

Culture and Beliefs About Time: Comparisons Among Black Americans, Black Africans, and White Americans

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ABSTRACT. The authors investigated the extent to which racial factors, cultural factors, or both influence a person's beliefs about physical time, personal time, and experienced and remembered duration. A total of 750 Black American, Black African, and White American students responded to a questionnaire on these beliefs about time. Factor analysis was used to compare belief structures. Pairwise comparisons, performed separately for each statement, tested the direction and strength of the reported beliefs. The groups showed many similarities, but they also showed some differences. All 3 groups differed in beliefs about physical and personal time, but they did not differ in beliefs about duration experiences. This evidence does not support simplistic views of racial or cultural influences. Culture may differentially influence beliefs about physical time and personal time. Beliefs about duration experiences may represent an etic factor that transcends cultures.

TIME IS A FUNDAMENTAL ASPECT of human experience, one shared by all humans. However, psychologists have observed cross-cultural differences in temporal behavior, such as pace of life (Levine, 1988, 1990, 1997); metaphors for time (Dahl, 1995); duration judgments (Eisler, 1992); and relative focus on past, present, and future (Sodowsky, Maguire, Johnson, Ngumba, & Kohles, 1994). Although temporal behavior may differ among cultures, basic conceptions of time may not. Excluding scattered anecdotal accounts, researchers have provided little data on this important issue.

Several questions are embedded in the issue of whether cultural differences in beliefs about time exist: Are these beliefs influenced by common factors or experiences that transcend cultural boundaries (etics); are these beliefs influ-

enced by culture-specific factors or experiences (emics); or are both possible? How do racial and ethnic differences contribute to beliefs about time, and do these differences relate to the larger culture in which the ethnic group may be embedded? Are differences in beliefs about time biologically (genetically) influenced, socially and culturally learned, or both?

In the present study, we examined cultural differences in beliefs about time. Although race has been used as a categorical variable in many psychological studies, many researchers have noted that there is greater biological and social variation within racial groups than there is between groups, and that the concept of race itself is scientifically suspect (see, for example, Alland, 1971; Jones, 1991; Lieberman, Stevenson, & Reynolds, 1989; Yee, Fairchild, Weizmann, & Wyatt, 1993; Zuckerman, 1990). Because of this within-group variation, race alone is not usually a psychologically meaningful predictor of behavior or attitudes (e.g., Gorey & Cryns, 1995; Zuckerman & Brody, 1988). There is also often confusion, even among psychological researchers, on the implications of heritability studies for the existence of biologically meaningful differences between the races (e.g., N. Block, 1995). Race (as well as ethnicity) is a marker variable for various psychosocial experiences and practices. Elements of these cultural experiences, if appropriately explicated and assessed, may account for more variance in beliefs about time than does race itself. Instead of being a categorical variable, race may involve a number of dimensions along which individuals vary. One of these dimensions may be beliefs about time.

Another issue is whether Black America and White America are two different cultures. Ruzgis and Grigorenko (1993) defined *culture* as a system of meanings. They found that a culture's relative levels of individualism–collectivism, which accounts for the relationship of individuals to groups, and of idiocentrism–allocentrism (interdependent–independent self-concepts) appear to be related to many intercultural differences. Several authors have proposed that Black (African) American culture is more collectivist than is the larger White American culture. Phinney (1990, 1995) suggested a three-dimensional characterization of culture or ethnicity that includes ethnic identity, acculturation, and type of minority status. Ogbu (1978) also emphasized the importance of the status of a minority group culture, and in particular, distinguished caste-like minority status, which involves political and economic subordination, and autonomous minority status. Examples of the latter include the Amish and other immigrant minorities who came to their new homes voluntarily, with positive expectations.

This research was supported in part by National Science Foundation grant ISP-8011449 to Montana State University. Versions of this article were presented at the meetings of the American Psychological Society, May 1998, and the International Association for Cross-Cultural Psychology, August 1998.

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These criteria also suggest that there may be cultural differences between Black Americans and White Americans.

