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The Benefits and Challenges of Linked Datasets for Cliodynamics and Comparative Anthropology

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The past few decades have witnessed a proliferation of large comparative cultural databases, primarily consisting of contemporary data (e.g., ethnographic writings), but increasingly historical data as well (including archaeological materials). Individually, these databases already serve as valuable resources as evidenced by the growing number of papers utilizing them. However, further benefits could result from merging or linking these data in ways that surpass their original intentions and ambitions. One avenue is the integration of ethnographic and historical data to help remedy the weaknesses of each (e.g., by addressing lacunae, imprecision, bias, subjectivity, and unreliability) and draw on their reciprocal strengths (e.g., by combining longitudinal depth and primary source material) of these different forms of evidence. The work presented here is a further step in that direction. This article shows how efforts to quantitatively examine historical variation in features of warfare benefit from combining ethnographic, historical, and archaeological data. It describes the general challenges faced by combining datasets (e.g. units of analyses, differing variables across datasets, sampling issues, etc.), how these challenges can be mitigated, and what further challenges remain to be addressed. The overall aim is to encourage further research into the benefits and challenges of integrating such datasets.

Introduction

This paper reviews the scholarly contributions of several major cross-cultural databases, and explores potential benefits and challenges of integrating data from multiple source databases to address research questions about human cultural

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diversity. For illustrative purposes, we focus on efforts to link three datasets to examine cross-cultural variation in historical warfare intensity, which were created by synthesizing cultural units, variables, and data from three preexisting ethnographic and historical databases: the Human Relations Area Files, the Ethnographic Atlas, and the Seshat Global History Databank. Issues around the selection of units of analysis and variable definition, coding, and validation are considered in the context of previous discussions and recommendations pertaining to the construction of comparative cultural databases (Slingerland et al. 2020; Watts et al. 2021), along with challenges arising from warfare data in particular and integration of data based on diverse sources and forms of evidence.

Cultural databases and their applications

Cross-cultural databases built from ethnographic data have been used for several decades in comparative anthropological research. One of the most widely used ethnographic databases is the Human Relations Area Files (HRAF), a large storehouse of writings by anthropologists on individual societies as well as cross-cultural studies on topics ranging from kinship and marriage systems, ritual practices, religious beliefs, warfare, social organization, subsistence strategies, and many more. The electronic version of this resource (eHRAF) provides users with the digitized copies of these ethnographies and other primary writings on over 360 cultures. The societies covered in eHRAF are mostly cultures studied by western anthropologists during fieldwork for relatively narrow spans of time. However, it is an authoritative source of detailed, first-hand accounts of a range of human cultures including hunter-gatherer and other nonstate societies.

One example of eHRAF's value in answering an overarching social scientific question is a study testing the theory of "morality-as-cooperation", which posits that seven cooperative rules will be universally considered morally good across cultures: help your kin, be loyal to your group, reciprocate favors, be courageous, defer to superiors, share things fairly, and respect other people's property (Curry 2016; Curry et al. 2019). eHRAF is a large storehouse of digitized ethnographic writings which can be mined by researchers to construct representative samples of the world's cultures and compare targeted features among them. To test the hypothesis that the above seven cooperative principles are judged morally good everywhere, prevailing norms were identified for a sample of 60 societies. At least 1,200 pages of ethnographic data, gathered by professional anthropologists with a minimum of one year of immersive fieldwork experience, were required for a given society to qualify for inclusion in the dataset. The sample of societies was drawn from six major world regions: Sub-Saharan Africa, Circum-Mediterranean, East Eurasia, Insular Pacific, North America, and South America (Lagacé 1979). Across 400 documents, a total of 3,460 paragraphs of text were found to relate to one or

more of the seven principles of cooperation. This resulted in 962 examples of behavior. The researchers found that the cooperative behaviors in question were associated with language indicating moral approbation in 961 cases (i.e., 99.9% of all cases), supporting the hypothesis that the seven principles of cooperation were universally regarded as morally good (Curry et al. 2019).

The Ethnographic Atlas contains quantitative codes based on ethnographies initially published in 1967, created by the anthropologist George Murdock as part of his aim to do comparative cross-cultural research with statistical methods (White et al. 1988). It was later revised and updated by Gray (1999). Like eHRAF, it has been widely used in comparative anthropological research on a range of topics. The EA and related Standard Cross-Cultural Sample provide snapshots of cultures specified for each society to an "ethnographic present" when the fieldwork was done, generally in the nineteenth and twentieth centuries. Studies using the EA are too numerous to summarize but range from those on subsistence practices and belief in moralizing gods (Peoples & Marlowe 2012), contemporary gender roles and the historical use of the plough (Alesina et al. 2013), the evolution of food sharing practices (Ringen et al. 2019), the evolution of kinship systems and post-marital residence (Jordan et al. 2009), and cross-cultural variation in prejudice (Jackson et al. 2019). It is also possible to link coded variables in the EA with cultures represented on language phylogenies to test cultural evolutionary hypotheses (Mace and Holden 2005), which has been facilitated by the creation of D-Place (Kirby et al. 2016). As it does not have variables specifically on warfare, studies using EA data on social structure, ecology, and other potential correlates have combined this with warfare data from other sources such as HRAF/eHRAF (Ember & Ember 1992a; Otterbein 1968) and modern conflict databases (Cao et al. 2023). Such cross-cultural studies have tended to focus on drivers of the incidence and frequency of war, testing the effects of variables such as resource pressure, natural disasters, population density, and subsistence modes.

The SCCS is an effort to provide a stratified sample of pre-industrial societies with limited historical relatedness. Like the EA, the SCCS has been used in numerous cross-cultural analyses (often in conjunction with EA variables). For instance, Roes and Raymond (2003) test whether belief in moralizing gods tend to exist in larger societies after examining a number of prerequisite hypotheses regarding correlations between external warfare, resource base, and society size. Other studies have looked at market integration and prosocial behavior (Dow & Eff 2008), the moderating effect of ingroup loyalty on valuation of violence directed towards the ingroup versus the outgroup (Cohen et al. 2006), the prevalence of pathogens and ingroup bias (Cashda & Steele 2013), resource stress and beyond-household sharing of labor and food (Ember et al. 2018), and environmental risks and parental care (Quinlan 2007). Dow and Eff (2008) have also conducted

analyses indicating that despite efforts to choose societies sufficiently distant from one another so as to be independent data points, many SCCS variables displayed spatial and linguistic autocorrelation, and recommended assessing autocorrelation when conducting analyses using SCCS societies. The SCCS has also been used in various cross-cultural studies on causes of war and drivers of conflict frequency (Eff & Routon 2012; Jackson et al. 2019). Its warfare variables (as listed on D-Place) are drawn from cross-cultural studies of ethnographic data by White and Burton (1988), Ember and Ember (1992a), Otterbein (1970), Ross (1983), and Nammour (1974). Warfare frequency is one variable that is frequently used across studies (e.g. Eff & Routon 2012), but the specific variable used differs by study– for instance, Jackson et al. (2019, 2020, 2023) use the SCCS variables 773 and 774 for internal and external war originally coded by Ross (1983) while other studies (Eff & Routon 2012; Grueter & White 2014; Wilson 2008) use Ember and Ember's 1992a measures, which differ with Ross' coding for some societies, likely because they refer to different time periods (Ember & Ember 1992b).

The D-Place site (Kirby et al. 2016) is an open-access database which aggregates variables from quantitative anthropological and ecological datasets for over 1400 societies linked with language phylogenies. These include variables from the Ethnographic Atlas, Standard Cross-Cultural Sample, the Western North American Indian database, and the Binford Hunter-Gatherer dataset. Society pages on the eHRAF and D-Place websites link to the corresponding society in the other, with the caveat that these might not be perfect matches to the EA/SCCS variables depending on exact location and time period of the source fieldwork. The construction of D-Place has facilitated comparative cultural analyses, especially cultural phylogenetic analyses, and is used by many of the studies cited above analyzing EA and SCCS variables.

Recently, there have been large collaborative efforts to build cultural databases with greater temporal depth, extending back to societies known from the archaeological and historical records. Two major projects in this area are the Seshat Global History Databank (Francois et al. 2016; Turchin et al. 2015) and the Database of Religious History (Slingerland & Sullivan 2017). Seshat is a historical database with quantitatively coded variables and qualitative evidence and descriptions of social complexity, religion and ideology, warfare, and other aspects of past societies. These variables are coded for independent political units (polities) representing different levels of social complexity across 30 natural geographic areas (NGAs) of the world (Turchin et al. 2015). It is newer than the aforementioned ethnographic databases, but the data have been used in a number of large studies primarily focused on measuring and assessing drivers of social complexity (Miranda & Freeman 2020; Shin et al. 2020; Turchin et al. 2018, 2022). The societies in Seshat tend to be larger and more politically complex than those

in ethnographic databases and include societies that are only known archaeologically. Critiques of Seshat raised by some researchers include limited knowledge by RAs responsible for coding data of extensive secondary historical literature and inability to deal with debates on various time periods and cultures that might lead to inaccurate or incomplete coding (Slingerland et al. 2020). Since its creation, these data have been used in a number of large studies primarily focused on measuring and assessing drivers of social complexity (Shin et al. 2020; Turchin et al. 2018, 2022). Although social complexity is a term frequently invoked and debated in archaeology, anthropology, and other fields, there is not agreement on a single definition or meaningful set of factors that are comparable across human societies, which may include population, territory, and settlement size, levels and degree of specialization of governmental institutions, social differentiation, and centralization and permanence of political authority, among others (Currie & Mace 2011; Feinman 2013; Yoffee 2005). Turchin et al. use the Seshat Data Global History Databank to conduct a principal component analysis on nine 'complexity characteristics' created from 51 variables on aspects of polity size, governance, settlement, and information systems across historical polities from ten world regions. They find that the first component accounts for 77.2% of variance, supporting the idea that complexity characteristics tend to coevolve and are shared across a sample of polities from around the world such that 'social complexity' is a meaningful concept across human societies (Turchin et al. 2018).

