TIME AND SOCIETY: A CROSS-CULTURAL STUDY

Warren D. TenHouten, University of California at Los Angeles

ABSTRACT

Spoken text of two cultural groups with broadly divergent forms of social organization–Australian Aborigines and Euro-Australians–is analyzed to reveal these two cultures' underlying form of social relations and temporal experience. A lexical-level content analysis of a corpus of 658 life-historical interviews is conducted to measure social-relationship and time-consciousness variables. Results of this analysis shows that members of Aboriginal culture, because of their emphasis on equality and community in their social relations, experience time as at once patterned-cyclical and present-oriented. Euro-Australians, in contrast, because of their greater emphasis on hierarchical and economic social relations, experience time as linear and episodic-futural. Moreover, it was found that Aboriginal culture is predominantly hedonic–a unity of conditional equality and communal sharing, with the result that their time-consciousness is Natural, a cognitive structure that is both patterned-cyclical and immersed in the present. Euro-Australian culture, in contrast, is predominantly agonic–a unity of hierarchical and economic social relationships, with a resulting Rational time-consciousness, based on a unity of linearity and futurality.

CONTENT ANALYSIS OF LIFE-HISTORY INTERVIEWS

The theory developed in the first two parts of this paper link four kinds of time-consciousness to four elementary forms of sociality. It is proposed that equality-matching social relations contribute to an immediate-participatory time; communal-sharing, to a patterned-cyclical time; authority-ranking, to an episodic-futural time; and market-pricing, to an ordinary-linear time. The combination of equality and community constitute hedonic society; of authority and market-oriented relations, agonic society. It is further proposed that participation in hedonic and agonic social relations contribute to a natural and rational experience of time, respectively, natural time being both present-oriented and cyclical, rational time both futural and linear.

The study of individual lives, as bearers of culture, in a general sense requires the use of text produced by individuals reflecting upon, and telling stories, 'yarning', about their lives and times. From Heidegger's (1962) notion of temporality stretched from birth to death as a basis of being, it becomes apparent that text appropriate for analysis of time-consciousness requires reflection upon one's entire life. The logic of this argument takes us immediately to life-historical interviews and autobiographies as arguably *the* most appropriate source of data. The life story represents an overall construction of the informant's past and anticipated future life, in which relevant experiences are linked up in temporally and thematically consistent patterns.

The dataset for this study consists of carefully edited transcripts from a corpus of 658 life-historical interviews: 204 Aboriginal males, 197 Aboriginal females, 155 Euro-Australian males, and 120 Euro-Australian females. These interviews were obtained throughout Australia and are roughly representative of the population. The Euro-Australians selected were, in large measure, selected with ancestry from the British Isles and Northern Europe, in an effort to reduce within-sample variation. Many of the interviews were obtained by the author, in collaboration with Aborigines from the New South Wales Aboriginal Family Education Centres Federation and others were obtained from institutes, libraries, private collections, and publications.

The methodology to be used is lexical-level content analysis of text, of all the words produced by the informant in the course of a life history. To this end, Roget's (1977) *International Thesaurus* was used. Roget provided a remarkable hierarchical classification of the English language. Roget developed an inventory of 1,042 "broad classes of words," here termed *folk-concepts,* which serve as multiple indicators of eight social relations variables and the four basic kinds of time-consciousness. Under the folk-concepts, Roget listed words and phrases which were used to generate lists of individual words. In many cases, the various forms of a word were assigned to different folk-categories. The division of words into their folk-concepts was based on the first meanings of the words and was a partition, such that words that fit two or more concepts equally

Table 2: Statistical Tests of Initial vs Final Quartiles for Roget's Folk Categories: Demand (Indicating the Positive Experience of Hierarchical Ranking) and Plan (Indicating Episodic-Futural Time-Consciousness)

Demand	t		t		t		t
ask	6.96	demand	4.81	insistent	2.02	taxed	1.42
asked	8.96	demanded	3.72	insisting	1.57	taxes	1.00
asking	6.12	demanding	3.74	insists	1.50	taxing	1.42
asks	1.42	demands	3.47	levy	1.00	tribute	2.15
blackmail	1.42	direction	3.66	requisition	1.51	tributes	1.00
blackmailed	1.41	directions	3.61	requisitions	1.51	ultimatum	1.00
claim	5.25	duties	2.73	stipulated	2.02	urge	2.49
claimed	2.83	duty	3.74	stipulation	1.00	urged	2.80
claiming	2.37	insist	2.39	superimposed	1.42	urging	2.89
claims	3.60	insisted	3.67	tax	2.84		
Will	**t**		**t**		**t**		**t**
choice	4.20	desire	3.65	solved	3.02	wish	5.57
choices	1.46	desired	1.07	solving	2.25	wished	4.22
choose	4.21	desires	1.46	volition	1.00	wishes	3.14
chooses	2.02	fate	3.07	will	8.80	wishing	3.02
choosing	1.16	initiative	2.44	willed	2.03		
chose	5.05	initiatives	2.00	willing	3.78		
chosen	5.12	solve	3.70	wills	3.38		

well were excluded from analysis, and no word was used in more than one word-list. If a person has a linear conceptualization of time, for example, we might expect the use of words that have to do with clocks, calendars, schedules, timing, durability and lateness, age in years, etc.

RESULTS

Measurement of Variables

In order to have some confidence that the words selected as indicators of folk-concepts are not measuring different concepts, for each candidate folk-concept, item analysis based on the method of summated ratings was carried out for all of the selected words assigned to every Roget folk-concept. This was done in two stages. In the first stage of item analysis, a summated rating–the proportion of total words spoken by the informant in the entire interview that were assigned to each folk-concept–was calculated. The top ¼ and the bottom ¼ of the sample were then compared, and then two-sample *t*-tests of differences between the means for the top and bottom fourths of the corpus were calculated separately for each word in the wordlist. If an individual word measures what the words measure collectively, then the mean for the top fourth should be higher than the mean for the bottom fourth. In the second stage, the top ½ and bottom ½ of the corpus were compared, with *t*-values again calculated for each word. In both stages, if one or both of the two *t*'s for a word was negative, the word was purged; if one *t* was greater than or equal to 1 and the other not computed (for rarely used words), or had a value between 0 and 1, the word was retained; and, of course, if both *t*-values were greater than or equal to 1, the word was retained. Two example wordlists, for *Will* (an indicator of episodic-futural time-consciousness) and *Demand* (an indicator of the positive experience of authority-ranking) are shown in Table 2. If a person in their cognitive structure emphasizes episodic information processing in general, and has an episodic-futural time-consciousness in particular, then that person should be expected to use the words grouped under the Roget category *Will*, as they refer to the exercise of will-power in the words they utter in their life stories. This, simply put, is the rationale for the content-analytic methodology.

Roget folk-categories were selected, on theoretical grounds, as indicators for: 1) the eight social-relations variables–the positive and negative experiences of communal sharing (*CS-pos*, *CS-neg*), of market pricing (*MP-*

pos, *MP-neg*), of authority ranking (*AR-pos*, *AR-neg*), and of equality matching (*EM-pos*, *EM-neg*); and 2) folk-concepts were selected to measure the four kinds of time-consciousness: patterned-cyclical (*PC*), ordinary-linear (*OL*), episodic-futural (*EF*), and immediate-participatory (*IP*).

