

War, Sports and Aggression: An Empirical Test of Two Rival Theories¹

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This paper investigates relationships between war, sport and aggression. Two rival models of behavior are tested: the Drive Discharge Model and the Culture Pattern Model. Two test strategies are used: a cross-cultural correlation study and a diachronic case study of the U.S. War and combative sports are found to be positively correlated, thus discrediting aggression as a drive in humans and supporting it as a learned cultural behavior pattern.

THE SEARCH for a connection between Man's "nature" and his warfare again has become a major issue during the past decade and "there appears to be a recrudescence of the idea that humans possess an instinct toward aggression and war" (Holloway 1968:33).

This paper investigates relationships which are postulated, by folk wisdom and behavioral scientists, to exist between war and fundamental characteristics of man, and between war and sports. The major hypotheses can be subsumed under two rival, mutually exclusive models: Drive Discharge and Culture Pattern.

Drive Discharge Model

(1) Instinct and Aggression: Individual and group aggressive behavior is the result of an innate drive in the individual human. This drive, although somewhat responsive to the environment, normally generates a tension in the individual. There is a certain basal level of aggression pressure in every individual and society.

(2) Aggression and War: Aggressive tension, regardless of whether the aggressive drive is innate or acquired, accumulates in the individual and society. It is like a hydraulic substance and will find an outlet in aggressive behavior of one sort or another. Warfare is aggressive action brought about at

least in part by accumulated aggressive tension.

(3) War and Sports: Warlike sports serve to discharge accumulated aggressive tension and therefore act as alternative channels to war, making it less likely.

The Drive Discharge Model predicts somewhat similar levels of aggressive behavior in all societies, although the mode of expression can vary. It predicts an inverse relationship between the presence of war and of warlike sports in societies, which we should find expressed in two ways: (1) an inverse synchronic relationship should exist between societies, with more warlike societies less likely to have (or need) such sports and less warlike societies more likely to have these sports; (2) a diachronic relationship also should exist within a given society, with periods of more intense war activity accompanied by less intense activity in warlike sports and periods of less intense war activity associated with more intense sports activity. The probability of war can be reduced, according to this model, by increasing the incidence of alternative behavior similar to warfare (such as combative sports).

Culture Pattern Model

(1) Instinct and Aggression: Individual aggressive behavior primarily is learned. Al-

though perhaps utilizing some innate characteristics, its intensity and configuration can be considered predominantly cultural characteristics.

(2) Aggression and War: There is a strain toward consistency in each culture, with similar values and behavior patterns, such as aggressiveness, tending to manifest in more than one area of the culture.

(3) War and Sports: Behavior patterns and value systems relative to war and to warlike sports tend to overlap and support each other's presence.

The Culture Pattern Model predicts dissimilar levels of aggressive behavior in different societies. It predicts a direct relationship between the presence of war and of warlike sports in societies, which we should find expressed in two ways: (1) a direct synchronic relationship should exist between societies, with more warlike societies more likely to have such sports and less warlike societies less likely to have them; (2) either no diachronic relationship at all (for no dynamic feedback is inferred by this model) or a direct diachronic relationship, if any, should exist within a given society, with periods of more intense war activity accompanied by more intense sports activity and less intense war activity associated with less intense sports activity. The probability of war can be reduced, according to this model, by decreasing the incidence of combative sports and other behavior similar to warfare.

The present study is an empirical test of these two rival models through their predictions. The predicted intersocietal synchronic relationships between sports and war are tested in a hologistic correlation study of twenty societies. The predicted intrasocietal diachronic relationships between sports and war are tested in a time series case study of the United States.

THEORETICAL BACKGROUND

Along with the idea of man's aggressive nature, and from the time of the first Olympic Game, in popular thought and

learned circles, we find a recurring hope that sports and warfare might act as alternatives to each other; that possibly our intergroup problems could be resolved on the playing field rather than on the battlefield. Enough speculation on this has taken place in anthropology and allied disciplines but, with the exception of Textor (1967), Roberts, and a few others (Roberts, Arth, and Bush 1959, 1967; Roberts and Sutton-Smith 1962, 1966; Roberts, Sutton-Smith, and Kendon 1963), anthropologists have directed little objective research toward sports and almost none toward relationships between sports and war.

Instincts and Aggression

Explicit rebellion against the idea of innate behavioral characteristics in humans is traced by Marvin Harris (1968:10-12) to John Locke who, in 1690, postulated the human mind as a "white paper" at birth. At least since that time the nature/nurture controversy has been present in behavioral sciences.

Sigmund Freud viewed an instinct as a genetically programmed "chemico-physical status" which must be discharged in some fashion. Lack of direct discharge results in "tension" which can be stored and accumulated, often to be released in devious and destructive ways at a later time (Fenichel 1945:54-55, 58-61). An essentially identical "ergic tension" model is used by R. B. Catell (1965:198-204). R. W. Pickford (1941:281, 292) speaks of "impulses toward combat for possession of territory which are very deeply rooted in animals and in men." The drives irresistibly will be manifested in behavior. A. I. Hallowell (1955) uses blocked and accumulated aggression as a basic explanatory device in his analysis of Salteaux society. R. Steinmetz (1929:70) views war itself as innate. The latest and most elaborate uses of the innate drive model of aggression in animals and men are found in the works of K. Lorenz (1966) and I. Eibl-Eibesfeldt (1970).

Many researchers and theoreticians reject the idea of an innate aggression drive. R. J. Andrew (1971:54) denies the existence of long term storage or build-up of Eibl-Eibesfeldt's "central nervous excitatory potential" and of patterned searching for targets for aggression release. T. C. Schneirla and others (Asch 1952:ix; Atz 1970:178; Lehrman 1953, 1970) tend to object on other fundamental grounds, denying the validity of interspecific comparisons of behavior. M. F. Ashley Montagu (1968:ix) rejects instincts in general, saying that an appeal to them can explain everything and so explains nothing. E. Becker (1962:132) directs his criticism against the accumulable and hydraulic aspects of drive models (and these aspects can apply whether the alleged drives are instinctive or learned). He says they oversimplify and only "*seem* to describe what we are observing."

For other works on aggression and instinct, the reader is referred to R. Ardrey (1966); J. Bernard et al. (1957); A. Buss (1961); J. Dollard et al. (1939); Durbin and Bowlby (1939); E. Leach (1966, 1967); J. Masserman (1963); E. B. McNeil (1965); and J. Scott (1958).

Aggression and War

Generally, those foregoing authors who look upon aggression as an instinct also hold that it is one manifest cause of war. But one does not have to assume innateness of individual aggression to claim it as a causal factor in warfare. It is sufficient if aggression and aggression tension is present with certain operative characteristics, regardless of origin.

