IDEATIONAL FLUENCY IN PARAGUAYAN PRESCHOOL CHILDREN

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This article is based on the Master's thesis research of the author conducted under the direction of James D. Moran III, in partial fulfillment of the requirements for a master's degree in the Department of Family Relations and Child Development, College of Home Economics, Oklahoma State University.

Abstract

This study was conducted to investigate the construct validity of a Spanish version of the Multidimensional Stimulus Fluency Measure (MSFM). The children were tested individually by one examiner using the MSFM. This test consists of three measures: instances, pattern meanings, and uses. Results indicated that all items were somewhat correlated to total score, but the uses task proved to yield nonscorable responses. For the remaining tasks there is a significant order effect, that is, the number of original responses increased in the course of the sequential responding. There is also a strong correlation between quality and quantity. The Paraguayan children gave three to five times as many popular responses, as children in comparable studies in United State and Israel, though the number of original responses were similar. Thus, it is popular responses that seemed to be most affected by cultural or contextual variables in this study.

Ideational Fluency in Paraguayan Preschool Children

Creativity has aroused much interest in the last thirty years with several studies emphasizing the measurement and enhancement of children's creative abilities. In order to assure that the measurement of creativity adequately identifies creative children and fosters the potential creative behavior in all children, it is necessary that this form of measurement be reliable, valid and applicable to a variety of cultural contexts. The opportunity to verify the cross-cultural applicability of the measurement of children's creativity reinforces the theory underlying this measurement and makes it more universal.

Several studies support the formulation that ideational fluency is an essential component in the process of creative or original problem solving. Guilford (1956) distinguished divergent thinking as the ability to generate many appropriate responses to a question. Ideational fluency is a divergent thinking subprocess which refers to the number of responses or total output of ideas offered by a subject for a given item. Mednick (1962) further suggested that the number of associations to a problem is related to the probability of reaching a creative solution. Mednick also postulated that a response hierarchy exists, in which the first responses to a stimulus are generally everyday responses. The popular responses are followed by more creative ones later in the hierarchy.

Wallach & Kogan (1965), working with the same conceptual approach to

creativity as Mednick, emphasized the importance of associative flow and the presence of a playful, permissive task attitude.

Starkweather (1964), believed in the importance of measuring creativity in young children. She suggested that the means of assessing creativity in older children, such as that used by Wallach and Kogan, could not be directly applied to preschoolers. She found that young children need to handle the stimulus materials. Therefore, she developed ten simple three-dimensional styrofoam objects to be used in the Starkweather Original Test (1971).

Moran, Sawyers, Fu, and Milgram (1984) examined the methods and stimulus materials used in the study of creativity in preschool children and adapted Starkweather's materials in the Multidimensional Stimulus Fluency Measure (MSFM). They demonstrated that the Guilford-Mednick conceptualization of original thinking is applicable to preschool children. Quantity of ideational output was related to its originality. A stronger order effect, that is, popular responses occurring earlier and original responses later in the response sequence, was more evidenced for high original subjects rather than for low ones, (Moran, Milgram, Sawyers & Fu, 1983a).

The MSFM has subsequently been the focus of a number of studies interested in the assessment of creative potential among preschoolers. Godwin (1984) demonstrated construct validity of both a six item and a nine item version, based on four criteria: a creativity-intelligence distinction, the correlation of each task to each other and to measures of IQ, the relationship of the quantity of responses and their quality, and the presence of a response hierarchy. On these tasks, however, there was a significant correlation between IQ scores and popular responses whereas the scores for originality provided

measures of ideational fluency and divergent thinking which were more distinct from intelligence.

Moore and Sawyers (in press) report the Multidimensional Stimulus Fluency Measure (MSFM) to be stable (r = .54) from ages 4 to 7. This level of stability was slightly higher than that found for a shortened version of the WPPSI (Wechsler, 1967) measuring IQ during the same time period.

Cross-cultural studies on the creative potential of preschool children have been relatively sparse. Torrance (1968) engaged in a program of international studies focusing on creative development to children from grades one through six in eleven cultures and subcultures. Results suggest cultural differences in intellectual development. Children from Western Samoa and Black children in Georgia functioned on comparatively higher level on the figural measures than on the verbal ones. On the other hand, children from India performed at comparatively higher levels on the verbal tasks than on the figural ones.

Milgram, Moran, Sawyers and Fu (1987) have demonstrated that the MSFM has construct validity among Israeli children. This study showed that Mednick's response hierarchy could be generated among Israeli children in a similar fashion to the children in the United States through replication of the work of Moran, Milgram, Sawyers & Fu (1983). Quantity and originality were strongly related. These findings indicated that the Guilford-Mednick conceptualization of original thinking has validity beyond a given culture.

Expansion of the MSFM to other cultures would appear to be helpful in addressing issues related to the conceptualization of creativity in young children. Milgram et al (1987) have suggested that, to date, studies in preschool children's creativity have largely been restricted to Western societies

such as Unite States and Israel. They suggest the need to expand research to other societies.

The present study investigated the construct validity of the MSFM with Spanish-speaking children in Paraguay, a population that is sufficiently distinct from the American and Israeli samples to warrant replication of these studies. It is expected that the findings of the American and Israeli cultures would be replicated in Paraguay, since the theoretical framework of Mednick (1962) and Guilford (1956), upon which the MSFM is built, is not culture-based.

Method

Subjects

The 40 children participating in this study included 19 males and 21 females. The children were recruited from two preschool which predominantly serve middle class families in Asunción, the capital city of Paraguay. The mayority of the children came from two parent families in which parents had some college education and were typically employed in white collar jobs. The preschool was a half-day program for five days perweek. The children ranged in age from 50 to 70 months, with a mean of 56.93 months and a standard deviation of 4.55.

Instrument

Ideational Fluency. The Multidimensional Stimulus Fluency Measure (Moran, et al, 1983) for ideational fluency was used. This test consists of three measures: instances, pattern meanings, and alternate uses, with six items in total. In the instances task, the stimulus items are things that are red and things that are round. Subjects are asked to name all the items they can think of that have the specific features named. In the pattern meanings task, three-dimensional, various-colored styrofoam shapes are used. The child is asked what the shapes could represent. In the alternate uses task, the child is asked to name all the various uses of box and paper. See Appendix B for a follow description of the instrument.

Each test response was scored as popular or original, that is, given by more or less that 5% of the group, respectively. Separate guides for scoring originality were developed, taking into consideration the statistical frequency of a particular response within the culture.

The task instructions had been translated into Spanish by a Paraguayan native. The accuracy of this translation was checked by having another person translate the instructions from Spanish back to English. Comparisons of the translation are contained in the Appendix C and D.

Procedure

The testing was completed over a five-week period with an interval of two weeks between the two sessions. The examiner for this study visited each child care center at least once before the test sessions began. All testing took place in a room removed from the child's classroom. While every attempt was made to equalize the testing environment, it should be noted that the testing room contained potential visual stimuli such as books, toys and classroom materials. The children were told that they would play games with the examiner and no child was forced to participate.

In the first session, the instances and patterns meaning tasks were given; in the second session, the uses tasks were administered. A copy of the record form is contained in Appendix B.

Scoring of responses

Initial scoring of item, proved somewhat problematic. Responses to the "paper" item on the alternative uses task proved to be unscorable. Interestingly, the uses task had appeared in previous studies to be the most difficult for young children. Busse, Blum & Gutride (1972) dropped the unusual uses task adapted from Torrance (1962) and Ward (1968), after pretesting because it appeared that the children were not relating to it; few of the 40 subjects gave meaningful responses to the items. This had led Moran, Sawyers, Fu & Milgram (1983) to adapt the Wallach and Kogan stimuli to provide preschoolers greater familiarity with the objects named. The MSFM items, thus, had been considered more appropriate for this age. Nonetheless, Godwin (1984) reported this item to also have the lowest scoring reliability. She had proposed a scoring structure which emphasized differences in functional case and often classified responses by category. For example, specific categories could be to "make" an airplane or to "draw" an airplane. These categories generally relied on verbs accompanying nouns for appropriate scoring. Without these verbs, it is extremely difficult to ascertain the functional use. In the various American samples utilizing this instrument, children most typically provided responses which included both verb and noun spontaneously. The Paraguayan children, however, did not[1]. Thus, although the "box" item on the MSFM yielded scorable responses, the "paper" item did not. Based on Godwin's (1984) cautions about utilizing only one item per subtest, it was decided to drop the uses task from the remaining analyses by task, although box would be retained for interitem analysis.

