University of Groningen

Temperature, Cultural Masculinity, and Domestic Political Violence. A Cross-National Study

Van de Vliert, E.; Schwartz, S.H.; Huismans, S.E.; Hofstede, G.; Daan, S

Published in:
Journal of Cross-Cultural Psychology

DOI:
[10.1177/0022022199030003002](https://doi.org/10.1177/0022022199030003002)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
1999

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Van de Vliert, E., Schwartz, S. H., Huismans, S. E., Hofstede, G., & Daan, S. (1999). Temperature, Cultural Masculinity, and Domestic Political Violence. A Cross-National Study. *Journal of Cross-Cultural Psychology*, 30(3), 291-314. <https://doi.org/10.1177/0022022199030003002>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Cross-national data sets were used to examine the association between ambient temperature and internal political violence in 136 countries between 1948 and 1977. Political riots and armed attacks occur more frequently in warm countries than in both cold and hot countries, after controlling for effects of population size and density and levels of socioeconomic development and democracy. National differences on the cultural masculinity dimension, however, do account for this curvilinear temperature-violence association, in a subsample of 53 countries, suggesting that culture mediates the association. An explanation for this mediation in terms of Paternal Investment Theory is proposed.

TEMPERATURE, CULTURAL MASCULINITY, AND DOMESTIC POLITICAL VIOLENCE A Cross-National Study

EVERT VAN DE VLIERT

University of Groningen

SHALOM H. SCHWARTZ

Hebrew University of Jerusalem

SIPKE E. HUISMANS

Free University at Amsterdam

GEERT HOFSTEDE

Institute for Research on Intercultural Cooperation

SERGE DAAN

University of Groningen

Violence against and by the government is a major problem for many nations but rarely if ever occurs in others. Taylor and Jodice (1983) reported numbers of deaths from domestic political violence in many countries between 1948 and 1977. They cited large numbers in countries that have been plagued by civil or secession wars: about 2 million in Nigeria, 1.6 million in Vietnam, 600,000 in Indonesia, 300,000 in Pakistan, and 80,000 in Burundi. In contrast, no victims were reported from 13 other countries, including Ice-

AUTHORS' NOTE: Preparation of this article was sponsored by Grant No. 575-70-043 from the Netherlands Organization for Scientific Research to the first author, and by Grant No. 187/92 from the Israel Academy of Sciences and Humanities and by the Leon and Clara Sznajderman Chair in Psychology to the second author. We would like to thank Aukje Nauta and two anonymous *JCCP* reviewers for their helpful contributions. Direct correspondence to Evert Van de Vliert, Department of Social and Organizational Psychology, University of Groningen, Grote Kruisstraat 2/1, 9712 TS Groningen, The Netherlands; telefax: 31-503-636-304; e-mail: E.Van.de.Vliert@ppsw.rug.nl.

JOURNAL OF CROSS-CULTURAL PSYCHOLOGY, Vol. 30 No. 3, May 1999 291-314
© 1999 Western Washington University

land, Mongolia, Upper Volta, and Australia. One can debate the accuracy of these figures, as well as the extent to which conflicts in states still in a process of formation are domestic. But there no doubt are enduring differences between countries in regard to massive violence.

The literature provides no convincing explanation for the cross-national differences in the incidence of domestic political violence. This article focuses on ambient temperature as a potential determinant of politically instigated violence. In both laboratory experiments and field studies within nations, a general temperature-aggression link is well-documented (e.g., Anderson, 1987; Anderson & Anderson, 1996; Geen, 1990; Goldstein, 1994; Rotton, 1986), although there is an ongoing debate about whether the relation is rectilinear (Anderson, 1989; Anderson & DeNeve, 1992; Anderson, Deuser, & DeNeve, 1995) or curvilinear in the shape of an inverted U (Baron & Bell, 1976; Bell, 1992). However, because this literature primarily applies to affect-based, spontaneous aggression at the individual level (Anderson, 1989; Anderson & DeNeve, 1992), it does not provide potential explanations for mass violence that is primarily government-related, society-based, and planned.

The evidence for a specific association between ambient temperature and organized political violence rests solely on a 51-nation study by D. C. Schwartz (1968). He reported that, from 1948 to 1964, the frequency of coups, assassinations, terrorism, guerilla wars, and revolts covaried with mean annual temperature in a curvilinear way. Such violent events occurred more frequently in warm ($M = 24^{\circ}\text{C}$, 76°F) than in cold ($M = 17^{\circ}\text{C}$, 62°F) and hot ($M = 30^{\circ}\text{C}$, 86°F) countries.

At first sight, this cross-national temperature-violence link may appear to be spurious (cf. Berry, Poortinga, Segall, & Dasen, 1992; Rotton, 1986; Van de Vliert & Van Yperen, 1996). The study did not control potentially relevant third factors such as population size and density, socioeconomic development, level of democratization, and national culture. Furthermore, it did not evaluate possible mechanisms through which average temperatures around 24°C (76°F) might lead to a peak of violent events. Thus, to date, no one has sought, let alone discovered, possible reasons for the observed curvilinear link between ambient temperature and domestic political violence.

The first part of this article attempts to replicate D. C. Schwartz's (1968) intriguing finding. It seeks to identify whether an inverted U-shaped association between average ambient temperature and planned violence against and by the government still emerges when a larger set of nations and a larger time period are studied. We focus on national frequencies of political riots and armed attacks against and by the government, both examples of politically instigated collective aggression. We also examine whether the temperature-violence association persists when relevant social variables are controlled.

Because there are good conceptual reasons for expecting them to be relevant, we include the following variables as controls: population size (Hibbs, 1973); population density (Baron & Richardson, 1994; Goldstein, 1994); socioeconomic development (e.g., Moaddel, 1994; Van de Vliert, Kluwer, & Lynn, 1998); and political democracy (e.g., Muller & Weede, 1990). We examine whether these variables account for the curvilinear temperature-violence relation, suggesting that it is artifactual, or whether they mediate the relation in part or in full or point to alternative explanations.

The second part of the article introduces the cultural dimension of masculinity (Coltrane, 1988; Hofstede, 1980; Miller, 1994; Toch, 1992) as a possible mediator between temperature and violence, including domestic political violence, and theorizes about how it may link these variables. An empirical test, based on the subsample of 53 countries for which cultural masculinity has been estimated, lends plausibility to a cultural mediation explanation of the temperature-violence association.

WHY DIFFERENCES IN DOMESTIC POLITICAL VIOLENCE?

POPULATION

Compared to cold and hot countries, warm countries offer climates more suitable for human life and therefore may attract larger populations. The greater the population of a country, the more people there are who may clash, leading to higher rates of violence. Moreover, larger populations may be more heterogeneous, increasing the potential for violence among groups and with government, especially if ethnic and religious minorities abound. Greater population density in warm countries might also lead to greater violence, if crowding causes discomfort and people respond with more aggression (e.g., Baron & Richardson, 1994; Goldstein, 1994). Thus, greater population size and population density in warm countries also may account for a temperature-violence link.

ECONOMY

Modernization theory (e.g., Feierabend, Feierabend, & Nesvold, 1969; Hibbs, 1973; Huntington, 1968; Moaddel, 1994) addresses national characteristics at three levels of socioeconomic development. It postulates that: (a) industrially underdeveloped countries with a traditional social order, characterized by integration and stability, experience little political conflict; (b)

industrially developed countries, with dynamic structures capable of maintaining prosperity and social integration through participation, also experience little political conflict; and (c) in contrast, industrializing countries manifest high levels of political conflict because they are undergoing the destabilizing transition from tradition to modernity (see Feierabend et al., 1969; Hibbs, 1973).

