his [or her] solution hypotheses in problems that contain response uncertainty" (Kagan & Kogan, 1970, p. 1509). Latency to first response and the accuracy of that response are the two components of this cognitive style. A reflective-impulsive continuum has been identified with reflectives (R) characterized by slow/low error responding and impulsives (I) by fast/high error responding. The primary instrument for assessing R-I has been the Matching Familiar Figures Test (MFF), developed by Kagan, Rosman, Day, Albert, and Phillips (1964). The MFF is a matching to standard task where the child is given 6 variants, one of which is identical to the standard. Identification of R-I on the MFF is obtained by median split of the latency and error scores and fast/accurate and slow/inaccurate individuals are usually not considered in this index. The developers of the MFF view their test as tapping two components - anxiety over error and tempo of information processing. The anxiety over error, where reflectives have high anxiety and impulsives low anxiety, influences decision time and therefore must be considered in conjunction with tempo of processing (Kagan & Kogan, 1970).

Several studies have criticized the conceptual tempo dimension. Block, Block and Harrington (1974) feel that reflection-impulsivity is often conceptualized as response

latency only. But in reality, the MFF test operationally views this concept in highly specific terms only in situations of high uncertainty and weight is given to response accuracy as well as response latency. The problem with using errors as well as latency to determine R-I is that the response error dimension is only partially a result of rapid decision making - low intelligence and poor vision can also contribute to errors. Block et. al. (1974) conducted a study with preschool children and found significant negative correlation with MFF errors and intelligence scores on the WPSSI (Wechsler Preschool and Primary Scale of Intelligence), suggesting that intelligence is influencing error scores.

Errors and latency have generally been shown to be negatively correlated; yet for preschool children a longer response time is not associated with more accurate performance on the MFF (Kagan & Messer, 1975). Kagan and Messer thus feel that the performance on the MFF has different implications for preschoolers than it does for older children. Others have also questioned the reliability of the MFF with the preschool age child (e.g., Wright, 1971). The KRISP (Kansas Reflection-Impulsivity Scale for Preschoolers) has been developed by Wright (1971) for use primarily with children of preschool age. It is believed that the MFF and the KRISP are positively related to each other and measure the same construct (Kogan, 1976).

Based on Mednick's (1972) predicted tempo and length of response emission for creative individuals the expected main effect for the median split of R-I would be latency. The reflective individual would predictably produce more responses, more slowly and over a longer period of time than the impulsive individual. Thus the present research is concerned with the relationship of creativity, as evidenced by originality scores in measures of ideational fluency, and conceptual tempo resulting from measures of latency/errors in problem solving situations. There is further concern with the latency of responses in the creativity measures and the relationship between latencies on the two separate tasks.

Creative Potential and Conceptual Tempo

A few empirical studies have used various age children and several different measurement instruments while attempting to relate conceptual tempo and creativity. Two previous studies conducted with school age children using various testing procedures found no significant mean differences on errors and response latencies for high and low creative individuals (Ward, 1968; Rosenfield, Houtz, & Steffaro, 1977). Rosenfield, et. al. suggested that the reason that no relationship was found is because the measure for reflective/impulsivity and the measure for creativity require two different response styles; the MFF requires ambiguity in choice of one correct response, and the

creativity measure involves no ambiguity and no incorrect response.

The creators of the MFF have restricted the context and generalization of reflection/impulsivity to problem-solving situations that contain response uncertainty (Kagan, & Messer, 1975). If the reflective/impulsive dimension cannot be generalized to other cognitive tasks then it loses much of its attraction as an index of cognitive style. Kogan (1976) suggests that if a child's latency on MFF or similar measures is a reflection of general response tempo and not just specific information-processing, then the latencies should correlate with latencies obtained from other tasks which do not manifest response-uncertainty features. Other researchers feel that the tempo dimension is related to the cognitive developmental level of children and the particular demands of the task at hand (Haskins & McKinney, 1976). Haskins and McKinney state, "Therefore, if a child's tempo of responding is related to his [or her] strategy for processing information at a given developmental level, then response latency on the MFF may not correlate with latency measures on other tasks....because different skills or strategies are required" (p. 695).

Several studies suggest a correlation between MFF error scores and IQ test scores (Block, Block, & Harrington, 1974; Kogan, 1976). Block, et. al. in a study with preschool children found a significant negative correlation with MFF errors and intelligence scores on the WPSI (Wechsler

Preschool and Primary Scale of Intelligence). Achenbach and Weisz (1975) contend that mental age is the best indicator of cognitive developmental level. They argue that because there is a rapid change of developmental age during the preschool period that mental age should be a control variable when analyzing MFF. Kogan (1976) feels that when using a sample with an age span of 2 years or more for study, then one should statistically account for developmental level or divide the groups into younger and older subgroups to provide an effective control for developmental level (see Footnote 1).

Wallach and Kogan (1965) described reflective individuals as having cognitive caution and unwilling to risk error by deviating from conventional modes of response. Thus reflective individuals were predicted to be low in creativity by Ward (1968). Ward predicted that "creativity might well entail minimal censoring or evaluation of potential responses before they are made public, leading to relatively quick responding" (p. 740). It was the impulsive individual with a quick, noncensoring response style, which Ward anticipated would give more creative responses. However, while using a Wallach and Kogan type measure for creativity and the Haptic-Visual Matching test (HVM), Ward was unsuccessful at finding high and low creative children significantly different on errors and response latencies and he thus concluded that creativity and reflection-impulsivity are unrelated dimensions.