Results

The data were analyzed in the following manner: (a) interitem correlations, (b) Anova testing the order effect, and (c) correlation of quantity of responses to quality, and (d) comparisons to other studies. Each of these will be discussed below.

Intertask and intratask correlations

Computation of the interitem correlations for original responses on the remaining five items (red, round, half, hammer and box) of the MSFM are reported in Table 1. We would expect that significant interitem correlations suggest that these tasks are measuring the same construct: original thinking. The two sets of correlations are of interest: (a) intertask relationships and, (b) single items to overall scores[2]. Results indicated that the correlation of the items half and hammer was statistically significant, $r = .46$, $p < .01$, which is expected, because both are part of the same pattern task. The correlation between items, on the instances task was not as high, $r = .25$, $p < .10$. Additionally the correlation between the items; red ($r = .35$, $p < .05$), half ($r = .36$, $p < .05$), and box ($r = .29$, $p < .05$) were significantly correlated with the adjusted total of responses. The correlations for round ($r = .22$) and hammer ($r = .23$) to total responses only approached statistical significance, $p < .10$. See Table 1.

Insert Table 1 about here

Order effect

Analysis of the order effect was accomplished via separate 2 x 2 Anovas for popular and original scores. Popular and original scores were subjected to separate two-way analyses of variance; order of occurrence (first half vs. second half of one's response sequence) x level of original thinking (high vs low) with the first constituting a repeated measurement. We found one significant order effect, that is, the number of original responses increased, in the course of the sequential responding, F (1,76) = 8.97, $p < .005$. However, we had expected to find more popular responses in the first half and this was not the case, nor was the order effect more pronounced among high creative children. The percentage of original responses given in the first half and the second half of the response sequence was 48.8% and 57.2% respectively. Means and standard deviations of first- half and second-half popular and original scores are presented in Table

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Insert Table 2 about here

Quantity - quality correlation

The relationship between quantity and quality of ideas as hypothesized by Mednick (1962) is usually measured via the relationship of the number of popular to original responses.

The existence of a response hierarchy and this relationship between quantity and quality was reported in several studies using the nine-item form of the MSFM or for a six item version (Godwin 1984; Milgram, et al. 1987; Moran, et al. 1983; Moran, Bomba, Broberg & Freeland, 1987). The correlation in this study was $r = .82$, $p < .001$, indicating a strong quantity - quality relationship.

Comparisons to other studies

The Paraguayan children gave over twice as many responses per item than other studies have reported for children in the United States or Israel. Even more interestingly is the fact that very little difference is evidenced in the number of original responses but the mean number of popular responses is three to five times the number found in other studies. Table 3 reports the relevant data from comparable studies.

Insert Table 3

Discussion

The results of the present study indicate that with modification, the Spanish version of the Multidimensional Stimulus Fluency Measurement (MSFM) can be used, as an appropriate instrument to measure creative potential in preschool children. Some problems do exist, however. The uses task proved to be unscorable and concern regarding only moderate intertask correlations for a few items is evidenced. The existence of a response hierarchy was demonstrated for original responses. However, contrary to expectations, we did not find more popular responses in the first half than in the second half. This partial demonstration of the Mednick's hypothesis, could be the effect of the culture, of the specific examiner, or of the context of the testing. The fact that we do find an order effect for original responses but not for popular responses could also be related to the high number of popular responses generated in this sample.

In this study we found quantity and originality of ideational output were strongly related in Paraguayan preschool children. This correlation compares favorably to the quantity-quality correlations reported by Moran et al (1983) (r = .41), and Milgram et al. (1987), (r = .68).

Although specific cross-cultural comparisons were not the focus of this study, the very obvious difference in the number of popular responses appears to be especially salient and important. The data suggest that in the measurement of creative potential in young children, popular responses are more susceptible to the influence of contextual variables than are original responses.

Additional support for this notion can be found. Popular responses are correlated to IQ, and original responses are not (Milgram et al, 1987; Moran, et al, 1983). Popular responses have also been found to be more related to temperament variables than are original responses (Moran, et al, 1987). Additionally, Torrance (1965) found that rewarding creative behavior increases the quantity but not the quality of responses.

Although the advisability of using original rather than total fluency scores has been argued previously (Moran, Sawyers Fu & Milgram, in press), this study clearly demonstrates that, though correlated, popular and original responses may be evidence of slightly different constructs which are influenced by different factors, including culture. Differences in intelligence or socioeconomic status would not appear to account for large discrepancy in popular responses evidenced in this sample, especially since other studies (Sawyers, Moran & Fu, 1987) report no differences in MSFM responses for Head Start and University Laboratory School. If popular and original responses are, in fact, the result of slightly different constructs then the relationship of these variables within the response hierarchy may be more complex than originally thought.

Why the uses task proved so problematic in this study is still a puzzle. Perhaps the level of abstraction (e.g., what size, shape, and structure of box) may have resulted in difficulties. A study comparing sorting performance of Zambian and Scottish children with actual objects and with pictures representing the object, reported that sorting with real objects yielded no differences between the two cultural groups, while sorting with pictures of objects showed more classificatory ability for Scottish group (Deregowsky & Serpell, 1971). This finding relates to those of Fu, Kelso and Moran (1984)

which demonstrate that with the uses task, as well as patterns task, stimuli presented in three dimensions with visual and haptic exploration generated responses more in line with the theoretical expectations of Guilford and Mednick. It is possible that with the Paraguayan children presentation of actual objects in the uses task would be needed to obtain scorable responses.

Results from the present study suggest the Guilford-Mednick conceptualization of original thinking would generally apply to Paraguay as well as United States and Israel. Thus, the MSFM, if appropriately adapted (i.e., elimination or revision of the unusual uses task), has the potential to serve as a measurement of creative potential in young children in a number of cultural contexts. The data also suggest that generation of popular responses appears to be more susceptible to variations in context (e.g., culture) than is the generation of original responses.

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Footnotes

(1) The original design of this study called for inclusion of a measure of fantasy predisposition, obtained from scoring movement responses to the Holtzman Inkblot Test. This task was the final measure administered in the second session. Since the focus of this task was movement responses, it also required a verb-noun or adjective-noun format to provide an adequate range of scores.

Data from this task were also unusable since only rarely did the Paraguayan children respond in this format. Thus, the fantasy component in the study was dropped prior to scoring the MSFM task. This provides additional confirmation that a stylistic difference in responding exists in the Paraguayan culture that renders administration and scoring of the uses task difficult.

(2) Within these analyses an adjusted overall score was used. The overall score was based on four items with the score from the target variable omitted from the total. This procedure eliminated artificially high correlations due to overlapping scores.

Table 1

Interitem Correlations for Original Responses

	Items				
Items	Round	Half	Hammer	Box	Total [a]
Red	.25*	.21*	.23*	.13	.35**
Round	--	.01	.03	.36*	.22*
Half	--	--	.46***	.30**	.36**
Hammer	--	--	--	.09	.23*
Box	--	--	--	--	.29**

[a] Total in each case omits the target correlated variable from the total.

* $p < .10$

** $p < .05$

*** $p < .01$

Table 2

First-Half and Second-Half Popular and Original Mean Scores and Standard Deviations

	Total N		High Original		Low Original	
	First	Second	First	Second	First	Second
Popular	16.22[a]	16.20	20.95	21.05	11.50	11.35
S.D.	(6.84)	(6.94)	(5.49)	(5.38)	(4.15)	(4.42)
Original	5.63	7.52	8.90	11.45	2.35	3.60
S.D.	(4.39)	(4.82)	(3.80)	(3.41)	(1.57)	1.90)

[a] These mean scores are based on the four items of the patterns and instances tasks.