L. Berkowitz (1962:23); E. D. Hoedemaker (1968:71); and E. B. McNeil (1961:290) postulate learned rather than innate origins for aggressions but believe that resultant pressures and ingrained behavior patterns make war more likely. Whiting (1967:154) says child-rearing practices often lead to inhibition of direct aggression and to displacement onto alternate objects, presumably including other societies. E. D. Chapple (1970) would seem to classify ag-

gression as an "intervening variable" between territoriality and warfare. McDougall (1964:33) says the instinct of "pugnacity" explains warfare. Ellis (1951:199); Steward and Faron (1959:325-330); J. Dollard et al. (1939:1, 190); and R. F. Murphy (1960:186) all attribute warfare to accumulated aggression tensions within the societies they studied.

Other writers reject or ignore the idea that aggression tension plays a causal role to war. S. Andreski (1968:187) says that the fact that societies must devote so much time and energy to the development of aggressive and warlike "virtues" in individuals proves these "virtues" are not innate. He presents them as results, rather than causes, of the leaders' decisions to engage in war. J. Burton (1964:147-148) grants aggression to individuals but denies the very application of the term to nations and hence to war. Conflict theorists—of which C. von Clauswitz (1911); Q. Wright (1935, 1965); J. Bernard (1949); Bernard et al. (1957); and T. Schelling (1960) are representative—seldom use the term "aggression" except in the technical military sense of initiative.

War and Sports

Freud and Fenichel (1945:485, 558) speak of the usefulness of sports as a means of "substitute discharge." N. Perrotti (1932) and R. W. Pickford (1940:132-138, 1941:282-287) probably would agree with K. Lorenz (1966:271-273) when he claims that "the main function of sport today lies in the cathartic discharge of aggressive urge . . . (especially) collective militant enthusiasm." M. Mead (1955:xxv-xxvi); G. P. Murdock (1949:90); and L. Tiger (1969:152, 216, 234, 266) all view sports as functional equivalents to war in discharging aggression tension. S. R. Rosenthal (1971), speaking of riots and war, says "RE [risk exercise] sports should replace not only the violent acts of our ancestors but the violent acts of today!"

I conducted a series of interviews with six college and four high school coaches of

football and basketball in Erie, Pennsylvania, and Buffalo, New York, during February and March, 1971. They generally agreed that these sports released aggressive tension, engendered social virtues such as fair play and discipline, and reduced the possibility of warfare. These attitudes probably reflect a widely held set of professional values and perhaps would qualify as a general cultural belief in the United States.

On the other hand, S. Blanton (1942); G. Flick (1940); D. Jaeger (1939); and D. Schayes (1971) generally would ascribe to S. L. Washburn's (Tiger 1969:148) view of sports as good training grounds for combat; that is, sports are complementary to warfare rather than being alternatives. B. Rimland (1961), though, tested and found no significant correlation between the individual's level of interest or activity in sports and his success in the military.

Those physical anthropologists, psychologists, social psychologists, sociologists, and ethologists who abjure or ignore the Drive Discharge Model seldom mention sports, with one noticeable exception: Lüschen (1970:9) says that "sports are not only representative of societal norms and values . . . (they) socialize toward such patterns . . ." Neither do cultural anthropologists talk much of sports when discussing war or culture in general. It would seem, however, that a certain relationship between sports and warfare are implicit in one view of culture. "To most modern anthropologists," according to R. L. Beals and H. Hoijer (1965:279), "the patterns of a culture are held together or integrated in terms of abstractions variously known as themes, configurations, drives, or postulates." To the degree that the culture is consistent, we might expect to find somewhat similar attitudes and behaviors manifesting in different activities. We can hypothesize that such generalities as zero-sum games, indifference to suffering, bravery, aggressiveness, and the like, would apply across all the culture rather than being limited in manifestation to a single activity. Combative sports would more likely be

found in war-like societies than in peaceful ones. Such sports would not be alternatives to war as much as they would be embodiments of the same theme or outlook as is war.

THE CROSS-CULTURAL STUDY

A holocultural correlation study was used to test empirically the Drive Discharge Model and its rival, the Cultural Pattern Model. Specifically, the following inter-societal synchronic predictions were tested:

Drive Discharge Model: An inverse synchronic relationship between war and combative sports will be found, with more warlike societies less likely to have such sports and less warlike societies more likely to have them.

Culture Pattern Model: A direct synchronic relationship between war and combative sports will be found, with more warlike societies more likely to have these sports and less warlike societies less likely to have them.

Sample Selection and the War Variable

I used K. Otterbein's (1968) internal war study sample as a basis for my own. Otterbein used the first 628 societies listed in the Ethnographic Atlas (Murdock 1962-64) as the universe from which to draw his sample. Fifty of the sixty culture areas in the Atlas were utilized and a society selected from each. Otterbein distinguished three modes of war: internal war; external war, attacking; and external war, attacked. War frequencies in each of these modes were coded for each of his sample societies, using the categories "infrequent or never" (I), "frequent" (F), and "continual" (C). Details of his sample selection and coding methods, and definitions, can be found in his cited article.

I decided on a sample of twenty of these societies. I wanted ten relatively warlike and ten relatively peaceful societies. The best identification of a strong war orientation appeared to be a high frequency of attack on

others. I ranked in random order the twenty-seven societies which had received an "F" or a "C" rating in the external war, attacking, mode. Starting with the first society, I accepted or rejected it on the basis of availability of sufficient ethnographic information in the Human Relations Area Files, State University of New York at Buffalo library, or personal library to code the sports variable. I used the first ten which qualified in this respect.

Difficulty soon was encountered in gathering ten relatively peaceful societies. Otterbein's sample contained only five which received an "I" rating in all three modes. I imposed this requirement for an "I" rating in all three modes after a preliminary investigation of the Trumai (rated "I" in internal war and aggressive external war but "F" in defensive external war) suggested that some societies may not wage internal war nor attack others primarily because they are under so much aggressive pressure from neighbors that they do not have an opportunity to seize the initiative. This appeared to be the case with the Trumai. I strongly suspect that they would wage aggressive war were they not a small, vanishing, harrassed group (Murphy and Quain 1955:ix, 11; Steinen 1886:193).