The twelve sets of items were subjected to maximum likelihood factor analysis and Tucker-Lewis (TL) inter-indicator reliability coefficients were calculated. For these dozen variables, the final measure was the total number of words used from the list of folk-concept indicators, divided by the total words produced in the whole interview, with this quotient then multiplied by 10^4.

The ten *PC* and nine *CS* folk-category indicators span their seven-part definitions, as there is at least one measure for each of P1-P7 and for each of L1-L7, which contributes to their content validity. The second criteria for *PC* and *CS*, P2 and L2, were measured by interaction terms: P2, a fusion of the past and the present, was measured by *PastPres* =(Past*Present)$^{1/2}$ and L2, by *FuturePres*= (Future*Present)$^{1/2}$. For two of the *OL* criteria, wordlists were pooled: for L1, time as linear, the measure used was *Linear*=Length + Interval + Period; and for L6, *Quantity*=Measurement of Time + Frequency. While *OL* is, by definition, a single dimension, *PC* is by definition multidimensional, which is reflected in the Tucker-Lewis reliabilities *OL*=.90 and *PC*=.67, which suggests that *OL* came closer to being a single dimension than did *CS*.

EF time was measured by seven Roget wordlists that would appear to be face-valid and have good factor-score coefficients but the TL reliability of .49 was the lowest of the twelve variables. *IP* time had only three indicators, so one of them, *The Present*, was randomly split into two variables to over-identify the model and made possible a reliability estimate (TL=.81), which had no effect on the combined measure of *IP*.

The four most important independent variables–the positive experiences of the four social relations, were adequately measured, as the TLs were *CS-pos* .98, *MP-pos* .99, *AR-pos* .77, and *EM-pos* .88. For *EM-pos*, a random split of the Roget indicator *Equality* was carried out to make possible an assessment of reliability. The negative experiences of the four social relations were less well measured, as the TLs were *CS-neg* .61, *MP-neg* .83, *AR-neg* .91, and *EM-neg* .58. It should be mentioned that Roget provides many folk-concepts that have an unclear or neutral valence (especially for *MP*-related categories). For example, the potential *CS-pos* categories 'Birth' and 'Marriage' did not factor with the chosen indicators, and, upon reflection, cannot be assume to be positive experiences, for the interviews contained many stories of tragic problems in giving birth, failed and abusive marriages, and having children 'taken away'; however, they were included indirectly in the measure *Temporality* =(Birth * Reproduction * Marriage)$^{1/2}$.

To explore the construct validity of the social-relations variables, their means were calculated for each of the four culture-sex group. The data (not shown) are consistent with the literature and make common sense: 1) females were more verbally expressive of *CS* relations, both positive and negative, than were males; 2) Euro-Australians were more involved in *MP* relations, both positive and negative, than were Aborigines; 3) Aborigines expressed an insufficiency of social power (*AR-neg*) relative to the Euro-Australians; and 4) the Aborigines, relative to the Euro-Australians, expressed a high level of denigrated identity (*EM-neg*).

The positive and negative experiences of hedonic society were defined by the interaction terms: *Hedonic-pp* = (*CS-pos* * *EM-pos*)$^{1/2}$ and *Hedonic-nn* = (*CS-neg* * *EM-neg*)$^{1/2}$, respectively; the positive and negative experiences of agonic society, by *Agonic-pp* = (*MP-pos* * *AR-pos*)$^{1/2}$ and *Agonic-nn* = (*MP-neg* * *AR-neg*)$^{1/2}$. The four interaction terms, mixing positive and negative social relations and the two pairing negative relations, played no role in exploratory regression analyses, and were excluded from the final analyses.

The Natural time (*NT*) and Rational time (*RT*) variables were operationally defined as *NT* = (*PC* * *EM*)$^{1/2}$ and *RT* = (*OL* * *EF*)$^{1/2}$, respectively. The four measures of hedonic and agonic social relations were used only in the two regression analyses using *NT* and *RT* as the dependent variables.

The six criterion variables, the measures of time-consciousness, were then subjected to univariate analysis in order to normalize their distributions. Square-root transformations were necessary for PC, EF, and IP. After transformation, these measures were approximately normal, with the Shapiro-Wilk coefficients (1=perfectly normal) *PC* .96, *OL* .98,

Table 3: Roget Folk-Concept Indicators of the Four Time-Consciousness and Eight Social-Relational Variables, Factor Score Coefficients, Tucker-Lewis Reliability Coefficients (TL), and Total Number of Words (NW) for each Variable

Time-Consciousness Variables

Patterned-Cyclical		**Ordinary-Linear**		**Episodic-Futural**		**Immediate-Participatory**	
Duality (P1)	.30	Linear[a] (L1)	.52	Will	.34	The Present-a[d]	.75
Past-Pres (P2)	.16	Fut-Pres[b] (L2)	.36	Resolution	.40	The Present-b[d]	.13
Infrequency (P3)	.10	Regular (L3)	.39	Intent	.56	Presence	.12
Season (P4)	.06	Age Years (L4)	.36	Plan	.54	Imminence	.34
Youngster (P5)	.37	Timeliness (L4)	.33	Foresight	.43	(TL .81, NW 47)	
Adult (P5)	.20	Earliness (L5)	.22	Presentiment	.22		
Interim (P6)	.23	Sequel (L5)	.14	The Future	.27		
Durability (P7)	.57	Quantity[c] (L6)	.37	(TL .49, NW 285)			
Evening (P7)	.30	Transience (L7)	.17				
Lateness (P7)	.32	(TL .90, NW 294)					
(TL .67, NW 297)							

Social-Relations Variables

Communal-Sharing-pos		**Market-Pricing-pos**		**Authority-Ranking-pos**		**Equality-Matching-pos**	
Lovemaking	.21	Possessor	.13	Master	.05	Identity	.23
Friends	.50	Possession	.26	Demand	.33	Equality-a[g]	.84
Temporality[f]	.32	Acquisition	.91	Compulsion	.26	Equality-b[g]	.31
Welcome-Frnshp[e]	.34	Property	.16	Strictness	.40	Similarity	.10
Cooperation	.004	Wealth	.10	Disobedience	.28	(TL .88, NW 42)	
(TL .98, NW 297)		(TL .99, NW 120)		Opposition	.29		
				Resistance	.22		
				Contradiction	.31		
				(TL .77, NW 272)			

Communal-Sharing-neg		**Market-Pricing-neg**		**Authority-Ranking-neg**		**Equality-Matching-neg**	
Death	.32	Loss	.26	Lack Influence	.07	Contrariety	.18
Divorce	.08	Relinquish	.98	Confinement	.90	Difference	.08
Seclusion	.39	Poverty	.49	Obey	.12	Disapproval	.34
Selfishness	.29	Debt	.03	Prohibit	.07	Disagreement	.05
Dislike	.42	Payment	.23	Accuse	.73	Disrepute	.11
Discourtesy	.16	(TL .83, NW 138)		Condemnation	.15	Disparagement	.73
(TL .61, NW 118)				Punishment	.09	Ridicule	.04
				Atonement	.08	Injustice	.15
				(TL .91, NW 255)		(TL .58, NW 242)	

[a] Linear = Length + Interval + Period

[b] Fut-Pres = Future + Present

[c] Quantity = Measurement of Time + Frequency

[d] To over-identify the model, necessary for estimating inter-item reliability, the wordlist for The Present was randomly divided into two sublists

[e] Welcome-Frnshp = Welcome * Friendship

[f] Temporality = Birth * Reproduction * Marriage

[g] To over-identify the model, the wordlist for the folk-concept Equality was randomly divided into two sublists

EF .98, *IP* .97, *RT* .96, and *NT* .97. The measures of the twelve multi-indicator variables are summarized in Table 3.

