Time Orientation Across Cultures

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Abstract

Time orientation, is potentially an important consideration in designing task environments and user interfaces for cross-cultural audiences. Several researchers have proposed questionnaire methods to evaluate the monochronicity or polychronicity (M-P) of people, but the questions that compose these instruments vary widely from one instrument to another. In this paper, we present a few different methods to quantify M-P and present results from 181 respondents to show the differences among different countries.

1 Introduction

Time is embedded so firmly in our life that people treat it as one of the most fundamental dimensions of life, similar to our attitudes about interpersonal space. One key aspect of time is related to people's behavior in terms of time usage (Hall, 1959; Francis-Smythe and Robertson, 1999). When people perform multiple tasks, some use a serial approach whereas others do many things at once (i.e, in parallel). Hall (1959) first distinguished these two behaviors as monochronic and polychronic behaviors. Monochronic behavior or monochronicity is doing one thing at a time, and polychronic behavior or polychronicity is doing many things at a time (Hall, 1983). The monochronic person always schedules tasks and they "permit only a limited number of events within a given period… Important things are taken up first and allotted the most time; unimportant things are left to be last or omitted if time runs out" (Hall,

1989). For a polychronic person, there is little or no effect when "things are constantly shifted around. Nothing seems solid or firm, particularly plans for the future, and there are always changes in the most important plans right up to the very last minute" (Hall, 1989). Society organizes time in everyday life in one of these two ways and the behaviors may be learned in the society (Hall, 1989). Thus, people belonging to different cultures may exhibit different types of behaviors in relation to time orientation. The aims of this paper are to evaluate potential differences in monochronicity and polychronicity among different cultures and to determine the similarities and differences of three M-P evaluation methods.

Researchers have proposed many different ways of measuring and quantifying polychronicity. These include the Polychronic Attitude Index (Kaufman et al., 1991), Polychronic Attitude Index 3 (PAI3 Kaufman-Scarborough et al., 1999), Monochronic/Polychronic predictor variables (Kaufman-Scarborough et al., 1999), Monochronic work behavior (Frei et al., 1999), Inventory of Polychronic Values (IPV) (Bluedorn et al., 1999), and the Representative Polychronic Index (Haase et al, 1979) (Table 1). Some of these scales have shown internal consistency with alpha coefficients of 0.80 or higher, appropriate for basic research as suggested by Nunnally (1978). These scales have been useful to show differences among cultures. For example, Lindquist et al. (2001) used a modified form of the PAI3 scale (MPAI3) and found that Japanese students were significantly monochronic when compared to their U.S. counterparts.

2 Methodology

A web questionnaire was used to collect data on time orientation. The first part of the questionnaire was designed to gather general demographic information and respondent's education and employment. The nationality of each respondent at time of answering the survey, and nationality by birth were also included in the first part of the questionnaire. The second part contained 44 questions related to time orientation and answered on a 7-point Likert scale (with 1 as strongly disagree to 7 as strongly agree and one added choice for don't know or not applicable). Of these 44 questions, 11 related to beliefs, 15 related to preferences, and 14 related to actions and 4 related to interruptions.

Table 1. M-P Scales. Each item uses a 7-point scale. Questions 2, 4, 5, 7, and 9 in the IPV scale and all the questions in the RPV scale were reverse scaled and hence each person can be categorized based on the mean of all items with 1 implying a highly monochronic person and 7 a highly polychronic person.

Modified Polychronic Attitude Index 3 (MPAI3)

1. I like to juggle several activities at the same time.
2. I am comfortable doing several activities at the same time.
3. People should try to do many things at once.

Inventory of Polychronic Values (IPV) - modified for individuals

1. I like to juggle several activities at the same time.
2. I would rather complete an entire project every day than complete parts of several projects.
3. I believe people should try to do many things at once.
4. When I work by myself, I usually work on one project at a time.
5. I prefer to do one thing at a time.
6. I believe people do their best work when they have many tasks to complete.
7. I believe it is best to complete one task before beginning another.
8. I believe it is best for people to be given several tasks and assignments to perform.
9. I seldom like to work on many tasks or assignments at the same time.
10. I would rather complete parts of several projects every day than complete an entire project.

