

## Beliefs About Time: Cross-Cultural Comparisons

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**ABSTRACT.** Block, Saggau, and Nickol (1983–1984) investigated beliefs about time and temporal experience in a sample of American college students. In the present study, the same questionnaire was administered to students in Japan and Malawi. Factor analysis revealed similarities and differences in the structure of beliefs reported by students in the three countries. Belief structures and beliefs concerning physical time and personal time were somewhat different across the three groups, suggesting cultural influences. However, belief structures and beliefs about experienced duration and remembered duration were similar across cultures.

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**CULTURE MAY BE DEFINED** as “the human-made part of the environment” (Triandis, 1994, p. 111), which includes both objective and subjective elements, such as beliefs. Beliefs are cognitive structures linking objects, events, and concepts with other such structures. Psychological time is a prototypical example of a constellation of human-made beliefs, because most theorists think that psychological time is a cognitive construction that is influenced by many factors (Block, 1990; Doob, 1971).

Several writers have described the conception or use of time in people from various cultures (Edlund, 1987; Murungi, 1980). Gurevich (1976) noted that “representations of time are essential components of social consciousness, whose structure reflects the rhythms and cadences which mark the evolution of society and culture” (p. 229). Researchers have focused on variables that influence temporal concepts and experiences, but only a few have systematically studied relat-

ed cross-cultural differences (Block, 1994). We may classify this research in terms of the major aspect of psychological time studied:

1. Time perspective. Most cross-cultural research on psychological time has focused on differences in time perspective or beliefs concerning the importance of the past, present, and future (Carter, 1991; Jones, 1988; Zaleski, 1994). Using only American students, Ibrahim and Kahn (1987) developed and tested a scale to assess world views based on C. Kluckhohn's (1956; see also F. R. Kluckhohn & Strodtbeck, 1961) proposal that five existential categories characterize value orientations and their relative emphasis in different cultures. Time orientation ("What is the temporal focus of human life?") is one of them. Sodowsky, Maguire, Johnson, Ngumba, and Kohles (1994) used Ibrahim and Kahn's scale to compare the relative focus on the past, present, and future in White American, mainland Chinese, Taiwanese, and African students at the University of Nebraska. The finding most relevant to the present study was that, compared with White Americans, Africans focused more on the past and the present, but not significantly more on the future. Several other researchers (Meade, 1972; Mehta, Rohila, Sundberg, & Tyler, 1972) studied only future time perspective, finding some cross-cultural differences. Differences in temporal orientation, especially in future-time perspective, may have important individual and societal consequences (Zaleski, 1994).

2. Pace of life and punctuality. Using various measures of tempo, punctuality, and timekeeping, Levine (1988, 1990; Levine & Bartlett, 1984) found substantial cross-cultural differences. Pace of life was generally faster in industrial than in nonindustrial cultures, and it tended to be faster in larger than in smaller cities. Levine related these measures to physiological measures such as the incidence of coronary heart disease.

3. Duration judgment. Deregowski (1980) suggested that different attitudes toward time may produce cross-cultural differences in duration estimation. Only a few researchers have investigated such differences, however (Eisler, 1992; Gay & Cole, 1967; Schwitzgebel, 1962; Shannon, 1976). There are too few studies to draw meaningful generalizations.

4. Meaning of temporal terms and concepts. Several researchers have

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explored meanings of temporal terms or concepts. Mass (1985) asked people from three ethnic groups in the Fiji Islands to rate temporal concepts (*future, change, permanence*, and other terms) on semantic differential-type scales. Some groups differed in ways most related to degree of urbanization and level of education.

In short, research has not yet suggested any systematic understanding of patterns of similarities and differences in psychological time across cultures.

Block, Saggau, and Nickol (1983–1984) assessed beliefs about time and temporal experience reported by college students at Montana State University who responded to a 65-statement questionnaire, the Temporal Inventory on Meaning and Experience (TIME), which contains statements concerning physical time, personal time (including temporal perspective), duration in passing (experienced duration), and duration in retrospect (remembered duration). Factor analysis of responses on 5-point Likert-type scales revealed a structure of beliefs containing 19 substantive and interpretable factors. Block et al. speculated about the origins of those beliefs, but the monocultural nature of their data limited the conclusions they were able to draw.