Fuqua, Barsch and Phye (1975) however, while investigating preschool children, not only found differences in creativity along the reflective/impulsive dimension, but found it in the direction opposite from Ward's prediction. These authors found that reflective subjects evidenced more creativity as measured by the Picture Completion subtest of the Torrance Test of Creative Thinking (TTCT). It is noteworthy that this study utilized the Picture Completion subtest (which asks for one response per stimulus) rather than ideational fluency tasks which require multiple responses per stimulus item. In the cases which used the latter methodology (Rosenfield, et. al, 1977; Ward, 1968), no differences were found. It may be that the type of creativity task is critical to whether differences exist as a function of reflective/impulsivity. Specifically, conceptual tempo may generalize only to tasks which ask for a single response per stimulus item.

In all of the aforementioned studies which investigated the relationship between conceptual tempo and creativity, two other issues are relevant. Those that did look at young children (e.g., Fuqua, et. al., 1975; Ward, 1968) did not use measures of conceptual tempo or measures of ideational fluency designed specifically for preschoolers. There is some indication in the literature that their instruments may not be appropriate (i.e., reliable or valid) at the younger age levels. The need for age appropriate measures is critical. Additionally none of these studies utilized all

four quadrants of the latency/error splits on the conceptual tempo measure or considered these to be continuous variables as recommended by Ault, Mitchell, and Hartmann (1976). With consideration of only the fast inaccurate and slow accurate groupings much information is lost. Moreover, and more importantly, one assumes that speed and accuracy reflect only cognitive styles related to the vague descriptions of "reflective" or "impulsive", without consideration of related stylistic variations. Although these two groups may lend themselves to easy descriptions, if slow responding is indicative of cautiousness or anxiety in the reflective group, what does it represent in the slow inaccurate group (especially in relation to fast inaccurates)? If latencies and accuracy depict a cognitive style related to how a child approaches the task, it appears quite likely that the child's perception of the task is very important, especially related to the demands for cautiousness, accuracy or speed. Consideration of all four quadrants lends itself much more readily to investigation of cognitive stylistic variations in this context.

Finally, we must recognize that ideational fluency measures, especially those obtained in preschool children are not synonymous with creativity, but are indicative of creative potential. Creativity involves more than simply the generation of a number of responses, although ideational fluency certainly appears to be a critical component of that process. A variety of cognitive, personality and contextual

variables are involved. Where conceptual tempo fits into this complex picture has not been adequately researched. How stylistic variations (of which the conceptual tempo reflective/impulsive dimension is but one example) contribute to other aspects of the creative process at varying stages of development is an important area still open for research.

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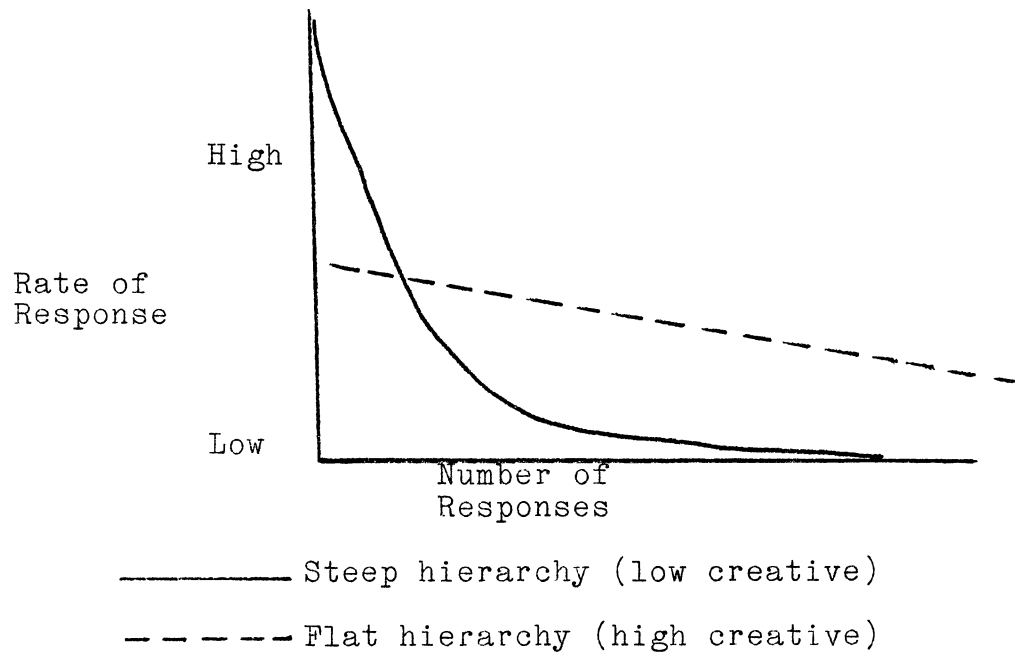
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Footnotes

¹The present study did not control for developmental age change since the age span was not much over 2 years. Also there was no difference between the mean age of reflectives (57.67) and the mean age of impulsives (56.79).