Boykin (1986, 1994) argued that the African American culture is distinct from the White American culture, especially in its emphasis on spirituality, movement, affect, communalism, orality, and a socially defined time perspective. Baldwin and Hopkins (1990) delineated differences between African American and White American worldviews, especially differences regarding values, group relations, and assumptions regarding relations with nature. Authors of two other recent articles emphasized the importance of studies focusing on the experience of time in the Black experience (Adjaye, 1994; Mazrui & Mphande, 1994). Researchers who argue that there are important cultural differences between Black and White Americans often also emphasize that there are many cultural similarities between Black Americans and Black Africans. Our study allowed a test of that assumption with regard to beliefs about time.

R. A. Block, Saggau, and Nickol (1983–84) developed an instrument to assess beliefs about time and temporal experience, the Temporal Inventory on Meaning and Experience (TIME). The instrument contains statements concerning physical time, personal time (including temporal perspective), experienced duration, and remembered duration. Factor analysis performed on responses (on a 5-point, Likert-type scale) revealed a structure of beliefs containing 19 substantive and interpretable factors. Because the sample in that study by Block et al. consisted almost entirely of White Americans, they could not draw any conclusions about the origins of these beliefs.

Hill and Stuckey (1992) administered the TIME to a sample of African American college students and found a radically different factor structure for beliefs about time. Hill and Stuckey speculated that this different belief structure could represent a component of cognitive style differences between Black and White college students. However, R. A. Block (1993) reanalyzed Hill and Stuckey's data and suggested that their findings do not provide evidence of cultural differences in time-related beliefs.

R. A. Block, Buggie, and Matsui (1996) compared responses of students in Japan, Malawi, and the United States to the TIME. Factor analyses revealed that the belief structures and beliefs concerning physical time and personal time differed across the three cultural groups, but belief structures and beliefs about experienced duration and remembered duration were similar.

In the present study, we used the TIME to compare the beliefs and the belief structures of (a) a sample of Black (African) American students from Virginia State University, a historically Black American institution in an eastern U.S. urban environment; (b) a sample of Black African students in Malawi, an English-speaking country in southeastern Africa; and (c) a sample of primarily White American students from Montana State University, located in a rural western U.S. state.¹ These three groups allow comparisons that provide insights regarding racial and cultural contributions to the formation of beliefs about time.

If beliefs about time represent an etic factor, respondents from all three groups should report similar beliefs. If the larger culture is an important emic influence, the two American samples should be the most similar, and both should be different from the African sample. If biological factors are the more important influence, or if Black Americans and Black Africans share substantial cultural similarities, then the Malawi and Virginia State samples should be most similar, and both should be different from the Montana State sample. If Black American and White American cultures are substantially different and race is not an important factor in beliefs about time, then all three samples should differ from each other. Although the TIME does not assess all possible beliefs about time (an impossibility), it provides an assessment of several important aspects of psychological time. Thus, using the TIME affords an excellent opportunity to detect possible cross-cultural differences in a basic aspect of human cognition.

The methodology of this study involved intracultural factor analysis, followed by intergroup comparisons (Leung & Bond, 1989). Comparisons of beliefs about time and temporal experience across the three groups were accomplished by comparing both mean responses to each statement and the intragroup factor structures. This methodology enables a fine-grained assessment of intergroup similarities and differences (Leung, 1989).

There is no comprehensive theory regarding the extent to which cultural factors may differentially influence beliefs about various aspects of time, so predictions must be based on previous empirical findings. R. A. Block et al. (1996) found cross-cultural differences in beliefs concerning physical time and personal time; therefore, we also expected to find such differences. Block et al. also found similarities in beliefs about experienced duration and remembered duration. They speculated that such beliefs may originate in metacognitive awareness of everyday events, which is shared by all humans. Assuming that this assertion is true, we expected to find relatively few intergroup differences in beliefs about experienced and remembered duration.