Given that cold countries tend to be wealthy and hot countries poor (Hofstede, 1980; Van de Vliert & Van Yperen, 1996; Van de Vliert et al., 1998), modernization theory provides another potential explanation for a curvilinear association between ambient temperature and political violence. The theory predicts that cold and wealthy as well as hot and poor countries experience little political conflict. Countries with moderate climates and income levels, however, already moving up the socioeconomic ladder in the process of industrialization, will experience high levels of political conflict. If so, this would produce an inverted U-shaped economy-violence association.

DEMOCRACY

Resource mobilization theory (e.g., Boswell & Dixon, 1993; Gupta, Singh, & Sprague, 1993; Muller & Weede, 1990; Tilly, 1974) postulates that: (a) highly democratic regimes provide nonviolent channels for the expression of frustrations; (b) highly repressive regimes suppress violence by blocking opportunities for goal-directed opposition; and (c) in contrast, regimes between these extremes experience greater numbers of aggressive reactions such as political riots and armed attacks in response to governmental measures. Similarly, neo-Marxist theory asserts that: (a) highly democratic regimes enforce peaceful class compromise; (b) highly authoritarian regimes enforce repressive class paternalism; and (c) regimes between these extremes face outside opposition (Boswell & Dixon, 1993; Ludtke, 1979; Przeworski, 1985). Both theories might account for the relatively frequent occurrence of political violence in warm as compared to cold and hot countries if warm countries happen to be governed by moderately democratic regimes. Hence, the level of democracy should be controlled.

METHOD

SAMPLE

All countries ($n = 136$) were included whose record of political violence was listed in the third edition of the *World Handbook of Political and Social*

Indicators (Taylor & Jodice, 1983) and whose capital city's mean temperature was listed in the sixth edition of the *National Geographic Atlas of the World* (Garver, Payne, & Canby, 1990).

DEPENDENT VARIABLE: DOMESTIC POLITICAL VIOLENCE

Internal violence against and by the government is typically subject to long-term oscillations with a wavelength of several years. Therefore, we opted for the most recent 30-year period for which such violence scores are available (1948-1977). We used two indicators of organized violence from Taylor and Jodice (1983): political riots and armed attacks.

Political riots are violent gatherings of people for the announced purpose of protesting against a regime or government or one or more of its leaders. Hundreds, if not thousands, of participants are rampaging through streets, overturning automobiles, wrecking shops, hurling paving stones at the police, and so forth. Nonviolent protest demonstrations and strikes were not coded as riots.

Armed attacks are acts of violent political conflict carried out by an organized group with the object of weakening or destroying the power exercised by another organized group. The weaponry used varies from guns and explosives to primitive hand weapons. Three types of armed attacks were distinguished in the coding: those by political groups and ethnic minorities, those by military or police units following state orders, and those for which the initiator could not be determined.

The annual numbers of political riots and armed attacks between 1948 and 1977 in each country had been assessed with explicit inclusion criteria and coding conventions, with much attention to maximizing reliability among coders and across sources of information (for details, see Taylor & Jodice, 1983). Because political riots and armed attacks are neither theoretically nor empirically independent ($r = .76$, $n = 136$, $p < .01$), they were additively combined.¹ An increment of 1.0 was then added to permit taking the natural logarithm to correct for skewness across countries. The split-half reliability coefficients of this index were .85 (15 odd vs. 15 even years) and .66 (15 first vs. 15 last years). For the same reason of skewness, the same log-transformation (base e) was also performed on the population data and the data on socioeconomic development (see subsequent discussion).

INDEPENDENT VARIABLE: TEMPERATURE

Average daytime temperature of the country's capital city (Garver, Payne, & Canby, 1990) was chosen as the indicator of ambient temperature ($M = 24^{\circ}\text{C}$,

76°F; $SD = 7^{\circ}\text{C}$, 13°F) for three reasons. First, as a rule, the capital city is the national center of political activity. Second, worldwide, the within-countries variance in ambient temperature is nonsignificant compared to the between-countries variance. Third, even in large countries, the mean temperature in the capital city adequately reflects the broad range of within-countries temperatures (e.g., Argentina, Brazil, Chile, Peru, Soviet Union, Saudi Arabia, Sudan), unless the capital city is eccentrically located (e.g., Algeria, Australia, Canada, China, India, United States). To check that the inaccuracy of our operationalization of the country's ambient temperature did not markedly influence the results, we paid special attention to the temperature effects on violence in countries with a surface area of more than 1 million square kilometers. In addition to mean temperature within each country, we computed each country's squared deviation from the overall mean temperature across countries to represent curvilinearity in temperature.

CONTROL VARIABLES

The relative population size and density, socioeconomic development, and democracy of the world's nations are relatively stable over a few decades. This allowed us to adopt indexes of these control variables from different years during the 1948-1977 period defined by the violence index.

Population size: The natural logarithm of each country's population in 1960 (Taylor & Jodice, 1983).

Population density: The natural logarithm of each country's total surface area in 1975 (Taylor & Jodice, 1983), which, when added to the regression following population size, represents population density.

Socioeconomic development: The natural logarithm of gross national product in U.S. dollars (*World Bank Atlas*, 1966). Maldives, Mozambique, and Papua New Guinea do not appear in the Atlas. We assigned to these countries the mean income value of the economically most similar country in their region (Sri Lanka, Botswana, and Indonesia, respectively). To explore the curvilinear economy-violence relation derived from modernization theory, we analyzed both gross national product and each country's squared deviation from the mean cross-national score, the variable that represents curvilinearity in development.

Democracy: Gastil's (1978) 7-point ratings of each country's standing in civil liberties and political rights ($r = .92, p < .01$) were additively combined to form an index of the level of democracy. To explore the curvilinear democracy-violence relation derived from resource mobilization and neo-Marxist theories, we analyzed each country's democracy and its squared deviation from the mean degree of democracy across countries, the variable that represents curvilinearity in democracy.

RESULTS

Based on the national scores in the appendix, Table 1 presents the means, standard deviations, and (above the diagonal) intercorrelations of all variables for the total sample of 136 countries. In line with D. C. Schwartz's (1968) findings, violence is negatively correlated with the curvilinear component of temperature ($r = -.32$). Moreover, in support of our inferences from resource mobilization and neo-Marxist theories, violence is negatively correlated with the curvilinear component of democracy ($r = -.21$).

Results of the hierarchical regression analysis are presented in Table 2. We entered each control variable in the order shown, with temperature entered last. For economy, democracy and temperature, the quadratic components represented by the deviation from the cross-cultural mean squared also were entered in the same step as the linear component. The quadratic components tested the curvilinear effects inferred from theory for these variables.

Population size ($\Delta R^2 = 33\%$, $F = 67.32$, $p < .001$); population density ($\Delta R^2 = 0\%$); economy (linear and quadratic: $\Delta R^2 = 2\%$, $F = 2.19$, n.s.); democracy (linear and quadratic: $\Delta R^2 = 3\%$, $F = 2.72$, n.s.); and temperature (linear and quadratic: $\Delta R^2 = 8\%$, $F = 9.15$, $p < .001$) accounted for 46% of the variance in violence. In the final equation, only population size ($\beta = .40$, $p < .05$) and temperature squared ($\beta = -.29$, $p < .001$) qualified as significant predictors of variance in the frequency of violence. Over and above population size, temperature had an inverted U-shaped association with violence, with the inflection point at a mean daytime temperature of 24°C (76°F). The downward trend below 24°C ($r = .55$, $n = 61$, $p < .01$) contributed significantly more to the curvilinear shape of the temperature-violence link than did the downward trend above 24°C ($r = -.29$, $n = 75$, $p < .05$; $z = 5.20$, $p < .001$). Relying on Cook's Distance coefficients (Cook & Weisberg, 1982), no outliers were found. In sum, countries with moderate climates suffer much more from domestic political violence than do colder countries,² and they suffer slightly more than hotter countries do. The question remains: Why?