Only four of the five societies coded "I" in all three modes by Otterbein could be used for the present study. The Monachi had to be rejected; although there was sufficient information to code their war activity and political system, information on sports was lacking. Rejection of twenty percent of Otterbein's peaceful societies and the necessity of locating six more means, in effect, that I have used two different samples drawn separately from the same universe. One was Otterbein's warlike societies; the other a combination of Otterbein's and my own peaceful societies. My method of selection, however, was sufficiently random and similar to Otterbein's that results would not be affected. I selected the six remaining societies in the following manner: A random list of 200 OWC Code numbers was constructed from the OWC Code (Murdock

1963). Starting with the first society so identified, I accepted or rejected it on the basis of two criteria: (1) availability of sufficient ethnographic information in the Human Relations Area Files, State University of New York at Buffalo library, or personal library to code the society, and (2) information indicating infrequent or no war activity on the part of the society. The first six so selected were used to complete the ten-society sample and can be identified in Table I by the fact that the "War" category was not coded by Otterbein. Relatively peaceful societies are not easy to find. I had to investigate 130 societies to find eleven, of which five were rejected because of insufficient information on sports in the available ethnographies. (See Table I.)²

The dependent variable, sports, was defined as a physical activity (1) engaged in primarily for amusement or recreation, (2) with no ostensible religious ritual or subsistence-activity training significance, and (3) involving at least two adult individuals. I was interested only in sports which reasonably could be expected to serve as an alternative to war and so distinguished between combative sports and all others.

A combative sport was defined as one played by two opponents (individuals or teams) and fulfilling one or both of the following conditions: (1) There is actual or potential body contact between opponents, either direct or through real or simulated weapons. One of the objectives of the sport appears to be inflicting real or symbolic bodily harm on the opponent or gaining playing field territory from the opponent (which would include placing a disputed object in, or acquiring one from, a guarded location). Wrestling which involves blows or immobilization or subjugation of the opponent (not simply pushing harder than he or causing him to lose his balance and fall) would be considered an example of symbolic bodily harm, as would mock removal of the opponent's head. (2) There is no body contact, harm, or territorial gain but there is patently warlike activity. Such sports, to be classified as combative, must include use of

TABLE I. SOCIETIES AND CODINGS

OWC Code	Society	War Coding Sources	Combative Sports	Sports Coding Sources
INFREQUENT OR NO WAR:				
AN7	Semang 1913-39 ¹	Schebesta 1954:226	No	Schebesta 1954:190
AW25	Bhil 1943-54	Bose & Ray 1953:32 Naik 1956:21	No ²	Koppers 1948:116,136, 211 Naik 1956:36, 121, 184
AW60	Toda 1873-1908	Otterbein 1968:280	No	King 1870:36 Marshall 1873:78 Rivers 1906:696-699 Thurstun 1909:161-162
EK2	Hutterite 1965	Hostetler & Huntington 1967:2-10	No ²	Hostetler & Huntington 1967:18, 24-27, 60-61, 67-68, 72-73, 78-79, 84
EP4	Lapp ca. 1660	Scheffler 1704:29, 47, 50, 421	No	Scheffler 1704:27, 279-282
FL6	Dorobo 1926-39	Otterbein, <i>op. cit.</i>	No	Huntingford 1953:613 Maguire 1927-256
FX10	Kung Bushman 1908-55	Marshall 1962:235-236	No	Marshall 1965:249, 264 Kaufmann 1910:28 Thomas 1959:210
ND8	Copper Eskimo 1908-23	Otterbein, <i>op. cit.</i>	Yes ²	Jenness 1922:218-222 Rasmussen 1932:265-270 Stefansson 1914:85
NH6	Naskapi Montagnai 1849-1932	Lips 1947:404 Turner 1894:268	No	Lane 1952:41 Speck 1935:92, 103, 196-198, 219 Turner 1894:321-323
OT11	Tikopia 1913-29	Otterbein, <i>op. cit.</i>	Yes	Firth 1939:93, 183, 201 Rivers 1914:349
FREQUENT OR CONTINUAL WAR:				
AJ1	Tibetan 1879-1949	<i>ibid.</i>	Yes	Bell 1928:170, 263 Das 1902:198, 260 Kawaguchi 1909:492 MacDonald 1929:70, 208 Ma 1947:165 Rockhill 1895:724 Shen & Liu 1953:165 Tsybikov 1919:445
AO1	Thai 1600	<i>ibid.</i>	Yes	Landon 1939:208
AR13	Sema Naga 1910	<i>ibid.</i>	Yes	Hutton 1968:109
FQ6	Ila 1902-14	<i>ibid.</i>	Yes	Smith & Dale 1920: 171-174
NE13	Comox 1880	<i>ibid.</i>	Yes	Barnett 1955:262
NU7	Aztec 1520	<i>ibid.</i>	Yes	Sahagún 1950:17 Sahagún 1951:19, 31, 32 Sahagún 1954:29, 58, 125
SH5	Tehuelche 1800	<i>ibid.</i>	Yes	Cooper 1946:156-157
SI4	Abipon 1800	<i>ibid.</i>	Yes	Dobrizhoffer 1822:46, 216-218
SO8	Timbira 1820	<i>ibid.</i>	Yes	Nimuendajú 1946:147-148
SQ13	Mundurucú 1952	<i>ibid.</i>	No	Murphy 1954:32

1. Time level to which the ethnographic data apply.

2. These cases required interpretation for coding. The Bhil and Copper Eskimo are discussed in the deviant case analysis section and the Hutterites in Note 2.

actual or simulated combat weapons against an actual or simulated human being.

Combative sports were considered absent from a society if any ethnographer speaks of the amusements, recreations, and games of the society and does not describe or mention any combative sports or says that the kind of sports which I would classify as combative are missing, and he is not contradicted by any other ethnographer available to me at the time of coding. (As I have mentioned, the society was rejected from the sample unless an ethnographer reported sufficiently on the amusements, recreations, games, and sports of the society to make it seem probable that combative sports would have been mentioned had they been practiced.) Simple tests of strength and so-called wrestling which involves only lifting the opponent or causing him to fall (such as arm- or Indian-wrestling), with no significant subjugation or chance or injury, are *not* considered combative.³ Contests of skill with hunting tools—such as bow and arrow—by peoples for whom hunting is an important subsistence activity at the time of ethnography are *not* classified as combative sports (even though the hunting tool could be used in combat) unless the target is a real or simulated human being.

Data Accuracy: Otterbein's coding of war frequency in those societies coded "I" was verified while coding the sports variable, since these societies were considered the more critical ones. I did not disagree with Otterbein in any of his codings.

Table I references the page and publication from which coding information was obtained. The interested reader may readily verify my coding accuracy at his convenience. Where there seemed to be no combative sports, the researched ethnographies are listed, along with those pages on which sports, games, amusements, and entertainment are discussed.

My sports codings were subjected to a coding reliability test. Another coder was engaged to apply the combative and non-combative sports descriptions (as they appear in this paper) to the sample.⁴ The

coder holds a Bachelor of Arts degree but has no training in anthropology, no previous coding experience, and was unaware of the study's hypotheses. There was ninety-five percent agreement between us in the coding results. Disagreement existed only on the Tehuelche; I coded them as having combative sports and the other coder decided none of their sports was combative.