Figure 1

Mednick's hierarchy of response

APPENDIX B

DESCRIPTION OF INSTRUMENTS

DESCRIPTION OF INSTRUMENTS

Ideational Fluency

The MSFM (Moran et. al., 1983) uses three tasks from the Wallach and Kogan model to index ideational fluency : Instances, Pattern Meanings, and Unusual Uses. For each task the subject is first provided an example item than asked to name all the things that they can think of to fit the particular task. (see pp. 42-46 for test instructions) The reliability and validity of the MSFM has been established as well as scoring protocols and normative data from research with over 120 preschool children (Godwin, 1985). Validity of the MSFM as a cognitive style distinct from intelligence was evidenced by Moran, Milgram, Sawyers and Fu (1983) with correlation between original and popular scores with intelligence being .22 (NS). The MSFM appears to remain relatively stable, $r = .54$, $p < .01$ between the ages of four and seven (Moore & Sawyers, 1984). The intertask reliability for the MSFM tasks runs greatest between round and red, $r = .65$, $p < .05$, and lowest between boat and foot, $r = .24$. Scoring of the MSFM was accomplished by joint consensus of the three testers on the response scores given in the scoring protocol (Godwin, 1984).

Creativity Research Group

General Instruction for the Examiner

Please bear in mind the following general guidelines:

- (1) The establishment of the proper atmosphere for testing and rapport between examiners and subjects is a critical factor in this study. Examiner behavior can significantly affect the research results. Examiners must behave in a friendly manner, create a pleasant atmosphere, and refrain from any behavior which creates the impression of school-type testing and evaluation. The very words and actions of the examiner are critical.
- (2) Examiners are requested to arrive early and to make a special effort by means of informal talk to establish rapport. It is imperative not to express anger or impatience at any time. It is important to maintain a pleasant tone in your speech at all times.
- (3) Since testing procedures are untimed, each subject will finish at a different time. Allow children enough time to do this task. Do not overschedule.
- (4a) The examiner must bear in mind the importance of establishing trust, a pleasant atmosphere, and the desire to participate. The warm-up game is designed to help achieve these goals. The examiner should maintain as natural a manner as possible while at the same time stimulating the child's interest in the games and encouraging him to think and to make the maximum effort to give as many responses as possible.
- (4b) The examiner should exchange names with the subject, record the name, and continue to call the subject by his first name during the testing session. The child was asked his first name so that the examiner can use it in establishing a more relaxed and friendly atmosphere.
- (4c) The examiner says:
Today we are going to play some games. They are a new kind of game which you have probably not played before. We will play several different games. These are thinking and imagination games. You don't have to hurry. We can play for as long as you want.

- (4d) Refer to specific task instructions for detailed instructions on tasks and answer sheets. Examiner records child's answers verbatim on the form provided. If you do not have enough room use the other side of the answer sheet.
- (4e) At the end of the test session the examiner should say to the subject, "THAT WAS THE LAST GAME FOR TODAY. THANK YOU FOR YOUR COOPERATION, YOU WERE A BIG HELP. YOU DID VERY WELL. I'LL SEE YOU AGAIN AND PLAY SOME MORE GAMES LIKE THESE.
- (5) The examiner is to answer the subject's questions in the following manner:
- (a) Procedural questions are to be answered by repeating the instructions or explaining in synonymous terms.
 - (b) Questions designed to elicit help from the examiner are answered by saying "WHATEVER YOU THINK" or "DO WHAT YOU THINK IS BEST."
 - (c) Children may ask "IS THAT RIGHT?" Respond by saying: "THERE ARE NO RIGHT OR WRONG ANSWERS, WHATEVER YOU THINK IS FINE."
- (6) It is important to remember that we are guests within the school and have been allowed the privilege of testing the children. We need to remain courteous at all times. Confidentiality of data must be respected. Also children may refuse to be tested or decide to quit in the middle of a test session. If this occurs use "gentle coersion" to try to persuade the child to stay but if the child will not, discontinue testing for that day and try later in the week.
- (7) Be sure to record any irregularities in testing, such as discontinuance, which might occur before, during, or after testing on the form provided for general comments.
- (8) In Session I we will be using the following tasks:
- 1. Instances
 - 2. Patterns
- In Session II the tasks will be;
- 1. Uses
 - 2. KRISP

Instances Task Instructions

"Now we're going to play a game called 'all the things you can think of'. I might say, 'Tell me things that hurt' and I would like you to tell me as many things as you can think of that hurt. Let's try it. Please tell me all the things you can think of that hurt." (Let the child try to generate responses.) Then reply with, "Yes, that's fine. Some other things that hurt are falling down, getting slapped, fire, getting bruised, a knife, and probably there are a lot of other things too." (The examiner should vary answers so as to give all of these which the child did not give.) Then proceed by saying, "You see that there are all kinds of different answers in this game. Do you know how to play?" (If the child indicates understanding of the game proceed with test items. If the child is still not understanding, terminate test sessions.) The examiner should then say, "Now remember, I will name something and you are suppose to name as many things as you can. Take as long as you want. OK, let's try another" (No help should be given to the child when test items are being used)

(1) Name all the things you can think of that are ROUND.

(2) Name all the things you can think of that are RED.

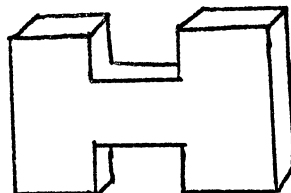
When child stops responding ask "What else can you think of" or "Tell me some more things you can think of" until the child indicates he or she has no more responses.