A CULTURAL EXPLANATION?

Cross-national differences in the climate-related incidence of political riots and armed attacks may reflect cultural variation, that is, differences in the collective programming of the mind that distinguishes the members of one group or category of people from another (Hofstede, 1991). Cultural differences may be described with well-known dimensions such as

TABLE 1
Means, Standard Deviations, and Intercorrelations of Variables for the Total Sample
(above the diagonal) and for the Culture-Based Subsample (below the diagonal)

	Total Sample ^a		Subsample ^b		1	2	3	4	5	6	7	8	9	10
	M	SD	M	SD										
1. Violence	4.71	2.00	5.41	1.68	-	.08	-.32**	.58**	.31**	.43**	.01	-.07	-.21*	
2. Temperature	24.33	7.26	21.54	6.99	.45**	-	-.48**	-.21*	-.07	-.55**	-.25**	-.38**	-.47**	
3. Temperature-curve	52.38	64.77	55.06	61.98	-.47**	-.65**	-	.02	.13	.23**	.15	.14	.40**	
4. Population size	8.63	1.55	9.39	1.33	.60**	.04	-.08	-	.61**	.82**	.22*	-.04	-.03	
5. Population density	6.70	2.06	7.02	1.97	.33*	-.03	-.07	.64**	-	.42**	.12	-.27**	-.09	
6. Economy	14.17	1.94	15.57	1.49	.24	-.47**	.27*	.76**	.52**	-	.30**	.31**	.26**	
7. Economy-curve	3.73	5.29	4.18	6.27	.28*	-.31*	.14	.61**	.38**	.86**	-	.25**	.28**	
8. Democracy	3.57	2.07	4.93	1.82	-.26	-.60**	.48**	-.02	-.11	.45**	.42**	-	.51**	
9. Democracy-curve	4.26	3.77	5.13	4.70	-.37**	-.71**	.55**	-.07	-.04	.48**	.44**	.90**	-	
10. Masculinity			48.74	18.33	.39**	.16	-.34**	.27*	.10	.26	.28*	.12	.03	
11. Masculinity-curve			329.48	483.75	-.43**	-.49**	.48**	-.06	-.09	.21	.13	.42**	.50**	-.20

NOTE: Curve = curvilinear (quadratic component).

a. $n = 136$ countries.

b. $n = 53$ countries.

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

TABLE 2
Summary of Hierarchical Regression Analyses for Population, Economy, Democracy, Masculinity, and Temperature Predicting Domestic Political Violence

<i>Variables</i>	<i>Total Sample^a</i>				<i>Subsample^b</i>			
	<i>Entry Beta^c</i>	<i>Final Beta^d</i>	<i>R²</i>	<i>ΔR²</i>	<i>Entry Beta^c</i>	<i>Final Beta^d</i>	<i>R²</i>	<i>ΔR²</i>
Step 1: Population size	.58**	.40**	.33	.33**	.60**	.75**	.36	.36**
Step 2: Population density	-.07	-.00	.34	.00	-.08	-.05	.37	.00
Step 3: Economy	-.14	.27	.36	.02	-.91**	-.40	.52	.15**
Economy-curve	-.11	-.07			.43*	.21		
Step 4: Democracy	.07	.00	.39	.03	.16	.05	.53	.01
Democracy-curve	-.20*	-.08			-.31	-.02		
Step 5: Masculinity					.23*	.11	.58	.05*
Step 6: Masculinity-curve					-.24*	-.20	.62	.04*
Final step: Temperature	.12	.12	.46	.08**	.10	.10	.64	.02
Temperature-curve	-.29**	-.29**			-.16	-.16		

NOTE: Curve = curvilinear (quadratic component).

a. *n* = 136 countries.

b. *n* = 53 countries.

c. Standardized regression coefficients shown are from the equation at the step indicated.

d. Standardized regression coefficients shown are from the equation at the final step.

* *p* < .05. ** *p* < .01.

individualism-collectivism, power distance, uncertainty avoidance, and masculinity-femininity (Hofstede, 1980, 1991), or autonomy, mastery, hierarchy, conservatism, harmony, and egalitarian commitment (S. H. Schwartz, 1994). A cultural dimension of particular interest here is cultural masculinity. This is because Paternal Investment Theory, described subsequently, provides reasons to expect that masculinity may mediate the effects of ambient temperature on violence.

According to Hofstede (1980, 1991), cultural masculinity characterizes societies in which men are expected to be dominant, assertive, tough, and focused on material success, whereas women are expected to be subordinate, modest, tender, and concerned with the quality of life. In contrast, in low masculinity cultures, both men and women are expected to be subordinate, modest, tender, and concerned with the quality of life. Thus, it is variation in expectations toward men rather than toward women that characterizes differences on this cultural dimension.

Paternal Investment Theory (Bjorklund & Kipp, 1996; Buss & Schmidt, 1993; Coltrane, 1988; Daly & Wilson, 1983; Endicott, 1992; Hewlett, 1992; Hurtado & Hill, 1992; Katz & Konnor, 1981; Miller, 1994) is an evolutionary social-psychological theory derived from the biological construct of differential parental care (Clutton-Brock, 1991; Trivers, 1972). This theory can be presented in the form of the following three postulates: a trade-off proposition, a climate proposition, and a cultural proposition.

Trade-off proposition. From the perspective of evolution and reproductive success, men more than women have a trade-off possibility between investing time and effort in providing for a single family and investing in fertilizing multiple partners to increase offspring. The choice men make is partly dependent on climatological circumstances.

Climate proposition. It is more arduous and difficult for families to meet basic needs for food, safety, and security in cold climates with a prolonged winter than it is in warmer climates. The survival of mothers and offspring in cold climates requires substantial paternal investment in the family. By comparison, it is easier to meet basic survival needs in warm climates, so paternal investment in the family is less critical. As a result, men have more freedom to invest in siring children with multiple mates in the expectation that many of these children will survive.

Cultural proposition. Greater paternal investment in the family in cooler climates produces cultures that are lower in masculinity and show less violent behavior for the following reasons. Within the family, both paternal and

maternal investment are characterized by sacrifice, delay of gratification, and the evolution of predominantly cooperative attitudes and behaviors (Bjorklund & Kipp, 1996; Woodburn, 1988). Thus, men and women enact symmetrical parental roles that entail strong normative pressure on husbands and fathers to share with their wives in caring for children (Kenrick, 1994; Miller, 1994; Robbins, De Walt, & Peltó, 1972). In Hofstede's (1980, 1991) terms, a culture low in masculinity evolves. In principle, behavior outside the family could nonetheless be aggressive and competitive. More likely, however, the cooperative behavior in the nuclear family associated with low cultural masculinity generalizes to much of societal behavior and infuses it. Families tend to cooperate to maximize the joint probability of their survival (cf. Bonta, 1997; Van de Vliert, 1997). Hofstede (1980, 1991) brought evidence that members of societies at higher (cooler) latitudes are collectively programmed to make cooperative rather than competitive choices. For example, in cooler regions, large-game hunting is carried out more often by groups of men who share their skills (Lee, 1968; Miller, 1994; Moran, 1979).