A number of covariates and cofactors were defined. The informants' ecological location as a child and an adult were recorded, the settings being rural-outback, rural, small urban, and suburban-urban. Using *Small-urban* as a reference category, three dichotomous (1, 0) variables were defined: *Outback-tribal* = 1 if the informant lived in such a location both as a child and an adult, and 0 otherwise; *Rural* = 1 for rural residence at both stages of life, 0 otherwise; and *Urban* = 1 if location is suburban-urban at both life stages, 0 otherwise. The variable *Culture* was coded Aborigines 1 and Euro-Australians 0; Sex, males 1 and females 0; the Culture-Sex interaction, *CS* = Culture * Sex. The covariates *Age in Years* and *Year of Birth* had missing values assigned to the mean for exploratory regression analyses but the missing-values cases were excluded for these two variables in other analyses.

REGRESSION ANALYSES

The predicted standardized regression coefficient *beta*-values (which have *t*-distributions) and their associated probability ranges are shown in boldface along the main diagonal of the portion of Table 4 above the cofactors *Culture* and *Sex*. These six coefficients are predicted to be positive and in the range of statistical significance. The effects of social relations variables will be presented first, to test propositions 1-6, and then the effects of the cofactors and two covariates will be described.

Proposition 1. Patterned-Cyclical Time-Consciousness was regressed on the eight social relations variables (Table 4, column 1), *Culture*, and *Sex*. The prediction is that the positive experience of Communal Sharing, when all other variables are controlled, contributes to *PC* and this is the obtained result (the standardized partial regression coefficient, *beta* = 3.36, with a one-tailed probability $p < .001$). *CS-neg* was unrelated to *PC*, and all of the other six social relations variables had negative coefficients, one of which, *MP-neg*, was significant.

Proposition 2. Ordinary-Linear Time-Consciousness was regressed on the eight social variables, *Culture*, and *Sex*. As predicted, it was the positive experience of market pricing, *MP-pos* (*beta* = 2.85, one-tailed $p < .01$), that contributed to this time-orientation. The other component of agonic society, *AR-pos*, also made a significant positive contribution to *OL*, which is consistent with theory but was not predicted. It was also found that *EM-pos* significantly depressed *OL*.

E. P. Thompson (1967) argues that a linearity of time-consciousness has historically been imposed on working class persons. Given this argument, we might expect a similar difference by *Culture*, as we have seen evidence that linear time is imposed on Aborigines working for Euro-Australians under oppressive conditions. To investigate this possibility, *OL* was regressed on the same independent variables separately by *Culture*. For the Euro-Australians, *MP-pos* again had a strong effect on *OL* (*beta*=3.06, one-tailed p=.001) but *MP-neg* was no longer unrelated to *OL* but instead depressed *OL* (*beta*=–2.84, p=.002). But for Aborigines, *MP-pos* made only a directional and non-significant contribution to *OL* (*beta*=0.98, one-tailed p=.16) but *MP-neg*, the negative experience of market-pricing social relations, made a strong, positive, significant contribution to an ordinary linear time-consciousness (*beta*= 3.15, two-tailed p=.02)! This remarkable result is entirely consistent with Thompson.

Proposition 3. Episodic-Futural Time-Consciousness was, as predicted, strongly and positively influenced by *AR-pos* (*beta*= 6.57, one-tailed $p < .0001$), and also by the other positive component of agonic society, *MP-pos* (*beta*= 4.75, $p < .0001$), with the other six coefficients at chance level.

Proposition 4. An Immediate-Participatory Time-Consciousness was, as predicted, strongly and positively related only to *EM-pos* (*beta*= 9.21, one-tailed $p < .0001$) but not to *EM-neg* (*beta*= .44). The other six coefficients were negative, three of these results being statistically significant.

Proposition 5. For the *entire corpus* of interviews, Natural Time experience (*NT*) was, according to theory, expected to be predicted by the positive experience of hedonic social relations, *Hedonic-pp*, and this was obtained (*beta*= 2.51, one-tailed $p < .01$). There were other results, not predicted, but consistent with theory that are of interest:

1) *NT*, as predicted, responded positively to one component of hedonic sociality, the positive experience of equality-matching (for *EM-pos*, *beta*= 2.81, two-tailed $p < .01$) but not to the other component, the positive ex-

Table 4: Least-Squares Regression Analyses for the Combined Samples (Predicted betas in boldface)

Independent Variables	Patterned-Cyclical		Ordinary-Linear		Episodic-Futural		Immediate-Participatory		Natural = (PC * IP)		Rational = (OL * EF)	
	UC	Beta	UC	Beta	UC	Beta	UC	Beta	UC	Beta	UC	Beta
Communal Sharing-pos	.016	**3.36*** **	.089	1.11	-.005	-1.00	-.004	-0.73	-.187	-1.32	-.006	-.07
	(.005)		(.080)		(.005)		(.003)		(.141)		(.889)	
Communal Sharing-neg	-.000	0.01	-.054	-0.54	-.014	-2.21*	-.014	-2.226*	-.206	-1.76	-.064	.87
	(.006)		(.099)		(.006)		(.006)		(.117)		(.074)	
Market Pricing-pos	-.004	-2.03*	.392	**2.85****	.039	4.75***	-.042	-4.89***	-.344	-1.05	-.227	-1.11
	(.008)		(.138)		(.008)		(.009)		(.326)		(.205)	
Market Pricing-neg	-.008	-4.60***	-.027	-0.27	.010	1.72	-.016	-2.48*	-.347	-2.95**	.071	-0.96
	(.001)		(.099)		(.006)		(.006)		(.118)		(.074)	
Authority Ranking-pos	-.003	-1.06	.085	-0.97	.018	**6.57*****	.001	-0.24	-.042	-0.66	.098	2.45*
	(.003)		(.088)		(.003)		(.003)		(.063)		(.040)	
Authority Ranking-neg	-.009	-1.70	-.085	-0.97	-.004	-0.72	-.020	-3.64***	-.313	-2.99**	-.055	-0.83
	(.005)		(.088)		(.005)		(.006)		(.105)		(.066)	
Equality Matching-pos	-.001	-0.53	-.080	-3.69***	-.006	-4.47***	.013	**9.22*****	-.093	2.81*	-.069	-3.31**
	(.001)		(.022)		(.001)		(.001)		(.033)		(.021)	
Equality Matching-neg	-.014	-1.82*	-.077	-0.61	-.006	0.73	.004	0.44	-.184	-1.21	.019	-0.20
	(.008)		(.127)		(.008)		(.008)		(.153)		(.096)	
Hedonic-pp = (CS-pos * IM-pos)	---		---		---		---		.289	**2.41****	-.033	-0.44
									(.115)		(.072)	
Agonic-pp = (MP-pos * HR-pos)	---		---		---		---		-.260	-1.03	.696	**4.37*****
									(.254)		(.159)	
Culture	1.26	**7.18*****	-20.650	**-7.21*****	-.847	**-4.90*****	1.20	**6.61*****	31.3	**9.00*****	-12.97	**-3.35*****
	(.175)		(2.86)		(.173)		(.181)		(3.474)		(2.183)	
Sex	-.999	-5.72***	11.420	4.01***	.427	2.48*	.524	2.90**	-6.08	-1.80	7.12	3.35***
	(.170)		(2.852)		(.172)		(.181)		(3.383)		(2.125)	
R^2	.190		.149		.198		.272		.251		.229	