Three-Dimensional Patterns Instructions

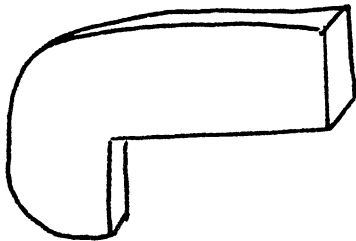
"In this game I'm going to show you some blocks. After looking at each one I want you to tell me all of the things you think each block could be. Here is an example - you can turn it any way you'd like to." (Give the example block to the child) "What could this be?" (Let the child respond) "Yes, those are fine. Some other things I was thinking of were a bridge, a bed, a building block, a chair, and there are probably a lot of other things too. " The examiner should vary answers as to give different ones than the child. If the child indicates an understanding of the game, proceed with the other two stimuli.

Drawings of Three-Dimensional Stimuli

Example:"



Stimuli:



"Hammer"



"Half"

Uses Task Instructions

"Now today we have a game called 'What can you use it for?' The first thing we're going to play with will be a pencil" (Examiner hands pencil to child) "I want you to tell me all the things you can think of that you can DO with a pencil, or PLAY with it, or MAKE with it. What can you use a pencil for?" (Let the child try to generate some responses.) Then reply with "Yes, that's fine. Some other things you could use a pencil for are as a flagpole, to dig in the dirt, or you could use a pencil as a mast in a toy boat. Probably there are a lot of other things too. (The examiner should vary answers so as to give all of these which the child did not give.) Then proceed by saying, "You see that there are all different answers to this game. Do you know how to play?" If the child indicates understanding of the game proceed with test items. If the child does not understand, repeat procedure from beginning. If child still does not understand, terminate. The examiner should then say: "Now remember I will name something and you are supposed to tell as many uses for it as you can think of. Take as long as you want. Let's try this one." NO help should be given to the child on the test items.

(1) What can you use a BOX for?

(2) What can you use PAPER for?

Problems may arise when children ask additional questions. For example, if the child asks, "What size box?" the examiner should reply with a very neutral answer such a "whatever size you think of." All clarifications of the test questions should be non-committal type.

When the child stops responding ask "What else can you think of?" or "Tell me some more things you can think of.", until child indicates he or she has no more responses.

Conceptual Tempo

Form A of the KRISP (Wright, 1971) was administered and scored according to instructions given for this measure. This matching to standard test was administered after all of the ideational fluency measures were given because it required a more stringent solution and thus different cognitive skills than the creativity measures. We also believed that the verbal praise for correct responses that are given in the KRISP necessitated administering the test last in the testing sessions, since the ideational fluency measures require no verbal praise of response to be given.

The response latency and number of errors have been normed for preschool age children for over 1000 children by Wright (1971). The validity of the conceptual tempo construct with the KRISP has not been established. On a test-retest of the KRISP with 495 subjects there was a significant increase in latency $F(1,487) = 9.52; p < .002$ and a significant decrease in errors $F(1,487) = 71.91; p < .001$ and the correlation between the two test sessions was .58 for latencies and .75 for errors. The normative data for the KRISP with the same age as our subjects include correlation between latency and errors as $-.28, p < .001$, mean latency = 4.89, and mean errors = 5.31.

INSTRUCTIONS AND PROCEDURE FOR E

Bring child to room and seat him comfortably across the table from E. Say: NOW WE HAVE A DIFFERENT GAME TO PLAY. HERE'S HOW WE PLAY THE GAME.

Practice Items

Open book to first practice item, P-1 (circles). Say: DO YOU SEE THIS PICTURE AT THE TOP? (point and make sure the child is looking at standard.) Continue: CAN YOU FIND THE ONE PICTURE DOWN HERE (indicate entire array on lower page) THAT LOOKS JUST LIKE THIS ONE UP HERE? (Point to standard again.)

If the child points to the correct alternative, say: VERY GOOD. LET'S DO THAT EVERY TIME. ALWAYS POINT TO THE ONE DOWN HERE THAT IS JUST EXACTLY LIKE THE ONE UP HERE. (Turn to blank page.)

If the child points to an incorrect alternative, say: NO, THAT'S NOT EXACTLY THE SAME AS THE ONE UP HERE, BECAUSE (point to and describe the discrepancy ad lib). NOW POINT TO THE ONE THAT IS EXACTLY LIKE THIS ONE UP HERE.

Proceed as follows on items P-2 and P-3 (ice cream cone and silverware): While the blank page between items is showing, say: O.K., WHEN I TURN THE PAGE, POINT TO THE PICTURE DOWN HERE (indicate) THAT IS EXACTLY THE SAME AS THE ONE YOU WILL SEE UP HERE (point).
READY?

Turn the page and ask: WHICH ONE DOWN HERE IS JUST LIKE THIS ONE? CAN YOU POT TO IT THE FIRST TIME? Reinforce right responses and correct wrong responses just as on item P-1 above.

On items P-4 and P-5 (hats and umbrellas) while the preceding blank page is still displayed, say (instead of the above): REMEMBER, ONLY ONE IS EXACTLY THE SAME. ALWAYS TRY TO FIND IT THE FIRST TIME. ARE YOU READY? Turn the page, but say nothing until the child makes his first response. Reinforce right responses and correct wrong responses just as on the preceding three items.

Test Items

Beginning with the first test item, say nothing during display of the preceding blank page, except: O.K., READY FOR THE NEXT ONE?

Then turn the page, and start the timer.

Whenever the child is correct, give brief and varied social reinforcement, but without reminders or instructions. If the child is incorrect, do not point out the discrepancy. Instead, point to the standard and say: NO, LOOK UP HERE. CAN YOU FIND THE ONE THAT IS EXACTLY LIKE THIS ONE UP HERE?