Of course, we can never prove the null hypothesis. However, the notion that there are relatively few cross-cultural differences in beliefs about experienced and remembered duration, or that those differences are small, would be strengthened by an additional failure to find an influence of cultural group on beliefs about experienced and remembered duration. The strengthening of this notion would come from the fact that there is abundant anecdotal evidence that Black Americans view time (especially matters of punctuality) differently than do White Americans. It would also come from evidence that the TIME is sensitive enough to detect cross-cultural differences in other beliefs about time, such as beliefs concerning physical time and personal time.

¹Although the Montana and Malawi data were collected during the 1980s and the Virginia data were collected during the 1990s, we think that beliefs about time reported here did not change much during the approximately 10-year time span.

Method

Instrument

R. A. Block et al. (1983-84) provided a complete description of the TIME, along with reliability data. Each of four questionnaire variants (differing in order and wording of statements) contains 65 statements divided into four parts: Part A contains 16 statements about physical time, Part B contains 23 statements concerning personal time, Part C contains 13 statements concerning experienced duration, and Part D contains 13 statements regarding remembered duration. Appendixes A through D show examples of statements from Parts A through D.

Respondents

R. A. Block et al. (1983-84) reported data from 403 students in introductory psychology classes at Montana State University (Bozeman). Although a few respondents were African Americans or American Indians, more than 99% were of mixed European descent (but heavily northern European, especially Scandinavian). In the present study, we equated the sample sizes for our three groups to ensure that any similarities or differences in factor structures among groups could not be attributed to artifactual distortion of the underlying correlation matrices. This procedure resulted in a random selection of 250 respondents from the Montana sample, and all subsequent data analyses were based on this number. The Montana sample was 63.6% women and 36.4% men. The mean age was 19.8 years ($SD = 3.7$).

The Malawian sample consisted of 256 students, all native Africans, enrolled in introductory psychology classes at the University of Malawi (Zomba). Although these students were highly selected, they came from relatively low-quality high schools and poor families. All read and spoke English fluently. We excluded data from several multivariate outliers, leaving a sample size of 250. The Malawi sample was 58.4% women and 41.6% men. The mean age was 21.1 years ($SD = 3.2$).

The Virginia sample consisted of 418 Black American students enrolled in several introductory classes at Virginia State University (Petersburg). After we excluded several multivariate outliers, 250 respondents were selected quasi-randomly to match closely the averages of the other two groups on sex and age demographics, as well as on the proportion of respondents using each variant of the TIME. The Virginia sample was 60.8% women and 39.2% men. The mean age was 20.7 years ($SD = 3.5$).

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. This technique was essential to control for possible response-scale biases that might differ from one individual or group to another. We made three intergroup pairwise comparisons of overall mean responses to each statement.

For principal components and factor analyses, we used the SPSS 7.0 Factor procedure (SPSS, 1996). We first performed a principal-components analysis for each group, using the complete 65-statement questionnaire. Matching and comparing factor structures would have been unwieldy with 16–23 factors (varying between groups) and three two-way comparisons of groups; therefore, we then conducted separate factor analyses for each part of the TIME. This procedure is 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. In subsequent factor analyses, we used scree tests to determine the correct number of factors to extract (Cattell, 1966b, 1978).² We performed several principal-factor 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 (Cattell, 1966a).³ In all cases, the numbers of factors in our reported solutions were equal to or less than those suggested by the scree tests, and all factors had eigenvalues greater than 1.

We used the salient similarity index s (Cattell, 1978; Cattell, Balcar, Horn, & Nesselrode, 1969; Tabachnick & Fidell, 1989) to ascertain the degree of similarity in the pairwise comparison of factor pattern loadings. We defined positive salient variables as those with loadings greater than .30, negative salient variables as those with loadings less than $-.30$, and hyperplane variables as those with intermediate loadings.⁴ When hyperplane counts differed, we equated hyperplane counts by treating smaller factor loadings as salient (Cattell, 1978). We used the highest loading variable as a marker when making comparisons in which the appropriate factors to compare were unclear. Each resulting s value can range from 0 (no similar pattern of factor loadings in the two sets) to 1 (an identical pattern of factor loadings in the two sets). The “significance of an s -value is conceived of as a departure from the probability of the value arrived at in the case of

²A scree test involves plotting the eigenvalue of each principal component, then inspecting the curve for a discontinuity or break from a shallow, linear slope involving higher numbered components (the “scree,” or meaningless components). Most factor analysts agree that a scree test is the best way to determine the correct number of factors to extract (Kline, 1994).