Table 3

Relevant Cross-cultural Data from Previous Studies

	Culture				
Tasks	Paraguay	US (OK)[a]	US (VA1)[b]	Israel[c]	US (VA2)
Popular	8.11[e]	2.42	1.89	2.63	1.57
Original	3.29	3.13	3.10	2.84	2.37
% Orig.	28.9	57.2	62.1	62.0	60.0
Tasks[f]	P-3D Inst.	P-3D Inst.	P-3D Inst.	P-2D Inst.	P-2D Inst.
Items	4	4	6	6	6

Note. These data were compiled from the raw scores of the following studies:

[a] "Personality correlates of creative potential in preschool children" by J. D. Moran, A. K. Bomba, G. C. Broberg, & S. H. Freeland, 1982, Proceedings of the 52nd Biennial Meeting of the Society for Research in Child Development, 6, 239.

[b] "Stimulus specificity in the measurement of original thinking in preschool children" by J. D. Moran, R. M. Milgram, V. R. Fu & J. K. Sawyers, 1983a, Journal of Psychology, 114, 99-105.

[c] "Original thinking in Israeli children" by R. M. Milgram, J. D. Moran, J. K. Sawyers, & V. R. Fu, 1987, School Psychology International.

[d] "Original thinking in preschool children" by J. D. Moran, R. M. Milgram, J. K. Sawyers, & V. R. Fu, 1983b, Child Development, 54, 921-926.

[e] Popular and original data reflect mean number of responses per item.

[f] All studies included the instances tasks, though some used three items per task (items = 6) whereas others used only two-items per task (Items = 4). Although administered in all cases, the uses task was omitted from this data, due to the problems in scoring in the current study. Some studies utilized three dimensional patterns tasks (P-3D), others included the two dimensional tasks (P-2D). To assist in cross-cultural comparisons, inclusion of these various permutation was needed.

APPENDIX A

LITERATURE REVIEW

Cross-cultural creativity in preschool children

Measuring creativity

Creativity is a multidimensional concept that can be studied within different frameworks. Creative adults and older children, their products and the processes by which they manifest their creativity have excited a good deal of interest and curiosity. However, more research remains to be done about the characteristics of creative young children, and about how creativity is related with their development. Techniques for measuring young children's potential creativity and the opportunity to verify the validity of this measurement beyond a given society are also neglected areas of investigation.

Guilford (1956), one of the pioneers in research of creativity, distinguishes between convergent thinking and divergent thinking. In convergent thinking there is usually one conclusion or answer that is regarded as unique, and thinking is channeled or controlled in the direction of that answer. This factor is more related to intelligence tests. In divergent thinking, on the other hand, there is much searching or going off in various directions. One of the divergent thinking factors is ideational fluency, which refers to the ability to generate a large number of ideas for a given stimulus. A critical factor in ideational fluency is originality which refers to responses that are unique or unusual.

Mednick (1962) defines the creative thinking process as the forming of associative elements into new combinations which either meet specific requirements or are in some way useful. The more mutually remote the

elements of the new combination, the more creative is the process or the solution. Therefore, the originality of a response is simply inversely related to its probability in a given population. Mednick also proposes that the quantity of ideational output is related to its quality, and that a response hierarchy exists such that popular responses appear early in the sequence and original responses later.

Wallach and Kogan (1965), basing their work on the models of Guilford (1956) and Mednick (1962), emphasized the importance of a playful context without time limit. In their extensive research with adult and older children they found that intelligence and creativity are different, and that ideational fluency serves as the best measure of divergent thinking. Using tasks of ideational fluency they also found that various measures were related to each other, thereby demonstrating the construct validity of the measures at these age levels.

Several studies have explored the proposition that the Wallach and Kogan model can be applied to young children. Busse, Blum & Gutride (1972) investigated the effects of different testing conditions with preschool children, showing that most of the creativity measures showed no significant effect due to the test conditions. Ward (1968) suggested that at a clear creativity-intelligence distinction appeared in 7 and 8 years old boys, however, results with kindergarten children were ambiguous.

Williams and Fleming (1969) using ideational fluency measures, appeared to find original thinking to be reliable, consistent, and different from intelligence tests with preschool children.

Starkweather (1964), however, found the method used by Wallach and Kogan

with older children and adults inadequate for young children because these children generally need to handle the materials. Therefore, she developed ten simple shapes which formed the Starkweather Originality Test (1971).

Moran, Milgram, Sayers and Fu (1983), using Stakweather's shapes, conducted a study of two- vs three- dimensional materials to assess stimulus effects on responses in preschool children, and they also found that fluency and the number of original responses increased when the children were given the three-dimensional forms to handle.

Using the adapted tasks of the Wallach and Kogan model with three stimulus items per task, construct validity for these measures was demonstrated in the study of Moran, Milgram, Sawyers & Fu (1983a). Other studies (e.g., Godwin, 1984; Moran, Sawyers, Fu & Milgram, 1984), demonstrated that the MSFM appears to be a psychometrically sound measure of original thinking in preschool children for both nine-item and six-item versions and that the scoring protocols are sufficiently reliable. Moreover, these researchers (e.g., Moran et al, 1983a) found original thinking in preschool children distinguishable from intelligence and the quantity of ideational output was related to its originality.

These studies, emerging from the Guilford-Mednick model, basically demonstrate that ideational fluency can serve as a measure of the creative potential of young children if appropriate adjustment to the need of this age group are made. With the establishment of reliable measures, researchers now need to turn attention to factors underlying the expression of that creation potential.

According to Piaget (1971), the child starts with reflexes which are an extremely limited set of structural universal and in the process of growth and

development, including the interaction with the environment, builds the mind. Therefore, biology and the physical and social environment, represented by sociocultural factors such as education and language are essential in the formation of cognitive processes.

Recently, Sawyers, Moran and Tegano (1987) postulated a model of creativity which attempts to identify factors associated with creative potential in young children. This model suggests that cultural factors play an important role in determining how cognitive, personality and contextual variables influence the expression of creative potential at this age. The model also looks at contextual differences rather than similarities as the central feature, suggesting that behavioral stability is not the critical issue but rather how behavior or relationships change with development and with context.

Cultural factors

The study of creativity in young children is still developing and adding the cross-cultural dimension makes the problem more complex. However, this addition may be well worth it, if a cultural dimension can serve to provide a new perspective and enlarge the field of creativity.

One way that cross-cultural research can be useful is testing psychological measurement based on theories of observations in specific cultures for their applicability under other circumstances.

Following that, the investigator should take a closer examination of the contexts in which behavior variations occur to examine and distinguish cultural factors from the multiple of other possible variations in method, administration

or test environment which can affect the results.

Cultural variation occurs both between and within societies. Holtzman (1979) refers to subcultural variation within every large society, indeed much greater cultural variation can be found within the urban centers of different nations than across nations as a whole.

Cross-cultural studies of creativity

Very few cross-cultural studies on creativity in preschool children exist. This could be the result of the lack of reliable instruments until only recently. Thus we must rely initially on studies with older subjects.

Iscoe and Pierce-Jones (1964) suggest the possibility that white and black children may differ on aspects of divergent thinking ability and that ideational fluency was significant positively correlated with WISC Information, Similarities and Vocabulary subtest scores. Among white children, significant positive correlations ocurred between divergent thinking scores and WISC Information and Vocabulary.

Torrance (1968) was engaged in a program of international studies focusing on creative development to children from grades one through six in eleven cultures and subcultures. Results suggest cultural differences in intellectual development. Children from Western Samoa and black children in Georgia functioned on comparatively higher level on the figural measures than on the verbal ones. Other children from India performed at comparatively higher levels on the verbal tasks than on the figural ones. Milgram, Moran, Sawyers and Fu (1987) demonstrated that the MSFM has construct validity among Israeli

children. This study replicated the work of Moran, et. al. (1983a), showing that using the MSFM, Mednick's response hierarchy can be generated among Israeli children in the similar fashion to the children in the United States.

Methodological considerations

The methodological difficulties involved in cross-cultural studies are varied and complex. Several studies have compared familiar vs unfamiliar materials. Glick (1975) has found that classification abilities were better with familiar materials. The study of Sawyers, Moran, Fu and Milgram (1983) reports results that can also support the view that ideational fluency in young children is influenced by stimulus familiarity.

