DOCUMENT RESUME

ED 136 916 PS 009 158

AUTHOR Salkind, Neil J.; Kojima, Hideo
TITLE Cognitive Tempo in Japanese and American Children.
SPONS AGENCY National Inst. of Mental Health (DHEW), Rockville, Md.
PUB DATE Mar 77
GRANT NIMH-MH-28487
NOTE 11p.; Paper presented at the biennial meeting of the Society for Research in Child Development (New Orleans, Louisiana, March 17-20, 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Age Differences; *Cognitive Development; Cognitive Measurement; *Cognitive Style; *Conceptual Tempo; *Cross Cultural Studies; Cultural Differences; Developmental Stages; *Elementary Education; Ideography; Japanese
IDENTIFIERS *Japan; *Matching Familiar Figures Test

ABSTRACT

The purpose of this study was to compare performances by Japanese and American children on the Matching Familiar Figures Test, the primary measure of cognitive tempo. Data on more than 3400 Japanese and American children (approximately half male, half female) were used. Factorial analyses of variance revealed significant age x nationality interaction for both errors and latency. Japanese children made fewer errors at a younger age than did their American counterparts, and continued to do so until their level of accuracy approached that of 11- and 12-year-old American children. The interaction for errors indicates a decreasing difference in accuracy as age increases. The age x nationality interaction for latency showed an increase for Japanese children towards a stabilized level, while the latency for American children continued to increase, eventually becoming slower than for the Japanese children. Developmental trends for both errors and latency in both groups of children are highly similar. There appears to be a typical "developmental shift" present, where these identical patterns are present; yet in Japanese children they occur from one to two years earlier than in American children. These results may be related to environmental and cultural differences such as the instruction Japanese children receive in the traditional symbolic character language, the traditional Eastern emphasis on patience, and other educational and cultural influences. (Author/BF)

Cognitive Tempo in Japanese and American Children

Neil J. Salkind — University of Kansas

Hideo Kojima — Nagoya University

Paper presented at the biennial meeting of the Society for Research in Child Development, New Orleans, March, 1977. Support for this study in part came from NIMH grant MH28487 awarded to the senior author. All requests for reprints should be sent to Neil J. Salkind, Bailey Hall, University of Kansas, Lawrence, KS 66045. The authors would especially like to thank those who contributed data to the norm pool.

Abstract

The purpose of this study is to compare performances by Japanese and American children on the Matching Familiar Figures Test, the primary measure of cognitive tempo. Data from over 3400 Japanese and American children were used. Factorial analyses of variance revealed significant age x nationality interactions for both errors and latency. Japanese children made fewer errors at a younger age than their American counterpart, and continued to do so until their level of accuracy approached that of 11 and 12 year old American children. The interaction for errors indicates a decreasing difference in accuracy as age increases. The age x nationality interaction for latency showed an increase for Japanese children towards a stabilized level, while the latency for American children continued to increase, eventually becoming slower than the Japanese children.

For both errors and latency the developmental trends for both groups are highly similar. However there appears to be a typical "developmental shift" present where these patterns are evidenced in Japanese children from two years earlier than American children. These results may be related to environmental and cultural differences such as Japanese children receiving instruction in the traditional symbolic character language and other educational and cultural influences.

Cognitive Tempo in Japanese and American Children

Although cognitive tempo has been studied from a variety of perspectives, there is no research comparing differences in cognitive tempo between different cultural groups. Cross cultural comparisons are always of value since they assist the developmental psychologist in understanding the impact and interaction of different environmental influences upon behavior. Cognitive tempo is an especially interesting variable to examine cross culturally since the primary components of tempo performance, errors and latency on the Matching Familiar Figures Test, have been shown to be modifiable through training studies and susceptible to external factors such as differential reinforcement (Stein & Landis, 1975), and modeling (Debus, 1970). The purpose of this study was to examine differences in MFF performance between American and Japanese children. These two populations were chosen for comparison since cultural traditions related to evaluate strategies may lead to differing developmental patterns in cognitive tempo.

Procedure

The impetus for this study came as an outgrowth of correspondence between the two authors. Kojima was contributing to Salkind's efforts at developing a normative base for the MFF, and subsequently, this joint effort was undertaken. It should be pointed out, that the data reported in this paper resulted from other studies where the MFF was used as a classificatory variable with no emphasis on modifying tempo performance or any other related manipulation. Seven hundred and sixty Japanese, and 2676 American children constituted the sample examined here, with an almost equal number of males (51%) and females (49%). Data for American children aged five through 12 years and data for Japanese children aged five through ten years was used. The authors would like to acknowledge the contribution of G. Hatano for Japanese data as well as other researchers who contributed American data. Each child was administered an identical form of the elementary school version of the MFF (Kagan, Rosman, Day, Albert & Phillips, 1964) using standardized directions. Although this norming project has accumulated MFF data based on many different samples, no data was included in this study without assurance from the contributing researcher that the children were of normal intelligence and were of middle class socioeconomic status with no other potential sources of confounding present. The norms themselves, are now in the final stages of development and should be available for distribution within the next two months.