Record time to first response, regardless of whether or not it is correct. If a second erroneous choice is made, do the above instructions again. But if the third choice is still wrong, turn the page and say: O.K., LET'S GO ON TO THE NEXT ONE. REMEMBER, ONLY ONE IS EXACTLY THE SAME AS THE ONE UP HERE. CAN YOU FIND IT THE FIRST TIME?

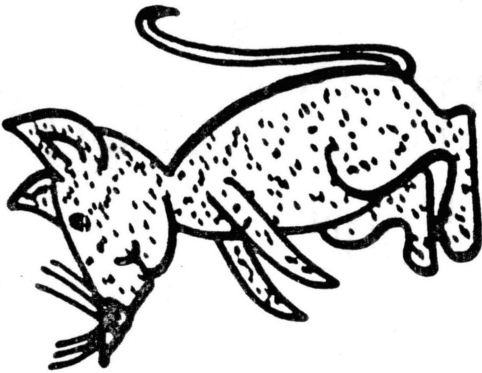
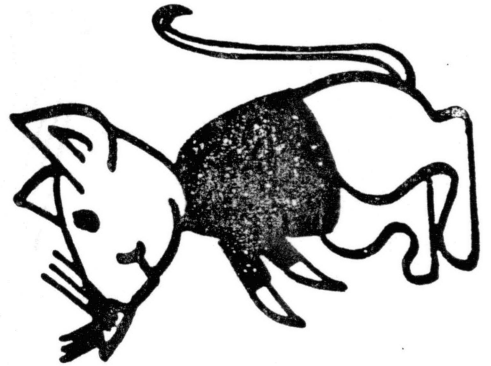
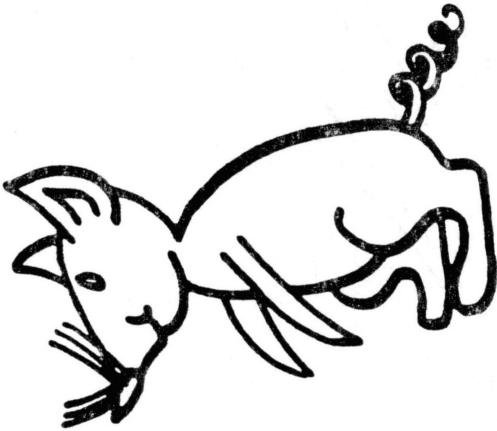
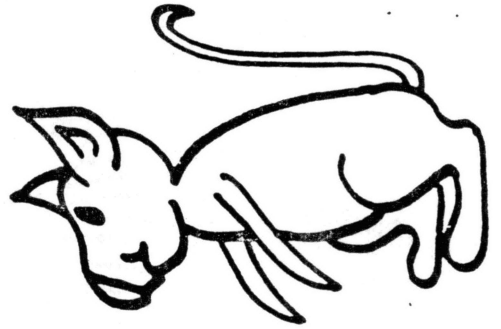
Always turn the page immediately after a correct response (or the third error on the same page) and immediately record all choices,

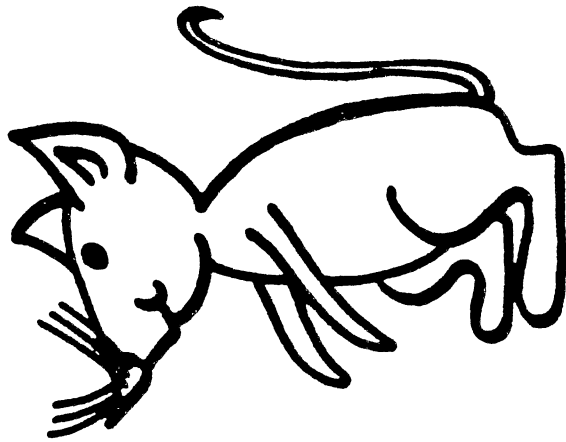
right or wrong on the scoring sheet. Also record time to first response and reset the timer.

Prompts

Certain standard prompts are to be used in the event that the child says or does certain things indicating that he is having difficulty. These prompts are to be used whenever the specified occasion arises, whether on practice or on test items.

1. Child says: "None of them match," or equivalent.
E replies: YES, THERE IS ONE THAT IS EXACTLY THE SAME.
KEEP LOOKING AND SEE IF YOU CAN FIND IT.
2. Child says: "All of them are the same," or equivalent.
E replies: NO, SOME OF THEM ARE DIFFERENT. (Pause) ONLY ONE IS EXACTLY THE SAME. CAN YOU FIND IT?
3. Child says: "I don't know," or equivalent.
E replies: KEEP LOOKING. TRY TO FIND THE ONE THAT'S THE SAME AS THE ONE ON TOP.
4. Child points to one and says, "That's not it," or equivalent.
E must restart the clock immediately if it has been stopped, and say: JUST POINT TO THE ONE THAT IS EXACTLY THE SAME. TRY TO FIND IT THE FIRST TIME.
5. Child points rapidly to more than one alternative.
E must stop clock and interrupt to ask: WHICH ONE DID YOU POINT TO FIRST? JUST POINT TO THE ONE THAT IS THE SAME, BUT DON'T POINT TO THE OTHERS.