Although the familiarity of the task must be considered in a cross-cultural research, the mode of representation of materials is also critical. Deregowsky and Serpell (1971), who compared sorting performance of Zambian and Scottish children with objects and with picture representing the object reported that sorting with real objects, yielded no differences between the two cultural groups, while sorting with pictures of objects showed more classificatory ability for the Scottish group.

Conclusion

As evidenced by the literature reviewed, few studies on creativity and culture seem to exist. Possibly, this limitation has been the consequence of the lack of a reliable and valid instrument of creative potential for young children until recently.

The perspective provided by consideration of a peripheral Western culture permits a broaden view of the Guilford-Mednick conceptualization of original thinking.

Careful attention to cultural factors, however, must be made. Thus, as a first step, focus on obtaining reliable measure for the specific culture is needed before moving toward investigation of cultural differences with the appreciation of cultural variances.

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APPENDIX B

DESCRIPTION OF INSTRUMENTS

Description of Instruments

Ideational Fluency

The Multidimensional Stimulus Fluency Measure (Moran, et al., 1983) uses three tasks from the Wallach and Kogan model to index ideational fluency: Instances, Patterns, and Unusual Uses. For each task the subject is first provided an example, then asked to name all the things that they can think of to fit the particular task (see pp. 39-43 for test instructions). Godwin (1984) has established adequate reliability and validity of the MSFM as well as has provided scoring protocols and normative data from research with over 120 preschool children. The alpha coefficients of the original and popular scores were .76 and .55 respectively (Moran, Milgram, Sawyers and Fu, 1983). Construct 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 half and hammer, $r = .24$. Scoring of the MSFM was accomplished by joint consensus of the three testers on the response scores given in the scoring protocol (Godwin, 1984).

General Instructions

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 not timed, each subject will finish at a different time. Allow children enough time to do this task. Do not over schedule.

(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 stimulate the child's interest in the games, and encourage 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 sot 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 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 "What do 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 if 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 coercion" to try to persuade a 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

Ideational fluency

Items Two items will be used on each subtest:

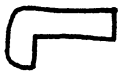
Instances:

Tell me all the things you can think of that are round.

Tell me all the things you can think of that are red.

Patterns:

Tell me all the things that this could be: 

Tell me all the things that this could be: 

Uses:

Tell me all things you could use a box for.

Tell me all the things you could use a paper for.

Instances task instructions

"Now we are going to play a game called 'all the things you can think of it.' 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 think 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 a lot of other things too." The examiner should vary the 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 the test items. If the

child does not understand, repeat the procedure from the beginning. If a child still does not understand, terminate the test session. The examiner should then say, "Now remember, I will name something and you are supposed to name as many things as you can. Take as long as you want. Okay, let's try another." No help should be given to the child when the test items are being used. When the child stops responding, ask, "What else can you think of?" or "tell me more things you can think of" until the child indicates he or she has no more responses.

Patterns Task Instructions

"In this game I am 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 child the sample block. Ask, "What could this be? Let the child respond. Reply, "Yes, those are fine. Some other things I can think of are a bridge, a bed, a building block, a chair, and there are probably a lot of other things too." The experimenter should vary answers so as to give ones different from the child's. If the child indicates an understanding of the game, proceed with the test tasks.

Uses Task Instructions

"Now today we have a game called 'what can you use a box for?'. The first thing we are going to play with will be a pencil." Hand the child a pencil. "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, "Yes, that is fine. Some other things you could use a pencil for are as a flagpole, to dig in the dirt, as a mast of a toy boat. There are probably a lot of other things, too." The experimenter should vary the answers so as to give one which the child did not give. Proceed by saying, "You see that there are all different kinds of answers. Do you know how to play? If the child indicates an understanding of the game, proceed with the test items. If the child does not understand, repeat the procedure from the beginning. If the child still does not understand, terminate the test. The examiner should then state, "Now remember I will name something and you are suppose to tell me 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.

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

When the 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.

CREATIVITY RESEARCH

Session I:

Subject Number _____

Gender M F

Date _____

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 IMAGINING GAMES. YOU DON'T HAVE TO HURRY. WE CAN PLAY AS LONG AS YOU WANT.

Proceed to Task 1.

General Comments:

CREATIVITY RESEARCH

INSTANCES

ANSWER FORM

Subject number:_____

Name all the things you can think of that are ROUND:

Child's Responses:

CREATIVITY RESEARCH

INSTANCES

ANSWER FORM

Subject number:_____

Name all the things that you can think of that are RED:

Child's Responses:

CREATIVITY RESEARCH

PATTERNS

ANSWER FORM

Subject number_____

Name all the things you think this could be: 

Child's Responses:

CREATIVITY RESEARCH

PATTERNS

ANSWER FORM

Subject number_____

Name all the things you think this could be: 

Child's Responses:

CREATIVITY RESEARCH

USES

ANSWER FORM

Subject number_____

What can you use a BOX for ?

Child's Responses:

CREATIVITY RESEARCH

USES

ANSWER FORM

Subject number_____

What can you use a PAPER for ?

Child's Responses:

APPENDIX C

TRANSLATION OF THE DOCUMENTS

Spanish version of the MSFM

Fluidez de ideas

Items Dos items van a ser usados en cada una de las tres subpruebas:

Ejemplos:

Decime todas las cosas que puedas pensar que puedan ser redondas.

Decime todas las cosas que puedas pensar que puedan ser rojas.

Formas (modelos tridimensionales):

Decime todas las cosas que podría ser esto: 

Decime todas las cosas que podría ser esto: 

Usos:

Decime todas las cosas para las que una caja se puede usar.

Decime todas las cosas para las que un papel se puede usar.

Instrucciones para pruebas de ejemplos

"Ahora vamos a jugar un juego llamado 'todas las cosas en que vos podés pensar'. Yo podría decir, 'Decime todas las cosas que pueden lastimar y me gustaría que vos me dijeras todas las cosas que puedas pensar que lastiman'." Deje que el niño genere respuestas. Luego dice, "Sí, está bien. Algunas otras cosas que duelen son caerse, resbalarse, el fuego, hacerse moretones, un cuchillo, y probablemente hay muchas otras cosas también." El examinador variará las respuestas para poder así dar respuestas que el niño no haya dado. Proseguir diciendo, "Vos ves que hay toda clase de diferentes respuestas en este juego. ¿Sabés cómo jugar?" Si el niño indica que entiende el juego, se continúa con los items de la prueba. Si el niño no entiende, repetir el proceso desde el comienzo. El examinador debe decir luego, "Ahora acordate, yo voy a decirte el nombre de una cosa y vos me decís todas las cosas que puedas pensar que eso puede ser. Tenés todo el tiempo que quieras. Está bien, vamos a probar otra." Ninguna ayuda debe darse al niño cuando los items de la prueba son usados. Cuando el niño cesa de responder, hay que preguntarle, "¿En qué otra cosa podés pensar? o "Decime más cosas en que puedas pensar" hasta que el niño indique que no tiene más respuestas.

Instrucciones para pruebas de formas

"En este juego te voy a mostrar algunos bloques. Después de mirar cada uno quiero que me digas todas las cosas que vos pensás que cada bloque puede ser. Este es un ejemplo. Vos lo podés dar vuelta como quieras." Darle el bloque al

niño. "¿Qué puede ser esto?". Dejar que el niño responda. "Sí, esos están muy bien. Pienso que eso también puede ser un puente, una cama, un edificio de bloques, una silla y seguramente también muchas otras cosas." El examinador deberá variar las respuestas para poder dar respuestas que el niño no haya dado. Si el niño indica entendimiento del juego, continuar con las pruebas.