Results and Discussion

When findings from studies using very large populations are discussed, classical parametric statistics tend to lose their meaningfulness. Instead greater analytic value can be placed in visual inspection of the raw data. However, for sake of consistency with other literature, sex, age (five through ten years), and nationality were used as factors in separate factorial analysis of variance. The results revealed sex and age main effects for errors and latency, as well as a main effect for nationality on errors. In addition, a significant age x nationality interaction for both errors and latency was apparent. In general, errors decreased and latency increased with age, females responded more slowly than males and also made fewer errors, and American children made more errors than their Japanese counterparts. Means and standard deviations for errors and latency are presented in Table 1. While similar age and sex main effects have been reported (Ault, 1976; Messer, 1976), the age x nationality interactions are unique to the literature. Such an interaction also tends to lessen any valid interpretation of the main effects involved in this interaction.

Insert Table 1 about here

Figure 1 shows that Japanese children make fewer errors at a younger age than American children, and continue to do so until their accuracy reaches asymptote about eight years of age, then approaching the error rates of ten, 11 and 12 year old American children. This age x nationality interaction also suggests, that the American children are playing "catch up" since as they get older, differences between the two groups in accuracy tend to decrease. The statistical interaction present here is somewhat misleading since visual inspection of the curves shows them to be almost parallel save for the slight upswing by ten year old Japanese children. Figure 2, mean latency for Japanese and American children also shows a striking similarity in the shape of developmental trends. The interaction between age and nationality shows the younger American children being "faster" than the younger Japanese children, but this trend reverses itself around eight years of age when latency for Japanese children begins to decrease, while latency for American children continues to increase until ten years of age.

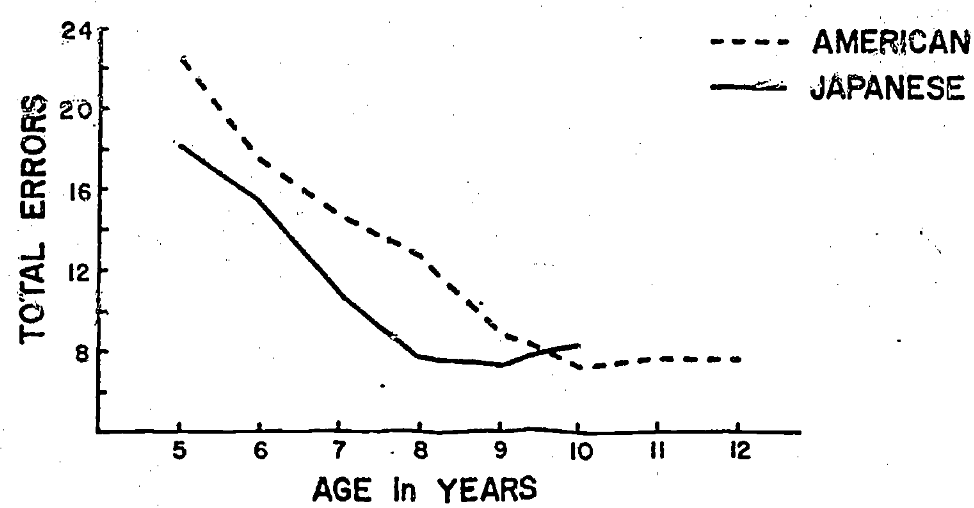
Insert Figures 1 and 2 about here

A simultaneous examination of both of these trends shows great consistency within the dependent variables errors and latency across cultures, as well as across dependent measures within age. The trends for both errors and latency for Japanese and American children are highly similar in shape. There appears however to be a "developmental shift" present, where these identical trends are present, yet in Japanese children they occur two years earlier than in American children. For both cultures it appears that the developmental trend in cognitive tempo seems to be from impulsivity at a young age to reflectivity at a later age, up through the time of this hypothesized developmental shift. After this shift, performance in both cultures tends to be characterized by a stabilization in errors and a decrease in latency, hence a more efficient performance in terms of the model presented by Salkind and Wright (1976). The specific age at which this change in strategy occurs may reflect a transformation in cognitive growth, possibly indicating the onset of some early aspects of formal operations. Interestingly, Wright and Gaughan (1977) also report similar developmental trends for both errors and latency on the KRISP for a much younger range of children, a finding which is inconsistent with an age or stage related explanation. It seems that regardless of age, discovery of a strategy (followed by gains in efficiency) associated with an appropriate task, may be a developmental process specific to the task.