By contrast, in warmer climates, greater male investment in mate-seeking provides immediate gratification. The pursuit of multiple mates promotes the evolution in men of relatively dominant and contentious attitudes and behaviors toward male rivals and resisting women.³ Asymmetrical parental roles emerge, with men expected to show little concern for offspring but women expected to invest in provisioning and childrearing (Kenrick, 1994; Miller, 1994; Robbins et al., 1972; Woodburn, 1988). Thus, societies in warmer regions tend to evolve toward greater cultural masculinity, with men collectively programmed to manage interpersonal, intragroup, and intergroup problems through aggressive competition rather than through integrative cooperation (see Anderson & Anderson, 1996; Mesquida & Wiener, 1996; Nisbett & Cohen, 1996; Ross, 1993; Van de Vliert, 1998). In sum, Paternal Investment Theory can explain why culturally more masculine societies, characterized by more dominance and violence, evolve in warmer climates. In more masculine compared with less masculine societies, issues of conflict are more likely to be managed through fight rather than flight and through aggression rather than negotiation. It is reasonable to infer that these aspects of cultural masculinity also may lead to government-related violence in the form of organized political riots and armed attacks. Here, we test the inference that political violence is greater in societies higher in cultural masculinity.

Some anthropological reports suggest that the temperature-masculinity association actually may be curvilinear if human populations from hot countries are included. For example, among the extraordinarily peaceful Aka pygmies in the Central African Republic, fathers provide more direct infant care

than do fathers in any other known society, and they keep up extremely cooperative relationships with their wives and children (Hewlett, 1992). Also, the Batek in Kelantan, Malaysia, are renowned both for their peaceful nature and for the fact that no one has power over others through economic, religious, or social advantage (Endicott, 1992). Like survival in cold climates, offspring survival in hot climates appears to require paternal care to protect the family against the hardships of nature and to prevent shortages of water and food. It is self-evident that in desert areas (e.g., Aka pygmies), more paternal care is needed than in jungle areas (e.g., Batek), where supplies are less of a problem. Overall, a culture of moderately high masculinity might have evolved in hot climates, going hand-in-hand with higher and lower degrees of male dominance and violence in cold and warm climates, respectively.

Thus, we speculate on the basis of evolutionary and anthropological research that ambient temperature is related to cultural masculinity in an inverted U-shaped manner (see Figure 1: cold-low masculinity; warm-high masculinity; hot-moderate masculinity). Cultural masculinity, in turn, is postulated to influence the level of domestic political violence in a linear way, thus producing an overall curvilinear temperature-violence relation. The second part of our study, reported next, evaluated this rudimentary chain of theoretical connections, which is illustrated graphically in Figure 1. The slopes in Figure 1 are based on the temperature-violence data from 136 countries, with the inflection point at a mean daytime temperature of 24°C (76°F). The slope to the left of the inflection point, based on 61 countries, has an angle of 57° ($r = .55 = \cos 57^\circ$), whereas the slope to the right of the inflection point, based on 75 countries, has an angle of 17° ($r = -.29 = \cos 17^\circ$).

METHOD

In the context of attitude surveys of more than 116,000 predominantly male IBM employees, Hofstede (1980, 1991) established national differences in cultural masculinity, reflected in different degrees of male role distinctiveness. The raw data for the masculinity index were collected between 1967 and 1973. Masculinity scores are available for 53 countries, 50 directly and for Egypt, Nigeria, and Zambia by using the scores for the larger regions of Arab countries, West Africa, and East Africa, respectively. Although there was some increase in masculinity over time in most countries, the cross-national differences in masculinity were quite stable (Hofstede, 1980). Several indications of construct validity exist. For example, notwithstanding a 20-year time lag, Hofstede's (1980, 1991) masculinity index is positively related to a novel masculinity index ($r = .44$, $n = 32$, $p < .01$; Van de Vliet,

Figure 1: Theoretical Links Between Ambient Temperature, Cultural Masculinity, and Violence

1998) and to active mastery of the social environment through self-assertion ($r = .56$, $n = 23$, $p < .05$; S. H. Schwartz, 1994).

The model in Figure 1 predicts a curvilinear temperature-masculinity relation and a subsequent linear relation between masculinity and violence. Nonetheless, we also explored the contribution of the squared deviation from the mean cross-national masculinity score, the curvilinear component of masculinity, to the prediction of domestic political violence.

RESULTS

The third and fourth columns of Table 1 list the means and standard deviations of the variables examined in the subsample of 53 countries on which scores for cultural masculinity are available (these masculinity scores are included in the appendix). Below the diagonal, Table 1 presents the intercorrelations among the variables in this subsample of countries. A comparison of the correlations in row 1 with those in column 1 reveals that the directions of the correlations with violence are the same in the subsample of countries as in the total sample, although the latter are consistently stronger. As in the total sample, violence occurs more in warm countries (curvilinear component: $r = -.47$).

A regression analysis parallel to that performed on the total sample was run on these data. Results are summarized in columns 7 through 10 of Table 2. As shown, in this subsample, population size ($\Delta R^2 = 36\%$, $F = 29.04$, $p < .01$); population density ($\Delta R^2 = 0\%$); economy (linear and quadratic: $\Delta R^2 = 15\%$, $F = 7.68$, $p < .001$); and democracy (linear and quadratic: $\Delta R^2 = 1\%$, $F = .59$, n.s.) accounted for 53% of the variance in violence. Not shown in Table 2, temperature accounted for an additional 6% of the variance in violence ($F = 3.50$, $p < .05$; linear: $\beta = .17$, n.s.; quadratic: $\beta = -.25$, $p < .05$), over and above this set of predictors.

We next examined whether cultural masculinity mediates the association between temperature and violence. We first looked at the relation of cultural masculinity to temperature. Temperature ($\beta = -.11$, n.s.) and its curvilinear component ($\beta = -.42$, $p < .05$) predicted 13% of the variance in masculinity ($F = 3.60$, $p < .05$). In support of our inferences from Paternal Investment Theory, compared with cold and hot countries, warm countries have cultures characterized by relatively high masculinity. The inflection point of the curvilinear temperature-masculinity association occurred at a mean daytime temperature of 23°C (74°F). However, there was only a significant slowing down of the upward trend at the inflection point, rather than a reversal of direction (upward trend below 23°C: $r = .37$, $p < .05$; above 23°C: $r = .15$, n.s.).

As shown in Table 2, the linear component of masculinity added 5% to the prediction of the variance in violence, over and above population size, population density, economy, and democracy ($F = 5.09$, $p < .05$; $\beta = .23$, $p < .05$). When temperature was then entered before the curvilinear component of masculinity, it no longer made an independent contribution to the prediction of violence (not shown in Table 2: $\Delta R^2 = 3\%$, $F = 1.60$, n.s.; linear: $\beta = .13$, n.s.; quadratic: $\beta = -.19$, n.s.). Relying on Cook's Distance coefficients (Cook & Weisberg, 1982), no outliers were found. Thus, the data are compatible with the view, presented previously, that the linear component of cultural masculinity mediates the association between temperature and violence. Finally, Table 2 shows that the curvilinear component of masculinity, when entered immediately after the linear component of masculinity, accounted for an additional 4% of the variance in violence ($F = 4.32$, $p < .05$; $\beta = -.24$, $p < .05$), leaving only 2% of the variance for temperature in the final step ($F = 1.04$, n.s.; linear: $\beta = .10$, n.s.; quadratic: $\beta = -.16$, n.s.).