Instrucciones para pruebas de usos

"Ahora vamos a tener un juego que se llama '¿para qué podés usar esto?'. La primera cosa con que vamos a jugar es un lápiz". El examinador pasa un lápiz al niño. "Quiero que me digas todas las cosas que podés hacer con un lápiz, o cómo podés jugar con él? ¿Para qué podes usar un lápiz?" Dejar que el niño genere respuestas. Luego agregar, "Sí, está muy bien. Un lápiz también se podría usar para hacer con él el mástil de un bote de juguete o de una bandera, o para enterrarlo en la arena. Seguramente hay muchas otras cosas más." El examinador debe variar las respuestas para así dar muchas respuestas que el niño no haya dado. Seguir diciendo, "Vos ves que hay muchas clases de respuestas en este juego. ¿Sabés cómo jugar?'. Si el niño indica que entiende el juego, continúe con los items de la prueba. Si el niño no entiende, repetir el proceso desde el comienzo. Si aún así el niño no entiende, terminar. El examinador debe decir luego, "Ahora acordate, yo voy a decir el nombre de una cosa y vos me decís todas las cosas para las que pueda servir. Tenés todo el tiempo que quieras. Esta bien, vamos a probar otra." Ninguna ayuda debe darse al niño cuando los items de la prueba son usados.

Algunos problemas pueden aparecer cuando los niños hagan preguntas

adicionales. Por ejemplo, si el niño pregunta: "¿Qué tamaño de caja?", el examinador deberá responder con una respuesta neutral como: "La medida que vos quieras". Todas las aclaraciones de las preguntas de la prueba deben ser de tipo neutral. Cuando el niño cese de responder, preguntar: "¿En qué más podés pensar?" o, "decime más cosas en las que puedas pensar", hasta que el niño indique que no tiene más respuestas.

APPENDIX D

DOUBLE TRANSLATION

Ideational fluency

Items Two items will be used on each of the three subtest:

Examples:

Tell me all the things you can think of that could be round.

Tell me all the things you can think of that could be red.

Forms: (three dimensional models)

Tell me all the things that this could be: 

Tell me all the things that this could be: 

Uses:

Tell me all things you could use a box for.

Tell me all the things you could use a paper for.

Instances task instructions

"Now we are 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 think 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 a lot of other things too." The examiner should vary the 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 that he understand the game, continue with the test items. If the child does not understand, repeat the process from the beginning. If a child still does not understand, terminate the test session. The examiner should then say, "Now remember, I will name something and you are supposed to tell me all the things that you can. Take as long as you want. Okay, let's try another." No help should be given to the child when using the testing item. When the child cease to respond ask, "What else can you think of?" or "tell me other things that you can think of" until the child indicates he or she has no more answers.

Patterns Task Instructions

"In this game I am going to show you some blocks. After you look at each one I want you to tell me all of the things you think each one could be. This is an example. You can turn it any way you would like ." Give the child the sample block. Ask, "What could this be? Let the child respond. Reply, "Yes, those are fine. I think that this could also be a bridge, a bed, a building block, a chair, and there are probably a lot of other things too." The experimenter should vary answers in order to give ones not given by the child. If the child indicates an understanding of the game, continue with the test tasks.

Uses Task Instructions

"Now today we have a game called 'what can you use a box for?'. The first

thing we are going to play with is a pencil." The examiner hands the child a pencil. "I want you to tell me all the things that you can do with a pencil, or play with it. What can you use a pencil for?". Let the child try to generate answers. Then reply, "Yes, that is fine. A pencil can alo be used for a flagpole, to dig in the dirt, as a mast of a toy boat. Certainly, there are many other things, too." The experimenter should vary the answers so as to give one not given by the child. Continue by saying, "You see that there are many kinds of answers in this game. Do you know how to play? If the child indicates that he understand the game, continue the game with the test items. If the child does not understand, repeat the procedure from the beginning. If the child still does not understand, terminate the test. The examiner should then state, "Now remember I will name something and you are suppose to tell me all the things that it could be used for. Take all the time you want. Alright, let's try another." No help should be given to the child when the test items are used. Some problems may appear when children ask additional questions. For example, if the child asks, "What size box?" the experimenter should respond with a very neutral answer such as "Whatever size you like." All clarifications of the test questions should be neutral.

When the 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.

APPENDIX E

VARIABLES CODES LABELS

Variable Code Labels

First Card

Vn	Subject number (11-50)
V1	Gender (1=Male, 2=female)
V2	Age in months
V3	Round, original first half
V4	Round, original second half
V5	Round, total original
V6	Round, popular first half
V7	Round, popular second half
V8	Round, total popular
V9	Red, original first half
V10	Red, original second half
V11	Red, total original
V12	Red, popular first half
V13	Red, popular second half
V14	Red, total popular
V15	Half, original first half
V16	Half, original second half
V17	Half, total original
V18	Half, popular first half
V19	Half, popular second half
V20	Half, total popular

V21	Hammer, original first half
V22	Hammer, original second half
V23	Hammer, total original
V24	Hammer, popular first half
V25	Hammer, popular second half
V26	Hammer, total popular
V27	Total original first half
V28	Total original second half
V29	Total original

Second card

V32	Box, original first half
V33	Box, original second half
V34	Box, total original
V35	Box, popular first half
V36	Box, popular second half
V37	Box, total popular
V38	Total popular first half
V39	Total popular second half
V40	Total popular

Pearson Correlations Coefficients

IO V5 + V11

PO V17 + V23

UO V34

IP V8 + V14

PP V20 + V26

UP V37

WORED = Sum (V5, V17, V23, V34)

WORND = Sum (V11, V17, V23, V34)

WOPAT1 = Sum (V5, V11, V23, V34)

WOPAT2 = Sum (V5, V11, V17, V34)

WOBOX = Sum (V5, V11, V17, V23)

APPENDIX F

RAW DATA

Raw Data

Vn	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14
11	2	57	0	1	1	3	3	6	3	4	7	5	6	11
12	2	55	0	1	1	4	4	8	1	0	1	4	3	7
13	1	65	3	1	4	6	5	11	1	4	5	7	8	15
14	1	54	1	0	1	4	3	7	2	2	4	4	5	9
15	2	55	0	0	0	2	1	3	2	2	4	9	10	19
16	2	58	2	3	5	6	6	12	0	2	2	5	5	10
17	1	60	1	2	3	3	3	6	1	0	1	3	3	6
18	2	50	0	0	0	3	4	7	2	2	4	3	4	7
19	2	52	1	1	2	2	2	4	1	2	3	3	4	7
20	2	56	3	3	6	5	6	11	1	2	3	5	5	10
21	2	60	2	6	8	7	7	14	4	3	7	5	6	11
22	1	60	3	4	7	6	6	12	0	3	3	4	3	7
23	2	54	3	2	5	7	6	13	3	3	6	7	7	14
24	1	57	1	3	4	7	8	15	0	1	1	1	1	2
25	2	56	0	0	0	4	3	7	7	7	14	8	8	16
26	1	55	0	0	0	0	1	1	2	2	4	4	4	8
27	1	63	3	6	9	11	10	21	0	4	4	3	4	7
28	1	58	0	2	2	5	4	9	2	3	5	4	5	9
29	1	59	13	10	23	16	15	31	1	2	3	4	5	9
30	1	61	2	2	4	4	4	8	1	0	1	1	1	2

Vn	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14
31	1	59	0	0	0	3	2	5	0	2	2	2	2	4
32	1	59	0	1	1	3	2	5	0	1	1	2	3	5
33	2	61	0	1	1	2	1	3	1	0	1	1	1	2
34	2	67	1	1	2	3	4	7	1	0	1	5	4	9
35	2	65	0	2	2	6	7	13	1	2	3	7	6	13
36	1	60	2	1	3	3	2	5	1	0	1	1	1	2
37	1	64	7	6	13	13	13	26	1	2	3	3	4	7
38	1	58	0	0	0	1	1	2	0	1	1	2	2	4
39	1	55	1	1	2	4	4	8	0	1	1	2	3	5
40	1	56	4	5	9	10	9	19	7	5	12	10	10	20
41	2	63	0	1	1	2	3	5	2	2	4	7	6	13
42	1	55	0	2	2	3	4	7	1	1	2	3	2	5
43	2	57	0	2	2	6	7	13	2	0	2	4	3	7
44	1	63	2	1	3	2	3	5	3	1	4	3	2	5
45	1	55	7	8	15	11	11	22	3	4	7	4	5	9
46	2	70	1	4	5	7	6	13	5	4	9	7	8	15
47	1	56	0	1	1	3	3	6	0	1	1	2	3	5
48	2	59	0	0	0	3	2	5	0	0	0	4	5	9
49	1	54	0	0	0	1	1	2	1	0	1	2	2	4
50	2	50	1	0	1	3	3	6	0	0	0	1	1	2