Validity of the Variables: The theoretical variables specifically tested for correlation in this study are warfare and combative sports. The indicators for these variables are reports or descriptions of their presence or absence in ethnographic reports. The theoretical variables and their indicators, therefore, can be considered conceptually identical. No indirect indicators are used and consequently tests of validity are not necessary. Warfare and combative sports, at least as they are ethnographically reported, are being directly measured.

Bias: The data were tested for ethnographer and informant bias but not for bibliographic bias (Naroll and Cohen 1970:896, 933-935). Bibliographic bias would have an important effect on the data and the study only if there were a greater tendency for societies with particular relationships between sports and war to be studied by ethnographers. I considered the probability of this to be small.

Informant and ethnographer bias can be tested simultaneously by using two of the criteria of the Standard Ethnographic Sample (Naroll et al. 1970; Naroll and Sipes n.d.): Ethnographer field stay of at least twelve months, and familiarity with the native language. Ethnographies written by authors meeting both of these criteria are assumed less likely to have such biases than are ethnographies written by authors who fail to meet them.

I compared deviancy and codings on warfare and sports with the ethnographers meeting or failing to meet the Standard Ethnographic Sample requirements. (In cases where more than one ethnographic source was used to code a society, only one ethnographer had to meet the requirements.)

Results indicate that bias is not likely to account for any correlation between warfare and sports. The distribution of deviant societies relative to ethnographer qualifications shows a computer-determined ϕ value of 0.015 and the one-tailed probability of the distribution being due to chance is 0.750. The distribution of warlike societies relative to ethnographer qualification has a negative ϕ value of 0.105 and the one-tailed probability is 0.500. The distribution of combative sports relative to ethnographer qualification shows a ϕ value of 0.179 and the one-tailed probability is 0.370. The lower probability of this last distribution being due to chance at least in part is an artifact of the coding and selection procedures, since societies were rejected if the ethnographer did not include sufficient information on sports. Sports seem to have a relatively low priority in ethnographies. The longer an ethnographer stays in the field the more exhaustive his ethnography tends to be and the more likely it is to include sufficient information on sports.

Galton's Problem: One criticism of cross-cultural surveys has been the possibility of confusing historical interdependence of traits with a functional relationship or other legitimate correlation. This is called Galton's problem after the man who originally voiced it (Tylor 1889). Are the traits related in any non-historical, informative fashion or did they simply diffuse together, or is their multiple occurrence due to the splitting of an original society or societies? Considerable attention has been paid over the last decade to solving this problem (Naroll 1961, 1964; Naroll and D'Andrade 1963; Murdock and White 1969; Driver and Chaney 1970; Ember 1971).

I used the linked pair interdependency test (Naroll and Cohen 1970:984-987) to check for diffusion of warlikeness and of combative sports. The ϕ value (Anderson and Zelditch 1968:138-142) in both cases is zero, and the probability that this distribution is due to chance approaches unity. This indicates minimum diffusion within the sample I have used. Correlation between the

TABLE II. CORRELATION TEST RESULTS

		Combative Sports		
		Yes	No	
Warlike	Yes	9	1	10
	No	2	8	10
		11	9	20

traits cannot be explained by historical association.

Analysis of results: Coding results are summarized in Table II. The ϕ value of this distribution is 0.6035. The Fisher Exact Test shows that the probability of getting this, or a less likely distribution in the same direction, by chance alone is less than 0.0028.

The cross-cultural study shows that where we find warlike behavior we typically find combative sports and where war is relatively rare combative sports tend to be absent. This refutes the hypothesis that combative sports are alternatives to war as discharge channels of accumulated aggressive tension in the social frame of reference. It casts strong doubt on the idea that there is such a thing as accumulable aggressive tension, certainly on the social level and perhaps, under most circumstances, even on the individual level. It clearly supports the validity of the Culture Pattern Model and as clearly tends to discredit the Drive Discharge Model.

Deviant Case Analysis: One relatively peaceful people, the Tikopians, have a combative sport. Rivers (1914:349) tells us that "one very popular game is a kind of mock fight with sticks in which, however, no one is hit . . . Each party moves forward with a rapid shuffling movement till they meet and clash their sticks together . . . [This] is played with the greatest zest and enjoyment." Firth (1939:201), on the other hand, says the objective of the game is to tap the opponent on the head or ribs with the sago-leaf shaft. This makes the game a combative sport. The best (but still weak) ex-

planation of this deviation would seem to be that societies which once were warlike but now are not are likely to retain anachronistic combative sports. The Tikopians, when they first arrived on the island, were oriented toward war in a way similar to related Polynesian peoples. They have retained in modified form at least this one sport more typical of warlike societies.

A similar case obtains with the Bhil. They have been at peace for only about a hundred years (Bose and Ray 1953:32; Naik 1956:21). One sport engaged in by older boys and younger men is arrow shooting for distance. The contestants lie on their backs, resting the bow on the soles of both feet and holding the arrow and cord with both hands for maximum pull. No target whatsoever is used (Koppers 1948:116), and the bow and arrow is still used as a hunting tool. I do not classify this as a combative sport. At one time, however, the Bhil were warlike and the bow and arrow a weapon as well as a tool. The sport probably is a modified relic of those times.

The Mundurucú, a people continually attacking others, have no combat sports. R. F. Murphy analyzes this deviant case for us. He says: "War was a relief from boredom. One might ask why they did not relieve boredom in log racing as do some groups, or in drinking bouts as did many of their neighbors." He answers this by stressing the fragile stability of the local community. The Mundurucú are unusual in that they have patrilineal descent and matrilineal residence. "Conflict had to be rigorously suppressed, for if men become arrayed in overt violence along lines of residential affinity, it would pit patrilineal kin against each other and destroy the very fabric of the kinship structure. And if the combatants aligned themselves according to kinship affiliations, strife could break out within villages and even within households... As a result, Mundurucú ethical values enjoined absolute harmony and cooperation upon all the males of the tribe" (Murphy 1957:1028-1030). "Indeed, the Mundurucú did not openly

seek to better anybody even in play with the exception of one strength test game, consisting of an attempt by each of two opponents to force back the forearm of the other, indulged in by the young people" (Murphy 1954:32). The Mundurucú, by reason of their peculiar social structure, cannot afford to indulge a consistent attitude in sports and warfare as do most other peoples.