Hill and Stuckey (1992) administered the TIME to African American college students and reported a radically different factor structure, which they believed to be evidence that African American and Caucasian American students differ in cognitive style. However, Block (1993) reanalyzed Hill and Stuckey's data and discovered a systematic anomaly. Thus, their findings are not evidence for cultural differences in time-related beliefs.

In the present study, we used the TIME to investigate the extent to which the beliefs and belief structures of students living in other countries were similar to those of American students living in Bozeman, Montana, a small city in a relatively rural state.<sup>1</sup> Like all questionnaires on psychological time, the TIME does not include statements about all possible beliefs about time, whether reported by respondents from a single culture or by those from different cultures. Given the multifaceted nature of psychological time, such comprehensiveness is impossible. Most questionnaires on psychological time are limited to one facet, usually temporal perspective; however, the TIME is more comprehensive than most.

We decided to survey respondents living in a collectivist culture. Partly because Japan is regarded as such a culture and partly because many cross-cultural studies have focused on Japan (Triandis, 1994), we translated the TIME and administered it in Sapporo, Japan. Although the Japanese differ from Americans in linguistic, religious, and other cultural aspects, Japan is a comparably modern country. In fact, we expected that, compared with students living in the United

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<sup>1</sup>The present data were collected during the 1980s. Although pilot United States data were used for the initial selection and standardization of statements, we report a combined standardization of statements and separate factor analyses.

States, Japanese students would focus more heavily on time, perhaps concomitant with their relatively fast pace of life (Levine & Bartlett, 1984).<sup>2</sup>

We also decided to study students living in a less modern country. Partially in an attempt to obtain a preliminary assessment of the potential influence of language (i.e., questionnaire translation), we sought respondents who would understand English. We chose students living in Zomba, Malawi, because they understood English and differed from students living in the U.S.A. and Japan in cultural background and world views, presumably being partly traditional and partly modern (Sodowsky et al., 1994). Malawi is a Black-ruled independent country located in southeastern Africa. It was governed as a British colony prior to its independence in 1964, and recent decades have seen the continuation of English language and traditions.

The primary method we used was intracultural factor analysis, followed by cross-cultural comparisons (Leung & Bond, 1989). The primary data were within-society correlations, one set for each group: "It is precisely these differences in within-society correlations which are of interest from a culture point of view" (Hofstede, 1980, p. 29). Systematically comparing factor structures and mean responses to each statement yielded empirically based comparisons of beliefs about time and temporal experience across different cultures. Thus, we used an individual-level approach to assess cross-cultural similarities and differences (see Leung, 1989).

No comprehensive theory predicts whether or not cultural background influences beliefs about various aspects of time differentially—for example, to lesser or greater extents. Culture may influence beliefs about physical time, if only as a result of educational differences across different societies. We also expected to find substantial cultural differences in beliefs about personal time, which several researchers have observed. Beliefs about experienced and remembered duration may originate in metacognition of temporal characteristics of everyday events that are common to all humans. As a result, we expected relatively few cross-cultural differences in beliefs about those aspects of time.

## Method

### *Instrument*

Block et al. (1983–1984) have described the TIME and provided a complete listing of the 65 statements included on it, along with reliability data. Part A contains 16 statements about physical time, such as "The rate of passing of time is constant; that is, time does not speed up or slow down." Instructions emphasize

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<sup>2</sup>One cause or reflection of this focus on time is that the Japanese national television channel (NHK) almost always shows the current time in one corner of the screen, and all Japanese channels display it during the morning hours.

that the word *time* in these statements refers to physical time, not psychological time. Part B contains 23 statements concerning personal time, such as "My present will always be more important than my past or my future." In Parts A and B, participants responded on a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5). Part C contains 13 statements concerning experienced duration, such as "When I am busy, time seems to pass \_\_\_\_\_ compared to when I have little to do." The 5-point scale ranges from *very slowly* (1) to *very quickly* (5). Part D contains 13 statements concerning remembered duration, such as "When I remember a period of time during which I was busy, it seems \_\_\_\_\_ compared to an identical period of time during which I had little to do." The 5-point scale ranges from *very short* (1) to *very long* (5).