V_n	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26
11	1	1	2	3	3	6	1	0	1	2	2	4
12	1	0	1	3	3	6	3	2	5	4	2	9
13	1	1	2	5	4	9	0	1	1	1	2	3
14	6	4	9	10	10	20	4	4	8	7	7	14
15	0	2	3	3	6	0	2	2	2	2	2	2
16	4	4	8	6	6	12	2	2	4	4	4	8
17	0	0	0	2	1	3	0	0	0	2	2	4
18	2	5	7	6	7	13	2	1	3	4	3	7
19	4	2	6	4	4	8	2	2	4	4	4	8
20	2	3	5	3	3	6	2	3	5	5	5	10
21	6	4	10	9	8	17	2	2	4	3	4	7
22	0	2	2	3	4	7	2	3	5	4	4	8
23	0	0	0	2	2	4	3	2	5	4	4	8
24	2	0	2	2	1	3	1	3	3	2	3	5
25	3	1	4	4	4	8	2	3	5	4	5	9
26	2	2	4	4	4	8	0	1	1	3	3	6
27	1	2	3	4	4	8	1	1	2	2	2	4
28	1	0	1	2	1	3	0	0	0	1	2	3
29	0	2	2	4	3	7	0	2	2	3	4	7
30	0	1	1	3	2	5	0	1	1	4	3	7
31	0	0	0	1	2	3	0	1	1	1	1	2
32	1	1	2	4	4	8	4	3	7	7	7	14

V_n	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26
33	0	1	1	3	4	7	1	2	3	3	2	5
34	0	2	2	2	3	5	0	1	1	4	3	7
35	0	1	1	3	3	6	1	1	2	2	3	5
36	1	1	2	2	2	4	0	1	1	2	2	4
37	1	1	2	5	5	10	1	2	3	5	5	10
38	1	1	2	2	1	3	0	0	0	1	1	2
39	2	3	5	8	7	15	2	3	5	5	6	11
40	2	3	5	4	5	9	4	4	8	8	7	15
41	1	4	5	6	7	13	2	9	11	9	8	17
42	1	4	5	7	7	14	11	9	20	15	15	30
43	2	2	4	4	4	8	2	1	3	2	2	4
44	0	0	0	1	2	3	0	0	0	2	1	3
45	1	0	1	2	2	4	1	2	3	3	3	6
46	1	1	2	4	4	8	3	3	6	6	5	11
47	0	2	2	3	2	5	0	0	0	3	4	7
48	0	1	1	3	3	6	0	0	0	2	1	3
49	0	1	1	1	1	2	0	0	0	1	1	1
50	0	0	0	0	0	0	0	0	0	1	0	1

V_n	V27	V28	V29	V32	V33	V34	V35	V36	V37	V38	V39	V40
11	5	8	13	0	2	2	2	3	5	13	14	27
12	5	3	8	0	0	0	1	0	1	15	15	30
13	5	7	12	0	2	2	2	3	5	19	19	38
14	13	10	23	1	1	2	5	4	9	25	25	50
15	2	6	8	1	0	1	2	2	4	16	16	32
16	8	11	19	0	1	1	1	2	3	21	21	42
17	2	2	4	1	0	1	1	1	2	10	9	19
18	4	2	6	0	0	0	1	0	1	18	17	35
19	8	7	15	1	1	2	2	3	5	13	14	27
20	8	11	19	0	0	0	1	0	1	19	18	37
21	14	15	29	5	5	10	8	8	16	24	25	49
22	5	12	17	0	1	1	2	2	4	17	17	34
23	9	7	16	1	1	2	1	1	2	20	19	39
24	3	7	10	0	1	1	1	2	3	12	13	25
25	7	11	18	0	2	2	4	3	7	20	20	40
26	3	4	7	0	0	0	0	1	1	9	10	19
27	5	13	18	2	1	3	3	2	5	20	20	40
28	3	5	8	0	1	1	0	1	1	12	12	24
29	14	16	30	3	3	6	5	4	9	27	27	54
30	3	4	7	0	0	0	0	1	1	11	11	22
31	0	3	3	0	0	0	1	1	2	7	7	14
32	5	6	11	1	1	2	2	1	3	16	16	32

Vn	V27	V28	V29	V32	V33	V34	V35	V36	V37	V38	V39	V40
33	2	4	6	0	0	0	2	2	4	9	8	17
34	2	4	6	0	0	0	2	2	4	14	14	28
35	2	6	8	0	0	0	3	4	7	18	19	37
36	4	3	7	1	1	2	2	2	4	8	7	15
37	10	11	21	1	0	1	3	3	6	26	27	53
38	1	2	3	1	0	1	3	3	6	6	5	11
39	5	8	13	0	0	0	0	0	0	19	20	39
40	17	17	34	0	0	0	2	2	4	32	11	33
41	5	16	21	0	0	0	1	0	1	24	24	48
42	13	16	29	0	1	1	5	6	11	28	28	56
43	4	5	9	0	2	2	3	2	5	16	16	32
44	5	7	12	0	1	1	1	1	2	8	8	16
45	12	14	26	1	0	1	2	1	3	20	21	41
46	10	12	22	0	0	0	1	1	2	24	23	47
47	0	4	4	2	3	5	2	3	5	11	12	23
48	0	1	1	0	0	0	1	0	1	12	11	23
49	1	1	2	0	1	1	0	1	1	5	5	10
50	1	0	1	0	0	0	0	0	0	5	4	0

APPENDIX G

PEARSON CORRELATION COEFFICIENT

16 MAR 87 GRETA MARCOS
11:21:21 OKLAHOMA STATE UNIVERSITY IBM 3081K MVS/SP 1.3.1

- - - - - - - - - - - - - - - - - P E A R S O N C O R R E L A T I O N C O E F F I C I E N T S - - - - -

	I0	P0	U0	IP	PP	UP	V29	V40
I0	1.0000	.1460	.3401	.8756	.1606	.3561	.8016	.5914
	(0)	(40)	(40)	(40)	(40)	(40)	(40)	(40)
	P=	P= .184	P= .016	P= .000	P= .161	P= .012	P= .000	P= .000
P0	.1460	1.0000	.0828	.1825	.9462	.3887	.6835	.6910
	(40)	(0)	(40)	(40)	(40)	(40)	(40)	(40)
	P= .184	P= .	P= .306	P= .130	P= .000	P= .007	P= .000	P= .000
U0	.3401	.0828	1.0000	.2596	.0843	.7257	.2970	.2828
	(40)	(40)	(0)	(40)	(40)	(40)	(40)	(40)
	P= .016	P= .306	P= .	P= .053	P= .302	P= .000	P= .031	P= .039
IP	.8756	.1825	.2596	1.0000	.2095	.2991	.7168	.7062
	(40)	(40)	(40)	(0)	(40)	(40)	(40)	(40)
	P= .000	P= .130	P= .053	P= .	P= .097	P= .030	P= .000	P= .000
PP	.1606	.9462	.0843	.2095	1.0000	.4096	.6705	.7551
	(40)	(40)	(40)	(40)	(0)	(40)	(40)	(40)
	P= .161	P= .000	P= .302	P= .097	P= .	P= .004	P= .000	P= .000
UP	.3561	.3887	.7257	.2991	.4096	1.0000	.4907	.4861
	(40)	(40)	(40)	(40)	(40)	(0)	(40)	(40)
	P= .012	P= .007	P= .000	P= .030	P= .004	P= .	P= .001	P= .001
V29	.8016	.6835	.2970	.7168	.6705	.4907	1.0000	.8129
	(40)	(40)	(40)	(40)	(40)	(40)	(0)	(40)
	P= .000	P= .000	P= .031	P= .000	P= .000	P= .001	P= .	P= .000
V40	.5914	.6910	.2828	.7062	.7551	.4861	.8129	1.0000
	(40)	(40)	(40)	(40)	(40)	(40)	(40)	(0)
	P= .000	P= .000	P= .039	P= .000	P= .000	P= .001	P= .000	P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