The Database of Religious History is historical database project focused specifically on religious history. Its cultural units were originally various types of religious groups, which has broadened to include religious places and religious texts, with variables filled in by subject matter experts who may define the scale and temporal range of these units (Slingerland & Sullivan 2017; Slingerland et al. 2023). This has been critiqued for limiting comparability between groups for cross-cultural analyses (Watts et al. 2021) but also allows for flexibility in what are realistically heterogeneous types of groups and greater accuracy and specificity when coding variables (Slingerland et al. 2023).

Some research questions have been approached using more than one database, although tending to rely primarily on one. For instance, the role of supernatural beliefs, particularly in morally-concerned or moralizing gods, in promoting social complexity is a heavily debated topic in cultural evolution (Norenzayan et al. 2016; Purzycki et al. 2023), which has previously been analyzed using primarily ethnographic data (Botero et al. 2014; Watts et al. 2015). More recent work on the relationship between moralizing gods and social complexity has been done through a combination of multiple forms of data integrated in Seshat (Whitehouse et al. 2023), sparking further debate about what can be inferred from the

construction and analysis of historical databases (Purzycki et al. 2023; Whitehouse et al. 2023).

Databases like Seshat and the DRH have shown major potential in answering major research questions and clarifying cultural evolutionary processes. However, their ambitious scope means many areas have not yet been filled in and variables relevant to an individual scholar's research questions may not have been coded or sufficiently reviewed. In many cross-cultural studies, researchers have used EA or eHRAF data partially, such as using some variables from the EA and coding additional variables on warfare, or using the eHRAF probability sample and coding data from different sources (Cao et al. 2023; Ember & Ember 1992a; Otterbein 2000). Some work has been published using a combination of data from the DRH with other data (e.g. Spicer et al. 2022; Wormley & Cohen 2022). For instance, Spicer et al. (2022) attempt to replicate results from statistical analyses of ethnographic data on the relationship between ecological variables and belief in moralizing gods through combining paleoclimatic data from previous studies with DRH data, including a separate sample with SCCS data recorded within the DRH (currently 100 out of the total 186 societies) to take advantage of the SCCS's sampling strategy designed to maximize independence between societies. This demonstrates the use of a large historical database in combination with additional datasets to more thoroughly test hypotheses that had previously only been looked at primarily with small-scale, ethnographically recorded societies (Spicer et al. 2022). With the current datasets, both Seshat and D-Place were used to delineate cultural units of analysis and for the existing variables on date ranges, population size, and social complexity.

Case studies: combining datasets to investigate historical wartime violence

The datasets presented in this section were created in an effort to explore variation in moral attitudes about violence in warfare across cultures and time periods. Addressing these sorts of questions about large-scale historical and cross-cultural variation in human social behavior requires looking outside preexisting data or methods focused on particular subsamples, such as twentieth-century small-scale societies or behavioral data drawn from contemporary populations. Combining a wide range of data sources, including primary ethnographic data and information from academic historical and archaeological literature on past societies is a promising way to explore such questions and reach meaningful conclusions. Along with a historical trend of greater social complexity in the form of larger and more hierarchically complex forms of political organization, cultural evolutionists have also studied accompanying ideologies promoting morality and prosociality which helped to build and/or sustain such societies (Norenzayan et al. 2016; Turchin et al. 2022). These two developments are linked with changes in the conduct of

warfare: differences in political complexity through military recruitment, organization, professionalization, and tactics; and differences in ideology through attitudes about violence and how social groups, their members, and outsiders are defined and their lives valued. In particular, the variables around which the current datasets are centered were chosen both to represent wartime behaviors on which there was some previous research indicating possible links with social complexity, and for which it was possible to code from existing sources in a relatively objective manner.

The first dataset was created to test predictions generated by the 'Modes of Religiosity' theory and identity fusion theory, specifically those aspects relating to between-group differences in resource extraction and participation in violent intergroup conflict (Whitehouse 2018). According to modes theory, beliefs and ritual practices across societies tend to cluster around one of two forms: infrequent, emotionally intense rituals which take place among small groups and create close kinship-like bonds among participants- the imagistic mode- and frequent, standardized, low-arousal rituals practiced among large populations- the doctrinal mode. A group's reliance on one form or another is argued to result from necessary patterns and levels of cooperation among group members to successfully survive in a given environment (Whitehouse & Lanman 2014; Whitehouse & McQuinn 2012; Whitehouse et al. 2017). Previous efforts to use databases to test the core predictions of the modes theory have utilized ethnographic materials sourced from HRAF (Atkinson & Whitehouse, 2011; Kapitány et al., 2020) or have attempted combine the results of those studies with large archaeological datasets – an approach dubbed 'material correlates analysis', indicating that imagistic group bonding was gradually replaced by more doctrinal systems over the course of the Neolithic transition in Western Eurasia (Gantley et al., 2018). Ethnographic and cross-cultural studies have demonstrated how different resource bases (e.g. subsistence practices of agriculture, foraging, or livestock herding) are associated with different group sizes, hierarchical complexity, forms of military organization, and levels of internal and external war (Ferguson 1990; Haas 1990, 2001; Keeley 1996; Otterbein 2004). The modes framework predicts imagistic groups with higher levels of ingroup cohesion, and therefore risk-taking and sacrifice on behalf of the group, among small-scale societies reliant on non-agricultural forms of subsistence (Whitehouse & Lanman 2014; Whitehouse, 2021) where participation in combat is voluntary and mobilized through familial ties or friendships (Glowacki et al. 2020; Zefferman & Mathew 2015). In contrast, doctrinal groups reliant on diffuse immovable resources such as agriculture would be expected to display lower levels of voluntary self-sacrifice during war, due to reliance on coercive recruitment scale-based military tactics characteristic of larger complex polities. The dataset was

created to test whether these predictions would be supported by a comparative analysis of past societies; specifically, if evidence for self-sacrifice would be less likely among societies with greater reliance on agriculture and higher levels of social complexity. Alternatively, an opposite relationship might be found if fighters in small-scale societies without formal militaries tended not to engage in parochially altruistic or self-sacrificial behavior on behalf of other group members, instead relying on greater numbers and surprise attacks to maximize individual benefits and decrease risk (Glowacki & Wrangham 2013), and self-sacrificial behavior was more likely in socially complex societies as cultural institutions of coercion, punishments, and rewards were correspondingly scaled up.

The second dataset was created to examine whether indiscriminate killing in war was linked with lower or higher levels of social complexity. Some researchers have argued for a pacifying role of socially complex, centralized states with proportionally lower levels of people exposed to internal and external violence (Gat 2012; Keeley 1996; Pinker 2011). These arguments draw on a range of ethnographic and archaeological evidence for raids and ambushes among hunter-gatherer and other small-scale societies that often results in opportunistic and indiscriminate violence against enemies (Gat 1999; Glowacki & Wrangham 2013; Milner 1999; Otterbein 1997). However, there is also evidence for greater warfare intensity with the advent of agriculture and the growth of centralized states, and it is possible that more efficient and destructive military technology and greater ideological significance of warfare resulted in intensified violence against conquered or resistance populations (Ferguson 2013; Kim et al. 2015; Otterbein 1970, 2004). Additional interacting factors include the distribution, scarcity, and predictability of resources, perceived social and cultural differences between warring societies, and social norms of militarism and violence (Arkush 2008; Ember & Ember 1992a; Kim & Kissel 2018; Glowacki et al. 2020). The dataset was intended to test whether indiscriminate killing of enemies will increase with the presence of formal military structure and with the presence of violent territorial or political expansion, or whether the lack of distinction between combatants and non-combatants among non-state and small state societies would result in more indiscriminate killing.

The third dataset was constructed to test for correlations between trophy-taking practices and levels of social complexity. Such practices have been recorded in multiple regions across different periods of history and have been hypothesized to be a near-ubiquitous feature of human cultural systems (Chacon & Dye 2007). The existing literature on trophy-taking emphasizes its social functions among small-scale societies where warriors used trophies to demonstrate military skill and increase their social standing, as well as chiefdoms and early states where leaders needed to publicly display their monopolization of violence to maintain

control of internal populations and intimidate external ones. The dataset was used to test whether institutionalized and/or widespread practices of human trophy-taking were more likely to occur in societies at intermediate levels of sociopolitical complexity and decrease at higher levels of political complexity, and whether they were more likely in societies engaging in violent expansion of political power over territories or peoples.