In addition to masculinity, Hofstede (1980, 1991) also investigated the cultural dimensions of individualism, power distance, and uncertainty avoidance across the 53 nations. Temperature is related to individualism (linear: $r = -.68$, $p < .001$; quadratic: $r = .53$, $p < .001$); power distance (linear: $r = .65$, $p < .001$; quadratic: $r = -.49$, $p < .001$); and uncertainty avoidance (linear:

$r = .03$, n.s.; quadratic: $r = -.40$, $p < .01$). Out of these three dimensions, only power distance is also related to violence (linear: $r = .51$, $p < .001$; quadratic: $r = -.09$, n.s.). Thus, in theory, the temperature-violence link also might be mediated by power distance. Empirically, however, power distance is unable to account for the curvilinear temperature-violence association (at the final step: power distance linear: $\beta = .21$, n.s.; power distance quadratic: $\beta = .18$, n.s.; temperature linear: $\beta = .10$, n.s.; temperature quadratic: $\beta = -.30$, $p < .05$).

DISCUSSION

Our analysis of a worldwide sample of 136 countries corroborates D. C. Schwartz's (1968) finding that countries with a mean daytime temperature around 24°C (76°F), compared to colder and hotter countries, tend to suffer more from violent political actions against and by the government. Among the politically peaceful nations between 1948 and 1977 were Mongolia, New Zealand, Norway, The Netherlands, and Finland (cold), as well as Chad, Mali, Niger, Saudi Arabia, and Upper Volta (hot). Among the politically violence-plagued nations were Burundi, Congo, Cuba, the Dominican Republic, Guyana, Indonesia, Kuwait, Maldives, Pakistan, and Panama (warm). In line with our inferences from Paternal Investment Theory (e.g., Bjorklund & Kipp, 1996; Hurtado & Hill, 1992; Katz & Konnor, 1981; Miller, 1994), we found that the cultural factor of masculinity may mediate the temperature-violence association. In contrast, the cultural dimensions of individualism-collectivism, power distance, and uncertainty avoidance cannot be nominated as serious candidates for the position of mediator between temperature and violence. The mediating role of the reproductive strategy of mate-seeking in warmer climates versus paternal provisioning in cooler climates has not been addressed empirically. This seems a worthy topic for further research because evolutionary arguments that link environmental conditions, associated with latitude and temperature, to human cultures and behavior have been applied successfully in other domains (see Anderson & Anderson, 1996; Berry et al., 1992).

It comes as no surprise that countries having larger populations suffer more internal political violence. More interesting is the lack of empirical support for the inference from modernization theory that both economically underdeveloped and economically developed nations are likely to experience low levels of political conflict (e.g., Feierabend et al., 1969; Moaddel, 1994). Perhaps, were rates of economic growth included in addition to level of development, modernization theory would fare better (cf. Boswell & Dixon,

1993; Muller & Weede, 1990). We have omitted this from consideration, because there is no reason to expect that economic growth may account for the curvilinear temperature-violence association that is of interest here.

According to the zero-order correlations, nations governed by moderately democratic regimes suffer more from political violence than do those with higher and lower levels of civil liberties and political rights. This supports our derivations from resource mobilization and neo-Marxist theories. When population size and socioeconomic development were controlled, however, political violence was unrelated to the level of democracy. These results are in agreement with other cross-national studies showing that moderate degrees of civil liberties and political rights predict political violence only if level of industrial development is ignored (Boswell & Dixon, 1993; Moad-del, 1994).

Despite several notable strengths (a large sample size of 136 countries, a reliable index of political violence over a 30-year period, five independently assessed control variables, and explicit attention to curvilinear relations), this study has a number of limitations. A major limitation is the narrow focus on political riots and armed attacks. Our speculations about how climate affects paternal care and, through it, levels of cultural masculinity and, in turn, violence, apply equally well to all types of violence. Future research should consider the frequency and intensity of nonpolitical violence (cf. Anderson, 1987, 1989; Anderson & Anderson, 1996), and should examine nonviolent protests.

This study is correlational, offering no strong evidence for causality, and there are potential alternative explanations and variables of importance that should be considered. For example, migration and population diversity are among the many variables that should be controlled. In addition, national ambient temperature is positively related to engagement in agriculture rather than services, employment security, income inequality, valuation of money and savings, economic growth, organizational centralization, individual role overload, conservatism, extraversion, and competitiveness (Van de Vliert & Van Yperen, 1996). Further work that attends to variation in the perceived intensity and specific content of the conflicts also would be useful.

Operationalization of the predictors considered was not without problems. The temperature of the capital city does not reflect accurately the broad range of temperatures in many countries. Nevertheless, larger and smaller countries yielded basically the same results. We did not address the different seasonal variations of climate across countries, which may be an interesting parameter in the context of our model. Furthermore, demographic, economic, and political variables change over time and might exert influences on violence that are felt only years later, yet we measured them at a single point

in time. Our choice of economic and political control variables was dictated by the fact that these indexes were from the first large-scale, cross-national data sets of their kind and fall within the period covered by the violence index.

Inaccuracy in the operationalization of the levels of socioeconomic development and democracy may have masked the impact of these factors to some extent; this deserves further attention. Given the imperfect measurement of ambient temperature and cultural masculinity, the evidence for curvilinear relations of temperature to masculinity and to violence, and for a mediating masculinity-violence relation, is all the more impressive. The path of causal influence can lead only from climate via masculinity to violent behavior and not the reverse. Several alternative explanatory variables that might have rendered this postulated causal path spurious can be dismissed on empirical grounds covered here. Neither population size and density; nor levels of socioeconomic development and democracy; nor individualism-collectivism, power distance, and uncertainty avoidance can account for the temperature-masculinity-violence link.

Additional arguments support the proposition that ambient temperature is not accidentally related to the culturally programmed tendency of a country's inhabitants to manifest masculinity and to use violence. First, both masculinity and political violence are associated with temperature despite the restriction of range in the temperature dimension. Extremely cold countries such as Mongolia and Iceland ($M = 6^{\circ}\text{C}$; 43°F), and extremely hot countries such as Sudan, Niger, Chad, Mali, and Upper Volta ($M = 36^{\circ}\text{C}$; 97°F) could not be included in the subsample because masculinity scores were not available for them. Second, the complexity of the combination of a curvilinear temperature-masculinity link, a predominantly linear masculinity-violence link, and a curvilinear temperature-violence link that disappears if masculinity is controlled reduces the probability that these findings are attributable to chance. Third, the temperature-masculinity and temperature-violence associations have similar inflection points (23°C and 24°C , respectively). This is unlikely to be a coincidence. Fourth, the temperature-masculinity and temperature-violence curves are quite similar in the sense that their slopes are both steeper on the cold side and flatter on the hot side of the inflection point. Again, it is difficult to attribute this to chance.

Thus, the findings lend plausibility to the reasoning underlying the temperature-masculinity-violence model outlined previously and portrayed in Figure 1. This research highlights the value of further exploration of the little-known and complex causal paths through which climate affects human behavior.

