AN ANALYSIS OF THE LIFE COMPLEXITY INVENTORY (LCI) WITH A CHINESE SAMPLE

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INTRODUCTION

Many studies have been designed to investigate the relationship between contextual variables (e.g., socio-economic status, work circumstances, friends and social interactions) and their impact on life-style patterns (Gribbin, Schaie, & Parham, 1980). However, this topic has not been extensively considered in non-Western countries. There is a need for cross-cultural studies in supplementing Western theories of environmental factors and their interaction with significant life experiences. Nonetheless, studies of individuals' micro-environment involving non-Western contexts are underinvestigated.

The impetus for the present study is the need for cross-cultural studies of contextual variables, i.e., those variables that occur in the day-to-day experience of adults. The import of such studies was salient at the 1987 meetings of the International Society for the Study of Behavioral Development and is widely recognized. The present study emerged from a collaboration between scholars from China and the United States.

The design of the present study was based on the model of the Seattle Longitudinal Study (SLS, Schaie, 1995) in order to provide empirical data on the development of Primary Mental abilities (Thurstone, 1958) in Chinese adults. Additional objectives of this study were : (1) To gather a comprehensive overview of the daily activities of the participants and their personal

information; (2) To obtain preliminary data on the differences of these contextual variables in Chinese adults over the age span of 20 to 80 years. These data are reported here.

METHOD

Sample

Subjects for the China PMA Study included 121 Chinese adults (56 women and 65 men) aged 20 to 80 years selected from Tianjin, a large metropolitan area in China. The pool of potential subjects was stratified by education and 10 year age intervals. Approximately 20 subjects were then randomly selected from each strata. A total of six cohorts were analyzed for this study. The mean ages for cohort 1-6 were as followed: 75.0, 65.2, 55.4, 44.8, 36.4, and 24.0, respectively. All mean ages were calculated as of March 1988. (See Table 1 for a detailed breakdown of cell sizes.)

Measure

The Life Complexity Inventory (LCI) used in the Seattle Longitudinal Study was adapted to obtain a comprehensive study of variables that make up the micro-environment of the adult individual in the Chinese sample. This instrument examines a broad range of adult activities and interests and includes data on many aspects of the interpersonal, work, social, structural, and cultural aspects of the participants' environment. These variables contain basic demographic information, home environment questions, characteristics of the work and home-making

environment, neighborhood composition, travel, mobility, reading activities, continued educational pursuits and social network data (see Schaie, 1983, for greater detail). In addition, the LCI collects data on frequency of leisure activities based on the work of Lowenthal and associates (Lowenthal et. al., 1975). The instructions for the measure was translated using bilingual Chinese translators, and the Chinese testers were trained to administer the inventory following the same protocol as used in the Seattle Longitudinal Study (SLS). The inventory was completed by 121 of the subjects who had participated in the study.

ANALYSES AND RESULTS

O'Hanlon (1993) analyzed the information gained from the LCI in the SLS sample and developed latent dimensions that summarized the life complexity inventory. Using exploratory and confirmatory factor analysis, several identifiable factors emerged that represented the expected environmental dimensions. The factors were labeled Work characteristics, Leisure, Social Status, Prestige, Physical Environment, Intellectual Environment, Mobility, and Social Network (See Table 2). Together these factors provided a broad characterization of the micro-environments of the respondents. Moreover, six leisure factors were developed from the list of leisure activities. These factors corresponded to the Household, Social, Educational/Cultural, Fitness, Solitary, and Communication factors (See Table 3).

Factor solutions obtained from the LCI in the SLS sample were used to compare patterns of age and gender differences in micro-

environment dimensions and levels of leisure participation of the Chinese sample. To assess age differences in the dimensions, subjects were divided into six birth cohorts of 10 year intervals with age categories of 20-30, 31-40, 41-50, 51-60, and 71-80 year old subjects.

To permit comparison across the different dimensions, raw scores of each factor solution obtained within the sample were standardized into T-Score form ($\underline{M}$=50, $\underline{SD}$=10) based on the total sample means and standard deviations. A Multivariate Analysis of Variance (MANOVA) was used for our analyses. The model represented the eight environmental dimensions and the six leisure dimensions as dependent variables. Cohort, and gender and all interactions between them were the independent variables.