Representative Polychronicity Index (RPI)

1. When too much is going on at once I really become disorganized.
2. Crowds make me uncomfortable.
3. Nowadays there is so much new information thrown at a person that it is impossible to keep up with things.
4. When working on a project, I take one thing at a time.
5. People who cannot stick to a schedule are usually not very effective.

The purpose of the questionnaire was to evaluate the time orientation of the respondents. Using the survey results, the M-P index was calculated for each scale: MPAI3 (Lindquist et al., 2001), IPV (Bluedorn et al., 1999) and the RPI (Haase et al., 1979). The questions are shown in Table 1. In this paper, we report the responses of 181 respondents. The respondents so far are 117 Americans, 13 Chinese and 51 other nationality persons.

3 Results and Analysis

3.1 Simple Statistics

The demographics and the simple statistics of each scale (N=181) are shown in Tables 2 and 3. Some of the questions were reverse-scaled so that 1 is "strongly agree" and 7 is "strongly disagree". These included questions 2, 4, 5, 7, and 9 in the IPV scale and all the questions in the RPV scale.

Table 2 Demographic Characteristics

Variable	Number	Percentage
Gender		
Male	107	59%
Female	74	41%
Age (years)		
Between 20 and 29	52	29%
Between 30 and 39	58	32%
Between 40 and 49	40	22%
50 or more	31	17%
Education		
High School	7	3.9%
Undergraduate degree	50	27.6%
Graduate degree	110	60.8%
Other	14	7.7%

The scale value was chosen to be the mean of the scale items in order to be consistent among the scales. Figures 1 and 2 show the scale scores by the respondents' current nationality and birth nationality.

Table 3. Simple Statistics (1 is highly monochronic and 7 is highly polychronic)

	Minimum	Maximum	Mean	Std Dev
MPAI3	1.00000	7.00000	4.53591	1.29747
IPV	1.10000	6.50000	4.22224	1.16999
RPI	2.00000	6.40000	3.77127	0.90680

3.2 Analysis of Variance

A one-way (country of nationality) ANOVA with the scale value as dependent variable was performed for each of the three scales. Unlike before, the published method for calculating the MPAI3 score was used. That is, the MPAI3 scale score for the ANOVA was the summation of the three items (Lindquist et al., 2001), rather than the mean as used in Figures 1 and 2.
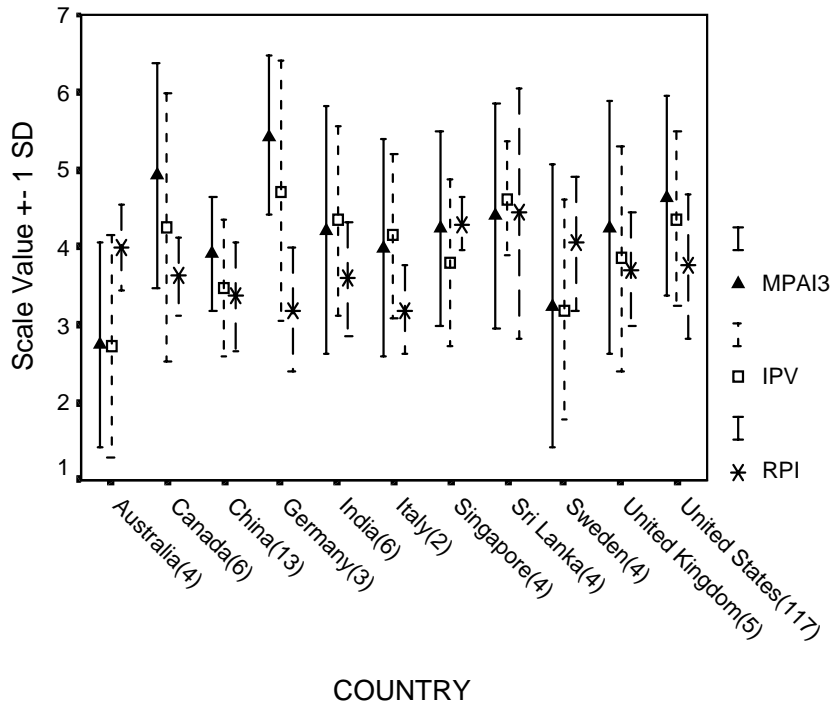

Figure 1. Mean Scale values (mean ± 1 standard deviation) for respondents current nationality. Only countries that have 2 or more respondents are shown.