Methodology

To construct the initial dataset, eHRAF subject categories, particularly those on armed forces and war, as well as keywords were used in initial searches to find societies for which there was some description of warfare. Materials in eHRAF have been indexed according to the Outline of Cultural Materials (OCM) which contains a range of broad subjects ranging from religion, family life, economy and subsistence, and other aspects of human societies (Ember & Ember 2013). Specifying relevant subject categories when searching eHRAF is an established method for finding relevant ethnographic records often used when compiling datasets for cross-cultural studies (e.g. Atkinson & Whitehouse 2011; Ember & Ember 2013; Jackson et al. 2020). For the purposes of this study, the OCM categories 700 (armed forces) and 720 (war) were primarily used. Keywords potentially contained in relevant descriptions may also be used to narrow eHRAF search results (Fischer & Ember 2018). For this study, keywords related to the focal variables for each dataset were used to search across and/or within subject categories. The keywords used would sometimes be adjusted based on the amount of material on warfare for different societies as well as the content of that material: for societies with extensive descriptions of warfare, fewer, more direct keywords were used while societies with limited descriptions of warfare were searched with additional, broader keywords to find any relevant information. Those descriptions were then used to code the target variable. To expand the dataset to include historical and archaeological societies, Seshat polities that had been coded with some degree of certainty (present/inferred present or absent/inferred absent) for variables of interest in the 'Warfare Intensity' section (e.g. mutilation, torture, general massacre, and extermination) were also added. Although different variables on wartime behavior were created for this project, these Seshat variables provided an indication of available data and sources on historical warfare for indiscriminate killing and trophy-taking. The sources and evidence for the codes on mutilation and massacre/extermination were checked for each polity included; those for which the evidence was found to be insufficient and no additional sources were found were removed. Societies which could not ultimately be coded for the focal variable in each dataset were also removed. As these varied based on the variable, the datasets are different for each, i.e. the first dataset on self-sacrifice is

composed mostly of ethnographic and a few historical societies. More detailed information was found on the killing of enemies in ethnographic than historical sources, so there are fewer Seshat polities in the dataset on killing enemies while there are far more for the dataset on trophy-taking.

The first dataset focuses on evidence for self-sacrificial behavior in war. As there was no existing dataset with variables directly about self-sacrificial behavior or motives for past societies, it was necessary to develop a measure and code it from available sources. Previous studies that indirectly address self-sacrifice or parochial altruism use other proxies, like ritual intensity (Atkinson & Whitehouse 2011) or estimated mortality from war (Bowles 2009). Other studies have used data from national militaries on awards for heroism (Blake 1978; Riemer 1998; Rusch 2013). However, these were from contemporary nation-states and focused on variation within, rather than be tween, societies. As self-sacrificial actions are sometimes described directly in both ethnographic and historical sources, a code based on these- ideally representing the actual occurrence of such behavior– was chosen. This addresses a suggestion in a previous study on risk-taking in war among small-scale societies for "a systematic review that searches for evidence of self-sacrificial behavior in societies practicing war but lacking a militarized culture" (Wrangham & Glowacki 2012) to explore evidence for parochial altruism. It also serves as an exploration of the available sources and whether this was something possible to code reliably. The starting point for the dataset sample was the set of societies analyzed in Atkinson & Whitehouse (2011). This was appropriate as the intention of their study was to classify cultures as imagistic or doctrinal, and their dataset included data on warfare frequency, subsistence practices, and political complexity with sampling intended to maximize geographic diversity. It was not possible to find detailed descriptions of warfare, specifically indications of the presence or absence of self-sacrificial behavior, for all societies in their sample (and a few did not engage in warfare). These were excluded and replaced with societies with an attempt to preserve the regional distribution of the original sample. Self-sacrificial behavior was coded from ethnographic sources based on indications of death in battle in defense of their fellows or group as a whole. For instance, one ethnographer of the Saramaka of Suriname writes that, based on Saramaka oral history, "it was common for Saramakas to send spies to be deliberately captured by the whites, in order to reveal information under "interrogation" (and often just before being executed)...But there was one final group whose presence weighed heavily on the celebrants that night: those men and women who did not live to see the Peace, but upon whose sacrifices and heroism it was built" (Price 1983: 180). For much older historical societies, descriptions of warrior culture among military units in the secondary historical literature could be used as evidence; for instance, scholars of Islamic history have written

extensively on the value placed on martyrdom by various early sects, such as the Ibādi Kharijites who established a small state in present-day Algeria in the eighth century and who espoused the Islamic concept of *shirā'*, "violent action for the purposes of establishing justice, an action that usually resulted in the deaths of the Khārijite *shurāt*" (Gaiser 2010: 110).

The second dataset focuses on indiscriminate killing of enemies. While there have been quantitative, cross-cultural studies focused specifically on treatment of enemies, these have largely focused on civilian victimization and atrocities in war among contemporary nation-states using data from aggregated news sources, governments and non-governmental organizations (Downes 2006; Eck & Hultman 2007; Harff 2003). Considering the nature of historical data, a more flexible scale that could account for uncertainty was required. As mentioned above, the Seshat codebook contains variables for 'Intensity of warfare' including widespread or systematic torture and mutilation, targeted and general massacre, and extermination. However, there was a large amount of missing data for the polities that have thus far been coded, there was a heavy bias in missing data towards older societies, and there was relatively little variation in the presence of most of these variables among polities that had been coded. Therefore, it was necessary to use other sources of data, although the existing Seshat data and codes provided many relevant sources on descriptions of warfare practices. The variable was ultimately defined as whether enemy individuals in different age/gender categories tended to be targeted or killed during war, coded as a cumulative scale that can also incorporate ranges for uncertainty or within-societal variation. Specifically, each society was coded on a scale of whether enemy individuals in the following age/gender categories tended to be targeted or killed during war: male or female infants/toddlers; children; younger adults; older adults. 1 point is added for each age/gender category, with the minimum being 1, and the maximum being 8 (everyone). Age and gender are not necessarily the most salient reason for whether enemies would be killed in a conflict, but scoring in this manner ideally captures variation in scales of violence less arbitrarily than a more undescriptive categorical or numerical scale. There was a lack of evidence for any sort of codes regulating the extent of violence or protection for enemy individuals in most of the societies surveyed.

However, it cannot be assumed that for all societies where no limits of war are found in the sources that indiscriminate violence was normal or desirable- the presence or absence of such evidence may result from the vagaries of historical records or the interests of specific researchers. With these caveats, this variable is intended as a proxy for the regular and presumably accepted means of conducting war in these societies. In the ethnographic record, descriptions of warfare, when present, would sometimes indicate whether it was common practice to kill women,

children, or surrendered enemies, or if there were informal or formally recognized restraints. For instance, an ethnography of the Tlingit in southeastern Alaska contains the following: "If the conquerors were not carried away by the excitement of slaughter, they would also secure some women and children as slaves...The victorious war party usually killed all the men, and sometimes everyone in the settlement" (De Laguna 1972: 584). As in this statement, many ethnographies would denote whether enemies would be killed, captured, or spared according to their gender and/or age. In contrast with ethnographies concerned with capturing the particular practices of a society, indications of enemy treatment for historical societies outside the scope of primary sources would generally be derived from descriptions of battles and massacres, ethnic cleansings, and other major instances of violence. A caveat to this is the potential for significant amounts of variation in such instances of violence based on the political context, enemies being fought, and multiple other factors. An attempt was made to mediate this by focusing on specified time periods and using multiple sources to determine whether, for instance, massacring defeated enemies was a common practice for a given polity.

A clear example is from the military practices of the Manchu Empire of seventeenth-eighteenth century China, where the government sanctioned massacres during the conquest of the Liaodong territories as well as in response to multiple rebellions (Perdue 2010; Sepe 2011). In this case, the extreme slaughter and designated enslavement of certain groups (men too old to fight, women, and children) was recorded in multiple conflicts, and was also ideologically significant due to the Qing Dynasty's reinterpretation of Confucian principles of "assimilation" for their political ends (Perdue 2010). For societies only recorded archaeologically, evidence for the degree of indiscriminate killing could be in the form of the identified age and gender of skeletons at sites indicating violent intergroup conflict, such as mass graves without evidence of careful burial and skeletal indications of violent trauma. For example, in an article discussing the patterns of violence of the Linearbandkeramik culture indicated by sites in the Early Neolithic period in central Europe, Meyer et al. (2018) write that "the mass fatality sites discussed above show that subadults were frequent targets of lethal collective violence, as indeed were men of all age groups and older women. It would appear that only young women and possibly (female?) adolescents were routinely spared during the attacks, probably to be captured alive" (Meyer et al. 2018: 34). Such inferences are possible because of the extent of archaeological research on the European Neolithic and the ability to place individual sites of mass violence in the context of multiple others, but this quantity of evidence is often not available for cultures of this antiquity. Thus, there are relatively few solely archaeologically-recorded societies in this dataset. However, even this modest inclusion allows for greater time depth than allowed from a purely ethnographic dataset.

The third dataset focuses on institutionalized trophy-taking of enemy body parts. While there have been extensive comparative qualitative examinations of these practices (Chacon & Dye 2007; Harrison 2012; Hoskins 1996), there was no preexisting quantitative dataset of trophy-taking across historical societies. For the construction of the current dataset, institutionalized trophy-taking was considered present when the taking of body parts from enemies was a widespread, socially accepted and expected practice in a given society. As this could be coded based on direct descriptions of such practices in ethnographic or historical records, or from evidence of processed or ritually treated human remains in the context of archaeological evidence for violent intergroup conflict, the sample spans twentieth-century small-scale societies as well as sites from the distant past only known archaeologically, demonstrating the benefits from combining different forms of evidence. The taking of human body parts, especially heads, as trophies, has long been a subject of fascination among anthropologists (Armit 2012; Hoskins 1996). There are numerous ethnographic descriptions of trophy-taking and whether taking of heads or other body parts were part of a status system for warriors or considered spiritually significant. For instance, an ethnography of the Mundurucu of the Amazon basin states that during battle, "adult males and females were killed and decapitated, and prepubescent children of both sexes were captured by the attackers...A central object of the raid was the taking of enemy heads, and a strict protocol was observed in the preparation of the trophies" (Murphy 1959). Ethnographies might also indicate whether such practices were absent in the context of other details given about how war was carried out among a given society, or such absence could be inferred if not mentioned among otherwise detailed accounts of warfare.