*p<.05; **p<.01, ***p<.001 (all of the tailed tests are in boldface)

Note: Unstandardized coefficients (UC) are to the left of the standardized beta-values (Beta), with these coefficients' standard errors directly below them in parentheses.

perience of communal sharing (*beta*= –1.32, not statistically significant);

2) *NT* was diminished at least directionally by all six of the other social-relational variables and significantly so by the negative components of agonic sociality (for *MP-neg*, *beta*= –2.95, two-tailed $p<.01$; for *AR-neg*, *beta*= –2.99, two-tailed $p<.01$). These results suggests that the experience of economic deprivation and an insufficiency of social power do not enhance informal social and family life but rather would appear to have a destructive effect. The results are consistent with a vast sociological literature documenting the tangle of pathology resulting from economic disadvantage and social powerlessness.

Separate analyses were also carried out for each Culture.

For the *Aborigines only*, the results parallel that of the entire sample. The theoretical prediction that *NT* would respond positively to *Hedonic-pp* was satisfied (*beta*= 2.00, one-tailed $p=.02$). Again, there was a positive effect of hedonic component *EM-pos* (*beta*= 2.08, two-tailed $p=.02$) but not for component *CS-pos* (*beta*= –1.46, not significant). And again, the other six variables had negative regression coefficients, with the same two nearly significant or significant (for *MP-neg*, *beta*= –1.46, two-tailed $p=.14$; for *AR-neg*, *beta*= –3.23, two-tailed $p=.001$).

For the *Euro-Australians only*, the results again resemble those of the entire sample, and Aborigines only, but they tend to be weak and not significant. *NT* responded only directionally to *Hedonic-pp* (*beta*=.79, one-tailed $p=.21$). As before, *EM-pos* made a positive contribution (*beta*= 2.20, one-tailed $p=.01$) but *CS-pos* did not. Economic difficulty, as indicated by *MP-neg*, again had a significantly negative effect but a deficiency of social power had only a weakly negative effect.

Proposition 6. Again, we begin with analysis of the entire corpus. Rational Time experience (*RT*) was, as proposed, predicted by the positive involvement in *agonic* sociality, (*beta*=4.37, one-tailed $p<.0001$). One component of positive, agonic social relations, *AR-pos,* made an independent contribution to *RT* (*beta=2.45*, $p<.01$) but the other, *MP-pos*, had a non-significant negative coefficient.

Separate analyses by Culture were then carried out.

For the Aborigines, *RT* was successfully predicted by *Agonic-pp* (*beta*=2.00, one-tailed $p=.02$) with an independent contribution from *AR-pos* (*beta*=2.55, one-tailed $p<.01$). We again find an E. P. Thompson-type effect, as *MP-neg* has a significant effect (*beta* =2.17, two-tailed $p=.03$) but *MP-pos* had no effect whatever. There was also an unexpected negative effect of *EM-pos* (*beta*= –2.45, two-tailed $p=.01$), suggesting that agonic and hedonic orientations might to some extent be zero-sum in their effects.

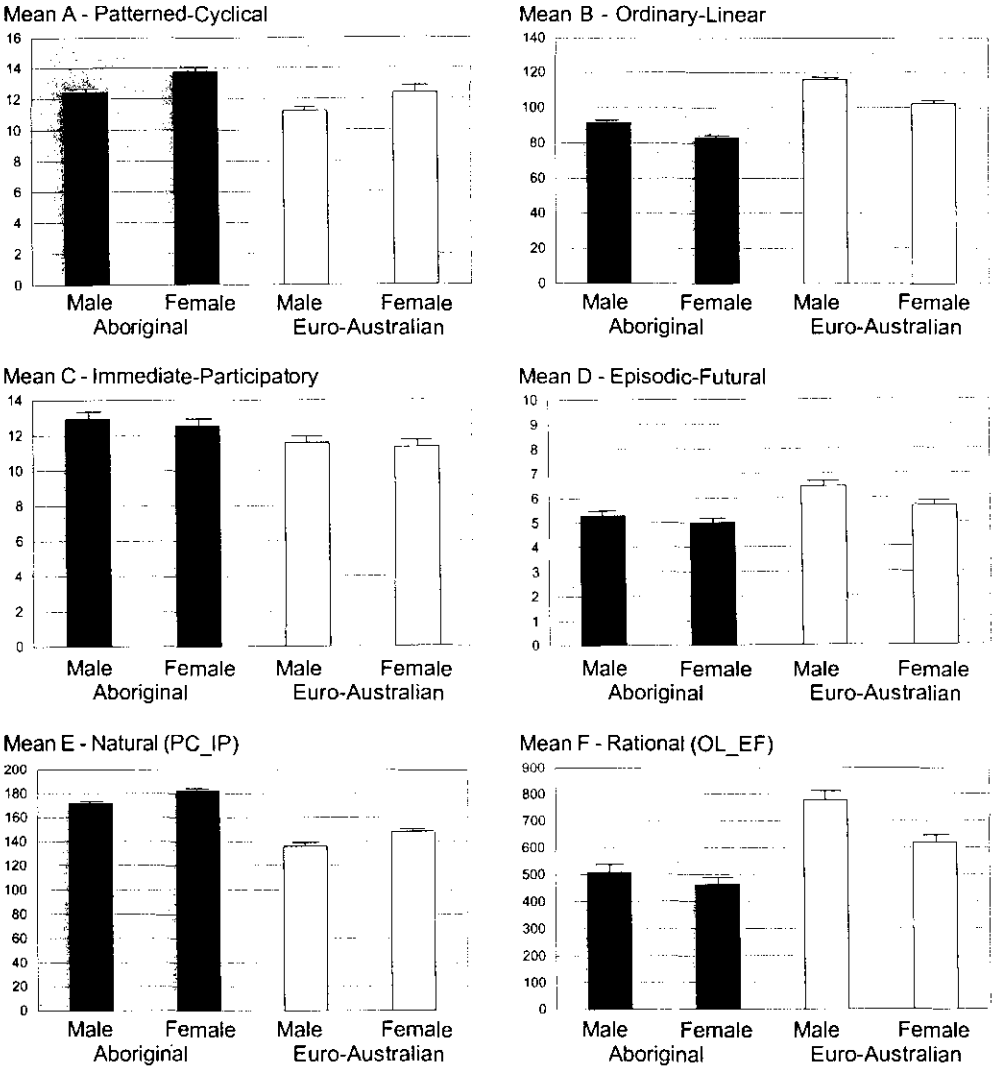
For Euro-Australians, *RT* was strongly influenced by *Agonic-pp* (*beta*=4.84, one-tailed $p<.0001$), the inclusion of which reduced the effects of the agonic components to *negative* status, with the effect of *MP-pos* significantly negative.