SCORING SHEET KRISP FORM A

Number _____

Subject _____ Date of birth _____ Date _____

Experimenter _____ Reliability _____ Sex _____

Stimulus	Correct Answer Seen by E	Response Time	Number of Errors	Comments
P-1 Circle	X 1			
P-2 Ice Cream	X 1			
P-3 Silverware	X 2 1			
P-4 Hat	X ³ 1			
P-5 Umbrella	4 X 2 1			
A-1 Ball	4 X 2 1			
A-2 Candle	X 3 2 1			
A-3 Coat	4 3 X 1			
A-4 Pail	5 4 2 X 1			
A-5 Wagon	5 4 2 3 X			
A-6 Pan	4 3 2 X			
A-7 Kite	5 3 X 2 1			
A-8 Truck	6 X 4 3 2 1			
A-9 Mouse	6 5 4 X 2 1			
A-10 Kitten	5 4 2 3 X			

Procedure for administration of
the two instruments

Testing continued over a five week period with each subject tested individually for two sessions in a private room separate from the other children and relatively free from external stimuli. Each session was executed in approximately 10-15 minutes per child. In session one, instances and pattern meanings measures were given; and in the second session the alternate uses and the KRISP measures were administered. The two testing sessions were approximately two weeks apart for each child with no time limits for responding during the session. There were three trained examiners conducting the research with different examiners testing each individual child for the first and second session. All ideational fluency measures were tape recorded in order to record the time to first response and overall time in task. The timing of the KRISP was recorded by means of a stopwatch. To ensure confidentiality, the children's names were not attached to the answer forms or the tapes.

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APPENDIX C

RAW DATA

RAW DATA

Variable Code Labels

V1 Subject number
V2 Gender (1 = male, 2 = female)
V3 Session 1 (1,2,3 = examiner 1,2,3)
V4 Session 2 (1,2,3 = examiner 1,2,3)
V5 Age in months

MSFM SCORES:

V6 Total original - first half
V7 Total popular - first half
V8 Total original - second half
V9 Total popular - second half
V10 Total original
V11 Total popular
V12 Total frequencies
V13 Original Red
V14 Popular Red
V15 Original Round
V16 Popular Round
V17 Original Half
V18 Popular Half
V19 Original Hammer
V20 Popular Hammer

V21 Original Paper

V22 Popular Paper

V23 Original Box

V24 Popular Box

KRISP SCORES:

V25 KRISP Errors

V26 KRISP Mean Latency*

V27 Reflective-Impulsive Quadrant (11=fast/accurate
[impulsive], 12=slow/inaccurate, 21=fast/
accurate, 22=slow accurate [reflective])

MSFM TIME MEASUREMENTS:

V28 Time to First Response in MSFM*

V29 Time to Second Response in MSFM*

V30 Total Time in MSFM*

* Time recorded in seconds

Raw Data

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18
101	1	3	2	58	01	13	11	07	12	20	32	05	04	02	03	01	03	
102	1	3	2	66	06	09	11	05	17	14	31	04	00	04	03	02	02	
103	1	3	1	57	01	08	03	02	04	10	14	01	01	00	01	00	02	
104	1	3	1	60	09	13	12	10	21	23	44	06	05	06	06	01	03	
105	1	2	1	61	00	07	03	03	03	10	13	00	02	00	01	02	01	
106	1	3	1	60	06	06	04	07	10	13	23	02	01	03	03	01	02	
107	1	3	1	62	02	07	03	08	05	15	20	01	03	02	01	01	02	
108	1	3	1	63	03	15	09	12	12	27	39	02	06	01	04	01	04	
111	2	2	1	59	07	04	05	05	12	09	21	04	00	01	03	03	02	
112	2	3	3	58	05	04	05	05	10	09	19	03	00	03	02	02	01	
113	2	2	1	55	07	10	13	05	20	15	35	11	04	02	02	02	01	
114	2	1	2	59	01	08	04	03	05	11	16	00	01	03	01	01	03	
115	2	2	1	56	07	09	06	07	13	16	29	04	04	05	03	02	03	
116	2	2	3	62	01	09	04	10	05	19	24	02	03	01	02	00	05	
117	2	2	3	62	06	05	05	09	11	14	25	02	03	02	02	01	02	

	V1	V19	V20	V21	V22	V23	V24	V25	V26	v27	v28	v29	v30
101	01	03	02	03	01	04	04	3.18	11	5.52	6.62	55.19	
102	04	01	01	02	02	06	02	5.94	22	4.20	9.15	62.17	
103	01	01	02	03	00	01	03	4.14	21	4.66	18.58	27.14	
104	05	01	03	03	00	05	01	9.12	22	4.98	6.98	85.48	
105	01	01	00	02	00	03	05	5.24	11	2.52	8.14	27.38	
106	02	04	00	02	02	01	02	4.92	21	4.97	10.46	39.54	
107	01	04	00	02	00	03	04	5.55	12	6.52	9.73	38.54	
108	01	03	07	04	00	06	06	3.18	11	5.11	4.37	54.79	
111	01	01	00	02	01	01	05	4.18	11	2.71	15.82	71.81	
112	00	02	01	03	01	01	02	5.29	21	4.84	6.24	27.95	
113	03	01	02	02	00	05	03	6.41	22	5.48	8.83	78.45	
114	01	03	00	01	00	02	05	3.30	11	3.74	8.53	29.56	
115	01	03	00	03	01	00	03	4.83	21				
116	00	04	00	03	02	02	01	5.90	22	2.03	9.29	57.74	
117	02	02	01	02	03	03	03	3.01	21	4.72	14.50	70.18	