### *Respondents*

Block et al. (1983–1984) reported data from 403 students in introductory psychology classes at Montana State University (Bozeman), excluding several multivariate outliers. Although a few respondents were American Indians or African Americans, most were of mixed European descent (but heavily northern European, especially Scandinavian). To ensure that any similarities or differences in factor structures among countries could not be attributed to artifactual distortion of the underlying correlation matrices, we equated sample sizes. All American data analyses were based on 250 randomly selected respondents.

We collected the Malawian data from 256 students, all native Africans, in introductory psychology classes at the University of Malawi (Zomba). Although those university students were highly selected, they came from relatively low-quality high schools. All read and spoke English fluently, so that we did not need to translate the TIME. We excluded data from 6 multivariate outliers, leaving a sample size of 250.

We collected the Japanese data from 275 students, all native Japanese, enrolled in several introductory classes at the University of Hokkaido (Sapporo). Because most of those students did not read English very well, the TIME was translated into Japanese.<sup>3</sup> A back-translation was compared to the original version, and the wording and syntax of some statements was revised. Pilot testing, along with an independent meaning comparison by a bilingual individual, verified the quality of the translation. We excluded data from 10 multivariate outliers and 15 randomly selected respondents, again leaving a sample size of 250.

The samples contained about the same proportions of men and women, as well as respondents of various ages. However, along with differences in cultural

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<sup>3</sup>Sperber, DeVellis, and Boehlecke (1994) reviewed issues concerning methodology and validation of translated questionnaires. Partly because our study included comparisons with a culture that required no translation, we did not adopt some of the stringent methods used by Sperber et al.

background, there were some educational differences. Both Japanese and Malawians reported having taken a mean of 3.3 precollege physics courses, whereas Americans reported a mean of .6 such courses.

### *Analyses*

We first pooled all data and standardized the relationship between the two wording versions of each statement (roughly, opposites) and the 5-point rating scale. For each statement, we reversed the rating scale of each response to the wording version that received the lower overall mean rating. That technique was essential to control for possible response-scale biases that might differ from individual to individual or from culture to culture. We made three cross-cultural pairwise comparisons of overall mean responses to each statement, using the Bonferroni test, with  $\alpha < .017$ .

We performed preliminary principal-components analyses separately for each country, using the full 65-statement questionnaire. Matching and comparing factor structures would have been unwieldy, with about 19 factors and three two-way comparisons of countries; therefore, we conducted separate factor analyses for each part of the TIME. That procedure was justified in part by the fact that the proportion of actually to potentially significant correlations among statements from the four parts was much higher for statements from the same part than for those from different parts.

All factor analyses, calculated separately for each country and for each part, used the SAS FACTOR procedure (SAS Institute, 1991). Several criteria, including scree tests (Cattell, 1966, 1978), suggested the number of factors to extract. We performed several principal-factors analyses, using varimax rotation, varying the number of extracted factors until an interpretable solution emerged that contained the minimum number of factors, with no factor fission. In all cases, the number of factors in the reported solutions was equal to or less than that suggested by the scree test, and all factors discussed here had eigenvalues greater than 1.

We used the salient similarity index  $s$  (Cattell, 1978; Cattell, Balcar, Horn, & Nesselrode, 1969; Tabachnick & Fidell, 1989) to calculate the similarity in the pairwise comparison of factor pattern loadings. We treated variables with loadings greater than .30 as positive salient variables, those with loadings less than  $-.30$  as negative salient variables, and those with intermediate loadings as hyperplane variables.<sup>4</sup> An exception to the rule occurred when hyperplane counts differed; in those comparisons, we equated hyperplane counts by treating smaller factor loadings as salient (Cattell, 1978). For comparisons in which the appropriate factors to compare were unclear, we used the highest loading variable as a

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<sup>4</sup>A variable in the hyperplane is one that does not load substantially on the factor; it is essentially uncorrelated with those that load on the factor.

marker. Each resulting  $s$ -value can range from 0 (if there is no similarity in the two sets of factor loadings) to 1 (if there is complete similarity). The “significance of an  $s$ -value is conceived of as a departure from the probability of the value arrived at in the case of a purely chance relationship between the pattern of loadings in factor 1 and that in factor 2” (Cattell et al., 1969, p. 787).