- - - - - - - - - - PEARSON CORRELATION COEFFICIENTS - - - - - - - - - - - -

	WORED	WORND	WOPAT1	WOPAT2	WOBOX	V5	V11	V17	V23	V31
WORED	1.0000 (0) P= .	.7992 (40) P= .000	.9062 (40) P= .000	.8591 (40) P= .000	.9212 (40) P= .000	.6876 (40) P= .000	.3479 (40) P= .014	.6105 (40) P= .000	.6042 (40) P= .000	.5124 (40) P= .000
WORND	.7992 (40) P= .000	1.0000 (0) P= .	.7779 (40) P= .000	.7080 (40) P= .000	.8681 (40) P= .000	.2174 (40) P= .089	.6400 (40) P= .000	.7474 (40) P= .000	.7350 (40) P= .000	.3846 (40) P= .007
WOPAT1	.9062 (40) P= .000	.7779 (40) P= .000	1.0000 (0) P= .	.9130 (40) P= .000	.9511 (40) P= .000	.7512 (40) P= .000	.6396 (40) P= .000	.3600 (40) P= .011	.5266 (40) P= .000	.4505 (40) P= .002
WOPAT2	.8591 (40) P= .000	.7080 (40) P= .000	.9130 (40) P= .000	1.0000 (0) P= .	.8684 (40) P= .000	.7731 (40) P= .000	.6285 (40) P= .000	.4821 (40) P= .001	.2294 (40) P= .077	.6092 (40) P= .000
WOBOX	.9212 (40) P= .000	.8681 (40) P= .000	.9511 (40) P= .000	.8684 (40) P= .000	1.0000 (0) P= .	.6332 (40) P= .000	.6373 (40) P= .000	.5635 (40) P= .000	.6524 (40) P= .000	.2905 (40) P= .034
V5	.6876 (40) P= .000	.2174 (40) P= .089	.7512 (40) P= .000	.7731 (40) P= .000	.6332 (40) P= .000	1.0000 (0) P= .	.2451 (40) P= .064	.0094 (40) P= .477	.0295 (40) P= .428	.3624 (40) P= .011
V11	.3479 (40) P= .014	.6400 (40) P= .000	.6396 (40) P= .000	.6285 (40) P= .000	.6373 (40) P= .000	.2451 (40) P= .064	1.0000 (0) P= .	.2104 (40) P= .096	.2277 (40) P= .079	.1337 (40) P= .205
V17	.6105 (40) P= .000	.7474 (40) P= .000	.3600 (40) P= .011	.4821 (40) P= .001	.5635 (40) P= .000	.0094 (40) P= .477	.2104 (40) P= .096	1.0000 (0) P= .	.4581 (40) P= .001	.3046 (40) P= .028
V23	.6042 (40) P= .000	.7350 (40) P= .000	.5266 (40) P= .000	.2294 (40) P= .077	.6524 (40) P= .000	.0295 (40) P= .428	.2277 (40) P= .079	.4581 (40) P= .001	1.0000 (0) P= .	-.0889 (40) P= .293
V34	.5124 (40) P= .000	.3846 (40) P= .007	.4505 (40) P= .002	.6092 (40) P= .000	.2905 (40) P= .034	.3624 (40) P= .011	.1337 (40) P= .205	.3046 (40) P= .028	-.0889 (40) P= .293	1.0000 (0) P= .

(COEFFICIENT / (CASES) / 1-TAILED SIG) " . " IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED

APPENDIX H

INTERTASK FREQUENCIES

16 MAR 87 GRETA MARCOS
11:21:21 INTERTASK CORRELATIONS

V27 TOTAL ORIGINAL, FIRST HALF

VALUE LABEL	VALUE	FREQUENCY	PERCENT	VALID PERCENT	CUM PERCENT
	0	3	7.5	7.5	7.5
	1	3	7.5	7.5	15.0
	2	5	12.5	12.5	27.5
	3	4	10.0	10.0	37.5
	4	3	7.5	7.5	45.0
	5	9	22.5	22.5	67.5
	7	1	2.5	2.5	70.0
	8	3	7.5	7.5	77.5
	9	1	2.5	2.5	80.0
	10	2	5.0	5.0	85.0
	12	1	2.5	2.5	87.5
	13	2	5.0	5.0	92.5
	14	2	5.0	5.0	97.5
	17	1	2.5	2.5	100.0
	TOTAL	40	100.0	100.0	

MEAN	5.625	STD ERR	.694	MEDIAN	5.000
MODE	5.000	STD DEV	4.389	VARIANCE	19.266
KURTOSIS	.023	S E KURT	.733	SKEWNESS	.894
S E SKEW	.374	RANGE	17.000	MINIMUM	.000
MAXIMUM	17.000	SUM	225.000		

VALID CASES 40 MISSING CASES 0

16 MAR 87 GRETA MARCOS
11:21:24 INTERTASK CORRELATIONS

V28 TOTAL ORIGINAL, SECOND HALF

VALUE LABEL	VALUE	FREQUENCY	PERCENT	VALID PERCENT	CUM PERCENT
	0	1	2.5	2.5	2.5
	1	2	5.0	5.0	7.5
	2	3	7.5	7.5	15.0
	3	3	7.5	7.5	22.5
	4	5	12.5	12.5	35.0
	5	2	5.0	5.0	40.0
	6	3	7.5	7.5	47.5
	7	5	12.5	12.5	60.0
	8	2	5.0	5.0	65.0
	10	1	2.5	2.5	67.5
	11	4	10.0	10.0	77.5
	12	2	5.0	5.0	82.5
	13	1	2.5	2.5	85.0
	14	1	2.5	2.5	87.5
	15	1	2.5	2.5	90.0
	16	3	7.5	7.5	97.5
	17	1	2.5	2.5	100.0
	TOTAL	40	100.0	100.0	

MEAN	7.525	STD ERR	.762	MEDIAN	7.000
MODE	4.000	STD DEV	4.820	VARIANCE	23.230
KURTOSIS	-.890	S E KURT	.733	SKEWNESS	.449
S E SKEW	.374	RANGE	17.000	MINIMUM	.000
MAXIMUM	17.000	SUM	301.000		

VALID CASES 40 MISSING CASES 0

16 MAR 87 GRETA MARCOS
11:21:24 INTERTASK CORRELATIONS

V29 TOTAL ORIGINAL

VALUE LABEL	VALUE	FREQUENCY	PERCENT	VALID PERCENT	CUM PERCENT
	1	2	5.0	5.0	5.0
	2	1	2.5	2.5	7.5
	3	2	5.0	5.0	12.5
	4	2	5.0	5.0	17.5
	6	3	7.5	7.5	25.0
	7	2	5.0	5.0	30.0
	8	5	12.5	12.5	42.5
	9	1	2.5	2.5	45.0
	10	1	2.5	2.5	47.5
	11	1	2.5	2.5	50.0
	12	2	5.0	5.0	55.0
	13	2	5.0	5.0	60.0
	15	1	2.5	2.5	62.5
	16	1	2.5	2.5	65.0
	17	1	2.5	2.5	67.5
	18	2	5.0	5.0	72.5
	19	2	5.0	5.0	77.5
	21	2	5.0	5.0	82.5
	22	1	2.5	2.5	85.0
	23	1	2.5	2.5	87.5
	26	1	2.5	2.5	90.0
	29	2	5.0	5.0	95.0
	30	1	2.5	2.5	97.5
	34	1	2.5	2.5	100.0
	TOTAL	40	100.0	100.0	

MEAN	13.175	STD ERR	1.390	MEDIAN	11.500
MODE	8.000	STD DEV	8.794	VARIANCE	77.328
KURTOSIS	-.458	S E KURT	.733	SKEWNESS	.638
S E SKEW	.374	RANGE	33.000	MINIMUM	1.000
MAXIMUM	34.000	SUM	527.000		