³As one increases the number of factors extracted from n to $n + 1$, factor fission occurs when a factor in the n factor solution splits into two highly correlated factors in the $(n + 1)$ -factor solution.

⁴A 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.

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 64×64 triangular matrix resulted in 2,080 correlations. At the $\alpha = .01$ level [$r(248) > |.161|$], a proportion of .01 of the correlations was expected to be significant by chance. Overall, a proportion of .11 was actually significant in the Montana data, .11 in the Virginia 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 of the TIME than between two parts. For the Montana, Virginia, and Malawi groups, respectively, these within-part proportions were .24, .15, and .12 for Part A; .14, .12, and .11 for Part B; .35, .31, and .15 for Part C; and .41, .28, and .24 for Part D. The only other consistently large proportions were those between Part C and Part D statements, which were .16, .15, and .12 for the respective groups. Performing separate factor analyses for each of the four parts was justified, therefore, although doing so would suppress potential factors with loadings from inter-part statements. These mostly involved a few minor factors in the original analysis (R. A. Block et al., 1983–84), factors that were indeterminate in that each of them contained loadings from only two statements.

A total of 24 eigenvalues were greater than 1.00 for the Montana group, 25 for the Virginia group, and 23 for the Malawi group. Scree tests suggested 17 substantive factors for Montanans, 23 for Virginians, and 16 for Malawians.

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

Our evidence offers several ways to decide on similarities and differences between each pair of groups in responses to the entire TIME questionnaire. First, one can tally the number of significantly similar factors. Of the 13 factors found in one or more groups, Montanans shared 9 significantly similar factors with both Virginians and Malawians; however, Virginians and Malawians shared only 6 significantly similar factors. According to this criterion, Virginians and Malawians seemed to be the most different pair of groups. Second, one can consider overall mean intergroup salient similarity of factors separately for each pair of groups. The greatest similarity was found between Montanans and Malawians (mean $s = .47$), intermediate similarity was found between Montanans and Virginians (mean $s = .42$), and the least similarity was found between Virginians and Malawians (mean $s = .32$). According to this criterion, Virginians seemed the most different from the other two groups, especially from Malawians. A third way to compare groups is by tallying significantly different mean responses to each of the 65 statements on the TIME. Montanans and Malawians differed significantly on 22 statements, Montanans and Virginians on 35, and Malawians and Virginians on 34. According to this criterion, Virginians also seemed the most different from the other two groups.

Of course, larger intergroup differences appeared on some parts of the *TIME*, and much smaller differences on others. In addition, we need to consider the direction of the differences (i.e., which group agreed more strongly with the statements on each of the factors). We now report the findings for each part and each within-part factor. Table 1 contains the salient similarity of pairwise comparisons of the three groups on each factor.

Physical Time (Part A)

Comparisons of overall mean responses revealed substantial group differences in beliefs about physical time. An overall proportion of .48 of intergroup paired comparisons on Part A mean responses differed significantly. Montanans and Malawians differed on 9 of 16 comparisons, Montanans and Virginians on 9 of 16, and Virginians and Malawians on 5 of 16. According to the unidimensional metric that these comparisons imply, Montanans were the most discrepant group in responses to Part A statements.

Scree tests suggested 5 Part A factors for Montanans, 4 for Virginians, and 6 for Malawians. However, the most easily interpretable factor solutions were the

TABLE 1
Salient Similarity of Factors in Pairwise Comparisons of Groups

Factor	Cultural groups compared		
	Montana/Virginia	Montana/Malawi	Virginia/Malawi
Physical time			
Progression	.67***	.67***	.67***
Realism	.33*	1.00***	.00
Absolute versus relative	.50**	.25	.25
Personal time			
Relativity	.67***	.67***	.50**
Activities ^a	—	.75***	—
Aspects ^a	.67***	—	—
Accuracy	.00	.67***	.50**
Processes	.33*	.33*	.33*
Future	.50**	.50**	.00
Present ^a	—	—	.33*
Experienced duration			
Aspects	.86***	1.00***	.86***
Remembered duration			
Aspects	.88***	1.00***	.88***

Note. See Appendixes A–D for a list of statements that loaded on each factor.