Current nationality. The ANOVA on current nationality showed a significant difference ($F_{(10,157)} = 1.92$; $p = 0.0457$) for IPV, a trend ($F_{(10,157)} = 1.88$; p 0.0518) for MPAI3 and no significant difference ($F_{(10,157)} = 0.93$; p =0.5111) for RPI.

Birth nationality. The ANOVA with birth nationality as independent variable showed significant ($p < 0.05$) differences for IPV ($F_{(14, 157)}= 2.02$; $p = 0.0192$) and RPI ($F_{(14, 157)}=1.92$; $p = 0.0282$) scales.

3.3 Correlation Analyses

Even though many different methods exist for the evaluation of monochronicity and polychronicity, the relationship among the scales has not been researched. In an effort to better understand the differences and similarities among the three scales, a correlation analysis was performed. Table 4 shows the correlations among the three scales. All three scales have a significant ($p < 0.05$) correlation with each other. The MPAI3 and IPV scales are significantly correlated with each other with $R^2 = 0.73$.
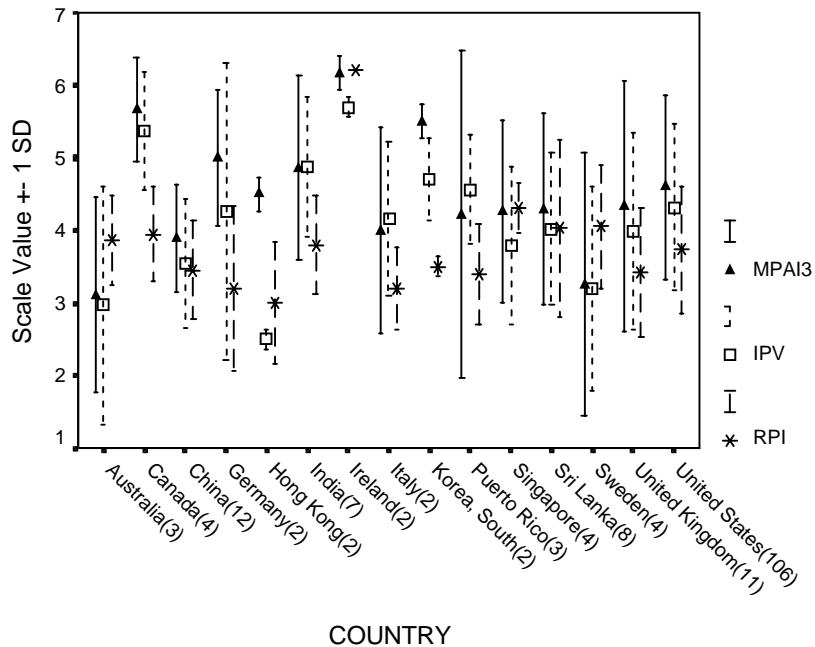

Figure 2. Scale values by birth nationality (mean ± 1 standard deviation). Only countries that have 2 or more respondents are shown.

3.4 Scale Reliability

Cronbach's alpha was used to assess the reliability of items in each scale. The Cronbach alpha reflects the consistency of a measure and the homogeneity of a scale. It is calculated as the proportion of variance contributing to the score that the experimenter intends to measure. If the inter-item correlations are high, then

Cronbach's alpha will be high and is an indicator that the items are measuring the same underlying construct. The alpha values with each item deleted is shown in Table 5.

Table 4 Pearson Correlation Coefficient (Prob > |r| under H0: Rho=0)

	MPAI3	IPV	RPI
MPAI3	1.00000		
IPV	0.85233 <.0001	1.00000	
RPI	0.34338 <.0001	0.39635 <.0001	1.00000

MPAI3. The Cronbach's alpha of the MPAI3 scale is 0.7263. It is lower than the reported value of 0.88 for US students, but higher than the 0.68 for Japanese males (Lindquist et al., 2001). In our survey, we find that the Cronbach's Alpha for U.S. respondents is 0.7639 (117 responses).   For other nationals,, the Cronbach's Alpha is 0.6559 (64 responses).   The difference is quite striking. The three questions of MPAI3 represent opinion with respect to preference, behavior and belief. Correlation analysis among the three questions show that people's preference and behavior are highly correlated (R= 0.708; p <0.0001). The correlations between belief and preference (R= 0.42802; p <0.0001) and between belief and behaviour (R=0.27761; p <.0001) are much lower. Deleting item 3 (belief) of the MPAI3 scale increases the Cronbach's alpha to 0.8261 (Table 5). The differences between US and other nationals may be related to the differences among beliefs, preferences, and behavior.