Although such practices would not necessarily be systematically noted by historians of a given society with the same attention as in ethnographies, widespread trophy-taking may be indicated in descriptions of battles or massacres. In some cases, body parts from defeated enemies would form part of a formalized system of rewards for victorious soldiers, such as among the Azande in western Africa (Evans-Pritchard 1971) or be taken to terrorize and/or punish rebels, as with the Fatimid Caliphate (Lange 2020). Among societies only known from archaeological evidence, evidence for accumulations of specific processed body parts in the context of broader evidence for violent conflict can be used to infer trophy-taking practices. For example, in the Acari Valley in Peru during the Early Intermediate period (50 BCE - 250 CE), there were "dozens of decapitated bodies buried inside a centrally located structure...Victims of decapitation represent all ages and both sexes, some of whom had their wrists and ankles tied. Many of the victims exhibit parry fractures, which indicate a violent, face-to-face confrontation. The presence in Acari of several sites with constructed defensive systems (and with

buffer zones between them), in conjunction with the evidence of decapitation, strongly indicate that outright violence occurred in Acari and that human decapitation likely was a direct outcome of that conflict" (Valdez 2009). Such osteological evidence, when possible, can be further supported by iconographical evidence for spiritual beliefs or practices (Arkush & Tung 2013).

In addition to ethnographic data in eHRAF and elsewhere, these datasets were coded from the extensive qualitative evidence for forms and intensity of conflict in past societies in the secondary historical and archaeological literature, similar to the approach used for coding Seshat variables. This effort differs from previous databases in the use of variables and societies from multiple datasets: in addition to ethnographic data in eHRAF and elsewhere, the datasets were coded from the extensive qualitative evidence for forms and intensity of conflict in past societies in the secondary historical and archaeological literature, similar to the approach used for coding Seshat variables. While this posed some difficulties with transferability of variable definitions and social units of analysis, it also allowed for greater heterogeneity in social complexity and related variables such as subsistence practices and military organization of included societies, as well as increased time depth and coverage of different world regions. While many cultures in eHRAF have rich primary descriptions of the conduct and social significance of warfare and intercultural relations, these are mainly focused on relatively small-scale societies, nonindustrial societies of interest to contemporary Western researchers, thus leaving a large portion of human social variation encompassed by historical states and large empires. As Seshat was created as part of effort to establish a science of history, it documents societies dating back to the Neolithic, which is a far greater timespan than samples in eHRAF/the EA. However, the scope of this effort means that the data needed for some research questions have not yet been coded. If an analysis is intended to capture the wide range of institutions across historical human societies, the integration of different forms of evidence is required by the nature of the available data from different time periods and types of societies. The process through which these datasets were compiled from different sources as required by the qualities of each focal warfare variable is expanded on below.

Attempts to address challenges of integration

As discussed above, a major challenge in constructing cultural databases is deciding on an appropriate unit for which to code variables. Congruity and comparability between units of analysis is an additional issue when combining different datasets that have been coded for differing cultural units. For the purposes of this project, the unit of analysis is a group of people occupying a demarcated region over a specified date range, generally speaking the same

language (in the case of politically uncentralized peoples) or under a consolidated political authority that might include people from multiple ethnolinguistic groups. Regarding comparability between units of analysis from combining datasets, Turchin (2018) notes that the political centralization code of a quasi-polity for Seshat is similar to the unit of analysis used in static cross-cultural databases such as the Ethnographic Atlas. As this project centers around behaviors during warfare, this could be explained as: given a group of people called X (treated as a unit of study in ethnographic, historical, or archaeological sources), and given that they engaged in war against people called something other than X, it is safe to consider them as a cultural unit over the range of time covered by the relevant sources. There were some exceptions with societies that only engaged in internal war; however, in these cases they could still be demarcated by e.g. sharing a language not spoken by neighboring groups. In keeping with Slingerland et al.'s recommendation for chosen units of analysis to be identifiable in other data contexts, the societies are identified with the culture name in eHRAF and/or their Seshat polity code along with the relevant date range, their primary key for societies in D-Place if applicable (xd_id) and, with the exception of some archaeological societies for which language is unknown, their identifier for the global language catalogue Glottolog (which can be matched to the language in glottolog.org and the corresponding society or societies in D-Place). Although the resources available for the project did not allow for consultation with subject-matter experts or consensus from multiple coders, evidence for each code and source are recorded so coding decisions are transparent. In the construction of the variables themselves, self-sacrifice and trophy-taking are recorded with different levels of certainty before being quantified (yes, no, inferred yes, or inferred no depending on the evidence), and indiscriminate killing is scored as ranges for each society to capture internal variation and uncertainty. While this only goes so far to address the nuances and uncertainties of qualitative cultural data, in combination with the documentation of sources and evidence, it allows for a transparent assessment of the datasets by other researchers.

The existing datasets focused on historical warfare, including specialized datasets created for specific studies and broader-spanning large databases, are relevant to researchers in the field of cultural evolution interested in shifts in moral norms about the treatment of ingroup and outgroup members, the expansion of the human moral circle, and cooperative capabilities over the span of history. A table of existing datasets/databases of historical and/or cross-cultural warfare variables, along with instances of their reuse in other studies and major critiques, is shown below (Table 1). However, using these datasets individually or integrating them to address questions of drivers or correlates of such shifts requires considering multiple issues, including but not limited to varying quality

and levels of agreement on available quantitative data on warfare (frequency, mortality, etc.) cross-culturally/historically and inconsistency in coding and citation practices. Different original research aims, variable definitions, data collection methods, and levels of transparency in evidence and coding procedures complicate such efforts. The same data can and has been used to make different, sometimes diametrically opposing arguments (Falk & Hildebolt 2017; Pinker 2011). Datasets such as that compiled by Bowles (2009) can have wide-ranging academic and public impact when included in a popular and highly influential work that overextends its original purpose. In this context, dataset integration provides an opportunity to reassess the sources, methodology, and accuracy of previously collected data in the context of the original research aims and critically evaluate how they are reused or used to support various arguments regarding humanity's propensity for peace or war. It can also clarify inconsistencies in definitions, coding standards, and the cultural units of analysis to which variables, such as mortality rates, refer. For instance, a closer evaluation of the data synthesized by Pinker (2011) and presented as evidence for decreased rates of wartime violence among state societies shows clear inconsistencies between the population levels and temporal ranges to which those rates apply– e.g. a single archaeological site as compared to a contemporary nation-state (Pinker 2011: 193). As mentioned above, Ember and Ember (1992b) find inconsistencies between their own coding of warfare frequency among ethnographic societies and those of Ross (1983), which they attribute to differences in focal time periods.

Their dataset for male mortality rates from external war used in several subsequent studies has not been published in its original form, and although it is available in the supplementary data for those further studies (Minocher et al. 2019) this does not include evidence or sources for the codes. When such ethnographic datasets are reanalyzed to answer additional research questions in different studies, it could be useful to consider these aspects of past data collection/coding and how they might affect the results of the current analysis. Most proposals for best practices in comparative cultural database construction put forward by others (Slingerland et al. 2020; Watts et al. 2021) are applicable to warfare data: transparency in coding procedures and evidence, clearly delineated units of analysis, availability of data and sources used to code variables, and consultation with relevant experts, among others. Some variables of the current dataset, such as the code for self-sacrificial behavior or for indiscriminate killing of enemies, could be argued as violating one of the principles put forth in Ember and Ember's (2013) guide to cross-cultural research, specifically avoiding attempting to operationalize an abstract, subjective concept as a quantitative variable. The hope is that by making the datasets open and the evidence for the codes

transparent, such variables can be critically evaluated and the pitfalls of attempting to measure such concepts quantitatively can be alleviated.

Table 1: Existing global/cross-cultural datasets on non-industrial warfare.

Variable	Sample size	Unit of analysis	Original study	Incorporated into larger database	Re-analysis in other studies	Criticisms
Overall frequency	160	Ethnographically-recorded cultures	Ember & Ember 1992a	SCCS1648	3+ (Chick et al. 1997; Nolan 2003; Quinlan 2007)	Fry 2007
Internal warfare frequency	72	Ethnographically-recorded cultures	Ember & Ember 1992a	SCCS1649	5 (Chick et al. 1997; Korotayev 2003; Grueter & White 2014; Minocher et al. 2019; Jackson et al. 2020, SI only)	-
External warfare frequency	155	Ethnographically-recorded cultures	Ember & Ember 1992a	SCCS1650	6 (Chick et al. 1997; Cashdan 2001; Roes & Raymond 2003; Wilson 2008; Eff & Routon 2012; Grueter & White 2014; Jackson et al. 2020, SI only)	-
Internal warfare frequency	85	Ethnographically-recorded cultures	Ross 1983	SCCS773	7 (White 1990; Cashdan 2001; Roes & Raymond 2003; Murray et al. 2013; Jackson et al. 2019, 2020, 2023)	-