^aBecause no factor similar to this appeared for one of the groups, no comparisons involving that group are possible.

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

4-factor Montana solution and the 3-factor Virginia and Malawi solutions. We discuss these solutions here (see Appendix A).

Physical time: Progression. All three groups had highly similar loadings on this factor (see Table 1), mainly from five statements. Respondents from all three groups agreed with Newtonian ideas that time progresses from past to future and that it passes at a constant rate and continuously. Malawians tended to differ from Montanans and Virginians in their stronger agreement that time is neither energy nor a space-like dimension. Montanans and Virginians were similar in their agreement to statements that loaded on this factor, and they agreed slightly less than Malawians with the notion that time is progressive.

Physical time: Realism. This factor appeared mainly in the Montana and Malawi samples, for which the structures were identical. The Virginia structure was slightly similar to the Montana structure but not at all similar to the Malawi structure. Compared with the others, Montanans agreed more strongly with the realist view (as opposed to the view of quantum theory) that physical time exists independent from the mind or consciousness of an observer. Montanans did not agree as strongly with the view that time is the same for people from different cultures, a view held by most Virginians and Malawians.

Physical time: Absolute versus relative. This factor, which concerns the distinction between absolute (Newtonian) and relative (Einsteinian) time, was moderately similar between the Montana and Virginia groups, but the Malawi structure was not similar to that of the other two groups. Respondents in both American groups were nearly equally divided between Newtonian and Einsteinian views on the issues of whether space and time are separate aspects or similar dimensions that are unaffected by events in the universe. Compared with both American groups, Malawians agreed more strongly with these Newtonian ideas. (The Newtonian theory is the more intuitive; it matches "common sense" notions regarding the constant nature of time.)

Physical time: Clock time. This additional Part A factor appeared only in the Montana sample. It reflects the views that a clock validly measures physical time and that time is cyclical (perhaps because an analog clock is cyclical). Although this factor did not appear in the other groups' analyses (not even in a four-factor solution), respondents from all groups agreed with the several statements that loaded on this factor in the Montana sample.

Personal Time (Part B)

Intergroup differences in reported beliefs about personal time were also substantial. An overall proportion of .45 of intergroup paired comparisons on Part B

mean responses differed significantly ($p < .017$). Montanans and Malawians differed on 7 of 23 comparisons, Montanans and Virginians on 12 of 23, and Virginians and Malawians on 12 of 23. According to this simple similarity metric, Virginians were the most discrepant group in responses to Part B statements.

Scree tests suggested 6 Part B factors for Montana, 6 for Malawi, and 7 for Virginia. However, the most easily interpretable factor solutions were the three 6-factor solutions (see Appendix B).

Personal time: Relativity. This factor concerns the relative nature of psychological time, such as the beliefs of respondents in all three groups that it is influenced by a person's state of consciousness, cultural background, and involvement in a situation. All three groups showed a similar structure. Compared with Montanans and Malawians, Virginians tended not to agree as strongly that relativistic influences change one's experience of time.

Personal time: Activities. This factor, which reflects issues concerning temporal activities, appeared only in the Montana and Malawi analyses, in which the structures were highly similar. On the marker variable, the view that the experience of time passing depends on many factors, Montanans and Malawians were fairly evenly divided, but Virginians tended to agree. Respondents from all groups agreed equally strongly that conscious, rational processes are involved in memory for a time period and that they are more comfortable when they know what time it is.

Personal time: Aspects. This factor, which concerns important aspects of personal time, appeared only in the Montana and Virginia analyses, in which the structures were highly similar. Respondents from all groups agreed strongly that the personal present is more important than the personal past or personal future. Compared with Virginians, the other respondents agreed more strongly that the past is less important than the present or future.