## Results

The  $64 \times 64$  triangular matrix contained 2,080 correlations. At the  $\alpha = .01$  level,  $r(248) > |.161|$ , a proportion of .01 of these correlations were expected to be significant by chance. Overall, a proportion of .11 were actually significant in the United States data, .10 in the Japan data, and .08 in the Malawi data. The proportion of significant correlations to the total number of comparisons was greater for statements within a part than between two parts.

For the United States, Japan, and Malawi, respectively, the within-part proportions were .24, .35, and .12 for Part A; .14, .20, and .11 for Part B; .35, .15, and .15 for Part C; and .41, .56, and .24 for Part D. The only other consistently large proportions were those between Part C and Part D statements, which were .16, .09, and .12 for the respective countries. Performing separate factor analyses for each of the four parts was justified, therefore, although doing so suppressed potential factors with loadings from interpart statements.

A total of 23 eigenvalues were greater than 1 for Malawi, 24 for the United States, and 23 for Japan. Scree tests suggested about 16 substantive factors for Malawi, 17 for the United States, and 21 for Japan.

For each part of the TIME, we shall discuss the factors in the order that reflects the overall (combined) mean proportion of common variance explained by the factors, from largest to smallest.

### *Physical Time (Part A)*

Comparisons of overall mean responses revealed substantial cross-cultural differences in beliefs about physical time. A proportion of .73 of paired comparisons on Part A mean responses differed significantly, a higher proportion than for any of the other three parts. Americans and Malawians differed on 9 of 16 comparisons, Americans and Japanese on 12 of 16, and Japanese and Malawians on 14 of 16. According to the unidimensional metric that those comparisons imply, Malawians expressed views at one extreme, Americans were intermediate but similar to Malawians, and Japanese were at the other extreme.

Scree tests suggested five Part A factors for the United States, five for Japan, and six for Malawi. However, the most easily interpretable factor solutions were the four-factor United States and Japan solutions and the three-factor Malawi solution (see Appendix A). (In each appendix, factors appear in decreasing order of overall proportion of common variance explained, and statements appear in

decreasing order of overall factor loadings. Except as noted, only statements that loaded at least  $|.30|$  for two or more countries are listed. Statements appear in the wording version that received the most overall agreement. More complete versions of the appendixes showing factor loadings and mean responses are available on request. The Japanese version of the TIME is also available on request.)

*Physical time: Realism.* These Part A factors were the most similar across the three countries. All three factors had highly similar factor loadings (all  $ss = 1.00$ , exceeding the value expected by chance,  $p < .001$ ), mainly from three statements. A slight majority of respondents from all three countries tended to adopt the realistic view that physical time depends neither on the consciousness nor on the cultural background of an observer. Japanese respondents more strongly agreed that physical time is independent of consciousness and culture than did Americans and Malawians. The realistic view that physical time exists and is not just an invention of the mind was endorsed strongly by Japanese, less so by Americans, and even less by Malawians. This issue is distinct from the issue of whether physical time is essentially absolute or relative, on which respondents from the three countries also differed.

*Physical time: Progression.* Americans tended to agree with Newtonian ideas that time progresses from past to future and that it passes at a constant rate and continuously. The Malawi factor had similar factor loadings ( $s = .67$ ,  $p < .001$ ). Malawians agreed with those Newtonian ideas, but only the progression notion loaded high on this factor. The Malawians' beliefs that time is neither an energy nor a space-like dimension, which were also included in the United States factor, were more central to the Malawi factor. The Japan factor contained loadings moderately similar to both the United States and the Malawi factors (both  $ss = .50$ ,  $p < .01$ ). However, it did not contain the notion of a constant rate, and the belief in a continuous progression received less support. Japanese respondents disagreed more strongly than Americans and Malawians with the notion that physical time is cyclical. Thus, we cannot attribute their weaker belief in the progression of time to a belief that time is cyclical. Most Japanese students thought, instead, that the issue of whether or not time progresses at a constant rate was inseparable from the issue of whether time is absolute or relative.