External warfare frequency	84	Ethnographically-recorded cultures	Ross 1983	SCCS774	8 (White 1990; Cashdan 2001; Roes & Raymond 2003; Murray et al. 2013; Jackson et al. 2019, 2020, 2023; Nawata 2020)	-
Frequency of external war (being attacked)	153	Ethnographically-recorded cultures	Otterbein 1970	SCCS893	4 (White 1990; Roes & Raymond 2003; <u>Osafo-Kwaako & Robinson 2013</u>; Nawata 2020)	-
Military mobilization	160	Ethnographically-recorded cultures	Otterbein 1970	SCCS894	3 (White 1990; Roes & Raymond 2003; <u>Osafo-Kwaako & Robinson 2013</u>)	-
Male mortality in internal and external warfare	?	Ethnographically-recorded cultures	Ember & Ember, unpublished	-	4+ (<u>Ember et al. 2007</u>; <u>Quinlan & Quinlan 2007</u>; Carter & Kushnick 2018; Minocher et al. 2019)	-
Annual percent of deaths from warfare	31	Ethnographically-recorded cultures and modern (nineteenth-twentieth century) states (Table 6.1)	Keeley 1996	-	2 (Wrangham et al. 2006; Pinker 2011)	Falk & Hildebolt 2017

Percent of deaths from warfare	27	Ethnographically-recorded cultures, ancient and modern states, and archaeological sites (Table 6.2)	Keeley 1996	-	2 (Bowles 2009, prehistoric examples only; Pinker 2011)	Ferguson 2013
Percent of adult deaths from warfare	15	Archaeological sites and ethnographically-recorded hunter-gatherers	Bowles 2009	-	1 (Pinker 2011)	Falk & Hildebolt 2017; Ferguson 2013
Casualties	430	Individual conflicts	Oka et al. 2017	-	-	Keenan-Jones & Hebblewhite 2019
War group size	295	Ethnographically-recorded cultures and historical and modern (20th and 21st century) states	Oka et al. 2017	-	-	Keenan-Jones & Hebblewhite 2019
Participants and outcomes of historical battles	8800	Battles 1468 BCE to 2003 CE	Miller & Bakar 2023	-	-	-

N.B., no standard citation exists for individual SCCS variables and only some frequently used SCCS variables on war are included.

Requirements for dataset integration

When attempting dataset integration for a particular research question, first steps include outlining relevant variables and available proxies and whether these have been collected or need to be coded. After a suitable unit of analysis has been decided, locations, dates, and focal populations should be checked to make sure these are consistent across source datasets and preexisting coded variables.

Variable definitions, evidence, and sources for the original codes should also be reviewed. For the datasets presented here, social complexity was characterized by running a principal component analysis of population estimates, levels of external political hierarchy, and degree of centralization. While defining population size (at least for a given political unit) is relatively straightforward, it was necessary for the datasets on indiscriminate killing and trophy-taking to consider the various definitions for levels of political hierarchy and degree of centralization used by EA and Seshat variables, specifically the similar but not identical variables of EA variable 33 'Jurisdictional hierarchy beyond local community' and the Seshat Hierarchical Complexity variables for settlement and administrative levels, and the EA variable 090 'Degree of political integration' and the Seshat variable 'Degree of political centralization'. The EA definition was primarily adhered to for consistency. In many cases, it was necessary to go over the available literature on individual societies to decide an appropriate code. When doing so for societies originally sourced from Seshat, the Seshat code and evidence was used to inform the new code based on the EA definition. Inconsistencies between how a Seshat polity would be coded for centralization or levels of jurisdictional hierarchy according to the EA variable definition and how these were coded for ethnographic societies are inevitable, but it is again hoped that potential issues arising from this can be alleviated by the transparency of the evidence and sources. For database efforts with additional resources and personnel, multiple coders and validation by experts would also be beneficial when drawing equivalencies between variables from different datasets.

Benefits of dataset integration

Although analyses of the EA/SCCS and eHRAF have provided multiple insights into drivers of variation and change in cultural systems, they are somewhat limited in their scope and temporal depth. To address the three sets of hypotheses described above, combining these data with additional sources on societies in the historical and archaeological literature allowed for greater variation in levels of social complexity- including large, multiethnic states as well as small-scale societies– and including societies much further back in time. Studies combining archaeological and ethnographic data have indicated that patterns of war in some small-scale groups are consistent with those in the historical and archaeological records (although these studies may not agree on what the nature of these patterns are) (Boyd & Richerson 2022; Ferguson & Whitehead 1992; Fry 2013; Keeley 1996; Milner 1999). However, the best way to contextualize evidence from contemporary small-scale societies when theorizing about human past is not always clear, particular with regards to levels of violence and war (Barrett 2020; Broesch et al. 2020; Haas & Piscitelli 2013). With the current datasets, the integration of data

collected in the "ethnographic present" with data on historical and archaeological societies helps bring the dataset sample closer to a representation of the political, social, and ecological variability present in human societies across different historical periods.

The current datasets do not include data from cases of interstate warfare or intrastate civil wars from World War I onwards (societies dated after this period are ethnographically-recorded nonstate societies). This was partly due to limitations in time and resources, and partly because extensive quantitative research on the nature of war after this period already exists in political science and genocide studies that analyzes such conflicts within the context of the modern nation-state system (e.g. Downes 2006; Eck & Hultman 2007; Harff 2003; Valentino et al. 2004). However, given the degree of scholarly effort into creating quantitative measures of such variables for these more contemporary datasets, consideration of this literature could yield potential applications for quantification of historical warfare data. For instance, two scholars of contemporary civil war have proposed an approach to the comparative study of violence among armed groups that incorporates the variation that might exist within a group's "repertoire of violence" (Gutiérrez-Sanín & Wood 2017). This can include reliance on particular forms of violence, sometimes directed specifically at certain groups, and different behaviors. Although their focus is on contemporary armed groups, their proposed methodology, which defines and accounts for the type, frequency, target, and method of violence, demonstrates a systematic approach to characterizing group-level patterns of behavior that could perhaps be modified and applied to the study of historical warfare. This level of detail would be challenging to attain– even with their focus on contemporary war, Gutiérrez-Sanín and Wood acknowledge the difficulty of finding sufficient data to properly characterize such repertoires. This is of course a difficulty often exacerbated when working with historical data. Such an approach applied to historical warfare patterns would require additional intensive study and quantification of details of combat found in the ethnographic, historical, and archaeological literatures, and qualitative comparisons may be necessary to fully understand the dynamics behind a given behavior, warfare-related or otherwise. Further studies that use the current datasets, or other forms of quantitative variables on war and violence among historical societies, could be enriched with careful qualitative analysis that delves into particular cultural and historical contexts.

Methodological challenges demonstrated by the current datasets

Although databases can be a way of systematically drawing together different sources of evidence to find previously overlooked patterns, or to formally test

theorized and qualitatively observed patterns, there are multiple challenges in their construction. These include defining and comparing units of analysis, capturing variation within societies and within specified time periods, procurement of relevant expertise to make coding decisions (which will still be subjective and open to different interpretations), and dealing with inconsistently or inaccurately coded data, and biases in sources (Bliege Bird & Codding 2021; Slingerland et al. 2020; Watts et al. 2021). Ways to address these challenges are covered in the aforementioned articles, but to briefly recap they include: regardless of the chosen units, using identifiers that can be standardized and pinpointed in space and time across wide range of contexts (Slingerland et al. 2020); quantifying variation within units/populations or focusing on a single or multiple time points per unit (Watts et al. 2021); seeking out collaboration and expertise from humanities scholars (Slingerland & Sullivan 2017); transparency of evidence, sources, and coding methods and decisions; recording disagreement between coders and levels of uncertainty in codes (Watts et al. 2021); and consideration of data structure longevity (Slingerland et al. 2020).

Many of these issues arose when constructing the datasets considered here, starting with the problem of choosing an appropriate unit of analysis. Previous cross-cultural studies have often taken individual societies or cultures as their unit of analysis with variables such as warfare frequency or military organization coded for the entire culture for a specified time period or point (Ember & Ember 1992; Otterbein 1970). This contrasts with the strategy adopted in most quantitative analyses of warfare intensity in political science, which tend to take individual conflicts - however defined - as their units of analysis (Eck & Hultman 2007; Sarkees & Wayman 2010). Considering Watts et al's suggestions regarding intrasocietal variation, a more effective method could be to examine available data on the individual conflicts in which a particular society engaged to characterize both between- and within-societal variation. This is the current structure for the as yet unpublished data on warfare in Seshat, which contains polity-level variables as well as variables for individual conflicts (https://seshatdatabank.info/methods/code-book/). As noted above with regard to the data presented by Pinker, such considerations of unit and scale can have major consequences for quantitative analyses and the conclusions drawn from them. However, even with an approach such as coding for both society and conflict level, units of analysis remain somewhat fuzzy, e.g. how one defines a battle or war (Miller & Bakar 2023), and the appropriate level of granularity is difficult to determine.

With the current datasets, there was some difficulty with adherence to best practices, particularly the use of multiple coders to validate variable definitions, consultation with subject-matter experts, and consideration for longevity in

computational infrastructure. This will likely be the case for other efforts by individual researchers or small teams without large grants and/or access to a large number of collaborators and institutional support. However, many challenges remained unresolved in the studies reported here, even with society-specific experts or multiple coders. Several behaviors of interest proved especially difficult to quantify, e.g. in the first dataset, what counted as sufficient evidence for norms of parochial altruism in an ethnographic society, and exacerbated by limitations of the original ethnographer's perspective and what details they chose to record. Even with expert consultation, there may be scholarly disagreements regarding the validity or proper interpretation of a source.