Personal time: Accuracy. This factor reflects beliefs about the extent to which one pays attention to the length of an experienced or a remembered duration and can usually estimate it accurately. The Malawi structure was highly similar to that of the other two groups, but the latter structures were *not similar*. Montanans reported the most confidence in estimation accuracy. Respondents in all three groups reported an equivalent amount of attention to time passing, but Virginians reported relatively more attention to the length of a past time period.

Personal time: Processes. This factor concerns whether experienced duration and remembered duration result from conscious, rational processes. The three structures were only slightly similar. Responses to statements loading on this factor were comparable for the three groups, except that Malawians agreed more strongly that the experience of time results from conscious, rational processes.

Personal time: Future. This factor reflects the amount of attention focused on the future, as well as the importance of the future. The marker variable asserts that one tends mainly to focus attention on the future rather than on the past or present. The Montana structure was moderately similar to the other two groups' structures, but the latter structures were not similar. Respondents from the three groups did not differ systematically on responses to statements loading on this factor.

Personal time: Present. This factor, which reflects the view that one focuses considerable attention on the present, appeared only in the Malawi and Virginia analyses. The marker variable, a statement asserting that one focuses primarily on the present, received less agreement from Malawians than it did from the other respondents. Virginians agreed more strongly than other respondents that they have only a vague idea of what time is. A statement about the importance of the future loaded negatively.

Experienced Duration (Part C)

In each data set, a scree test suggested two Part C factors. Because the factors were highly correlated, we adopted the more easily interpreted one-factor solutions (see Appendix C). The three structures were highly similar.

There were some substantial intergroup differences in mean response to each Part C statement: An overall proportion of .51 of paired comparisons differed significantly ($p < .017$). Montanans and Malawians differed on only 3 of 13 comparisons, Montanans and Virginians on 8 of 13, and Virginians and Malawians on 9 of 13. The Virginia group was clearly the most discrepant.

Despite these differences, respondents from all groups agreed strongly that experienced duration seems to pass more quickly when one is busy, moves among 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. Responses of the Virginia group were quantitatively, but not qualitatively, discrepant from the two other groups: They did not agree quite as strongly with statements about various factors that influence experienced duration.

Remembered Duration (Part D)

Scree tests suggested two Part D factors for all groups. Because the factors were highly correlated, we adopted the more easily interpreted one-factor solutions (see Appendix D). The three structures were highly similar.

A proportion of .46 of paired comparisons on Part D differed significantly ($p < .017$). Montanans and Malawians differed on 5 of 13 comparisons, Montanans and Virginians on 6 of 13, and Virginians and Malawians on 8 of 13. As on Part C, the Virginia group was the most discrepant.

Respondents from all three groups agreed that remembered duration seems

longer if a person has little to do, does something boring, stays in just one place, performs a single kind of task, does something unpleasant, or is in an unchanging environment. As on Part C, the Virginia group was quantitatively, but not qualitatively, discrepant from the other groups: They did not agree quite as strongly with statements about various factors that influence experienced duration.

Discussion

Although respondents from Virginia, Malawi, and Montana shared many beliefs and belief structures concerning time, they also differed in significant ways. The finding of differences suggests that the questionnaire, the TIME, was sensitive to cultural factors related to beliefs about time in these three samples.

The findings of our study provide important evidence on the issue of whether the main determinants of beliefs about time are common cultural experiences or common genetic, or racial, factors. If culture is relatively more important, then the two American groups should have been the most similar. If common genetic or racial factors are important, or if Black Americans share more common cultural traits with Black Africans than they do with White Americans, then the two Black groups should have been the most similar. Our data fit neither pattern: In general, all three groups were quite similar, but the Virginians (Black Americans) differed the most from the other two groups. This suggests either that ordinary assumptions about cultural and genetic determinants of beliefs about time are naive or that assumptions about the genetic and cultural similarities of Black Africans and African Americans are naive.