APPENDIX
List of Countries, Level of Domestic Political Violence (DPV) 1948-1977, Average Daytime Temperature (°C), 1960 Population Size (PS), 1975 Surface Area (SA) in Square Kilometers, 1965 Socioeconomic Development (SED): Gross National Product in U.S. Dollars, Level of Democracy (DEM), and Cultural Masculinity (MAS)

<i>Country</i>	<i>DPV^a</i>	<i>°C</i>	<i>PS^b</i>	<i>SA^b</i>	<i>SED^b</i>	<i>DEM</i>	<i>MAS</i>
Afghanistan	3.18	19.75	13,736	647	1,167,560	2.0	—
Albania	2.30	20.25	1,640	29	623,200	1.0	—
Algeria	8.41	21.58	10,800	2,382	2,484,000	2.0	—
Angola	6.28	26.75	4,619	1,247	277,140	1.0	—
Argentina	6.75	21.50	20,611	2,767	13,397,150	2.0	56
Australia	3.50	21.25	10,315	7,687	17,844,950	7.0	61
Austria	4.17	13.50	7,048	84	7,188,960	7.0	79
Barbados	0.00	30.75	231	0	83,160	7.0	—
Belgium	4.63	14.25	9,153	31	13,363,380	7.0	54
Benin	3.69	30.17	2,113	113	211,300	1.0	—
Bolivia	5.94	17.75	3,782	1,099	529,480	3.0	—
Botswana	2.40	22.42	506	600	32,890	5.5	—
Brazil	5.59	27.33	71,539	8,512	15,738,580	3.5	49
Bulgaria	2.64	15.17	7,867	111	5,113,550	1.0	—
Burma	7.19	31.75	22,254	677	1,446,510	1.5	—
Burundi	3.09	29.50	2,908	28	145,400	1.5	—
Cameroon	4.96	27.92	4,948	475	544,280	2.5	—
Canada	5.18	10.58	17,909	9,976	34,743,460	7.0	52
Central African Republic	0.00	31.50	1,326	623	119,340	1.0	—
Chad	3.93	36.08	3,138	1,284	219,660	1.5	—
Chile	5.27	22.25	7,585	757	3,413,250	2.0	28
China	7.86	18.42	654,488	9,597	62,176,360	2.0	—
Colombia	6.59	18.83	15,905	1,139	4,294,350	5.5	64
Congo	4.44	30.42	969	342	135,660	1.5	—
Costa Rica	4.65	25.33	1,250	51	450,000	7.0	21
Cuba	7.21	28.83	7,019	115	2,526,840	2.0	—
Cyprus	7.29	25.92	573	9	303,690	4.5	—
Czechoslovakia	4.62	12.17	13,654	128	16,384,800	1.5	—
Denmark	2.64	11.50	4,581	43	7,558,650	7.0	16
Dominican Republic	5.99	30.00	3,160	49	663,600	5.0	—
Ecuador	5.16	22.00	4,328	284	822,320	3.0	63
Egypt	5.97	28.17	25,929	1,001	3,889,350	3.5	53
El Salvador	2.83	32.17	2,527	21	657,020	4.0	40
Ethiopia	5.57	23.33	19,739	1,222	986,950	1.0	—
Finland	2.71	8.25	4,430	337	6,379,200	6.0	26
France	6.94	15.58	45,684	547	70,353,360	6.5	43
Gabon	3.04	30.25	472	268	132,160	2.0	—
Gambia	0.00	29.17	391	11	33,235	6.0	—

APPENDIX Continued

<i>Country</i>	<i>DPV^a</i>	<i>°C</i>	<i>PS^b</i>	<i>SA^b</i>	<i>SED^b</i>	<i>DEM</i>	<i>MAS</i>
Germany East	5.15	13.08	17,240	108	19,308,800	1.0	—
Germany West	5.71	13.67	55,433	249	85,366,820	6.5	66
Ghana	4.43	29.67	6,776	239	1,558,480	2.5	—
Greece	6.68	22.58	8,327	132	4,246,770	6.0	57
Guatemala	5.70	25.50	3,990	109	1,157,100	4.5	37
Guinea	2.64	30.50	3,183	246	222,810	1.0	—
Guyana	5.38	30.67	560	215	145,600	5.0	—
Haiti	5.28	32.17	3,630	28	272,250	1.5	—
Honduras	4.22	27.50	1,873	112	355,870	3.5	—
Hong Kong	5.57	24.67	3,075	1	984,000	5.5	57
Hungary	4.93	15.50	9,984	93	8,885,760	2.5	—
Iceland	0.69	7.42	176	103	272,800	7.0	—
India	7.83	31.83	427,892	3,288	38,510,280	6.0	56
Indonesia	8.98	30.33	92,701	1,904	6,489,070	3.0	46
Iran	5.82	22.75	21,554	1,648	4,526,340	2.5	43
Iraq	6.19	30.33	6,847	435	1,643,280	1.0	—
Ireland	5.02	13.00	2,834	70	2,267,200	7.0	68
Israel	5.23	23.08	2,114	21	2,261,980	6.0	47
Italy	6.90	20.50	50,223	301	42,689,550	6.0	70
Ivory Coast	1.10	30.17	3,433	322	686,600	2.5	—
Jamaica	4.19	31.08	1,629	11	700,470	5.5	68
Japan	5.57	18.67	94,096	372	62,103,360	6.5	95
Jordan	5.53	24.58	1,695	98	372,900	2.0	—
Kampuchea	7.14	31.92	5,364	181	643,680	1.0	—
Kenya	6.32	23.25	8,115	583	730,350	3.0	—
Korea North	2.20	16.33	10,526	121	2,210,460	1.0	—
Korea South	5.91	16.33	24,695	98	2,963,400	3.0	39
Kuwait	2.64	30.33	278	18	914,620	3.0	—
Laos	6.79	30.83	2,382	237	142,920	1.0	—
Lebanon	7.83	24.17	1,857	10	724,230	4.0	—
Lesotho	3.04	22.42	8,85	30	53,100	3.5	—
Liberia	0.69	28.83	1,256	111	226,080	3.0	—
Libya	4.11	23.42	1,349	1,760	283,290	2.0	—
Luxembourg	0.69	13.17	314	3	555,780	7.0	—
Madagascar	2.77	24.25	5,370	587	510,150	3.0	—
Malawi	5.17	25.83	3,563	118	142,520	1.5	—
Malaysia	9.04	31.00	7,908	330	2,056,080	4.5	50
Maldives	2.83	29.75	90	0	11,700	4.0	—
Mali	2.08	34.67	4,098	1,240	266,370	1.0	—
Malta	3.69	21.33	329	0	134,890	6.0	—
Mauritania	2.20	31.83	950	1,031	133,000	2.0	—
Mauritius	2.71	24.25	662	2	145,640	6.0	—
Mexico	5.85	22.33	36,369	1,973	15,638,670	4.5	69
Mongolia	1.10	3.83	93	1,565	446,880	1.0	—

(continued)