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18
203	1	1	3	48	04	05	02	03	06	08	14	03	01	00	03	01	00	
204	1	3	3	51	06	08	10	03	16	11	27	02	02	04	02	03	02	
206	1	3	1	52	06	08	05	06	11	14	25	08	07	00	01	00	02	
209	1	3	3	47	06	04	03	08	09	12	21	01	00	01	01	04	05	
210	2	1	3	50	01	09	03	07	04	16	20	01	07	01	03	00	03	
211	2	2	1	50	06	07	09	04	15	11	26	02	00	04	01	05	03	
213	2	3	3	47	04	11	07	07	11	17	29	00	04	04	01	02	02	
214	2	3	1	49	06	18	15	11	21	29	50	06	09	05	03	02	03	
215	2	1	2	43	10	05	09	06	19	11	30	02	01	04	02	09	01	
216	2	3	3	45	05	06	09	01	14	07	21	10	03	00	01	03	02	
217	2	2	3	52	06	10	08	05	14	15	29	02	03	00	03	06	02	
218	2	3	2	45	18	06	16	09	34	15	49	06	03	11	03	03	01	

	V1	V19	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30
203	01	00	00	02	01	02	08	4.02	11	6.03	7.60	30.06	
204	04	01	01	03	02	01	06	4.53	11	5.65	9.27	36.89	
206	01	00	00	01	02	03	07	5.89	12	6.57	12.50	50.41	
209	03	01	00	03	00	02	03	5.45	22	9.09	5.33	32.29	
210	01	02	01	01	00	00	02	4.38	21	4.31	15.76	78.79	
211	03	02	01	02	00	03	00	7.91	22	6.22	13.15	91.76	
213	03	03	01	03	01	05	03	7.13	22	4.29	11.46	71.59	
214	03	02	01	11	04	01	10	5.77	12	3.07	5.70	72.50	
215	03	02	00	04	01	01	05	3.96	11	14.05	21.89	78.63	
216	01	01	00	00	00	00	04	3.97	11	14.67	9.47	49.27	
217	06	03	00	03	00	01	03	5.51	22	3.67	8.22	100.81	
218	03	01	06	04	05	03	04	9.43	12	10.98	3.21	122.54	

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18
301	1	3	1	72	12	27	19	19	31	46	77	03	01	08	01	03	06	
302	1	2	1	61	27	16	38	06	65	22	87	17	04	20	00	08	03	
303	1	2	1	65	07	12	12	07	19	19	38	01	02	02	04	03	03	
304	1	2	1	66	04	05	04	04	08	09	17	04	00	02	00	02	00	
305	1	1	2	64	02	12	11	03	13	15	28	02	01	03	02	02	03	
306	1	1	2	63	04	09	10	05	14	14	28	04	03	04	03	01	03	
307	1	2	3	61	05	09	09	05	14	14	28	01	01	02	02	06	03	
308	1	1	2	68	02	04	02	06	04	10	14	02	00	00	02	01	02	
309	1	3	3	68	16	10	21	06	37	16	53	06	03	10	03	05	02	
310	1	1	2	65	00	03	00	01	00	04	04	00	00	00	01	00	00	
311	1	1	2	70	06	12	10	06	16	18	34	06	03	02	04	03	04	
312	2	2	1	64	02	09	06	07	08	16	24	01	03	00	04	03	03	
313	2	1	2	67	06	14	15	06	21	20	41	02	02	02	04	05	04	
314	2	1	3	60	04	06	03	06	07	12	19	03	00	00	02	01	04	
315	2	2	1	64	11	11	16	08	27	19	46	08	03	04	04	03	05	
316	2	2	2	66	11	16	17	08	28	24	52	11	04	06	03	08	04	
317	2	3	1	64	08	10	13	04	21	14	35	10	01	05	01	05	03	
318	2	1	2	61	00	08	02	04	02	12	14	00	01	01	01	00	01	

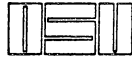
	V1	V19	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30
301	04	02	09	19	04	17	02	4.98	21	5.12	10.47	195.20	
302	10	02	05	08	05	05	06	5.98	12	3.78	10.88	191.34	
303	04	05	04	04	05	01	00	4.01	21	4.34	8.75	90.17	
304	00	03	00	01	00	05	03	6.06	22	5.40	13.20	30.07	
305	03	03	01	02	02	04	02	5.33	22	12.57	11.25	73.30	
306	03	03	01	01	02	01	02	8.94	22	5.08	23.95	76.29	
307	02	02	01	03	02	03	07	8.71	12	10.94	16.38	88.61	
308	01	02	00	02	00	02	00	7.85	22	4.72	13.27	27.64	
309	08	04	05	01	03	03	03	4.80	21	7.68	14.98	135.87	
310	00	02	00	01	00	00	08	2.06	11	2.64		7.99	
311	02	03	02	02	01	02	05	4.93	11	4.23	9.13	83.95	
312	02	02	01	02	01	02	02	5.79	22	4.14	6.86	39.38	
313	08	02	02	06	02	02	01	6.18	22	4.62	14.80	103.37	
314	01	01	01	02	01	03	01	6.48	22	7.03	8.01	35.19	
315	06	03	03	01	03	03	03	4.39	21	5.89	9.19	117.93	
316	02	05	01	04	00	04	04	2.76	11	4.82	10.77	123.05	
317	00	04	01	03	00	02	04	5.43	12				
318	01	03	00	03	00	03	00	6.24	22	9.56	13.20	40.49	