This latter statement is almost certainly true. There is considerable genetic variation among African peoples. In addition to several centuries of interbreeding with Caucasians and Native Americans, most African Americans are descendants of West African groups, like the Fulani, who are genetically dissimilar to the Bantus of Malawi, and both differ genetically from other African groups, such as the Xhosa of South Africa (e.g., Marks, 1995). There are also possible differences regarding behaviors related to time. For example, in Malawian culture, punctuality is emphasized. All public clocks must show the correct time; otherwise, the clock owner is supposed to be fined. In contrast, there is a stereotype within African American culture that African Americans have a relaxed view toward punctuality, as evidenced by the in-group expression, "colored people's time," which refers to the tendency for scheduled events to start late and for attendees to arrive accordingly. American Indians, among other cultural groups, also display this kind of time-related behavior (Levine, 1997, provides a good discussion of this topic).

Neither a simplistic view of genetic determinants of temporal experience and beliefs nor an environmental (cultural) view seems appropriate. However, on the issue of specific intergroup similarities and differences, we need to look separately at the four parts of the TIME.

Respondents from the three groups showed a somewhat similar structure of beliefs about physical time. Montanans and Virginians shared three similar factors (mean $s = .50$). Although Montanans and Malawians shared only two significantly similar factors, the overall similarity of the three factors was high (mean $s = .64$). Malawians and Virginians shared only one significantly similar factor (mean $s = .31$). According to this metric, Black Americans were the most discrepant group. Responses to statements concerning the issue of absolute (Newtonian) versus relative (Einsteinian) time showed the American groups equally divided, whereas the Malawians tended more toward the Newtonian interpretation. 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 one's consciousness and cultural background influence perceptions of physical time. Although the Montanans expressed relativistic views, they exhibited a greater tendency toward realism than the other groups did (i.e., they tended to agree more strongly that time exists independently of the consciousness of an observer). Malawians expressed absolutist views and tended to agree with the view that time is the same for people from different cultures, as did the Virginians. Physics background apparently was not the sole influence on these beliefs about physical time. Malawians averaged 3.3 postsecondary courses on physics, whereas Montanans averaged only 0.6. We do not have data on the mean number of such courses for the Virginia sample, but only 14% reported having taken any college-level physics classes.

Respondents differed in their belief structures and beliefs concerning most aspects of personal time, although there were some similarities. For the seven factors identified, the factor structures were similar for all groups only on the factor concerning the relative nature of temporal experience, the factor reflecting beliefs about the accuracy of duration estimates, and the factor concerning whether experienced duration and remembered duration result from conscious, rational processes. One factor (reflecting issues concerning temporal activities) appeared only in the Montana and Malawi analyses, one (concerning important aspects of personal time) appeared only in the Montana and Virginia analyses, and one (concerning focus on the present) appeared only in the Virginia and Malawi analyses. Compared with the others, Virginians agreed less strongly that relativistic factors influence the experience of time and more strongly that the experience of time passing depends on many factors.

There were also intergroup differences in the importance of the personal past, present, and future, as well as in the amount of attention focused on these three temporal zones. Malawians and Montanans regarded the present and future as being more important than the past, whereas Virginians showed a weaker future orientation and a greater focus on the past than the other groups. Compared with the other groups, Malawians regarded the present as being less important and the future as being more important.

Respondents from all groups showed a similar structure of beliefs about

experienced duration (mean $s = .91$), and they were in agreement concerning variables that influence it. Seven variables loaded significantly and in approximately the same order for all groups, 1 additional variable loaded for the Montana sample, and 6 other variables did not load in any group.

Respondents also showed a very similar structure of beliefs about remembered duration (overall mean $s = .92$), and they were in agreement concerning variables that influence it. Seven variables loaded significantly and in approximately the same order in all groups, 1 additional variable loaded for the Virginia sample, and 5 other variables did not load in any group.

Our study has revealed some substantial intergroup differences in beliefs about time and temporal experience; however, many factors underlying these beliefs, as well as many of the beliefs, were similar across the three groups. One must interpret these findings cautiously because college students may not be representative of the wider population, particularly in the case of a developing country like Malawi. Also, as Murungi (1980) noted, even with a representative sample for a given country, it is problematic to generalize over the continent of Africa.