The three datasets here illustrate how various challenges may or may not be overcome using different sources of evidence: primary, written historical records, archaeological. In particular, evidence for major aspects of wartime violence can be more or less available for different periods in human history. For example, the first dataset attempts to quantify the prevalence of self-sacrificial behavior among warriors in a society. Unless some suitable proxy is created, this results in a sample excluding ancient societies without written historical records. Previous studies making arguments for parochial altruism based on archaeological evidence (Bowles 2009; Choi & Bowles 2007) have relied on inferred relative mortality from sites with evidence of violent conflict, but this is indirect and does not capture motives or attitudes. The presence or lack of available evidence for the focal wartime behavior defined the society sample for each dataset, in turn creating difficulties with consistent definitions for predictor variables such as population size, political centralization, and social complexity. It is therefore necessary to acknowledge what can and cannot be inferred based on different types of evidence.

Conclusions

The datasets presented in this article are part of an effort to expand the scope of behavioral science to include the underused data available from historical societies (Muthukrishna et al. 2021). With this paper, we hope to stimulate further debate about the possibilities and challenges involved in combining datasets for this purpose and help establish standards and practices that can best facilitate these efforts. Although there have been works reviewing many of the issues with constructing and analyzing cultural-historical databases and proposing potential solutions to the numerous challenges these pose (Bliege-Bird & Codding 2022; Slingerland et al. 2020; Watts et al. 2021), the field still lacks widely agreed standards for such problems as data recording and transparency, the proper balance of expert consultation with the use of research assistants, data and code review when publishing, and assessing previously coded data when conducting reanalyzes, among other issues.

It might be possible to adapt practices from widespread data integration efforts in other fields such as ecology or evolutionary biology (Keller et al. 2023). As databases such as the EA and SCCS continue to be widely used in cross-cultural analyses, standardized data and variable citation practices could be beneficial in ensuring consistency in concept definitions across studies. This also applies to bespoke datasets produced for individual studies rather than those tied to large collaborative databases. Currently available standard resources for open science are biased towards experimental and behavioral studies; e.g. a standard OSF preregistration asks whether the data have been observed prior to analyses, something which is not possible to avoid when one is coding data from secondary sources, and when developing the definition of a variable is most effectively undertaken in tandem with deep familiarity with the source material.

Careful data integration efforts can be used to find additional uses or reapplications for analysis of previously gathered/collated data, and to make connections using data from different disciplines that might not be possibly using solely historical, archaeological, or ethnographic sources. Warfare data in particular can be used to provide richer and more meaningful data on forms of violence in the context of intergroup conflict across cultures and over time, helping to identify patterns that might exist between aspects of social complexity and repertoires of violence and possibly changes in moral attitudes and scales of cooperation and moral consideration. We hope to encourage further thought on the development, implementation, and dissemination of best practices for dataset integration on this and other topics, unleashing its evident potential to enhance our understanding of cultural transmission, variation, and evolution.

Code and Data Availability
The datasets discussed in this article and corresponding codebook are available on GitHub at https://github.com/drepanosaur/warpractices-datasets.

References

Alesina, Alberto, Paola Giuliano, and Nathan Nunn. 2013. "On the Origins of Gender Roles: Women and the Plough *." *The Quarterly Journal of Economics* 128 (2): 469–530. doi:10.1093/qje/qjt005.

Arkush, Elizabeth. 2008. "War, Chronology, and Causality in the Titicaca Basin." *Latin American Antiquity* 19 (4): 339–73. doi:10.1017/S1045663500004338.

Arkush, Elizabeth, and Tiffiny A. Tung. 2013. "Patterns of War in the Andes from the Archaic to the Late Horizon: Insights from Settlement Patterns and Cranial Trauma." *Journal of Archaeological Research* 21 (4): 307–69. doi:10.1007/s10814-013-9065-1.

Armit, Ian. 2012. *Headhunting and the Body in Iron Age Europe*. Cambridge: Cambridge University Press. doi:10.1017/CBO9781139016971.

Atkinson, Quentin D., and Harvey Whitehouse. 2011. "The Cultural Morphospace of Ritual Form: Examining Modes of Religiosity Cross-Culturally." *Evolution and Human Behavior* 32 (1): 50–62. doi:10.1016/j.evolhumbehav.2010.09.002.

Barrett, H. Clark. 2022. "Psychology Within and Without the State." *Annual Review of Psychology* 73 (1): 461–87. doi:10.1146/annurev-psych-020821-110248.

Blake, Joseph. 1978. "Death by Hand Grenade: Altruistic Suicide in Combat." *Suicide and Life-Threatening Behavior*. https://onlinelibrary.wiley.com/doi/10.1111/j.1943-278X.1978.tb01084.x.

Bliege Bird, Rebecca, and Brian F. Codding. 2022. "Promise and Peril of Ecological and Evolutionary Modelling Using Cross-Cultural Datasets." *Nature Ecology & Evolution* 6 (1): 6–8. doi:10.1038/s41559-021-01579-w.

Botero, C.A., B. Gardner, K.R. Kirby, J. Bulbulia, M.C. Gavin, and R.D. Gray. 2014. "The Ecology of Religious Beliefs." In *Proceedings of the National Academy of Sciences* 111 (47): 16784–89.

Bowles, Samuel. 2009. "Did Warfare Among Ancestral Hunter-Gatherers Affect the Evolution of Human Social Behaviors?" *Science* 324 (5932): 1293–98. doi:10.1126/science.1168112.

Boyd, Robert, and Peter J. Richerson. 2022. "Large-scale Cooperation in Small-scale Foraging Societies." *Evolutionary Anthropology: Issues, News, and Reviews* 31 (4): 175–98. doi:10.1002/evan.21944.

Broesch, Tanya, Alyssa N. Crittenden, Bret A. Beheim, Aaron D. Blackwell, John A. Bunce, Heidi Colleran, Kristin Hagel, et al. 2020. "Navigating Cross-Cultural Research: Methodological and Ethical Considerations." *Proceedings of the Royal Society B: Biological Sciences* 287 (1935): 20201245. doi:10.1098/rspb.2020.1245.

Cao, Yiming, Benjamin Enke, Armin Falk, Paola Giuliano, and Nathan Nunn. 2023. Herding, Warfare, and a Culture of Honor: Global Evidence. *NATIONAL BUREAU OF ECONOMIC RESEARCH*. http://www.nber.org/papers/w29250.

Carter, Tara-Lyn, and Geoff Kushnick. 2018. "Male Aggressiveness as Intrasexual Contest Competition in a Cross-Cultural Sample." *Behavioral Ecology and Sociobiology* 72 (6): 83. doi:10.1007/s00265-018-2497-3.

Cashdan, Elizabeth, and Matthew Steele. 2013. "Pathogen Prevalence, Group Bias, and Collectivism in the Standard Cross-Cultural Sample." *Human Nature* 24 (1): 59–75. doi:10.1007/s12110-012-9159-3.

Cashdan, Elizabeth. 2001. "Ethnocentrism and Xenophobia: A Cross-Cultural Study." *Current Anthropology* 42 (5): 760–64. doi:10.1086/323821.

Chacon, Richard, and David H Dye. 2007. *The Taking and Displaying of Human Body Parts as Trophies by Amerindians*. Boston, MA: Springer. http://dx.doi.org/10.1007/978-0-387-48303-0.

Chick, Garry, John W. Loy, and Andrew W. Miracle. 1997. "Combative Sport and Warfare: A Reappraisal of the Spillover and Catharsis Hypotheses." *Cross-Cultural Research* 31 (3): 249–67. doi:10.1177/106939719703100304.

Choi, Jung-Kyoo, and Samuel Bowles. 2007. "The Coevolution of Parochial Altruism and War." *Science* 318 (5850): 636–40. doi:10.1126/science.1144237.

Cohen, Taya R., R. Matthew Montoya, and Chester A. Insko. 2006. "Group Morality and Intergroup Relations: Cross-Cultural and Experimental Evidence." *Personality and Social Psychology Bulletin* 32 (11): 1559–72. doi:10.1177/0146167206291673.

Currie Thomas E., and Mace Ruth. 2011. "Mode and Tempo in the Evolution of Socio-Political Organization: Reconciling 'Darwinian' and 'Spencerian' Evolutionary Approaches in Anthropology." *Philosophical Transactions of the Royal Society B: Biological Sciences* 366 (1567): 1108–17. doi:10.1098/rstb.2010.0318.

Curry, Oliver Scott. 2016. "Morality as Cooperation: A Problem-Centred Approach." In *The Evolution of Morality*, edited by Todd K. Shackelford and Ranald D. Hansen, 27–51. Evolutionary Psychology. Cham: Springer International Publishing. doi:10.1007/978-3-319-19671-8_2.

Curry, Oliver Scott, Matthew Jones Chesters, and Caspar J. Van Lissa. 2019. "Mapping Morality with a Compass: Testing the Theory of 'Morality-as-Cooperation' with a New Questionnaire." *Journal of Research in Personality* 78 (February): 106–24. doi:10.1016/j.jrp.2018.10.008.

De Laguna, Frederica. 1972. "Under Mount Saint Elias: The History and Culture of the Yakutat Tlingit," Smithsonian contributions to anthropology, 7. https://ehrafworldcultures.yale.edu/document?id=na12-020.

Dow, Malcolm M., and E. Anthon Eff. 2008. Global, Regional, and Local Network Autocorrelation in the Standard Cross-Cultural Sample. *Cross-Cultural Research* 42 (2): 148–71. doi:10.1177/1069397107311186.

Downes, Alexander B. 2006. "Desperate Times, Desperate Measures: The Causes of Civilian Victimization in War." *International Security* 30 (4): 152–95. doi:10.1162/isec.2006.30.4.152.