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18
401	1	3	2	57	02	06	04	03	06	09	15	01	03	01	01	03	02	
402	1	2	1	58	15	13	17	10	32	23	55	21	03	00	04	03	03	
403	1	2	3	47	12	09	11	08	23	17	40	09	04	08	05	01	02	
405	1	3	3	44	11	07	08	10	19	17	36	06	01	03	05	03	02	
406	1	1	3	47	00	05	02	03	02	08	10	00	01	00	02	00	01	
407	1	1	2	50	05	06	09	03	14	09	23	03	02	03	01	01	01	
408	1	3	1	56	04	06	08	02	12	08	20	03	02	03	01	02	01	
409	1	3	1	47	17	15	28	04	45	19	64	09	03	03	03	04	03	
410	2	2	2	58	10	17	16	12	26	29	55	02	03	07	06	02	02	
412	2	2	3	49	15	12	13	15	28	27	55	13	09	10	01	04	03	
413	2	3	3	54	05	08	08	07	13	15	28	04	03	02	04	05	02	
414	2	1	3	47	05	07	07	04	12	11	23	01	00	00	01	00	03	
415	2	1	2	53	06	08	11	04	17	12	29	04	00	03	04	04	02	
416	2	1	2	48	15	11	16	07	31	18	49	07	02	08	05	04	02	
417	2	2	1	57	12	06	13	07	25	13	38	07	06	02	02	06	01	
418	2	2	2	57	07	08	11	06	18	14	32	04	01	01	02	06	02	

	V1	V19	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30
401	01	02	00	01	00	00	04	3.43	11	2.41	5.24	16.85	
402	03	03	02	05	03	05	03	6.17	22	2.47	10.04	156.73	
403	02	03	02	00	01	03	08	6.24	12	5.92	12.75	113.09	
405	05	02	01	02	01	05	04	7.68	12	6.49	13.16	115.98	
406	01	01	01	01	00	02	03	6.66	22	15.82	23.73	33.43	
407	03	02	02	03	02	00	02	6.99	22	5.11	15.86	120.89	
408	03	02	00	01	01	01	09	4.33	11	6.49	8.91	26.46	
409	03	01	21	04	05	05	07	5.39	12	3.82	8.26	125.28	
410	08	05	06	02	01	10	02	2.81	21	6.38	8.90	152.06	
412	01	02	00	08	00	04	03	3.47	21	3.37	8.28	134.50	
413	02	01	00	03	00	02	05	3.83	11				
414	05	04	03	01	03	02	02	4.37	22	5.33	9.32	38.50	
415	03	03	00	01	03	02	04	5.56	12	3.38	6.37	44.17	
416	06	02	02	04	04	03	03	3.87	21	6.23	21.18	176.70	
417	04	01	02	03	04	00	02	4.88	21	5.39	5.31	40.91	
418	07	04	00	03	00	02	02	7.42	22	4.76	14.58	92.41	

APPENDIX D

PARENT LETTER



Oklahoma State University

DEPARTMENT OF FAMILY RELATIONS
AND CHILD DEVELOPMENT

STILLWATER, OKLAHOMA 74078
241 HOME ECONOMICS WEST
(405) 624-5057

February 24, 1986

Dear Parent,

We are preparing a research project on creativity sponsored by the Department of Family Relations and Child Development at OSU. This project will help us understand the development of creative thought. We would like to have your cooperation in permitting your child to participate in the project. Your child will be asked to respond to several standardized questions in a "pressure-free" setting. Since we are interested in the child's thought processes, there are no right, wrong or expected answers to the questions.

Each child will be seen individually by a researcher for a 15-minute session. In these sessions, measures of creativity and other cognitive tasks will be administered. Our experience has been that most children very much enjoy participating in research of this kind (the activities are similar to those already in the child's classroom or home). Your child's name will not be attached to the answer forms to ensure confidentiality.

We respect the right of the parent and of the child to withdraw from the research project at any time. No child will be forced to participate if he or she does not want to. As previously mentioned, however, we do not foresee any physical, emotional, or social risks to you or the child which might result from participation. We will be more than happy to share our results with you upon completion of the research.

We are assuming that, after you have read this information, we have your consent and can use your child in our research project. If you do not want your child to participate, or have any questions about the research, please contact the researchers through the Department of Family Relations and Child Development (624-5057). Thank you for your cooperation.

Respectfully,

Dr. Jim Moran, Project Director

jj



VITA

Gayle C. Broberg

Candidate for the Degree of

Master of Science

Thesis: CREATIVE POTENTIAL AND CONCEPTUAL TEMPO IN PRE-SCHOOL CHILDREN

Major Field: Family Relations and Child Development

Biographical:

Personal Data: Born in Lafayette, Indiana, December 1, 1948, the daughter of Harold T. and Alice S. Christensen. Married to John P. Broberg on July 10, 1970.

Education: Graduated from West Lafayette High School, West Lafayette, Indiana, in May, 1966; received Bachelor of Science Degree from Brigham Young University in May, 1970; completed requirements for the Master of Science degree at Oklahoma State University in December, 1986.

Professional Experience: Teacher, Provo School District Provo, Utah, 8/70 - 1/71; teaching and research assistant, Department of Family Relations and Child Development, Oklahoma State University, 8/85- 5/86.