The Copper Eskimo have a football-handball type of group game apparently without organization into opposing teams (Jenness 1922:219-222). The ethnographies are unclear regarding the rules and objectives of this game. The impression I have gathered from investigating the sports of various societies is that there are three predominant forms of ball sports. The first involves simply tossing the ball back and forth, with no formal rules. The second involves a group of players divided into two opposing teams; the ball is hit, kicked, thrown and/or carried; the players have no fixed positions from which the game is played; possession of the ball or of playing field territory is disputed. The third basic type involves a group of players divided into two opposing teams; the ball is hit, thrown and/or kicked; the players have fixed position from which the game is played; disposition of the ball usually is determined by the rules and no territory changes hands. Examples of this last kind of game are American baseball and the ball-and-bat game played by Lapps (Scheffler 1704:279-282). The second form of ball-game I class as combative; the first and third I do not. The Eskimo game involves no fixed positions for the players from what I have been able to determine, and no rules governing possession of the ball are mentioned. I therefore decided to classify it as combative. Additional information may indicate that my decision was erroneous, thus strengthening the correlation between warfare and combative sports. It is interesting to note that the Eskimo are noted for the simplicity of their social organization, and this seemingly is reflected in the lack of organization in the ballgame.

THE TIME SERIES CASE STUDY

The alternative strategy of a time series case study was employed to investigate the predicted intrasocietal diachronic relationships between war and sports. The United States of America was selected as the subject society because data were more readily available on it than on other societies. It differs from the societies in our cross-cultural correlation study in being a large, urbanized, and industrialized nation-state. If results obtained in the cross-cultural correlation study are paralleled in this quite different arena we might consider the combined results as having appreciably greater significance than either set of results standing alone.

The dependent variable, sport, is transferable as is the independent variable, war. The indicators of both must be modified but at the same time can be made more precise.

I compared the relative importance of combative and noncombative sports to the level of military activity and to actual combat for each year between 1920 and 1970, where the data were available. I originally intended to extend the period back to 1900 but information prior to 1920 was too scanty to justify this. The half-century used does include three wars and an economic depression, which gives us sufficiently varied conditions for most purposes.

As in the cross-cultural survey, I do not claim that postulated aggressive tension could not be discharged through the sports listed below as non-combative nor that it necessarily would be discharged by the sports listed as combative. I claim only that, according to the Drive Discharge Model, the combative sports are more likely to successfully discharge more of this tension and the non-combative sports are less likely to successfully discharge it or would discharge less of it. This being the case, if the Drive Discharge Model is valid and applicable, we should find an inverse relationship between combative sports and military activity and no, or a smaller inverse relationship between

non-combative sports and military activity, after correction for other factors. The Culture Pattern Model would lead us to expect no, or a direct, relationship between combative sports and military activity, and no, or a smaller, direct relationship between non-combative sports and military activity.

*The Independent Variable:**Military Activity*

The U.S. has engaged in a total of twenty-seven separate military actions in the seventy-one years from the turn of the century—an average of one every 2.6 years. These actions have varied in scope from employment of a few hundred Marines for a week or so in a Central American republic to involvement of millions of men for several years against the Axis Powers. Obviously these two extremes cannot be equated, and we should not score military action as present or absent in a given year. Nor would we wish to do so since more refined measures are available. I have chosen to use the percentage of the U.S. adult male population in its armed forces (excluding Coast Guard) as the indicator of the nation's involvement in military preparations and activity. By using the percentage of adult male population I correct for the increase in population from 106 to 200 million in the fifty year period (U.S. Bureau of the Census 1960:8, 736, 1967:5, 263; Golenpaul 1970:110, 720; Long 1969:152-155, 253-255). The periods of actual combat, however, are provided for the three major conflicts—World War II, Korean Conflict, and Indochina War—so that the relationships of sports to these periods may be assessed.

*The Dependent Variable:**Sports*

I selected several popular sports and divided them into participant and spectator sports (some sports function as both in the U.S.) and separated each of these into com-

TABLE III. SPORTS CLASSIFICATION

	Combative	Non-combative
Spectator	Boxing	Baseball
	Ice hockey	Golf
	Football	Bowling
	Basketball	Auto racing
	Wrestling	Skating
Participant	Karate-judo	Golf
	Fencing	Bowling
	Hunting	Race betting
	Ice hockey	Baseball
	Football	Skiing

bative and noncombative, as shown in Table III.

I chose the first sport in each of the four categories on which the most appropriate and complete data could be found. Government and sports publications were researched and letters sent to various sports organizations requesting attendance or other data from 1920 to 1970.⁵

The sports selected for use are presented below, along with the method of correcting for known extraneous variables. Corrected indices of each were graphed against the percent of adult males in the military and periods of major combat. In all cases the graph base line equals zero for the measure and proportional increases and decreases can be determined from the graph. (See Figures 1 and 2.)

Hunting: I classified hunting as combative because (1) it involves the use of combat type weapons and physical violence and (2) it is not a subsistence activity of any importance in the U.S. and so there is no economic need to engage in it for the majority of people who do so. (As I explained in the cross-cultural study, I class the use of potential combat weapons as noncombative sport only when these items also are both important and necessary tools to the people using them.)

The number of hunting licenses sold in the U.S. was divided by the number of available potential hunters for each year. Hunting still is almost exclusively an adult male sport despite the increase in participation by women over the last decade. Very few males over sixty-five years of age engage in it and few males below the age of fifteen. In many states those below the age of fifteen need no hunting license if accompanied by a licensed adult. Therefore, to determine the number of available potential hunters, I chose the adult males as a base population. Hunters and servicemen are drawn from about the same section of the population and I corrected for this as follows:

(1) During the entire half century covered by this test the U.S. kept a remarkably stable forty percent of its servicemen outside the continental U.S. (U.S. Bureau of the Census 1960:735; Long 1970:345; Long 1967:262, 264). These men were unavailable as hunters, as measured by the number of hunting licenses sold in the U.S.

(2) The U.S. Armed Forces do not schedule leaves for the convenience of servicemen during periods of intense military activity such as World War II. At such times leaves are scheduled according to military requirements and, for the purpose of this test, can be assumed to be randomly distributed around the calendar. The major hunting season in most areas of the nation is less than two months. One month of leave per year is due most servicemen. At least during World War II, this permitted a maximum of 16.7% (one-sixth) of the servicemen stationed in the continental U.S. to be on leave during some portion of the hunting season, and thus be available for hunting. Conversely, at least eighty-three percent of military personnel stationed in the continental U.S. were not available for hunting during World War II (1942-45).