There are of course other plausible explanations for these trends such as the different cultural influences and expectations placed on the child. The distinct differences in errors between the two groups of children might be attributed to the concentration in Japanese schools on the traditional symbolic character language, which is still part of the early school curriculum. The visual processing skills, formulation of images, and attention to detail involved in learning the language facilitates accurate processing of pictorial information as required by tasks such as the MFF. Some additional support to such a tentative conclusion can also be found in an examination of cultural differences on the WIPPSI mazes subtests, where Japanese children outperform American children of the same age. Second, the traditional patience which is emphasized in the Oriental or Eastern tradition may result in an increase in attention to detail with a decreased emphasis on speed of response. Especially in educational settings, Japanese teachers actively convey the importance of a thoughtful and systematic approach in problem solving situations where a premium is placed on accuracy. For example speed reading is deemphasized. At least some support for this notion is found in the work of Zax and Takahashi (1967) who concluded that the extensive rules of etiquette present in the Japanese culture lead to more formal ritualized behaviors than those present in the American culture.

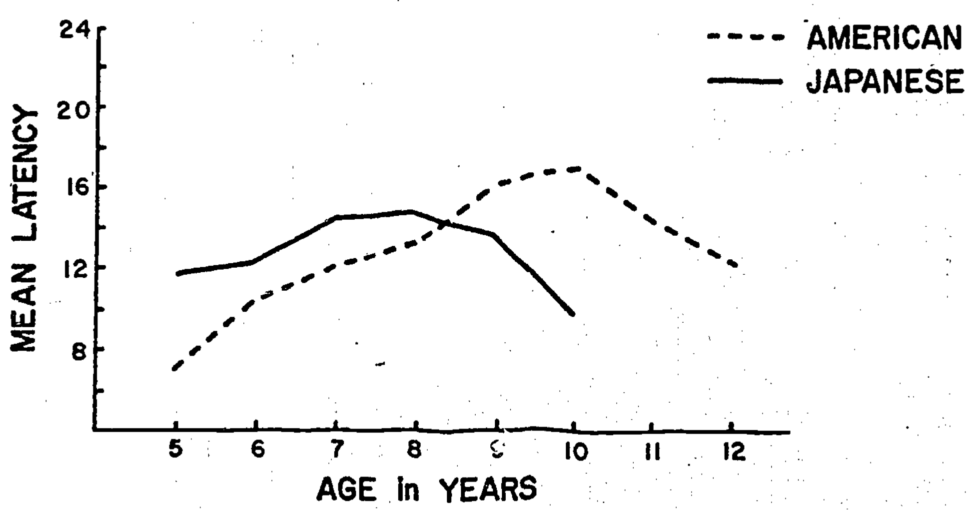
The differences between Japanese and American children discussed in this paper helped the authors to further appreciate the wealth of diversity present in different cultures. We found it fascinating to sit and discuss how different cultural influences affect development in different ways, yet there remains a consistency when one steps back and examines the larger picture. Further work is necessary to validate the findings and conclusions reported here. Perhaps the next logical comparison is the inclusion of a population culturally located between Western and Eastern traditions.

Figure 1



TOTAL ERRORS for AMERICAN and JAPANESE CHILDREN

Figure 2



MEAN LATENCY for AMERICAN and JAPANESE CHILDREN

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Table 1

Means and Standard Deviations for Errors and Latency

	JAPANESE (N = 760)					AMERICAN (2676)				
Age	Errors		Latency			Errors		Latency		
	$\bar{X}$	SD	$\bar{X}$	SD	N	$\bar{X}$	SD	$\bar{X}$	SD	N
5	18.44	7.30	11.89	11.99	88	22.64	7.05	7.20	3.41	192
6	15.65	7.14	12.48	9.92	72	17.65	6.86	10.61	7.97	329
7	10.73	6.20	14.67	6.65	48	14.79	6.44	12.03	7.46	499
8	7.72	4.21	14.83	8.20	330	12.69	6.24	13.44	8.32	444
9	7.35	3.91	13.71	6.28	109	9.13	5.68	16.42	9.71	565
10	8.38	4.05	9.83	5.03	113	7.40	5.23	17.23	10.58	226
11	---	---	---	---	---	7.62	4.78	14.42	9.50	248
12	---	---	---	---	---	7.64	4.80	12.31	7.57	173