APPENDIX Continued

<i>Country</i>	<i>DPV^a</i>	<i>°C</i>	<i>PS^b</i>	<i>SA^b</i>	<i>SED^b</i>	<i>DEM</i>	<i>MAS</i>
Morocco	7.24	21.92	11,640	447	1,978,800	4.5	—
Mozambique	5.00	27.67	6,791	783	441,415	1.0	—
Nepal	5.36	25.25	9,180	141	642,600	2.5	—
Netherlands	3.64	12.25	11,480	41	14,464,800	7.0	14
New Zealand	1.39	16.25	2,372	269	4,174,720	7.0	58
Nicaragua	4.39	33.08	1,472	130	471,040	3.0	—
Niger	2.20	36.92	3,095	1,267	232,125	1.5	—
Nigeria	6.72	30.17	43,542	924	4,354,200	3.5	46
Norway	1.79	9.83	3,581	324	5,443,120	7.0	8
Pakistan	6.72	31.92	45,851	804	4,126,590	3.0	50
Panama	5.13	30.75	1,082	76	486,900	2.5	44
Papua New Guinea	3.61	30.17	1,920	462	134,400	6.0	—
Paraguay	4.49	29.25	1,774	407	354,800	2.5	—
Peru	5.46	23.58	9,993	1,285	2,698,110	3.0	42
Philippines	7.40	31.67	27,561	300	3,858,540	3.0	64
Poland	5.07	12.33	29,561	313	27,491,730	2.5	—
Portugal	5.72	20.58	8,826	92	3,000,840	6.0	31
Puerto Rico	4.73	28.33	2,362	9	2,314,760	6.5	—
Rumania	3.69	16.67	18,403	237	13,066,130	1.5	—
Rwanda	2.83	29.50	2,802	26	140,100	2.0	—
Saudi Arabia	2.56	32.58	5,978	2,150	1,135,820	2.0	—
Senegal	3.64	29.17	3,110	196	528,700	4.0	—
Sierra Leone	2.94	30.50	2,136	72	256,320	3.0	—
Singapore	4.45	31.00	1,634	1	751,640	3.0	48
Somalia	4.01	30.00	2,226	638	111,300	1.0	—
South Africa	6.62	22.42	15,925	1,221	8,440,250	2.5	63
Soviet Union	4.83	8.50	214,329	22,402	191,000,000	1.5	—
Spain	6.36	19.00	30,303	505	16,060,590	5.5	42
Sri Lanka	4.84	29.75	9,889	66	1,285,570	6.0	—
Sudan	5.28	37.58	11,770	2,506	1,118,150	2.5	—
Sweden	2.94	9.58	7,480	450	15,259,200	7.0	5
Switzerland	3.09	13.92	5,362	41	10,884,860	7.0	70
Syria	5.44	24.58	4,561	185	820,980	2.5	—
Taiwan	6.14	26.00	10,610	32	2,015,900	3.5	45
Tanzania	3.76	29.58	10,241	945	716,870	2.0	—
Thailand	5.34	32.50	26,392	514	2,903,120	2.5	34
Togo	2.71	29.67	1,465	56	124,525	1.5	—
Trinidad & Tobago	3.04	30.75	843	5	497,370	6.0	—
Tunisia	5.92	23.25	4,221	164	759,780	2.5	—
Turkey	5.07	17.92	27,509	781	6,602,160	5.5	45
Uganda	5.30	26.58	7,551	236	604,080	1.0	—
United Kingdom	8.37	14.17	52,559	244	78,838,500	7.0	66
United States	7.56	18.33	180,671	9,363	546,000,000	7.0	62
Upper Volta	1.79	34.67	4,400	274	198,000	3.5	—
Uruguay	4.25	21.00	2,623	176	1,416,420	2.0	38

APPENDIX Continued

Country	DPV ^a	°C	PS ^b	SA ^b	SED ^b	DEM	MAS
Venezuela	6.57	25.92	7,635	912	5,955,300	6.5	73
Vietnam North	6.50	27.50	16,100	159	1,610,000	1.0	—
Vietnam South	9.18	32.08	14,100	174	1,551,000	1.0	—
Yemen (Aden)	6.30	31.00	1,109	333	99,810	1.0	—
Yemen (Sana)	5.50	31.00	4,429	195	398,610	2.5	—
Yugoslavia	3.71	16.67	18,402	256	7,176,780	2.5	21
Zaire	6.98	30.42	16,429	2,345	1,150,030	2.0	—
Zambia	5.45	26.33	3,252	753	520,320	3.0	41
Zimbabwe	5.92	24.92	3,633	391	762,930	2.5	—

a. Natural logarithm (political riots + armed attacks + 1).

b. In thousands.

NOTES

1. The mean and standard deviation for natural logarithm (ln) political riots were 20.79 and 9.72, respectively; for ln armed attacks, they were 19.12 and 9.9, respectively ($r = .79$, $n = 136$, $p < .01$). Separate analyses of the two violence indicators yielded similar results.

2. To assess the robustness of the temperature effects on violence, we examined their stability across time and across geographically different subsets of samples. A structural equations analysis (linear structural relations) showed that the effect of temperature on violence during the first 15-year period—1948-1962—did not differ from its effect during the second 15-year period—1963-1977 ($\chi^2_r(3) = 6.96$, $p = .07$). Separate regression analyses of countries in the Northern and Southern hemisphere reveal no significant difference between models that do and models that do not assume temperature effects on violence in each hemisphere, $F(2, 130) = 0.10$, $p = .90$. Finally, to assess possible distorting effects of using only one ambient temperature score for large countries in which there might be substantial within-countries variation in ambient temperature, we compared the temperature effects on violence separately in countries with a surface area of more than 1 million square kilometers ($n = 28$) to those in the smaller countries ($n = 108$). Once again, no differences were found, $F(2, 130) = 0.37$, $p = .90$.

3. Sometimes men in cultures with higher masculinity do devote a great deal of time and effort to their children and families, but, unlike men in cultures with higher femininity, they do so in a more paternalistic way. Paternalism couples dominant behavior and tight control with behavior that fosters the well-being of people. Reacting benevolently autocratic, a paternalist demands compliance and offers security in return (Van de Vliert, 1997).

REFERENCES

- Anderson, C. A. (1987). Temperature and aggression: Effects on quarterly, yearly, and city rates of violent and nonviolent crime. *Journal of Personality and Social Psychology*, 52, 1161-1173.
- Anderson, C. A. (1989). Temperature and aggression: Ubiquitous effects of heat on occurrence of human violence. *Psychological Bulletin*, 106, 74-96.

- Anderson, C. A., & Anderson, K. B. (1996). Violent crime rate studies in philosophical context: A destructive testing approach to heat and southern culture of violence effects. *Journal of Personality and Social Psychology*, 70, 740-756.
- Anderson, C. A., & DeNeve, K. M. (1992). Temperature, aggression, and the negative affect escape model. *Psychological Bulletin*, 111, 347-351.
- Anderson, C. A., Deuser, W. E., & DeNeve, K. M. (1995). Hot temperatures, hostile affect, hostile cognition, and arousal: Tests of a general model of affective aggression. *Personality and Social Psychology Bulletin*, 21, 434-448.
- Baron, R. A., & Bell, P. A. (1976). Aggression and heat: The influence of ambient temperature, negative affect, and a cooling drink on physical aggression. *Journal of Personality and Social Psychology*, 33, 245-255.
- Baron, R. A., & Richardson, D. R. (1994). *Human aggression* (2nd ed.). New York: Plenum.
- Bell, P. A. (1992). In defense of the negative affect escape model of heat and aggression. *Psychological Bulletin*, 111, 342-346.
- Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (1992). *Cross-cultural psychology: Research and applications*. New York: Cambridge University Press.
- Bjorklund, D. F., & Kipp, K. (1996). Parental investment theory and gender differences in the evolution of inhibition mechanisms. *Psychological Bulletin*, 120, 163-188.
- Bonta, B. D. (1997). Cooperation and competition in peaceful societies. *Psychological Bulletin*, 121, 299-320.
- Boswell, T., & Dixon, W. J. (1993). Marx's theory of rebellion: A cross-national analysis of class exploitation, economic development and violent revolt. *American Sociological Review*, 58, 681-702.
- Buss, D. M., & Schmidt, D. P. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review*, 100, 204-232.
- Clutton-Brock, T. H. (1991). *The evolution of parental care*. Princeton, NJ: Princeton University Press.
- Coltrane, S. (1988). Father-child relationships and the status of women: A cross-cultural study. *American Journal of Sociology*, 93, 1060-1095.
- Cook, R. D., & Weisberg, S. (1982). *Residuals and influence in regression*. London: Chapman & Hall.
- Daly, M., & Wilson, M. (1983). *Sex, evolution, and behavior*. Boston: Willard Grant.
- Endicott, K. (1992). Fathering in an egalitarian society. In B. S. Hewlett (Ed.), *Father-child relations: Cultural and biosocial contexts* (pp. 281-295). New York: Aldine de Gruyter.
- Feierabend, I. K., Feierabend, R. L., & Nesvold, B. A. (1969). Social change and political violence: Cross-national patterns. In H. D. Graham & T. R. Gurr (Eds.), *Violence in America: Historical and comparative perspectives* (pp. 606-668). New York: Signet.
- Garver, J. B., Jr., Payne, O. G. A. M., & Canby, T. Y. (1990). *National geographic atlas of the world* (6th ed.). Washington, DC: National Geographic Society.
- Gastil, R. D. (1978). *Freedom in the world: Political rights and civil liberties*. New York: Freedom House.
- Geen, R. G. (1990). *Human aggression*. Milton Keynes, UK: Open University Press.
- Goldstein, A. P. (1994). *The ecology of aggression*. New York: Plenum.
- Gupta, D. K., Singh, H., & Sprague, T. (1993). Government coercion of dissidents. *Journal of Conflict Resolution*, 37, 301-339.
- Hewlett, B. S. (1992). Husband-wife reciprocity and the father-infant relationship among Aka pygmies. In B. S. Hewlett (Ed.), *Father-child relations: Cultural and biosocial contexts* (pp. 153-176). New York: Aldine de Gruyter.
- Hibbs, D. (1973). *Mass political violence: A cross-national causal analysis*. New York: John Wiley.
- Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: Sage.
- Hofstede, G. (1991). *Cultures and organizations: Software of the mind*. London: McGraw-Hill.
- Huntington, S. P. (1968). *Political order in changing societies*. New Haven, CT: Yale University Press.