A 2 (sex) by 6 (cohort) MANOVA was run using the STATISTICA statistical package. The combined dependent variables (the eight environmental dimensions) were significantly affected by cohort ($\underline{p}$<.05; Wilk's Lambda criterion), but were not significantly affected by sex and the sex by cohort interaction. Because of the significant overall MANOVA, the specific differences among cohorts were investigated further. Univariate analyses for each of the eight factors were examined. The univariate statistics are reported in Table 4.

As indicated by Table 4, significant cohort differences were evident for all factors except for the Physical Environment and Social factors. In general, the older cohorts had significantly higher scores than younger cohorts; however, the specific cohorts

that differed varied (See Fig. 1 and 2).

On the Prestige factor, the oldest cohort (ages 71-80) had significantly higher means than the other younger cohorts (between the ages of 20-70). Concerning the Status factor, the middle-aged cohorts (aged 41-70 years) had significantly higher means than the two youngest cohorts. For the Mobility factor, the youngest three cohorts (20-50 years old) had significantly higher scores than the two oldest cohorts (61-80 years old). The youngest cohort (ages 20-30) had significantly higher means than the other five older groups (ages 31-80) regarding the Intellectual Environment factor. Significant cohort differences existed between the two oldest cohorts (aged 61-80) and the four younger cohorts (ages 20-60) on the Work factor; the oldest cohorts had higher means.

Our analyses also examined gender and cohort differences in the leisure factor scores. The six activity factors were significantly affected by sex ($p<.01$), cohort ($p<.01$), and the sex by cohort interaction ($p<.05$). Univariate analyses for each of the six factors were examined (See Table 5). Significant sex differences were evident for all of the factors except the Social and Education/Culture factors. The women had higher mean levels than men on the Household, Solitary, and the Communication factors (See Fig. 6). The men had a significantly higher mean score than women on the Fitness factor.

Cohort differences were significant for Education/Culture and Communication factors. The youngest cohort (20-30 years old) had significantly higher scores on Education/Culture than cohorts

1-4 (41-80 years old, see Fig. 4). For the Communication factor, cohort 6 (ages 20-30) had significantly higher scores than cohorts 2 and 5 (See Fig. 5).

The Communication factor was the only factor demonstrating a significant sex by cohort interaction. However, a trend of the Fitness factor of sex by cohort interaction was also detected. In general, the males in cohort 2 (ages 61-70) exhibited higher scores on the Fitness factor than all female groups (20-70 years old) except for the oldest female cohorts (ages 71-80). Similarly, the youngest male cohorts (ages 20-30) had higher scores on fitness activities than older female cohorts (cohorts 4, 5, and 6) ($p<.06$). On the Communication factor, the sex by cohort means revealed that the youngest female cohorts (ages 20-30) showed a much higher level of participation in communication activities than all other groups including the males in their birth cohort.

A moderate correlation was found between education and some of the LCI dimensions. Since educational levels were significantly different among males, females, and cohorts, the hypothesis that educational differences did not account for the differences found in LCI dimensions was tested. Results indicated that the effect of education on the dimensions was not significant.

SUMMARY AND DISCUSSION

The current study examined an empirical taxonomy of the environment of males, females, and birth cohorts in a Chinese

sample. Eight dimensions of the environment that were labeled Prestige, Status, Leisure, Physical Environment, Mobility, Intellectual Environment, Social Network, and Work Environment were analyzed, and a MANOVA was run to test for cohort and sex differences. These dimensions included those specifically assessing leisure behavior, as well as dimensions describing the overall micro-environment. For the Prestige, Mobility, Work, and Leisure factors, significant differences existed primarily between the youngest and oldest cohorts. The six leisure factors developed from the list of leisure activities were Household, Social, Education/Culture, Fitness, Solitary, and Communication. In general, the significant differences reflected higher levels of leisure participation for younger cohorts than older cohorts (See Fig. 3). Notably, significant cohort differences were present only between the oldest cohorts and the youngest cohorts. This finding suggests that age differences in leisure participation are not evident except at the extremes of the lifespan.