EFFECTS OF CULTURE, SEX, AND OTHER VARIABLES

The effects of *Culture* are consistent with the ethnographic literature on Aboriginal time-consciousness, and are strong and significant for all six kinds of time. As hypothesized, the Aborigines, in comparison to the Euro-Australians, were found to have a temporal orientation that is patterned-cyclical (*beta*=7.18, one-tailed $p<.0001$), present-oriented (*beta*=6.61, one-tailed $p<.0001$), and Natural (*beta*=9.00, one-tailed $p<.0001$), which follows from their culture's great emphasis on community life, on equality matching social relations, and on the combination of the two, which is constitutive of hedonic sociality. The Euro-Australians, in contrast and as hypothesized, give more emphasis to ordinary, linear time (*beta*=–7.21, one-tailed $p<.0001$), to the future (*beta*=–4.90, one-tailed $p<.0001$), and to a Rational time orientation (*beta*=–5.94, one-tailed $p<.0001$), which follows from their involvement in market-pricing, authority-ranking, and the combination of the two, which measures agonic sociality (see Figure 2).

The effects of *Sex* were generally weaker than those for *Culture*, and four of six were statistically significant. Female informants showed a time-consciousness that was strongly patterned-cyclical (*beta*= -.72, one-tailed $p<.0001$) but slightly less present-oriented (*beta*=2.90, two-tailed $p=.003$, a result not predicted); the net effect being a slightly lower level of Natural time (*beta*=1.80, two-tailed $p=.07$). Males, in contrast, were much more linear (*beta*=4.00, one-tailed $p<.0001$) and future-oriented (*beta*=2.48, $p<.01$), and

Figure 2. Time Consciousness by Culture and Gender



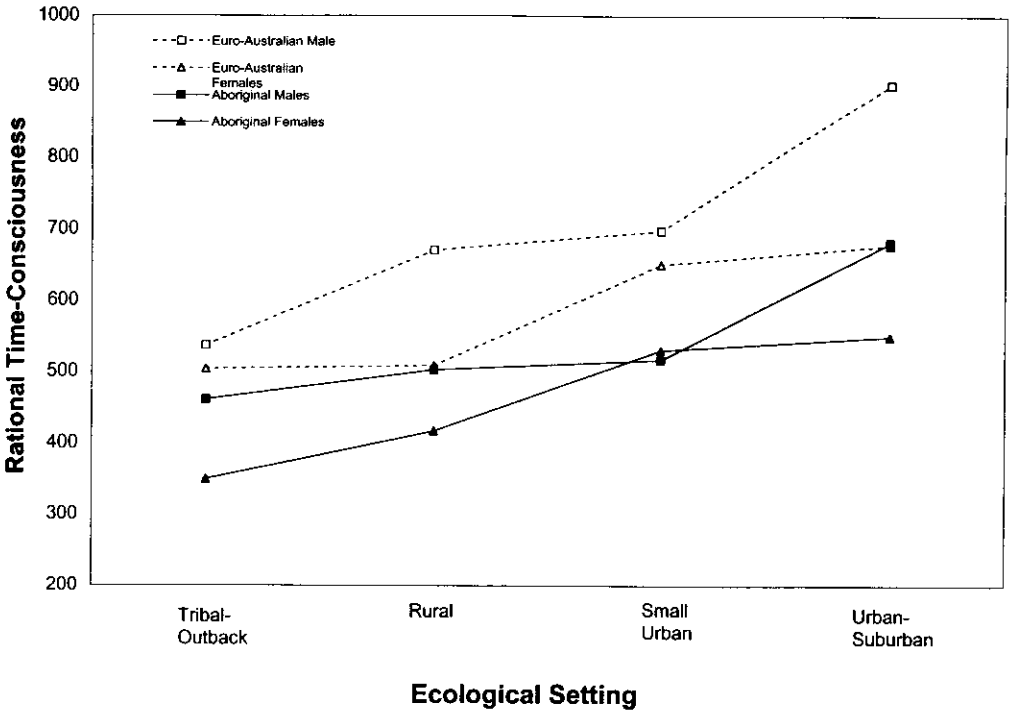
higher for Rational time (*beta*=3.35, $p<.001$).

The regression analyses presented in Table 4 were first done with the *Culture*-by-*Sex* interaction included, but none of these interaction terms were significant, so they were returned to residual status before the final analyses were carried out.

The above analyses were repeated, with the inclusion of other variables (data not shown). There was an interesting difference for Age: the older informants were more present-oriented but less future-oriented than were the younger ones.

The variable *Year of Birth* makes possible inferences about historical trends in the mentalities of the two cultural groups. The data show that as the decades (from the 1900s through the 1950s) go by, there has been a modest increase in linearity and in futurality, and a strong increase in Rational time. These trends can be seen in Figure 3, which also shows interesting culture-sex differences. This trend is strongest among the Euro-Australians (their line 'slopes' are steeper), with the females closing the gap for informants born in the 1940s and 1950s. Among the Aborigines, in contrast, the sex difference has not narrowed. The overall tendency toward a

Figure 3. Mean Level of Rational Time-Consciousness as a Function of Ecological Settings, for Four Culture-Sex Groups



Rational time-orientation with the development of modern, industrial society is well documented in the literature on time and temporality (see Heidegger 1962, Whitrow 1989). Natural Time, in contrast, has been stable over the decades, and least for these data (results not shown).

Rational Time is also strongly linked to ecological setting, as can be seen in Figure 4. As might be expected, it is the outback, 'bush'-dwelling Euro-Australians and the tribal-living Aborigines that have the lowest levels of Rational Time, with monotonic increased evident in larger settings, in Rural, Small Urban, and then in Suburban-Urban locations. The effect of location appears to be stronger for males than it was for females in both cultural groups.