The number of available potential hunters was considered to be the number of adult males—who represent about 0.35 of the U.S. population (P)—less some percent of the

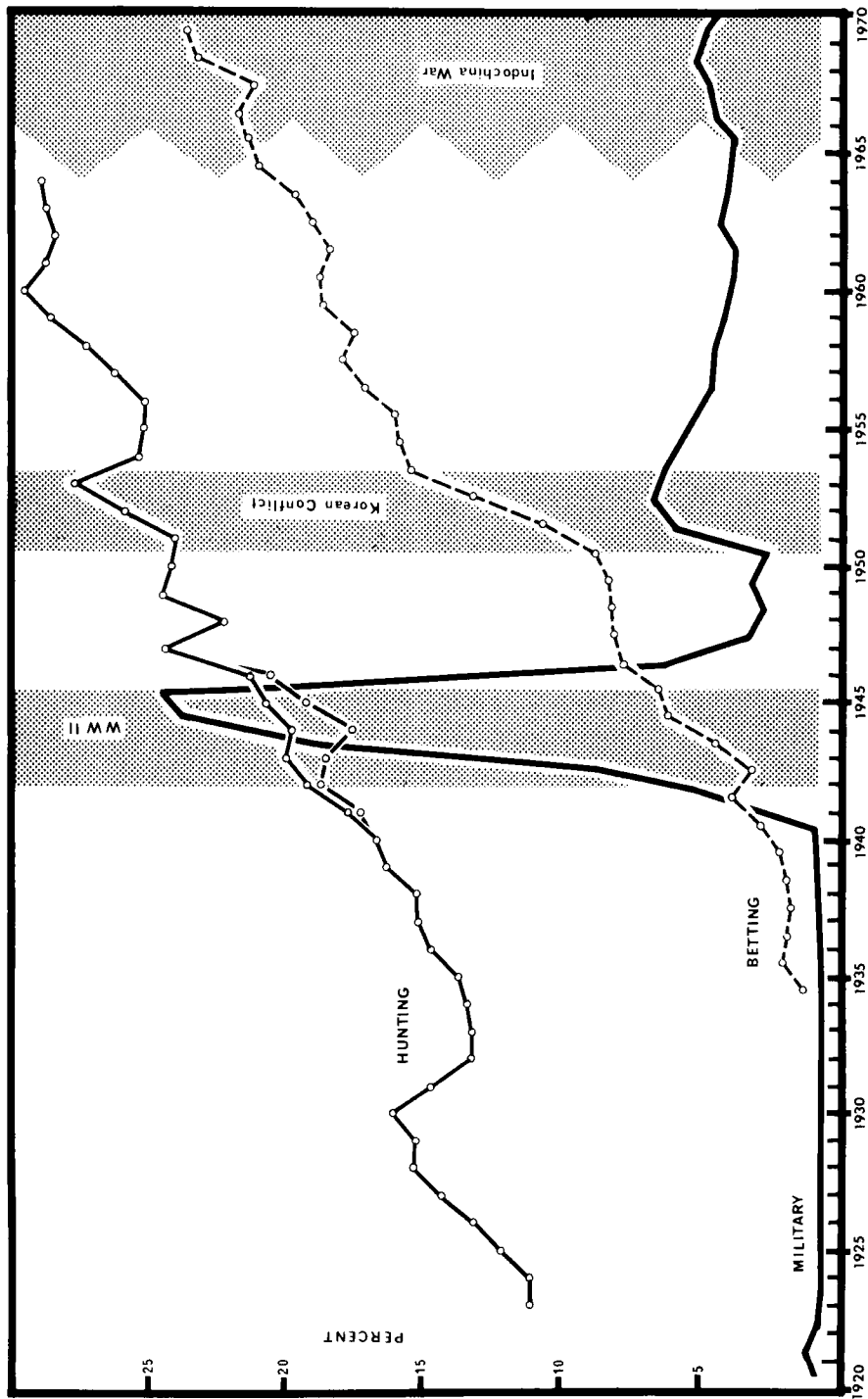


FIGURE 1. Participant Sports

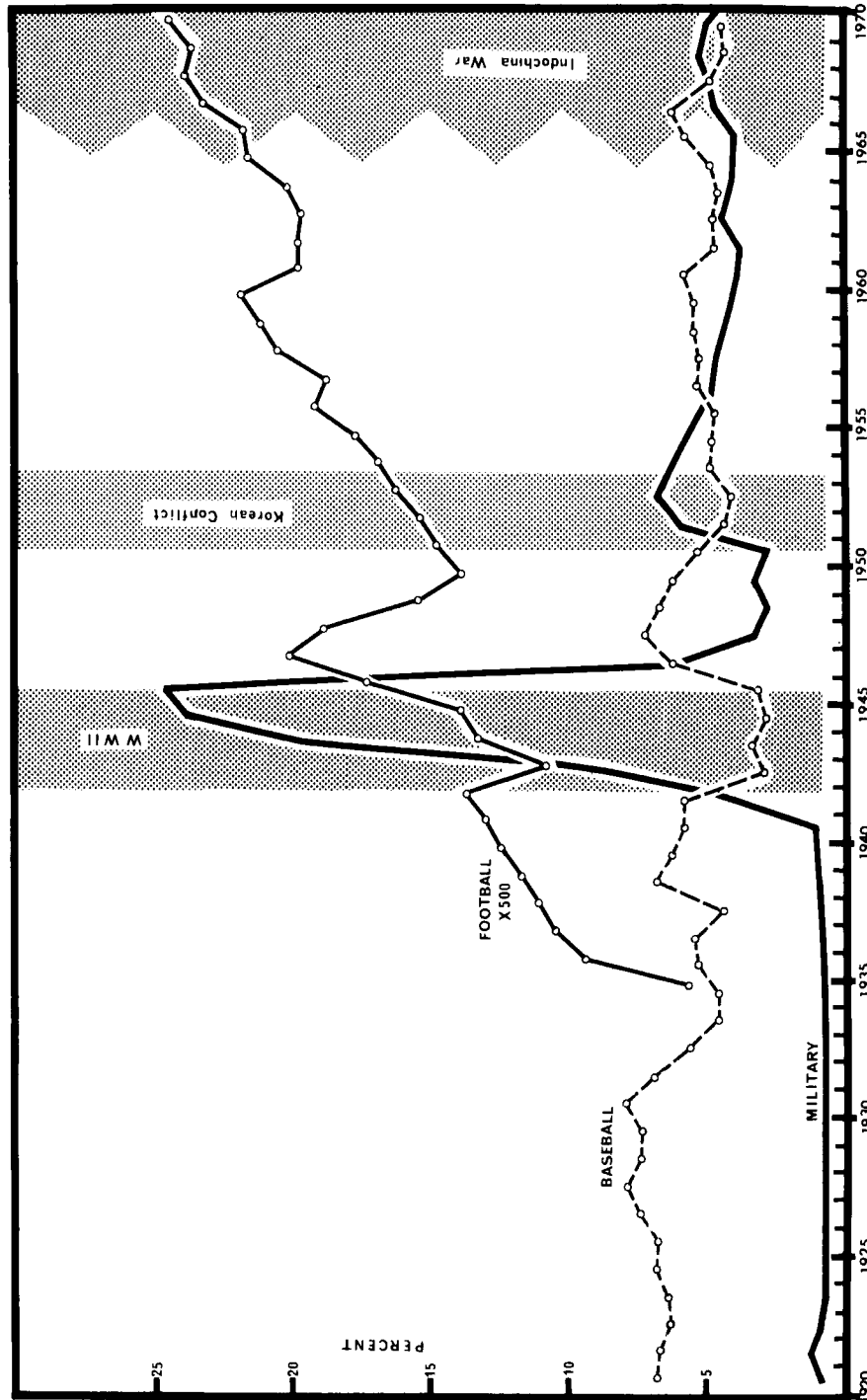


FIGURE 2. Spectator Sports

military (M). This corrected male population was computed as follows:

1920-1941: $0.35P - 0.40M$

1942-1945: $0.35P - 0.40M - (0.83 \times 0.60)M$

1946 on: $0.35P - 0.40M$

There are other corrective factors which should be introduced into this computation. If used, they would tend to increase the hunter index during some portion of the periods of heavy combat. They were not included because data were unavailable. The hunter index curve, therefore, is biased in favor of the Drive Discharge Model and against the Culture Pattern Model. These other unquantifiable, unused corrective factors include:

(1) The annual month of leave due servicemen often was not granted at all during World War II combat.

(2) Some random (relative to hunting season) leave scheduling occurred during the Korean Conflict.

(3) Men home on leave during periods of war probably are less likely to hunt than they would were they still civilians living with their families the year round.

(4) Some states permitted servicemen who had been inducted in that state to hunt some forms of game without a hunting license.

(5) Gasoline rationing was in effect during World War II, and most men must travel some distance in order to hunt.

(6) The manufacture of civilian hunting ammunition was restricted during World War II. Stocks in stores and private hands were depleted over the war years.

(7) Most women, and some adolescent boys who are required to purchase hunting licenses, hunt only with an adult male, and if the adult male does not hunt, neither do they.

All demographic data used to compute available potential hunters, and available potential participants and spectators of other sports, were drawn from U.S. Bureau of the Census publications (1960:8-12,

734-736, 1967:4-12, 260-263), Golenpaul (1970:110, 720), and Long (1967:262, 264, 1969:152-155, 253-255, 1970:345).

Race Betting: I classify betting on horse races as a participant sport because racing, as such, unequivocally is a sport and people attending horse racing events do so with the purpose of participating in the way open to them, i.e., placing bets on the outcome. (I attended several harness races and observed that few people were passive observers. Virtually all placed bets, or were in the company of persons who did so. I questioned twelve people in April, 1971, at the Batavia Downs, New York, race track. All said they probably would not have attended the race if they could not have placed bets. Moreover, in localities where off-track betting is legal—and in many places where it is not—people often bet without seeing the races or the horses. The betting activity and not the horse races is the focal point of interest.)

Total horse racing revenue per year to all States was the basic measure (National Association of State Racing Commissioners 1969). Pari-mutual turnover per year would have been preferable but data were available only back to 1949, whereas State revenues were available back to 1934. The distortion produced by using the revenues as indicators for the turnover totals was checked for the period between 1949 and 1969 and was found to be linearly progressive with no abrupt breaks. Such distortion does not affect the usefulness of the indicator. State revenues were divided by total money spent by the American public on spectator and commercial participant amusements and sports (U.S. Bureau of the Census 1960:224, 1967:212). This provided an index of horse race betting behavior corrected for number of available participants, inflation, and increasing affluence over the years.

Baseball: Baseball is a non-combative sport because there is (1) relatively little physical contact and no physical violence designed into the game and (2) no unequivocal territorial aspect to it.

Average paid attendance at National League baseball games for each year (Grote 1971) was divided by the number of available spectators for that year. The average game attendance was used instead of the total attendance at all games because only a game which is played can be attended. Fluctuations in number of games played, caused by scheduling, weather, and other extraneous factors would distort our results.

The number of available spectators was arrived at by considering the following: most sports spectators in the U.S. are, and have been, adult males. I reviewed popular and sports magazines until finding three clear photographs of spectators at professional football games in 1940 and 1970 and at professional baseball games for the same years. Each showed at least a hundred spectators in sufficient detail to classify them by sex and approximate age. I assumed these to be random samples of sports spectators. An average of sixty-two percent were adult males and thirty-eight percent were females, males under the age of fifteen and males over the age of sixty-five. There appeared to be no appreciable change in this from 1940 to 1970. Although almost no military uniforms were observed in the photographs, I assumed that military men shore-based in the continental U.S. attended games in the same proportion as the civilian adult male.

To correct for sex bias, population increases, and changes in the number of males outside the continental U.S., available spec-

tators for each year were considered to equal $0.565P - 0.40M$.

Football: Football is a combative sport because (1) it involves considerable violent physical contact and (2) territory is involved.

Average paid attendance at National Football League games for each year (National Football League 1971) was divided by the number of available spectators for that year.

ANALYSIS OF RESULTS

Correlation coefficients (Pearson's r) were determined by computer for the military and sports variables and are shown in Table IV. The military curve in Figures 1 and 2 suggests that we are dealing with two distinct politicomilitary periods: pre-1946 and post-1946. The individual's purchasing power and characteristics certainly differed from the former to the latter period. Correlation coefficients for all years, therefore, may be misleading; they are shown but separate coefficients for the two periods also are shown and are considered more truly indicative of the relationships.

However approached, the relationships generally are in the direction predicted by the Culture Pattern Model (six correct predictions out of eight) and not as predicted by the Drive Discharge Model (two correct predictions out of eight).

TABLE IV. MILITARY AND SPORTS CORRELATION COEFFICIENTS

SPORT	All Years		Pre-1946		Post-1946	
Combative						
Hunting	0.219	(0.320) ¹	0.101	(0.413)	0.123	(0.468)
Football	0.060	(0.334)	-0.036	(0.602)	0.096	(0.413)
Non-combative						
Betting	0.185	(0.320)	0.606	(0.576) ²	-0.498	(0.413) ²
Baseball	-0.080	(0.276)	0.017	(0.388)	0.002	(0.404)

¹ Pearson's r correlation coefficient and, in parentheses, the value of r needed for significance at the 0.05 level (Arkin and Colton 1963:155).

² Significant at the 0.05 level but not at the 0.01 level (pre-1946: 0.708, post-1946: 0.526).