*Physical time: Absolute versus relative.* These factors, which concerned the distinction between absolute (Newtonian) and relative (Einsteinian) time, were slightly similar (all  $ss > .40$ ,  $p < .05$ ). Americans were nearly equally divided between Newtonian and Einsteinian views on the issues of whether space and time are separate aspects or inseparably connected and whether or not time is a space-like dimension, but most sided with the Newtonian view that time is not affected by events. Like Americans, Japanese respondents were about equally divided



between Newtonian and Einsteinian views, although a slightly greater proportion of them reported relativistic (Einsteinian) beliefs. Compared with Americans and Japanese, Malawians agreed more strongly with the Newtonian ideas that the rate of passing of time is constant and that time is not affected by events.

*Physical time: Clocktime.* These factors revealed the view of most respondents that a clock validly measures physical time, but that one reliable clock is not sufficient to measure the passing of time in the universe. The United States factor was moderately similar to the Japan factor ( $s = .50, p < .01$ ). No similar factor emerged in the Malawi analysis (not even in a four-factor solution).

#### *Personal Time (Part B)*

Cross-cultural differences in reported beliefs about personal time were substantial, although differences among mean responses were not as numerous as those concerning physical time. A proportion of .48 of paired comparisons on Part B mean responses differed significantly ( $p < .017$ ). Americans and Malawians differed on 7 of 23 comparisons, Americans and Japanese on 12 of 23, and Japanese and Malawians on 14 of 23. According to this simple similarity metric, Americans and Malawians reported relatively similar beliefs, and both differed considerably from Japanese beliefs.

Scree tests suggested 6 Part A factors for the United States, 6 for Malawi, and 10 for Japan. The most easily interpretable factor solutions were the 6-factor United States and Malawi solutions and the 8-factor Japan solution. Of the four parts of the TIME, the factor structures in Part B were the most different among the three countries (see Appendix B).

*Personal time: Aspects.* These factors concerned important aspects of personal time, focusing especially on the past. The United States and Japan factors were moderately similar ( $s = .50, p < .01$ ). No comparable factor emerged in the Malawi data; these variables loaded on other factors. But respondents from all three countries agreed strongly and consistently with a temporal orientation in which the personal present and future are more important than the past.

*Personal time: Activities.* These factors reflected issues concerning temporal activities. The United States factor was similar to both the Malawi factor ( $s = .75, p < .001$ ) and the Japan factor ( $s = .50, p < .01$ ), but the latter were not similar ( $s = .25$ ). The marker variable concerned whether the experience of the passing of time depends on many factors or on a single factor. Respondents from each country did not agree on this issue. Compared with the United States and Malawi factors, the Japan factor contained high loadings on statements concerning attending to time, both in passing and in retrospect; Japanese students also more strongly reported paying considerable attention to time.

*Personal time: Relativity.* These factors concerned the relative nature of temporal experience, such as the belief of respondents in all three countries that temporal experience is influenced by a person's cultural background, state of consciousness, and involvement in a situation. The Malawi and Japan factors were highly similar ( $s = .75, p < .001$ ), the Malawi and United States factors were moderately similar ( $s = .50, p < .001$ ), and the United States and Japan factors were only slightly similar ( $s = .25, p < .05$ ). Compared with Americans and Malawians, Japanese agreed more strongly that relativistic influences change one's temporal experience.

*Personal time: Future.* These factors, which were similar (all  $ss > .60, p < .001$ ), reflected the importance of the future, along with a focusing of attention primarily on the future. Respondents from the three countries did not differ on future focus, although Malawians and Japanese reported that the future is slightly more important than did Americans.

*Personal time: Present.* These factors were similar for Japanese and Malawians ( $s = .67, p < .001$ ), but no comparable factor emerged in the United States analysis. Most respondents reported a tendency to focus on the present and to regard it as important, especially compared with the past. Malawians did not report being as focused on the present as the Americans and Japanese did.

*Personal time: Accuracy.* These factors, which were similar across all countries (all  $ss > .67, p < .001$ ), reflected beliefs about whether or not a person can usually estimate fairly accurately the length of an experienced or a remembered duration. Americans reported the most confidence in estimation accuracy, and Japanese the least. Ironically, there has been little evidence of much duration-judgment accuracy in other individuals (such as the American students) who have participated in some of our experiments.

*Personal time: Processes.* These factors concerned beliefs about whether experienced and remembered duration are a result of conscious, rational processes or unconscious, intuitive processes. The United States and Japan factors were highly similar ( $s = 1.00, p < .001$ ), and the Malawi factor was moderately similar to the others (both  $ss = .67, p < .001$ ). Japanese differed from Americans and Malawians in that they tended to report that duration experience is a product of unconscious, intuitive processes rather than of conscious, rational processes.