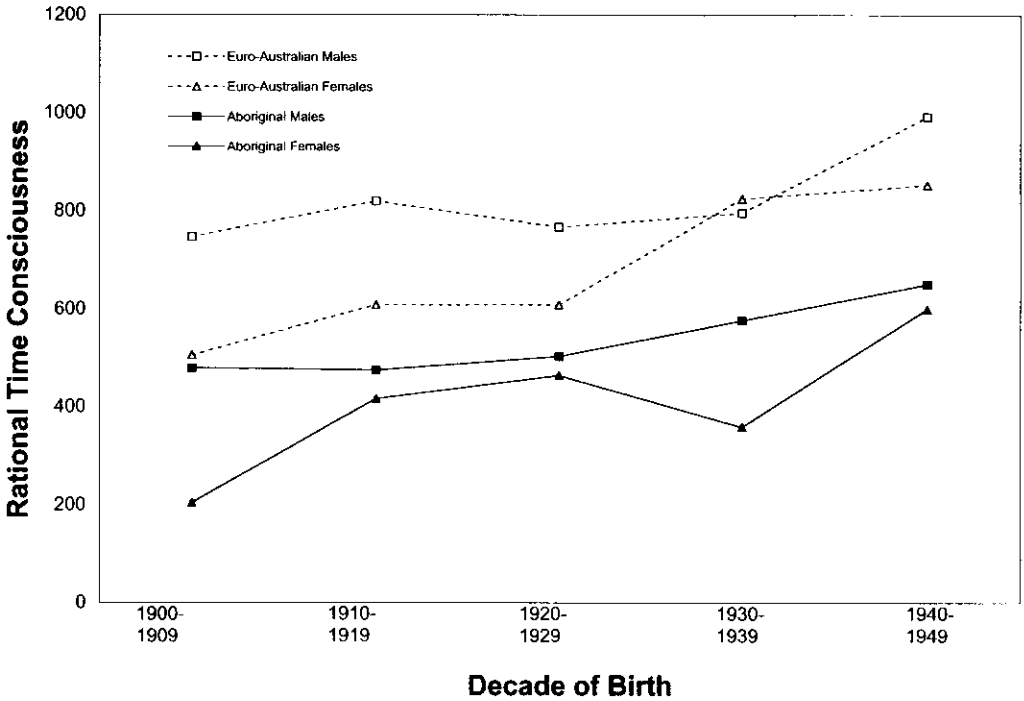
DISCUSSION

Discussion of Results

The present theory of time and society is based on two isomorphic models, one of social-relations and one of cognitive-structure. The four elementary forms of temporality identified in the cognitive model are seen as aspects of four larger cognitive structures, the four most major modes of information processing of the human brain. Once these models are developed, the theory is itself rather simple and, in this first empirical study of the theory, the fit to data is excellent. As predicted, patterned-cyclical time-consciousness is predicted by the positive experience of communal-sharing social relationships (but not by the positive experience of equality-matching relations); ordinary-linear time-consciousness, by the positive experience of market-pricing; episodic-futural time-consciousness, by the positive experience of authority-ranking; and immediate-participatory time-consciousness, by the positive experience of equality-matching (but not by the positive experience of communal sharing).

The negative experiences of these four kinds of social relations produced only 5 of 24 possible significant results in the whole-corpus analyses, all of which had negative coefficients. First, both *PC* and *NT* kinds of time-consciousness were significantly low-

Figure 4. Mean Level of Natural Time-Consciousness as a Function of Decade of Birth, for Four Culture-Sex Groups



ered by the negative experience of market-pricing, economic relationships. And second, a present orientation, *IP*, was significantly lowered by the negative experiences of *CS*, *MP*, and *AR;* it should be noted that the *positive* experiences of *MP* also depressed *IP*. None of these negative coefficients are of particular interest to the theory.

Fiske (1991) in his social-relations model pays little attention to the valences of his four social relations models. The importance of doing so is evident from these findings. For the entire sample, it was only the *positive* experiences of the four social relations that contributed positively to the four kinds of time consciousness, and it was only the *products* of the *positive* pairs of social relations that predicted Rational and Natural time experiences. The only negative social relationship that predicted a kind of time-consciousness that was of theoretical interest was found in the analysis of Aborigines only, where it was found, consistent with Thompson (1967), that negative experience of the work world contributed to a linearity of time-consciousness. Further analysis, with the addition of a measure of socioeconomic status, is of course needed to better understand this phenomenon.

The importance of the most general kinds of time-experience, the Natural and the Rational, is clearly evident in the results.

Natural Time is predicted by the interaction term for positive hedonic community, but when this variable is added to a regression analysis based on the eight social relations, only one of its two components–the positive experience of equality-matching, but not by the positive experience of communal-sharing–continue to have an effect.

Rational Time is predicted by the interaction term of positive agonic sociality, but when this variable is added to a regression analysis based on the eight social relations variables, again we find one component, the positive experience of authority-ranking, continues to have an effect. The conclusion is that the higher-level concepts, Natural-Rational, and hedonic-agonic, are hardly supererogatory to the theory but are rather essen-

tial. It cannot be said that the positive experience of communal-sharing has no effect on NT, nor can it be said that the positive effect of market-pricing has no effect on RT. What can be said is that the effects of *CS-pos* and *MP-pos* are not direct but rather come about in their interactions with their partners, *EM-pos* and *AR-pos*, respectively.

While it is claimed that the four social relationships–CS, MP, AR, and EM–are cultural universals, no such claim has been made for the two higher-order concepts, of hedonic and agonic sociality. Recall that propositions 5 and 6 are of an if-then nature, stating "to the extent that cultural members participate" in positive hedonic or agonic society, their time-consciousness should be Natural or Rational. The data suggest that Aborigines have a time-consciousness that, in addition to being patterned-cyclical and present-oriented, is also Natural, and the concept of Natural Time is given *predictive validity* by its responsiveness to positive hedonic sociality. The data also show that Euro-Australian time-consciousness, in addition to being linear and future-oriented, is also Rational, with the concept of Rational Time given predictive validity by its responsiveness to positive agonic sociality.

Whether there would be evidence that Aboriginal culture has also develop an agonic aspect, as a component of their level of cognitive assimilation, or cognitive adaptation, was at the beginning of data analysis an open question. What was found was that for Aborigines the measure of positive agonic sociality *did* predict Rational time, which provides predictive validity for the existence of agonic sociality among the Aborigines, most of whom are at least partially assimilated or integrated in modern Australia. But we did not find significant evidence that Euro-Australian culture is hedonic, because the hedonic sociality measure for them *did not* significantly predict Natural time. This, of course, does not mean that hedonic community is entirely absent among Euro-Australians, for there is abundant evidence that such community does exist, including the author's personal observations of Euro-Australian family and informal social life.

The finding that Rational time-experience has increased over decade of birth (Figure 4), whereas Natural time-experience has been relatively stable, while not part of the formal theory, is important. Linear, episodic, and Rational kinds of time-consciousness have, during the twentieth century, increased historically (increasing as a function of decade of birth), while cyclical, present-oriented, and Natural time-consciousness have not changed over decade of birth. Since Weber (1947), it has been widely believed that modern societies have undergone a period of progressive rationalization, and a progressive rationalization of time-consciousness can be considered part-and-parcel of this larger process. It certainly should not be inferred from the data presented that the progressive rationalization of time-consciousness has rendered a natural time-consciousness any less important to the overall effective functioning and adaptation of the human mind in its sociocultural context. In fact, it is very possible that a *pathological* lack of a Natural time-consciousness is part-and-parcel of a mentality that sees the earth and the life on it not as a fragile and delicately balanced web of life, but rather as resources to be developed, exploited, and consumed, even at the cost of the degradation and destruction of oral, indigenous cultures and of vast ecological damage to the entire planet and its life.