Eck, Kristine, and Lisa Hultman. 2007. "One-Sided Violence Against Civilians in War: Insights from New Fatality Data." *Journal of Peace Research* 44 (2): 233–46. doi:10.1177/0022343307075124.

Eff, E. Anthon, and Philip W. Routon. 2012. Farming and Fighting: An Empirical Analysis of the Ecological-Evolutionary Theory of the Incidence of Warfare. *Structure and Dynamics* 5 (2). doi:10.5070/SD952003377.

Ember, Carol R., and Melvin Ember. 2013. "Basic Guide to Cross-Cultural Research." *Human Relations Area Files - Cultural Information for Education and Research*. December 3. https://hraf.yale.edu/cross-cultural-research/basic-guide-to-cross-cultural-research/.

Ember, Carol R., and Melvin Ember. 1992a. "Resource Unpredictability, Mistrust, and War: A Cross-Cultural Study." *Journal of Conflict Resolution* 36 (2): 242–62. doi:10.1177/0022002792036002002.

Ember, Carol R., and Melvin Ember. 1992b. "Warfare, Aggression, and Resource Problems: Cross-Cultural Codes." *Behavior Science Research* 26 (1–4): 169–226. doi:10.1177/106939719202600108.

Ember, Melvin, Carol R. Ember, and Bobbi S. Low. 2007. "Comparing Explanations of Polygyny." *Cross-Cultural Research* 41 (4): 428–40. doi:10.1177/1069397107307672.

Ember, Carol R., Ian Skoggard, Erik J. Ringen, and Megan Farrer. 2018. "Our Better Nature: Does Resource Stress Predict beyond-Household Sharing?" *Evolution and Human Behavior* 39 (4): 380–91. doi:10.1016/j.evolhumbehav.2018.03.001.

Evans-Pritchard, E. E. (Edward Evan). 1971. *The Azande: History and Political Institutions*. Clarendon Press. https://ehrafworldcultures.yale.edu/document?id=fo07-068.

Falk, Dean, and Charles Hildebolt. 2017. "Annual War Deaths in Small-Scale versus State Societies Scale with Population Size Rather than Violence." *Current Anthropology* 58 (6): 805–13. doi:10.1086/694568.

Feinman, Gary M. 2013. "The Emergence of Social Complexity." In *Cooperation and Collective Action Archaeological Perspectives*, edited by David M. Carballo. Boulder, Colo: Univ. Press of Colorado.

Ferguson, R. Brian. 2013. *Pinker's List: Exaggerating Prehistoric War Mortality*. Oxford University Press. https://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780199858996.001.0001/acprof-9780199858996-chapter-7.

Ferguson, R. Brian. 1990. "Explaining War." In *The Anthropology of War*, edited by Jonathan Haas. Cambridge University Press.

Ferguson, R. Brian, and Neil L. Whitehead. 1992. "Chapter 1: The Violent Edge of Empire." In *War in the Tribal Zone: Expanding States and Indigenous Warfare*,

by R. Brian Ferguson. School of American Research Press. https://hdl.handle.net/2027/heb03246.0001.001.

Fischer, Michael D., and Carol R. Ember. 2018. "Big Data and Research Opportunities Using HRAF Databases." In *Big Data in Computational Social Science and Humanities*, edited by Shu-Heng Chen, pp. 323–36. Computational Social Sciences. Cham: Springer International Publishing. doi:10.1007/978-3-319-95465-3_17.

Francois, P., J. Manning, H. Whitehouse, R. Brennan, T. Currie, K. Feeney, and P. Turchin. 2016. A Macroscope for Global History - Seshat Global History Databank: A Methodological Overview. *Digital Humanities Quarterly*. https://ora.ox.ac.uk/objects/uuid:5b10c64e-51ae-4ba0-8766-a1bea932c805.

Fry, Douglas P. 2013. *War, Peace, and Human Nature: The Convergence of Evolutionary and Cultural Views*. Oxford University Press. https://academic.oup.com/book/12748.

Fry, Douglas P. 2007. *Beyond War the Human Potential for Peace*. New York; Oxford: Oxford University Press.

Gaiser, Adam. 2010. *Muslims, Scholars, Soldiers: The Origin and Elaboration of the Ibadi Imamate Traditions*. Oxford University Press. https://academic.oup.com/book/9886.

Gantley, Michael, Harvey Whitehouse, and Amy Bogaard. 2018. "Material Correlates Analysis (MCA): An Innovative Way of Examining Questions in Archaeology Using Ethnographic Data – ERRATUM." *Advances in Archaeological Practice* 6 (4): 384–384. doi:10.1017/aap.2018.33.

Gat, Azar. 1999. "The Pattern of Fighting in Simple, Small-Scale, Prestate Societies." *Journal of Anthropological Research* 55 (4). https://www.jstor.org/stable/pdf/3631615.pdf.

Glowacki, Luke, Michael L. Wilson, and Richard W. Wrangham. 2020. "The Evolutionary Anthropology of War." *Journal of Economic Behavior & Organization* 178: 963–82. doi:10.1016/j.jebo.2017.09.014.

Glowacki, Luke, and Richard W. Wrangham. 2013. "The Role of Rewards in Motivating Participation in Simple Warfare." *Human Nature* 24 (4): 444–60. doi:10.1007/s12110-013-9178-8.

Gray, J. Patrick. 1999. "A Corrected Ethnographic Atlas." *World Cultures* 10 (1): 24–85.

Grueter, Cyril C., and Douglas R. White. 2014. On the Emergence of Large-Scale Human Social Integration and Its Antecedents in Primates. *Structure and Dynamics: EJournal of Anthropological and Related Sciences* 7 (1). doi:10.5070/SD971024020.

Gutiérrez-Sanín, Francisco, and Elisabeth Jean Wood. 2017. "What Should We Mean by 'Pattern of Political Violence'? Repertoire, Targeting, Frequency, and Technique." *Perspectives on Politics* 15 (1): 20–41. doi:10.1017/S1537592716004114.

Haas, Jonathan. 1990. *The Anthropology of War*. Cambridge University Press.

Haas, Jonathan. 2001. "Warfare and the Evolution of Culture." In *Archaeology at the Millennium*, edited by Gary M. Feinman and T. Douglas Price, pp. 329–50. Boston, MA: Springer US. doi:10.1007/978-0-387-72611-3_9.

Haas, Jonathan, and Matthew Piscitelli. 2013. "The Prehistory of Warfare: Misled by Ethnography." In *War, Peace, and Human Nature*, edited by Douglas P. Fry, 1st ed., 168–90. Oxford University PressNew York. doi:10.1093/acprof:oso/9780199858996.003.0010.

Harff, Barbara. 2003. "No Lessons Learned from the Holocaust? Assessing Risks of Genocide and Political Mass Murder since 1955." *American Political Science Review*. https://www.cambridge.org/core/journals/american-political-science-review/article/no-lessons-learned-from-the-holocaust-assessing-risks-of-genocide-and-political-mass-murder-since-1955/FBA37FA563AC35E1CB6F7B57F8140F2C.

Harrison, Simon. 2012. *Dark Trophies: Hunting and the Enemy Body in Modern War*. New York: Berghahn Books.

Hoskins, Janet eds. 1996. *Headhunting and the Social Imagination in Southeast Asia*. Stanford, Calif: Stanford University Press.

Jackson, Joshua Conrad, Danica Dillion, Brock Bastian, Joseph Watts, William Buckner, Nicholas DiMaggio, and Kurt Gray. 2023. Supernatural Explanations across 114 Societies Are More Common for Natural than Social Phenomena. *Nature Human Behavior* 7 (5): 707–17. doi:10.1038/s41562-023-01558-0.

Jackson, Joshua Conrad, Marieke van Egmond, Virginia K. Choi, Carol R. Ember, Jamin Halberstadt, Jovana Balanovic, Inger N. Basker, et al. 2019. Ecological and Cultural Factors Underlying the Global Distribution of Prejudice. *PLOS ONE* 14 (9): e0221953. doi:10.1371/journal.pone.0221953.

Jackson, Joshua Conrad, Michele Gelfand, and Carol R. Ember. 2020. A Global Analysis of Cultural Tightness in Non-Industrial Societies. *Proceedings of the Royal Society B: Biological Sciences* 287 (1930): 20201036. doi:10.1098/rspb.2020.1036.

Jordan, Fiona M., Russell D. Gray, Simon J. Greenhill, and Ruth Mace. 2009. "Matrilocal Residence Is Ancestral in Austronesian Societies." *Proceedings of the Royal Society B: Biological Sciences* 276 (1664): 1957–64. doi:10.1098/rspb.2009.0088.

Kapitány, Rohan, Christopher Kavanagh, and Harvey Whitehouse. 2020. "Ritual Morphospace Revisited: The Form, Function and Factor Structure of Ritual

Practice." *Philosophical Transactions of the Royal Society B: Biological Sciences* 375 (1805): 20190436. doi:10.1098/rstb.2019.0436.

Keeley, Lawrence H. 1996. *War Before Civilization: The Myth of the Peaceful Savage*. Cary, UNITED STATES: Oxford University Press USA - OSO. http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=694019.

Keenan-Jones, Duncan, and Mark Hebblewhite. 2019. "The Pitfalls of Using Ancient Population, Army and Casualty Data without Expert Curation: A Review of Oka et al. 2017." *Cliodynamics* 10 (1). doi:10.21237/C7clio10142345.