*Personal time: Regularity.* Respondents from all three countries reported that they prefer to have a set time for daily events and that they are more comfortable when they know what time it is. Only for Japanese respondents, however, did the regularity of personal time emerge as a separate factor. Because it included loadings from only two statements, its scope is unclear but may be related to the relatively fast pace of life in Japan.

### *Experienced Duration (Part C)*

There were relatively few cross-cultural differences in mean response to each Part C statement: A proportion of .31 of paired comparisons differed significantly ( $p < .017$ ). Americans and Malawians differed on 3 of 13 comparisons, Americans and Japanese on 4 of 13, and Japanese and Malawians on 5 of 13.

In each data set, a scree test suggested two factors. Because the factors were highly correlated, we adopted the more easily interpreted one-factor solutions (see Appendix C). Pairwise comparisons revealed a similarity of the three factors (all  $ss > .71$ ,  $p < .01$ ).

Respondents from all three countries reported that experienced duration seems to pass more quickly when one is busy, is in several places, is doing something pleasant, is in a changing environment, is doing something interesting, is performing several tasks, and is not particularly waiting for something. For Japanese respondents, only the first four of those variables loaded significantly.

### *Remembered Duration (Part D)*

As on Part C, there were relatively few cross-cultural differences in mean responses to each Part D statement: A proportion of .38 of paired comparisons differed significantly ( $p < .017$ ). Americans and Malawians differed on 5 of 13 comparisons, Americans and Japanese on 4 of 13, and Japanese and Malawians on 6 of 13.

Scree tests suggested two factors for the United States and Malawi and three for Japan. Because the factors were highly correlated, we adopted the more easily interpreted one-factor solutions (see Appendix D). Pairwise comparisons revealed a similarity of the three factors (all  $ss > .66$ ,  $p < .001$ ).

Respondents from all three countries reported that remembered duration seems longer if a person had little to do, did something boring, was in just one place, performed a single kind of task, did something unpleasant, or was in an unchanging environment. The Japan factor also included beliefs about several other variables that seem to affect remembered duration.

## **Discussion**

Respondents from Japan, Malawi, and the United States shared many beliefs and belief structures concerning time, but they also differed in several ways. If there had been only great similarities or large differences between the samples, interpretation of the findings would have been problematic. The finding of similarities suggests that methodological concerns such as adequacy of translation and questionnaire response standardization are not serious. The finding of differences suggests that the present questionnaire, the TIME, is probably sensitive to cultural factors.

Respondents from the three countries showed a somewhat similar structure of beliefs about physical time. Americans and Japanese showed four highly similar factors (overall mean  $s = .65$ ). Malawians showed only three factors, but their structures were similar to those of Americans (mean  $s = .75$ ) and Japanese (mean  $s = .63$ ). Responses to statements concerning the issue of absolute (Newtonian) versus relative (Einsteinian) time revealed the Japanese leaning toward Einsteinian, the Americans equally divided, and the Malawians very Newtonian.

The pattern of responses to statements concerning absolute versus relative notions of physical time contrasted with the pattern concerning the realism of physical time—that is, whether or not one's consciousness and cultural background influence physical time. Although the Japanese expressed relativistic views, they tended to be realistic. Malawians expressed absolutist views but tended not to be as realistic as the Japanese. Americans were intermediate on both factors. Because Malawians and Japanese differed considerably, whereas Americans were intermediate, physics background apparently was not the sole influence on beliefs about physical time.

Respondents differed most in their belief structures and beliefs concerning personal time. This part of the TIME was also the most factorially complex, with six to eight factors. Overall, Japanese differed considerably from Malawians and Americans, who were more similar in their belief structures and beliefs. Compared with the others, the Japanese reported a high level of attention to time, and a factor emerged in the Japan analysis concerning the need for regularity of personal time. They also more strongly agreed that a person's cultural and personal background influences temporal experiences and that temporal experience is a product of unconscious, intuitive processes.