General Discussion

In her persuasive rejection of temporal dualism, Adam (1990 16-19) also refutes disciplinary isolation in the study of time and society. The present theory and research also refutes disciplinary isolation, as it is shown that a multi-level, multidisciplinary approach is required for an understanding of time and society, which models the sociocultural, the mental, and the biological as three necessary levels of analysis. The growing interests in time in sociology and related social- and behavioral-scientific disciplines is an expression of the growing appreciation of mind and society as *the* unifying topic of social theory. Cognitive sociologists, such as Zerubavel (1997 3), have urged that in this effort we steer a middle course between cognitive universalism on one hand and local knowledge and cognitive individualism on the other. But a theory of time and society *can* be constructed directly from the most modal sociocultural and cognitive universals, the elementary forms of sociality and the elementary forms of time-consciousness, which, it is proposed, require that these concepts be criterion-validated by showing that they have

a biological basis and an evolutionary history.

Much comparative research on culture and cognition has been carried out in psychology and has made extensive use of psychometric testing. The limitations of cross-cultural, cross-societal comparisons based on psychometric tests standardized on the norms of Western, modern society are well known. Comparisons of mentality and cognitive ability based on such tests are widely viewed as discriminating against members of 'primitive' or other non-modern societies (and to subdominant groups and classes in modern societies), which are generally outperformed by their comparatively 'modern' and/or 'advantaged' controls and on this basis have historically been invidiously stereotyped as lacking intelligence. This is socially important because life-chances will long remain linked to test performances. From a *scientific* point of view, such comparisons provide but limited information about the overall mentalities of people who live in different societies and cultures. Another level of analysis is required for a comparative, sociohistorical, and socioevolutionary understanding of human mentality, of the human mind in its sociocultural context. It is the author's conviction that the one of the deepest and most fundamental level of analysis that can possibly be used for comparative, historical, and cross-cultural analysis of mind and society is that of the relationship between sociocultural experience and time-consciousness. Thus, rather than rely on tests and measures, or focus on mind-in-general, a general theory of culture and time-consciousness is presented, which it is hoped can stimulate further research and other cross-cultural comparisons.

Australia's Aborigines, of course, do not live in isolation, and for them the modern, agonic society of modern Australia is an overwhelming reality that they must face every day of their lives. They have to deal every day with the existential problems of territory and authority. Nothing is more important to their cultural survival than access to their traditional lands, so that they can participate in a collectively represented meaning system that features a totemic landscape. While they trade in religious items and other things as well, they did not in their traditional culture develop money. As for authority, they traditionally have their Law, and invest decision-making for the group with tribal elders. They did not develop the institutions of tribal chiefs or headmen, so essentially possessed no political system. In general, Aboriginal culture can be described as primarily hedonic and secondarily agonic. The contrasted Euro-Australian, western culture, of course, also includes principles of equality and community. Australia is a democracy that, by law, is compelled to treat its citizens equally, and the family remains the basic institution of the society. But modern society has undergone great institutional elaboration of polity and economy, which is expressed in forms of sociality that emphasize authority ranking and market pricing social relations. Aborigines have been invidiously stereotyped as locked in a time warp, unable to cope with the modern world. But cope they must, and cope they do, and in the process they must undergo a process of cognitive development, which is in reality a manifestation not of weakness, or of mere cognitive assimilation, but rather of strength and resolve, and the involvement with agonic society requires knowledge of the clock and the calendar, and a concern with personal future and the continuing survival of their culture and way of life. It would be a sad state of affairs if Aborigines had not developed the cognitive flexibility to not only become, as Swain (1993) suggests, a people with two Laws, but also a people with two kinds of time orientation, the Natural and the Rational.

It has been argued here that there are universal structures of human social organization, and that there are universal structures of the human mind and human brain–which include four kinds of time-consciousness existing as aspects of four more general kinds of information processing. However, it is not the case that this work can be classified as some sort of structuralism, which it is most certainly not, or as ahistorical, which it is not, or as dualistic, which it is also not. Instead, I have argued that the human being has the capability for both hedonic and agonic society, for both natural and rational time-consciousness, and the responsibility to develop healthy and productive social arrangements that are both hedonic and agonic, and that in striving for a rational orientation, we do not lose sight of the natural, for to do so would be, and has been, a gross violation of human responsibility to make a better world, one in which peoples with differing mentali-

ties can understand they have a common responsibility to respect and celebrate both their differences and their commonalities.

REFERENCES

Abram D. 1996. *The Spell of the Sensuous: Perception and Language in a More-than-human World.* NY: Pantheon Books.

Adam B. 1990. *Time and Social Theory.* Philadelphia, PA: Temple U Press.

Aristotle. 1936. *Aristotle's Physics,* revised text with introduction and commentary by WD Ross. Oxford: Clarendon Press.

Armstrong E. 1991. The limbic system and culture: an allometric analysis of the neocortex and limbic nuclei. *Human Nature* 2 117-36.

Barnes RH. 1974. *Kédang: A Study of the Collective Thought of an Eastern Indonesian People.* Oxford: Clarendon.

Bergson H. 1910. *Time and Free Will; An Essay on the Immediate Data of Consciousness.* Translated by FL Pogson. London: G Allen & Unwin.

Bogen JE. 1973. Hemispheric specificity, complementarity, and self-referential mappings. *Proceeds of the Society for Neuroscience* 3 341.

_____. 1977. Some educational implications of hemispheric specialization. Pp. 133-52 in MC Wittrock ed *The Human Brain.* Englewood Cliffs, NJ: Prentice-Hall Inc.

Bogen JE & GM Bogen. 1969. The other side of the brain III: the corpus callosum and creativity. *Bull LA Neurological Societies* 34 191-220.

Bouma A. 1990. *Lateral Asymmetries and Hemispheric Specialization: Theoretical Models and Research.* Amsterdam: Swets and Zeitlinger.

Boyle RP. 1985. The dark side of Mead: neuropsychological foundations for immediate experience and mystical consciousness. Pp. 59-78 in NK Denzin ed *Studies in Symbolic Interaction,* vol. 6. Greenwich, CT: JAI Press, Inc.

Chance MRA. 1988. ed. *Social Fabrics of the Mind.* Hillsdale: Lawrence Erlbaum Associates.

Davidson RJ & K Hugdahl. 1995. eds. *Brain Asymmetry.* Cambridge, MA: The MIT Press.

Derrida J. 1981. *Positions.* Translated by J Bass. Chicago: U Chicago Press.

Durkheim É. 1960. *The Division of Labor in Society.* Translated by G Simpson. Glencoe, IL: The Free Press of Glencoe.

_____. 1965. *The Elementary Forms of the Religious Life.* Translated by JW Swain. NY: The Free Press.

Eisendrath CR. 1971. *The Unifying Moment: The Psychological Philosophy of William James and Alfred North Whitehead.* Cambridge, MA: Harvard U Press.

Elkin AP. 1979. *The Australian Aborigines.* Revised ed. London: Angus & Robertson.