Despite these caveats, the consistencies in the findings of this study and that of R. A. Block et al. (1996), which involved comparisons of Japanese students with Malawians and Americans, allow us to draw some tentative conclusions regarding the relationship of culture and beliefs about time. Cultural differences in beliefs about time appear to exist between White and Black Americans, as well as between Black Americans and this particular sample of Africans. The greatest cultural differences concern beliefs about personal time, which now have been found with samples from four cultural groups. Conversely, beliefs about experienced and remembered duration were similar across these groups. Metacognitive awareness of factors that lead to shortened or lengthened duration experiences may be remarkably similar, and therefore beliefs regarding these experiences may represent an etic factor that transcends cultures.

Future research investigating a variety of cultures is needed to address possible concerns regarding the internal and external validity of these findings. Because the TIME allows researchers to discriminate cultural differences in beliefs about time, it will be a useful instrument in future studies.

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APPENDIXES

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 in the text, only statements that loaded at least $|.30|$ for two or more groups are listed; nevertheless, the salient similarity index occasionally was computed using a few other statements. Statements appear in the wording version that received the most overall agreement. Statements that loaded on more than one factor for a given country are asterisked (*), and those that had predominately negative factor loadings are daggered (†). More complete versions of the appendixes showing factor loadings and mean responses are available on request.

APPENDIX A

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

Physical Time: Progression

Time is progressive; that is, time always moves forward from the past to the future.

Time is not an energy (like light); it is impossible to tap and control time.

The rate of passing of time is constant; that is, time does not speed up or slow down.

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 like the flowing of a river, because time passes continuously and inseparably.*

Physical Time: Realism

Physical time does not depend on the consciousness of an observer.

Physical time exists; it is not just an "invention" of the mind.

Physical time is the same for people from different cultures, because physical time is not affected by their concepts of time.

Physical Time: Absolute vs. Relative

Time is not affected by events (changes) in the physical universe.

Time is not a space-like dimension, because it is impossible to change the direction or rate at which a person passes through time.*

APPENDIX B

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

Personal Time: Relativity

My experience of time can change greatly during altered states of consciousness.

The experience of time is different for people from different cultures; it is affected by their concepts of time.

I do not tend to focus my attention primarily on the past, rather than the present or the future.

Time is experienced differently for a person involved in a situation and by a person uninvolved in it.

I do not tend to focus my attention equally on the past, the present, and the 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.

Personal Time: Aspects

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 past will always be less important than my present or my future.†

My present will always be more important than my past or my 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.†

I usually pay a lot of attention to how slowly or quickly time seems to be passing.

I usually pay a lot of attention to how short or long a past (already experienced) time period seems.

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: 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

I tend to focus my attention primarily on the present, rather than the past or the future.

APPENDIX C

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

Experienced Duration: Activity (Change)

When I am busy, time seems to pass _____ compared to when I have little to do.

When I am doing something interesting, time seems to pass _____ compared to when I am doing something boring.

When I am doing something pleasant, time seems to pass _____ compared to when I am doing something unpleasant.

When I am doing things in several different places, time seems to pass _____ compared to when I am doing things in just one place.

When I am performing several different kinds of tasks, time seems to pass _____ compared to when I am performing a single kind of task.

When I am spending time in a changing environment, time seems to pass _____ compared to when I am spending time in an unchanging environment.

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 to 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 to an identical period of time during which I did something interesting.

When I remember a period of time during which I performed a single kind of task, it

seems _____ compared to an identical period of time during which I performed several different kinds of tasks.

When I remember a period of time during which I did things in just one place, it seems _____ compared to an identical period of time during which I did things in several different places.

When I remember a period of time which I spent doing something unpleasant, it seems _____ compared to 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 to an identical period of time which I spent in a changing environment.

When I remember a period of time during which I was waiting for something to happen, it seems _____ compared to an identical period of time during which I was not waiting for something to happen.

Received May 26, 1999