Regarding gender differences, the present study found that women had higher participation on Household, Solitary, and Communication activities than men. Males had significantly higher means than women on the Fitness factor. These results suggest that men and women spend their leisure time pursuing different activities.

In sum, cohort and sex differences varied for each dimension and level of leisure participation. Also noteworthy was the lack of significant gender differences on the micro-environment

dimensions. Surprisingly, there was no gender differences on the factors associated with Work, Status, and Prestige. These findings do not reflect the assumption regarding general gender trends in the Chinese society where men are more likely to have higher job status, higher income.

The preliminary results found in this study should be interpreted with caution due to several reasons. The present study was hampered by the lack of a representable taxonomy to describe the environment in a Chinese population. The LCI dimensions analyzed in this study was quantified by factor analytic method using data from the SLS sample. The measurement precision of our measure is limited by the assumption that the dimensions being measured by the Life Complexity Inventory are equivalent in both cultures. This assumption remains to be tested.

These present results provide an initial look at gender and cohort differences among several environmental dimensions simultaneously. Gender and cohort differences varied for each dimension. The results of these preliminary analyses would be useful in the examination of the relationship between individuals' intellectual functioning and their micro-environments. Indeed, an interesting next step could be to investigate the causal relationship between leisure activities and intellectual performance as a way of understanding the interplay between intellectual development and environmental factors in a non-Western context.

Table 1

Cell Sizes for the Total Sample

Birth Cohorts	Males	Females	Total
1. 1908-1917	6	6	12
2. 1918-1927	13	9	22
3. 1928-1937	14	10	24
4. 1938-1947	12	7	19
5. 1948-1957	9	13	22
6. 1958-1968	11	11	22

Table 2

Variables Defining Micro-Environmental Dimensions

Mobility

Changes in jobs during the last 5 years
Changes in households during the last 5 years
Changes in professions during the last 5 years

Leisure

Fitness
Education/Culture
Communication
Social
Solitary
Household

Social

Number of neighbors know well enough to confide in
Number of visits to people not in neighborhood

Physical Environment

Quality of air in neighborhood
Number of trees in neighborhood
Noise level in the neighborhood

Intellectual Environment

Amount of art objects in home
Number of books in the home
Number of magazines read in last month
Number of educational courses taken

Work

Percentage of work hours spend reading
Work status (working vs. not working)
Work under time pressure
Place where work occurs
People work with

Status

Marital status
Own home
Income
Number of rooms in home

Prestige

Level of education
Occupational status

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O'Hanlon, A. M. (1993). Inter-individual patterns of intellectual aging: The influence of environmental factors. Unpublished doctoral dissertation, Pennsylvania State University, Pennsylvania.

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Table 3

Variables Defining Leisure Dimensions

Household

Cooking
Household chores
Shopping

Education/Culture

Participation in educational
    activities
Cultural activities

Fitness

Participant sports
Outdoor hobbies

Social

Visiting
Social life and parties

Solitary

Solitary games or hobbies
Handicrafts

Communication

Day-dreaming and reminiscing
Writing/correspondence

Table 4

LCI Factors Univariate F Tests for the Sex, Cohort, and Sex X Cohort Interaction

Factor	df	Sex	df	Cohort	Sex X Cohort
Prestige	1,73	0.38	5,73	3.41*	1.87
Status	1,73	0.05	5,73	2.81*	1.65
Environment	1,73	0.10	5,73	1.58	0.27
Mobility	1,73	1.59	5,73	3.50*	0.35
Int. Env.	1,73	1.57	5,73	6.15**	1.59
Social	1,73	0.29	5,73	0.86	1.63
Work	1,73	2.01	5,73	5.75**	0.80