The TIME distinguishes between the self-reported importance of the personal past, present, and future and the amount of attention focused on the three temporal divisions. Respondents from all three countries regarded the present and future as being more important than the past. In contrast to what the data of Sodowsky et al. (1994) suggest, not even Malawians reported focusing much on the past. In fact, both Americans and Malawians reported focusing slightly less on the past than did Japanese respondents. Malawians also showed that they accord slightly less importance and less focus to the present than did Japanese and Americans. This finding calls into question the finding of Sodowsky et al. that Africans are more focused on the present than are White Americans.

Respondents from the three countries did not differ in their reported focus on the future, but Malawians regarded the future as more important than did Americans, with the Japanese in the intermediate position. In short, compared with the other respondents, the Malawians reported being less present- and more future-oriented, the Japanese slightly more past- and present-oriented, and the Americans slightly less future-oriented. Differences between the present findings and those of Sodowsky et al. concerning Africans may reflect sampling differences: Sodowsky et al. surveyed Africans from a variety of countries who were

graduate students in the United States, whereas we surveyed Africans who were undergraduate students in Malawi.

Respondents from the three countries showed a similar structure of beliefs about experienced duration (mean  $s = .83$ ), and they were in agreement concerning variables that influence experienced duration. Several variables loaded in all three countries, including those concerning involvement in an activity, pleasantness of an activity, variability of location, and environmental change.

Respondents also showed a similar structure of beliefs about remembered duration (mean  $s = .78$ ), and they were in agreement concerning variables that influence remembered duration. The factor similarities were nearly as large as those concerning experienced duration. Several variables loaded in all three countries, including those concerning level, interest, variability, and pleasantness of activity, along with location variability and environmental change.

The present study revealed some substantial cross-cultural differences in reported beliefs about time and temporal experience. However, many factors underlying those beliefs, as well as many reported beliefs, were very similar across the three cultures. Of course, the present data were provided by college students living in modern countries or, in the case of Malawi, a relatively modern area of a developing country.

Because we did not obtain representative samples from each country, the present findings must be interpreted cautiously. Generalizing to other individuals in the same countries, or on the same continents (Murungi, 1980), is unwarranted. Issues of validity and generalizability can only be addressed by future research; Triandis (1994) has provided a cogent review of methodological issues. People living in more traditional societies who are not as influenced by modern views as are college students may have more radically different beliefs about time—perhaps a less abstract, more cyclical view of time that is closely linked with environmental regularities (Friedman, 1990).

In summary, cultural background apparently influences some, but not all, beliefs about time. Cultural influences on beliefs about personal time seem especially likely to occur, because those beliefs differed considerably among the three cultures. On the other hand, beliefs about experienced and remembered duration were extremely similar across the cultures. Perhaps everyday events that are common to people living in diverse cultures give rise to similar beliefs about variables that influence psychological time. This finding suggests that culturally diverse beliefs about variables that influence experienced and remembered duration may not differentially influence results of time-estimation experiments.

The present study, along with future assessment of other cultural groups, may clarify the various factors influencing the formation of temporal concepts and beliefs. A questionnaire such as the TIME appears to be the proper vehicle for making future cross-cultural comparisons of temporal belief structures and beliefs.

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## APPENDIX A

### Physical Time (Part A): Statements Loading on Each Factor

#### Physical Time: Realism

- Physical time does not depend on the consciousness of an observer.
- Physical time is the same for people from different cultures, because physical time is not affected by their concepts of time.
- Physical time exists; it is not just an “invention” of the mind.

#### Physical Time: Progression

- Time is progressive; that is, time always moves forward from the past to the future.
- The rate of passing of time is constant; that is, time does not speed up or slow down.
- Time is like the flowing of a river, because time passes continuously and inseparably.

Time is not an energy (like light); it is impossible to tap and control time.\*  
Time is not a space-like dimension, because it is impossible to change the rate or direction at which a person passes through time.\*  
Time is not cyclical; that is, time does not always move in a repetitive circle.\*

Physical Time: Absolute vs. Relative

Time is not affected by events (changes) in the physical universe.  
Space and time are inseparably connected, and form a four-dimensional structure.†  
Time is not a space-like dimension, because it is impossible to change the direction or rate at which a person passes through time.\*  
The rate of passing of time is constant; that is, time does not speed up or slow down.\*

Physical Time: Clocktime

A clock is a valid instrument to use in measuring time.  
The passing of time cannot be measured in an absolute way; that is, one reliable clock is not sufficient to measure the passing of time in the universe.†

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*Note.* Statements that loaded on more than one factor for a given country are asterisked (\*), and those that had predominantly negative factor loadings are daggered (†).