Fiske AP. 1991. *Structures of Social Life: The Four Elementary Forms of Human Relations: Communal Sharing, Authority Ranking, Equality Matching, Market Pricing.* NY: The Free Press.

Fuster JM. 1980. *The Prefrontal Cortex: Anatomy, Physiology, and Neuropsychology of the Frontal Lobes,* 2nd ed. NY: Raven.

Gell A. 1996. *The Anthropology of Time: Cultural Constructions of Temporal Maps and Images.* Oxford: Berg.

Harris P. 1984. Teaching about time in tribal aboriginal communities. *Mathematics in Aboriginal Schools Project: 2.* Darwin: Northern Territory Department of Education.

Hassard J. 1990. ed. *The Sociology of Time.* London: Macmillan.

Heidegger M. 1962. *Being and Time.* Translated by J Macquarrie & E Robinson. Oxford: Blackwell.

Husserl E. 1960. *Cartesian Meditations: An Introduction to Phenomenology.* Translated by D Cairns. The Hague: Martinus Njjhoff.

Itani J. 1988. The origin of human equality. Pp. 13-156 in MRA Chance ed *Social Fabrics of the Mind.* Hillsdale: Lawrence Erlbaum.

James W. 1890. *The Principles of Psychology,* 2 volumes. NY: H. Holt and Company.

Laughlin CD. 1988. The prefrontosensorial polarity principle: toward a neurophenomenological theory of intentionality. *Biology Forum* 81 245-62.

LeDoux J. 1996. *The Emotional Brain: The Mysterious Underpinnings of Emotional Life.* NY: Simon & Schuster.

Levy-Bruhl L. 1985. *How Natives Think.* Translated by LA Clark. Princeton, NJ: Princeton U Press.

Liberman K. 1985. *Understanding Interaction in Central Australia: An Ethnomethodologicial Study of Australian Aboriginal People.* Boston: Routledge & Kegan Paul.

Luria AR. 1973. *The Working Brain: An Introduction to Neuropsychology.* Translated by B Haigh. NY: Basic Books Inc.

MacLean PD. 1964. Mirror display in the squirrel monkey (*Siamiri Sciureus*). *Science* 146 950-2.

_____. 1973. *A Triune Concept of the Brain and Behavior.* Toronto: U Toronto Press.

_____. 1977. The triune brain in conflict. *Psychotherapy and Psychosomatics* 28 207-20.

Merleau-Ponty M. 1962. *Phenomenology of Perception.* Translated by C Smith. London: Routledge & Kegan Paul.

Munn N. 1970. The transformation of subjects into objects in Walbiri and Pitjantjatjara myth. Pp. 141-63 in RM Berndt ed *Australian Aboriginal Anthropology; Modern Studies in the Social Anthropology of the Australian Aborigines.* Nedlands, WA: U Western Australia Press.

Myers F. 1991. *Pintupi Country, Pintupi Self: Sentiment, Place, and Politics among Western Desert Aborigines.* Berkeley, CA: U California Press.

Plutchik R. 1991. *The Emotions: Facts, Theories, and a New Model*. Lanham, MD: The University Press of America.

Power M. 1986. The foraging adaptation of chimpanzees, and the recent behaviour of the provisioned apes in Gombe and Mahale National Parks, Tanzania. *Human Evolution* 3 251-66.

Pribram KH. 1981. Emotions. Pp. 102-34 in SB Filskov & TJ Boll eds *Handbook of Clinical Neuropsychology* vol. 1. NY: John Wiley and Sons.

Roget PM. 1977. *Roget's International Thesaurus*, 4th ed, revised by RL Chapman. NY: Harper & Row.

Rose D. 1992. *Dingo Makes Us Human: Life and Land in an Aboriginal Australian Culture*. Cambridge: Cambridge U Press.

Rudder J. 1983. *Qualitative Thinking: An Examination of the Classificatory System, Evaluative System and Cognitive Structures of the Yolnu people of North-east Arnhem Land*. Unpublished MA Thesis. Canberra, ACT: Australian National U.

Rutz HZ. 1992. ed. *The Politics of Time*. Washington, DC: American Anthropological Association.

Sansom B. 1980. *The Camp at Wallaby Cross*. Canberra, ACT: Australian Institute of Aboriginal Studies.

Scheler M. 1926. *Die Wissenformen und die Gesellschaft* (The Forms of Knowledge and Society). Leipzig: Der Neue Geist Verlag.

Stanner WEH. 1979. *White Man Got No Dreaming: Essays, 1938-1973*. Canberra: Australian National U Press.

Swain T. 1993. *A Place for Strangers: Towards a History of Australian Aboriginal Being*. NY: Cambridge U Press.

TenHouten WD. 1985. Right hemisphericity of Australian Aboriginal children: effects of culture, sex, and age on performances of closure and similarities tests. *International J Neuroscience* 28 125-46.

_____. 1998. Primordial temporality, the self, and the brain. *J Social Evolutionary Structures* 20 253-77.

_____. 1999. Text and temporality: patterned-cyclical and ordinary-linear forms of time-consciousness, inferred from a corpus of Australian Aboriginal and Euro-Australian life-historical interviews. *Symbolic Interaction* 22 121-37.

_____. Forthcoming. *Time and Society*. Albany, NY: SUNY Press.

Thompson EP. 1967. Time, work-discipline, and industrial capitalism. *Past & Present* 36 52-97.

Tonkinson R. 1991. *The Mardu Aborigines: Living the Dream in Australia's Desert*, 2nd ed. Fort Worth: Holt, Rinehart and Winston.

Tönnies F. 2000. *Community and Civil Society*. Translated by J Harris & M Hollis. NY: Cambridge U Press.

Van der Leeuw G. 1957. Primordial time and final time. In H Corbin et al eds *Man and Time: Papers from the Eranos Yearbooks*, vol 3. NY: Published for Bollinger Foundation, Inc. by Pantheon Books Inc.

Von Franz ML. 1974. *Number and Time: Reflections Leading Toward a Unification of Depth Psychology and Physics*. Evanston, IL: Northwestern U Press.

Weber M. 1947. *The Theory of Social and Economic Organization*. Translated by AM Henderson & T Parsons. Glencoe, IL: The Free Press of Glencoe.

Whitehead AN. 1930. *Process and Reality, an Essay in Cosmology*. Cambridge: Cambridge U Press.

Whitrow GJ. 1989. *Time in History: Views of Time from Prehistory to the Present Day*. NY: Oxford U Press.

Whorf BL. 1941. The relation of habitual thought and behavior to language. Pp. 75-93 in L Spier ed *Language, Culture, and Personality: Essays in Memory of Edward Sapir*. Menasha, WI: Sapir Memorial Publication Fund.

Wood D. 1989. *The Deconstruction of Time*. Atlantic Highlands, NJ: Humanities Press International, Inc.

Young MD. 1988. *The Metronomic Society: Natural Rhythms and Human Timetables*. Cambridge, MA: Harvard U Press.

Zerubavel E. 1997. *Social Mindscapes: An Invitation to Cognitive Sociology*. Cambridge, MA: Harvard U Press.