* $p < .01$
** $p < .001$

Table 5

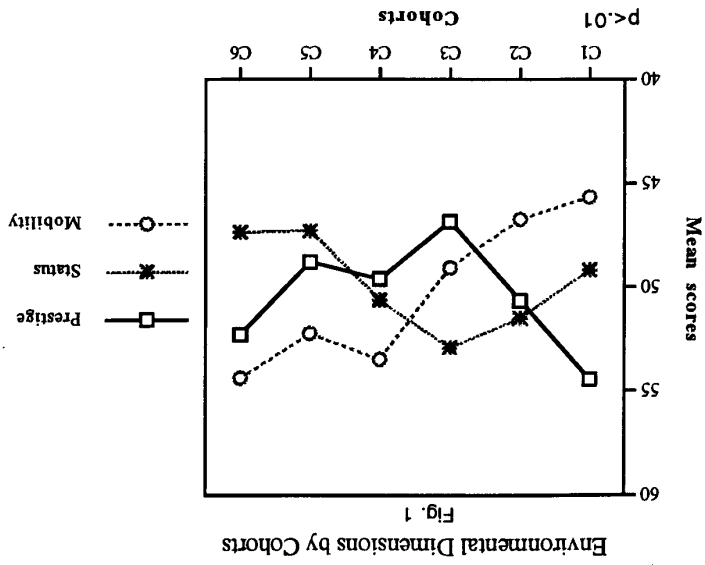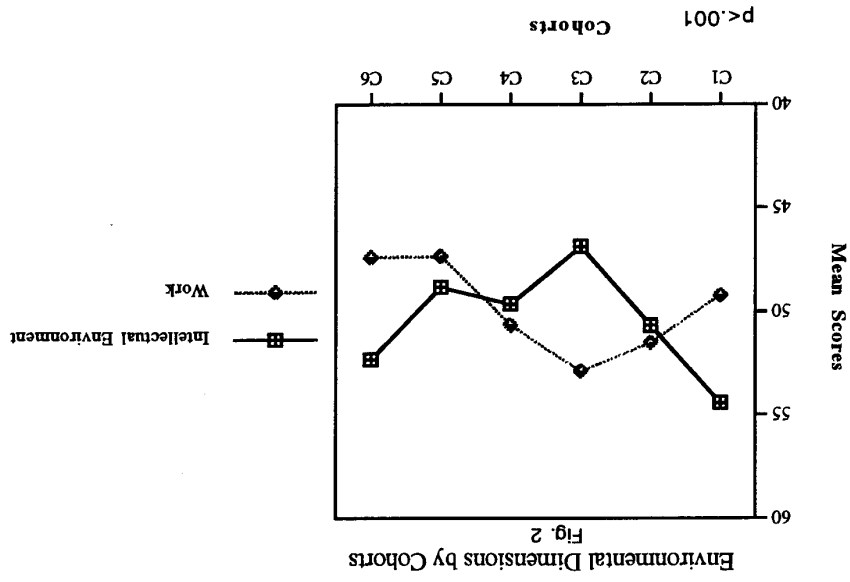### Activity Factor Univariate F Tests for the Sex, Cohort, and Sex X Cohort Interaction

Factor	df	Sex	df	Cohort	Sex X Cohort
Fitness	1,109	16.8***	5,109	1.89	2.19^
Educ/Cult.	1,109	1.15	5,109	3.67**	1.24
Social	1,109	1.55	5,109	1.16	0.83
Communication	1,109	3.43^	5,109	2.46*	2.29*
Solitary	1,109	11.06***	5,109	0.99	0.99
Household	1,109	20.01***	5,109	1.74	1.56

* $p < .05$ *** $p < .001$
** $p < .01$ ^ $p < .06$

Hours of Leisure Participation by Cohorts

Fig. 3

p<.003   ——☐—— Leisure participation per week
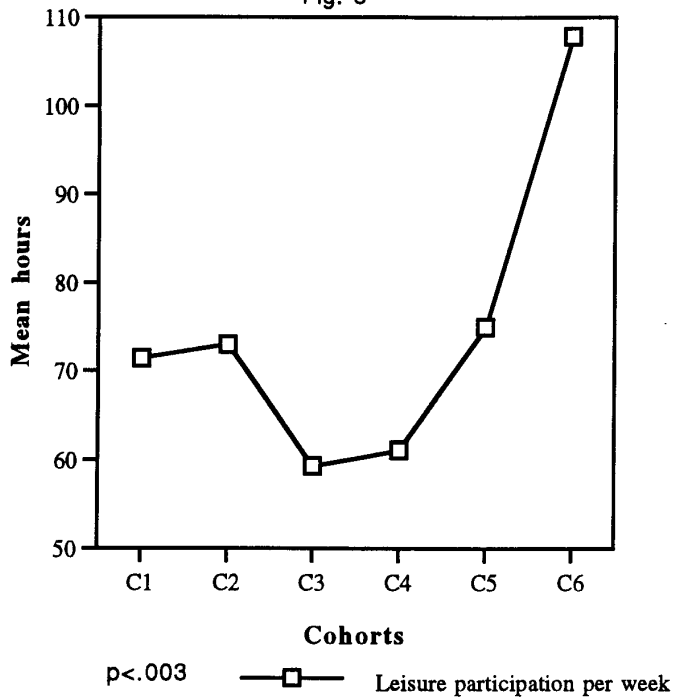
Education/Culture Activity by Cohorts