IPV. The Cronbach's alpha of the IPV scale is 0.8733, while the alpha is 0.8648 for the US respondents and 0.8838 for other nationality respondents.   These values are comparable to those in Bluedorn et al. (1999) where the alpha value 0.86 based on a sample of 115 senior business majors.

RPI. The Cronbach's alpha of the RPI scale is 0.2992 and is relatively low. The alpha for the US respondents were 0.3549 (117 responses) and the alpha for the other nationality respondents were 0.1812 (63 responses).

4 Discussion and Conclusions

Three published scales for measuring monochronicity and polychronicity were assessed using a web-based questionnaire. Even though the responses from nationals of some countries are quite few, we have been able to acquire a

reasonable sample size from USA. The analysis of variance showed a significant difference among the different countries (current nationality and birth nationality) for IPV. The RPI scale also showed significant differences among

Table 5. Reliability and item-to-total analysis

Scale	Cronbach's Alpha	Question	Alpha if question is deleted
MPAI3	0.7263	1	0.4330
		2	0.5994
		3	0.8261
IPV	0.8733	1	0.8519
		2	0.8570
		3	0.8643
		4	0.8665
		5	0.8492
		6	0.8686
		7	0.8655
		8	0.8679
		9	0.8519
		10	0.8666
RPI	0.2992	1	0.2140
		2	0.2653
		3	0.2102
		4	0.2435
		5	0.3304

the birth nationalities. Considering the fact that the three questions in MPAI3 are included in the IPV scale, it is no surprise that here is a high correlation between these two scales. Interestingly, the reliability of the IPV scale is even higher than the original study conducted by Bluedorn et al. (1999). Considering all these factors, it appears that IPV scale may be the most appropriate scale for measuring monochronicity and polychronicity.

References

Bluedorn, A.C., Kalliath, T.J., Strube, M.J. and Martin, G.D. (1999). Polychronicity and the Inventory of Polychronic Values (IPV): The development of an instrument to measure a fundamental dimension of organizational culture. *Journal of Managerial Psychology*, 14(3-4), 205-230.

Francis-Smythe, J. and Robertson, I. (1999). Time-related individual differences. *Time and Society*, 8(2), 273-292.

Frei, R.L., Racicot, B. and Travagline, A. (1999). The impact of monochronic and Type A Behavior patterns on research productivity and stress. *Journal of Managerial Psychology*, 14(5), 374-387.

Haase, R.F., Lee, D.Y., and Banks, D.L. (1979). Cognitive correlates of polychronicity. *Perceptual and Motor Skills*, 49, 271-282.

Hall, E.T. (1959). *The silent language*. New York: Fawcett Publications.

Hall, E.T. (1983). *The dance of life: the other dimension of time.* New York: Anchor Press.

Hall, E.T. (1989). *Beyond culture.* New York: Anchor Press.

Hall, E.T. (1990). *The hidden dimension.* New York: Anchor Press.

Hall, E.T. and Hall, M.R. (1990). *Understanding cultural differences.* Yarmouth, Me: Intercultural Press**.**

Kaufman, C.F., Lane, P. M. and Lindquist, J. D. (1991). Exploring more than 24 hours a day: A preliminary investigation of polychronic time use. *Journal of Consumer Research*, 18(3), 392-401.

Kaufman-Scarborough, C. and Lindquist, J.D. (1999). Time management and polychronicity: Comparisons, contrasts, and insights for the workplace. *Journal of Managerial Psychology*, 14(3-4), 288-312.

Lindquist, J.D., Knieling, J. and Kaufman-Scarborough, C. (2001). Polychonicity and consumer behavior outcomes among Japanese and U.S. students: A study of response to culture in a U.S. university setting. In *Proceedings of the Tenth Biennial World Marketing Congress.* City Hall Cardiff, UK.

Nunnally, J. C. (1978). *Psychometric Theory*, McGraw Hill, New York, NY.