VALID CASES 40 MISSING CASES 0

16 MAR 87 GRETA MARCOS
11:21:24 INTERTASK CORRELATIONS

V38 TOTAL POPULAR, FIRST HALF

VALUE LABEL	VALUE	FREQUENCY	PERCENT	VALID PERCENT	CUM PERCENT
	5	2	5.0	5.0	5.0
	6	1	2.5	2.5	7.5
	7	1	2.5	2.5	10.0
	8	2	5.0	5.0	15.0
	9	2	5.0	5.0	20.0
	10	1	2.5	2.5	22.5
	11	2	5.0	5.0	27.5
	12	3	7.5	7.5	35.0
	13	2	5.0	5.0	40.0
	14	1	2.5	2.5	42.5
	15	1	2.5	2.5	45.0
	16	3	7.5	7.5	52.5
	17	1	2.5	2.5	55.0
	18	2	5.0	5.0	60.0
	19	3	7.5	7.5	67.5
	20	4	10.0	10.0	77.5
	21	1	2.5	2.5	80.0
	24	3	7.5	7.5	87.5
	25	1	2.5	2.5	90.0
	26	1	2.5	2.5	92.5
	27	1	2.5	2.5	95.0
	28	1	2.5	2.5	97.5
	32	1	2.5	2.5	100.0
	TOTAL	40	100.0	100.0	

MEAN	16.225	STD ERR	1.081	MEDIAN	16.000
MODE	20.000	STD DEV	6.837	VARIANCE	46.743
KURTOSIS	-.632	S E KURT	.733	SKEWNESS	.240
S E SKEW	.374	RANGE	27.000	MINIMUM	5.000
MAXIMUM	32.000	SUM	649.000		

VALID CASES 40 MISSING CASES 0

16 MAR 87 GRETA MARCOS
11:21:24 INTERTASK CORRELATIONS

V39 TOTAL POPULAR, SECOND HALF

VALUE LABEL	VALUE	FREQUENCY	PERCENT	VALID PERCENT	CUM PERCENT
	4	1	2.5	2.5	2.5
	5	2	5.0	5.0	7.5
	7	2	5.0	5.0	12.5
	8	2	5.0	5.0	17.5
	9	1	2.5	2.5	20.0
	10	1	2.5	2.5	22.5
	11	2	5.0	5.0	27.5
	12	2	5.0	5.0	32.5
	13	1	2.5	2.5	35.0
	14	3	7.5	7.5	42.5
	15	1	2.5	2.5	45.0
	16	3	7.5	7.5	52.5
	17	2	5.0	5.0	57.5
	18	1	2.5	2.5	60.0
	19	3	7.5	7.5	67.5
	20	3	7.5	7.5	75.0
	21	2	5.0	5.0	80.0
	23	1	2.5	2.5	82.5
	24	1	2.5	2.5	85.0
	25	2	5.0	5.0	90.0
	27	2	5.0	5.0	95.0
	28	1	2.5	2.5	97.5
	31	1	2.5	2.5	100.0
	TOTAL	40	100.0	100.0	

MEAN	16.200	STD ERR	1.098	MEDIAN	16.000
MODE	14.000	STD DEV	6.944	VARIANCE	48.215
KURTOSIS	-.702	S E KURT	.733	SKEWNESS	.131
S E SKEW	.374	RANGE	27.000	MINIMUM	4.000
MAXIMUM	31.000	SUM	648.000		

VALID CASES 40 MISSING CASES 0

16 MAR 87 GRETA MARCOS
11:21:24 INTERTASK CORRELATIONS

V39 TOTAL POPULAR, SECOND HALF

VALUE LABEL	VALUE	FREQUENCY	PERCENT	VALID PERCENT	CUM PERCENT
	4	1	2.5	2.5	2.5
	5	2	5.0	5.0	7.5
	7	2	5.0	5.0	12.5
	8	2	5.0	5.0	17.5
	9	1	2.5	2.5	20.0
	10	1	2.5	2.5	22.5
	11	2	5.0	5.0	27.5
	12	2	5.0	5.0	32.5
	13	1	2.5	2.5	35.0
	14	3	7.5	7.5	42.5
	15	1	2.5	2.5	45.0
	16	3	7.5	7.5	52.5
	17	2	5.0	5.0	57.5
	18	1	2.5	2.5	60.0
	19	3	7.5	7.5	67.5
	20	3	7.5	7.5	75.0
	21	2	5.0	5.0	80.0
	23	1	2.5	2.5	82.5
	24	1	2.5	2.5	85.0
	25	2	5.0	5.0	90.0
	27	2	5.0	5.0	95.0
	28	1	2.5	2.5	97.5
	31	1	2.5	2.5	100.0
	TOTAL	40	100.0	100.0	

MEAN	16.200	STD ERR	1.098	MEDIAN	16.000
MODE	14.000	STD DEV	6.944	VARIANCE	48.215
KURTOSIS	-.702	S E KURT	.733	SKEWNESS	.131
S E SKEW	.374	RANGE	27.000	MINIMUM	4.000
MAXIMUM	31.000	SUM	648.000		

VALID CASES 40 MISSING CASES 0

APPENDIX I

ANALYSIS ANOVA

16 MAR 87 GRETA MARCOS
11:48:34 OKLAHOMA STATE UNIVERSITY IBM 3081K MVS/SP 1.3.4

* * * C E L L M E A N S * * *

. NRESPO # OF RESPONSES - ORIGINAL
BY CREATIVE
HALF

TOTAL POPULATION

6.57
(80)

CREATIVE

1	2
10.17	2.97
(40)	(40)

HALF

1	2
5.63	7.52
(40)	(40)

HALF	1	2
CREATIVE		
1	8.90	11.45
	(20)	(20)
2	2.35	3.60
	(20)	(20)

16 MAR 87 GRETA MARCOS
11:48:34 OKLAHOMA STATE UNIVERSITY IBM 3081K MVS/SP 1.3.4

* * * C E L L M E A N S * * *

NRESPP # OF RESPONSES - POPULAR
BY CREATIVE
HALF

TOTAL POPULATION

16.21
(80)

CREATIVE

1	2
21.00	11.42
(40)	(40)

HALF

1	2
16.22	16.20
(40)	(40)

CREATIVE \ HALF	1	2
1	20.95 (20)	21.05 (20)
2	11.50 (20)	11.35 (20)

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* * * A N A L Y S I S O F V A R I A N C E * * *

NRESPO # OF RESPONSES - ORIGINAL
BY CREATIVE
HALF

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	1109.000	2	554.500	68.848	0.0
CREATIVE	1036.800	1	1036.800	128.732	0.000
HALF	72.200	1	72.200	8.965	0.004
2-WAY INTERACTIONS	8.450	1	8.450	1.049	0.309
CREATIVE HALF	8.450	1	8.450	1.049	0.309
EXPLAINED	1117.450	3	372.483	46.249	0.000
RESIDUAL	612.100	76	8.054		
TOTAL	1729.550	79	21.893		

80 CASES WERE PROCESSED.
0 CASES (0.0 PCT) WERE MISSING.

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* * * A N A L Y S I S O F V A R I A N C E * * *

NRESPP # OF RESPONSES - POPULAR
BY CREATIVE
HALF

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	1833.625	2	916.812	37.272	0.000
CREATIVE	1833.612	1	1833.612	74.543	0.000
HALF	0.012	1	0.012	0.001	0.982
2-WAY INTERACTIONS	0.312	1	0.312	0.013	0.911
CREATIVE HALF	0.313	1	0.313	0.013	0.911
EXPLAINED	1833.937	3	611.312	24.852	0.000
RESIDUAL	1869.450	76	24.598		
TOTAL	3703.387	79	46.878		

80 CASES WERE PROCESSED.
0 CASES (0.0 PCT) WERE MISSING.

VITA

GRETA GUSTAFSON MARCOS

Candidate for the Degree of

Master in Science

Thesis: IDEATIONAL FLUENCY IN PARAGUAYAN PRESCHOOL CHILDREN

Major Field: Mass Communication

Biographical:

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Education:

Graduate from Las Teresas School, Asunción, Paraguay, 1970; received Bachelor of Science Degree in Mass Communication, in November 1976, from Catholic University of Asunción; completed requirements for the Master of Science degree at Oklahoma State University in June, 1987.

Professional Experience:

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