Fig. 4

p<.01   ——◼—— Participation of Educ/Cult activity
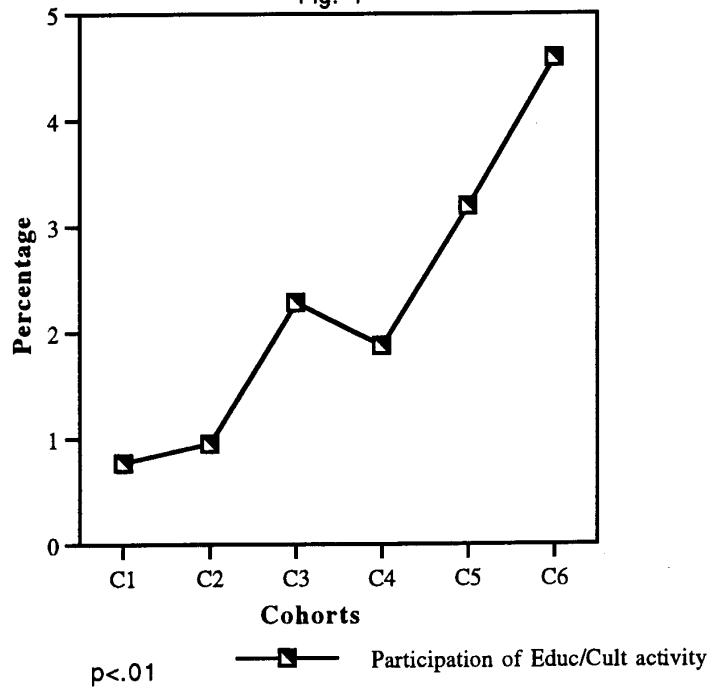
Communication Activity by Cohorts
Fig. 5

p<.05

━━━✚━━━ Participation of Communication activity
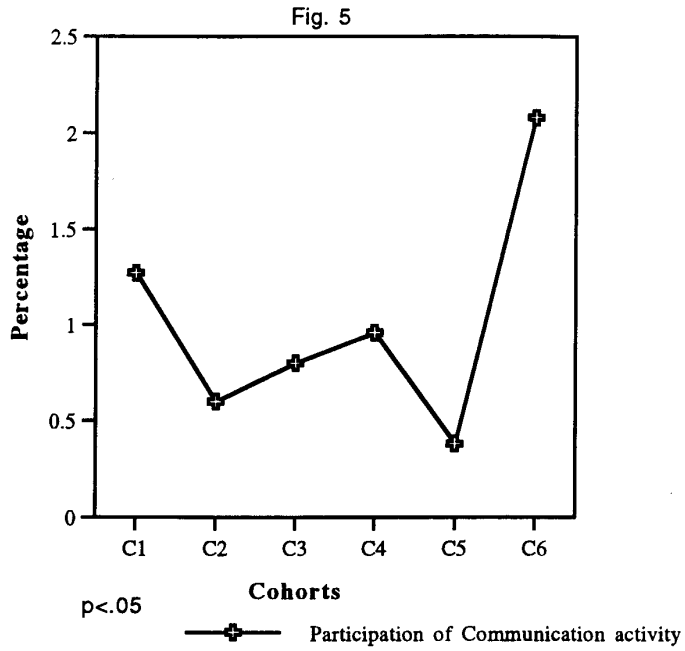
Leisure Activities by Gender
Fig. 6

━━⊕━━ Fitness

┅┅◆┅┅ Solitary

╌╌✳╌╌ Household

p<.001