- Hurtado, A. M., & Hill, K. R. (1992). Paternal effect on offspring survivorship among Ache and Hiwi hunter-gatherers: Implications for modeling pair-bond stability. In B. S. Hewlett (Ed.), *Father-child relations: Cultural and biosocial contexts* (pp. 31-55). New York: Aldine de Gruyter.
- Katz, M. M., & Konnor, M. J. (1981). The role of the father: An anthropological perspective. In M. E. Lamb (Ed.), *The role of the father in child development* (2nd ed., pp. 155-185). New York: John Wiley.
- Kenrick, D. T. (1994). Evolutionary social psychology: From sexual selection to social cognition. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 26, pp. 75-121). Orlando, FL: Academic Press.
- Lee, R. B. (1968). What hunters do for a living. In R. B. Lee & I. DeVore (Eds.), *Man the hunter* (pp. 30-48). Chicago: Aldine.
- Ludtke, A. (1979). The role of state violence in the period of transition to industrial capitalism: The example of Prussia from 1815 to 1848. *Social History*, 4, 175-222.
- Mesquida, C. G., & Wiener, N. I. (1996). Human collective aggression: A behavioral ecology perspective. *Ethology and Sociobiology*, 17, 247-262.
- Miller, E. M. (1994). Paternal provisioning versus mate seeking in human populations. *Personality and Individual Differences*, 17, 227-255.
- Moaddel, M. (1994). Political conflict in the world economy: A cross-national analysis of modernization and world-system theories. *American Sociological Review*, 59, 276-303.
- Moran, E. F. (1979). *Human adaptability: An introduction to ecological anthropology*. Boston: Duxbury.
- Muller, E. N., & Weede, E. (1990). Cross-national variation in political violence. *Journal of Conflict Resolution*, 34, 624-651.
- Nisbett, R. E., & Cohen, D. (1996). *Culture of honor: The psychology of violence in the South*. Boulder, CO: Westview.
- Przeworski, A. (1985). *Capitalism and social democracy*. Cambridge, UK: Cambridge University Press.
- Robbins, M. C., De Walt, B. R., & Peltó, P. J. (1972). Climate and behavior: A biocultural study. *Journal of Cross-Cultural Psychology*, 3, 331-344.
- Ross, M. H. (1993). *The culture of conflict: Interpretations and interests in comparative perspective*. New Haven, CT: Yale University Press.
- Rotton, J. (1986). Determinism redux: Climate and cultural correlates of violence. *Environment and Behavior*, 18, 346-368.
- Schwartz, D. C. (1968). On the ecology of political violence: "The long hot summer" as a hypothesis. *American Behavioral Scientist*, 11, 24-28.
- Schwartz, S. H. (1994). Beyond individualism/collectivism: New cultural dimensions of values. In U. Kim, H. C. Triandis, C. Kagitcibasi, S. C. Choi, & G. Yoon (Eds.), *Individualism and collectivism: Theory, method, and applications* (pp. 85-119). Thousand Oaks, CA: Sage.
- Taylor, C. L., & Jodice, D. A. (1983). *World handbook of political and social indicators* (3rd ed., Vols. 1-2). New Haven, CT: Yale University Press.
- Tilly, C. (1974). Do communities act? *Sociological Inquiry*, 43, 209-240.
- Toch, H. (1992). *Violent men: An inquiry into the psychology of violence* (4th ed.). Washington, DC: American Psychological Association.
- Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man* (pp. 136-179). Chicago: Aldine.
- Van de Vliert, E. (1997). *Complex interpersonal conflict behavior: Theoretical frontiers*. Hove, UK: Psychology Press.
- Van de Vliert, E. (1998). Gender role gaps, competitiveness, and temperature. In G. Hofstede (Ed.), *Masculinity and femininity: The taboo dimension of national cultures* (pp. 117-129). Thousand Oaks, CA: Sage.
- Van de Vliert, E., Kluwer, E. S., & Lynn, R. (1998). *Citizens of warmer countries are more competitive and poorer: Culture or chance?* Manuscript submitted for publication.
- Van de Vliert, E., & Van Yperen, N. W. (1996). Why cross-national differences in role overload? Don't overlook ambient temperature! *Academy of Management Journal*, 39, 986-1004.

- Woodburn, J. (1988). African hunter-gatherer social organization: Is it best understood as a product of encapsulation? In T. Ingold, D. Riches, & J. Woodburn (Eds.), *Hunters and gatherers: I. History, evolution and social change* (pp. 31-64). Oxford, UK: Berg.
- World Bank atlas of per capita product and population*. (1966). Washington, DC: International Bank for Reconstruction and Development.

Evert Van de Vliert is a professor of organizational and applied social psychology at the University of Groningen. He is interested in all aspects of social conflict, negotiation, and mediation at individual, organizational, and national levels.

Shalom H. Schwartz is the Clara and Leon Sznajderman chair professor of psychology at the Hebrew University of Jerusalem. He is interested in the nexus of culture, personality, and social psychology, with a focus on values. He currently is studying the antecedents and consequences of the value conceptions and priorities of individuals and of the cultural value emphases in societies.

Sipke E. Huismans is associate professor of statistics and research methodology. His topics of interest are application of linear models and Facet Theory.

Geert Hofstede is emeritus professor of organizational anthropology and international management at the University of Limburg at Maastricht, The Netherlands. He was the founder and first director of the Institute for Research on Intercultural Cooperation (IRIC). He is now a senior research associate of the IRIC, a fellow at the Center for Economic Research at Tilburg University, and honorary professor at the University of Hong Kong.

Serge Daan is professor of ethology at the University of Groningen. His fields of interest are the temporal organization of behavior, including its control by biological clocks and the evolution of life history strategies in animals and humans.