Similar conclusions are reached by visual inspection of sports behavior during the two delineated periods of combat. The two more combative sports, football and hunting, show an over-all rise during World War II and the Korean Conflict. So does betting. The less combative spectator sport, baseball, shows distinct drops during both combat periods. (Most baseball games are played during working hours of the week. The low baseball attendance during 1942-45 probably reflects more the need for defense-industry workers to remain on their jobs than it does a lack of interest in the game. Football games typically are played on weekends, on the other hand, and attendance was not affected as much. The drop in baseball attendance during the Korean Conflict would seem to be merely a continuation of the drop presumably brought about by television during the late 1940s.) The behavior definitely does not follow the predictions of the Drive Discharge Model.

Results of the diachronic case study tend to support those of the cross-cultural correlation study.

OTHER SUPPORTING RESEARCH

A concomitant-variation study by S. F. Nadel (1952) indicates that the practice of witchcraft and punishment for it do not serve to discharge as much hostility and aggression tension (to which he grants existence) as they generate and that witchcraft practices are components of a more general cultural orientation. His conclusions are similar to the findings of the present studies and indicate the possibility that war and witchcraft are not related as predicted by the Drive Discharge Model but rather as predicted by the Culture Pattern Model. A hologistic cross-cultural study should be conducted to test this.

R. Naroll (1970:1247-1249) references several studies which support what he calls the "cultural themes hypothesis" (which is contained within my Culture Pattern Model). He also speculates that the numerous studies of child rearing and adult behav-

ior which he cites require no causal relationships, for "the child-training practices may, like art styles or folk-tale motifs, merely be reflections of predominant cultural themes" (*Ibid.*:1251). And it is my belief that, in fact, most correlations in such studies can be as satisfactorily, and more parsimoniously, explained as manifestations of some strain toward cultural consistency in human groups and individuals.

S. A. Mueller (1967) has researched behavior on an individual level in a way parallel to my research on a social level. He tested to find if an individual's amount of social activity among kin is inversely or directly related to his amount of social activity outside kin circles. An inverse relationship would infer a functional equivalence model of behavior (analogous to the Drive Discharge Model). A direct relationship would infer a positive reinforcement model (analogous to the Culture Pattern Model). He found the relationship to be direct, supporting positive reinforcement.

DISCUSSION

No one has satisfactorily explained just how aggressive tension (based either on innate or acquired "drives") could be accumulated over a period of time, or in what form or where, nor how person A could discharge his tension through person B hitting a ball or killing someone somewhere far away. Hunger—a more likely candidate for being an innate response—and the predominantly learned sexual desire certainly are not satisfied by watching someone else's feast or orgy; if anything, they are intensified. I question why aggressive tension should lend itself more to symbolic or vicarious release than these other so-called drives and their tensions.

We still are left with the fact that most societies are or (before being pacified by larger societies) were relatively warlike. Certainly *Homo sapiens* have a capacity for intraspecific violent aggression and killing, since they occasionally engage in it. Nevertheless we need not postulate an innate

propensity in the individual toward such things nor speculate on the mechanics involved in natural selection for warlike or combative killing behavior in humans when it is not found in other animals. The tendency for a group of men to engage in war can be more parsimoniously and satisfactorily explained as being carried in their society's culture than in the individual men's genes (Livingston 1968:11). Other things being equal, a society proficient at and prepared for warfare and willing to engage in it has had (until recently) a better chance of surviving and growing than had a society not proficient, ready and willing (Naroll n.d.a, n.d.b:35-36; Otterbein 1970:93-99). This amounts to socio-cultural selection for socio-cultural warlike patterns of group behavior and explains the preponderance of warlike societies with only one reference to the individual. We would have to grant him "piety" (Burke 1965)—a trained response to go along with the group.

The prevalence of combative sports throughout the world also does not require reference to individual innate hunting patterns, aggression, need to excel, or the like. Such sports are components of combative culture themes, and since warlike societies are widespread so are combative sports. This infers some propensity for consistency in group cognitive and behavioral patterns but such consistency perhaps can best be explained as an outgrowth of group interaction mechanics and requirements. It need not reflect any innate propensity in the individual human.

CONCLUSIONS

Sports and war manifest no functional relationship across time. Cross-culturally, war and combative sports show a direct relationship.

War and combative type sports therefore do not, as often claimed, act as alternative channels for the discharge of accumulable aggressive tensions. Rather than being functional alternatives, war and combative sports

activities in a society appear to be components of a broader culture pattern.

However, the Drive Discharge Model is so entrenched in Western science that there should be investigation of other activities which conceivably could act as alternatives to war (and now, as we have seen, to combative sports as well) in the discharge of postulated drive tensions. Likely candidates are suicide, murder, punishment of deviants, drug use, physical assault on family or other community members, gossip, psychogenic illnesses, and malevolent magic. Unless there are definite indications that they serve as alternatives to war and combative sports, we can set aside the Drive Discharge Model with full confidence that it is not applicable to humans.

NOTES

¹ I wish to thank Professors Raoul Naroll, Keith Otterbein and Terrence Tatje for their encouragement, critical review and comments on this paper. Professor Otterbein directed me to the frustration-war statements of Dollard, Ellis, McDougall, and Steward and Faron. Professor Robert F. Winch, of Northwestern University, informed me of S. M. Mueller's study. Jacqueline Mithun directed me to a publication I otherwise would have overlooked. Fred Fohl and Gerald Pacillo, with their encyclopedic knowledge of American sports and unflagging interest in the project, were of considerable help. Rolf Wirsing performed the role of computer expert. Any errors or misjudgments, of course, reflect on me alone.

² The Hutterites were chosen when the Austrian society appeared in the random arrangement of OWC Code numbers. They originated in Austria in the sixteenth century and are native speakers of an Austrian dialect. They now, however, are separated from Austria by political boundaries and consequently are a separate cultural unit (Naroll 1968:248-253). Although not autonomous in political matters and hence not free to go to war, they consistently have exercised a functional equivalent of the war-making decision of political units. In Austria, and later in the United States and Canada, the Hutterites adamantly opposed warfare and refused service in the armed

forces, many being jailed for so refusing (Hostetler and Huntington 1967:2-10). I coded them as a relatively peaceful society.

³Wrestling, broadly defined, seems to be of almost universal occurrence. This is more due to our use of the word "wrestling" than to any postulated universal aggressiveness. We group under that term such diverse activities as friendly, casual arm-wrestling and vicious, destructive "mountain-style" wrestling.

⁴The coding reliability test was supported by a grant awarded by the State University of New York at Buffalo Institutional Funds Committee of the Faculty of Social Sciences and Administration. The grant was made from the University's National Science Foundation Institutional Fund, supervised by the Research Foundation of the State of New York.

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