## APPENDIX B

### Personal Time (Part B): Statements Loading on Each Factor

Personal Time: Aspects

My past will always be less important than my present or my future.\*  
When I remember a period of time, how long it seems usually depends on many factors (such as, how I felt, where I was, what I was doing, and so on).†  
My present will always be more important than my past or my future.†

Personal Time: Activities

My experience of the passing of time usually depends on many factors (such as, how I feel, where I am, what I am doing, and so on).†  
When I remember a period of time, how long it seems is a result of conscious, rational processes.\*  
I am more comfortable when I know what time it is than when I do not know what time it is.\*  
I usually pay a lot of attention to how short or long a past (already experienced) period of time seems.  
I usually pay a lot of attention to how slowly or quickly time seems to be passing.\*

Personal Time: Relativity

The experience of time is different for people from different cultures; it is affected by their concepts of time.  
Time is experienced differently for a person involved in a situation and by a person uninvolved in it.  
My experience of time can change greatly during altered states of consciousness.\*  
I do not tend to focus my attention primarily on the past, rather than the present or the future.



**Personal Time: Future**

I tend to focus my attention primarily on the future, rather than the past or the present.  
My future will always be more important than my present or my past.

**Personal Time: Present**

My present will always be more important than my past or my future.  
I tend to focus my attention primarily on the present, rather than the past or the future.\*

**Personal Time: Accuracy**

When I remember a period of time I cannot usually estimate fairly accurately how long it was.  
When I am experiencing a period of time, I can usually estimate fairly accurately how long it is.†

**Personal Time: Processes**

My experience of the passing of time is a result of conscious, rational processes.  
When I remember a period of time, how long it seems is a result of conscious, rational processes.\*

**Personal Time: Regularity**

I generally prefer to have a set time for daily events, such as getting up, meals, and so on, rather than doing things unscheduled.  
I am more comfortable when I know what time it is than when I do not know what time it is.

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*Note.* Statements that loaded on more than one factor for a given country are asterisked (\*), and those that had predominantly negative factor loadings are daggered (†).

### **APPENDIX C**

#### **Experienced Duration (Part C): Statements Loading on Each Factor**

**Experienced Duration: Activity (Change)**

When I am busy, time seems to pass \_\_\_\_\_ compared with when I have little to do.  
When I am doing things in several different places, time seems to pass \_\_\_\_\_ compared with when I am doing things in just one place.  
When I am doing something pleasant, time seems to pass \_\_\_\_\_ compared with when I am doing something unpleasant.  
When I am doing something interesting, time seems to pass \_\_\_\_\_ compared with when I am doing something boring.  
When I am spending time in a changing environment, time seems to pass \_\_\_\_\_ compared with when I am spending time in an unchanging environment.  
When I am performing several different kinds of tasks, time seems to pass \_\_\_\_\_ compared with when I am performing a single kind of task.  
When I am not particularly waiting for something to happen, time seems to pass \_\_\_\_\_ compared with when I am waiting for something to happen.

**APPENDIX D**  
**Remembered Duration (Part D): Statements Loading on Each Factor**

Remembered Duration: Activity (Change)

- When I remember a period of time during which I had little to do, it seems \_\_\_\_\_ compared with an identical period of time during which I was busy.
- When I remember a period of time during which I did something boring, it seems \_\_\_\_\_ compared with an identical period of time during which I did something interesting.
- When I remember a period of time during which I did things in just one place, it seems \_\_\_\_\_ compared with an identical period of time during which I did things in several different places.
- When I remember a period of time during which I performed a single kind of task, it seems \_\_\_\_\_ compared with an identical period of time during which I performed several different kinds of tasks.
- When I remember a period of time which I spent doing something unpleasant, it seems \_\_\_\_\_ compared with an identical period of time which I spent doing something pleasant.
- When I remember a period of time which I spent in an unchanging environment, it seems \_\_\_\_\_ compared with an identical period of time which I spent in a changing environment.

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