Keller, Alexander, Markus J. Ankenbrand, Helge Bruelheide, Stefanie Dekeyzer, Brian J. Enquist, Mohammad Bagher Erfanian, Daniel S. Falster, et al. 2023. "Ten (Mostly) Simple Rules to Future-proof Trait Data in Ecological and Evolutionary Sciences." *Methods in Ecology and Evolution* 14 (2): 444–58. doi:10.1111/2041-210X.14033.

Kim, Nam C., and Marc Kissel. 2018. *Emergent Warfare in Our Evolutionary Past*. New Biological Anthropology. New York London: Routledge, Taylor & Francis Group.

Kim, Nam C., Chapurukha M. Kusimba, and Lawrence H. Keeley. 2015. "Coercion and Warfare in the Rise of State Societies in Southern Zambezia." *African Archaeological Review* 32 (1): 1–34. doi:10.1007/s10437-015-9183-x.

Kirby, Kathryn R., Russell D. Gray, Simon J. Greenhill, Fiona M. Jordan, Stephanie Gomes-Ng, Hans-Jörg Bibiko, Damián E. Blasi, et al. 2016. "D-PLACE: A Global Database of Cultural, Linguistic and Environmental Diversity." *PLOS ONE* 11 (7): e0158391. doi:10.1371/journal.pone.0158391.

Korotayev, Andrey. 2003. "Form of Marriage, Sexual Division of Labor, and Postmarital Residence in Cross-Cultural Perspective: A Reconsideration." *Journal of Anthropological Research* 59 (1): 69–89. doi:10.1086/jar.59.1.3631445.

Lagacé, Robert O. 1979. "The HRAF Probability Sample: Retrospect and Prospect." *Behavior Science Research* 14 (3): 211–29. doi:10.1177/106939717901400304.

Lange, Christian. 2020. "Torture and Public Executions in the Islamic Middle Period (Eleventh–Fifteenth Centuries)." In *The Cambridge World History of Violence*, edited by Matthew Gordon, Richard Kaeuper, and Harriet Zurndorfer, 1st ed., pp. 164–84. Cambridge University Press. doi:10.1017/9781316661291.009.

Mace, Ruth, and Clare J. Holden. 2005. "A Phylogenetic Approach to Cultural Evolution." *Trends in Ecology & Evolution* 20 (3): 116–21. doi:10.1016/j.tree.2004.12.002.

Meyer, Christian, Olaf Kürbis, Veit Dresely, and Kurt W. Alt. 2018. "Patterns of Collective Violence in the Early Neolithic of Central Europe." In *Prehistoric Warfare and Violence: Quantitative and Qualitative Approaches*, edited by

Andrea Dolfini, Rachel J. Crellin, Christian Horn, and Marion Uckelmann, 21–38. Quantitative Methods in the Humanities and Social Sciences. Cham: Springer International Publishing. doi:10.1007/978-3-319-78828-9_2.

Miller, Charles, and K. Shuvo Bakar. 2023. "Conflict Events Worldwide Since 1468BC: Introducing the Historical Conflict Event Dataset." *Journal of Conflict Resolution* 67 (2–3): 522–54. doi:10.1177/00220027221119085.

Milner, George R. 1999. "Warfare in Prehistoric and Early Historic Eastern North America." *Journal of Archaeological Research* 7 (2): 105–51. doi:10.1007/s10814-005-0001-x.

Minocher, Riana, Pavel Duda, and Adrian V. Jaeggi. 2019. "Explaining Marriage Patterns in a Globally Representative Sample through Socio-Ecology and Population History: A Bayesian Phylogenetic Analysis Using a New Supertree." *Evolution and Human Behavior* 40 (2): 176–87. doi:10.1016/j.evolhumbehav.2018.11.003.

Murphy, Robert Francis. 1959. "Intergroup Hostility and Social Cohesion." *American Anthropologist* 59: 1018–35. https://ehrafworldcultures.yale.edu/document?id=sq13-007.

Murray, Damian R., Mark Schaller, and Peter Suedfeld. 2013. "Pathogens and Politics: Further Evidence That Parasite Prevalence Predicts Authoritarianism." *PLOS ONE* 8 (5): e62275. doi:10.1371/journal.pone.0062275.

Muthukrishna, Michael, Joseph Henrich, and Edward Slingerland. 2021. "Psychology as a Historical Science." *Annual Review of Psychology* 72 (1): 717–49. doi:10.1146/annurev-psych-082820-111436.

Nammour, V.W. 1974. Drums And Guns: A Cross-Cultural Study Of The Nature Of War. University of Oregon. https://scholarsbank.uoregon.edu/xmlui/handle/1794/27950.

Nawata, Kengo. 2020. "A Glorious Warrior in War: Cross-Cultural Evidence of Honor Culture, Social Rewards for Warriors, and Intergroup Conflict." *Group Processes & Intergroup Relations* 23 (4): 598–611. doi:10.1177/1368430219838615.

Nolan, Patrick D. 2003. "Toward an Ecological-Evolutionary Theory of the Incidence of Warfare in Preindustrial Societies." *Sociological Theory* 21 (1): 18–30. doi:10.1111/1467-9558.00172.

Norenzayan, Ara, Azim F. Shariff, Will M. Gervais, Aiyana K. Willard, Rita A. McNamara, Edward Slingerland, and Joseph Henrich. 2016. "The Cultural Evolution of Prosocial Religions." *Behavioral and Brain Sciences* 39: e1. doi:10.1017/S0140525X14001356.

Oka, Rahul C., Marc Kissel, Mark Golitko, Susan Guise Sheridan, Nam C. Kim, and Agustín Fuentes. 2017. "Population Is the Main Driver of War Group Size and

Conflict Casualties." *Proceedings of the National Academy of Sciences* 114 (52). doi:10.1073/pnas.1713972114.

Osafo-Kwaako, Philip, and James A. Robinson. 2013. "Political Centralization in Pre-Colonial Africa." *Journal of Comparative Economics*, Symposium in Honor of Thrainn Eggertson, 41 (1): 6–21. doi:10.1016/j.jce.2013.01.003.

Otterbein, Keith F. 1968. "Internal War: A Cross-Cultural Study." *American Anthropologist* 70 (2): 277–89. doi:10.1525/aa.1968.70.2.02a00040.

Otterbein, Keith F. 1970. *The Evolution of War: A Cross-Cultural Study*. HRAF Press.

Otterbein, Keith F. 1997. "The Origins of War." *Critical Review* 11 (2): 251–77. doi:10.1080/08913819708443456.

Otterbein, Keith F. 2000. "Killing of Captured Enemies: A Cross-cultural Study." *Current Anthropology* 41 (3): 439–43. doi:10.1086/300150.

Otterbein, Keith F. 2004. *How War Began*. College Station, UNITED STATES: Texas A&M University Press. http://ebookcentral.proquest.com/lib/oxford/detail.action?docID=3038004 .

Peoples, Hervey C., and Frank W. Marlowe. 2012. "Subsistence and the Evolution of Religion." *Human Nature* 23 (3): 253–69. doi:10.1007/s12110-012-9148-6.

Perdue, Peter C. 2010. *China Marches West: The Qing Conquest of Central Eurasia*. Cambridge, Mass.; London: Belknap. https://public.ebookcentral.proquest.com/choice/publicfullrecord.aspx?p=3300134.

Pinker, Steven. 2011. *The Better Angels of Our Nature: Why Violence Has Declined*. New York Toronto London: Penguin Books.

Price, Richard. 1983. *First-Time: The Historical Vision of an Afro-American People*. Johns Hopkins Studies in Atlantic History and Culture. Johns Hopkins University Press. https://ehrafworldcultures.yale.edu/cultures/sr15/documents/004.

Purzycki, Benjamin Grant, Theiss Bendixen, and Aaron D. Lightner. 2023. "Coding, Causality, and Statistical Craft: The Emergence and Evolutionary Drivers of Moralistic Supernatural Punishment Remain Unresolved." *Religion, Brain & Behavior* 13 (2): 207–14. doi:10.1080/2153599X.2022.2065349.

Quinlan, Robert J., and Marsha B. Quinlan. 2007. "Evolutionary Ecology of Human Pair-Bonds: Cross-Cultural Tests of Alternative Hypotheses." *Cross-Cultural Research* 41 (2): 149–69. doi:10.1177/1069397106298893.

Quinlan, Robert J. 2007. "Human Parental Effort and Environmental Risk." *Proceedings of the Royal Society B: Biological Sciences* 274 (1606): 121–25. doi:10.1098/rspb.2006.3690.

Roes, Frans L, and Michel Raymond. 2003. "Belief in Moralizing Gods." *Evolution and Human Behavior* 24 (2): 126–35. doi:10.1016/S1090-5138(02)00134-4.

Riemer, Jeffrey W. 1998. "Durkheim's 'Heroic Suicide' in Military Combat." *Armed Forces & Society* 25 (1): 103–20. doi:10.1177/0095327X9802500106.

Ringen, Erik J., Pavel Duda, and Adrian V. Jaeggi. 2019. "The Evolution of Daily Food Sharing: A Bayesian Phylogenetic Analysis." *Evolution and Human Behavior* 40 (4): 375–84. doi:10.1016/j.evolhumbehav.2019.04.003.

Ross, Marc Howard. 1983. Political Decision Making and Conflict: Additional Cross-Cultural Codes and Scales. *Ethnology* 22 (2): 169. doi:10.2307/3773578.

Rusch, Hannes. 2013. "Asymmetries in Altruistic Behavior during Violent Intergroup Conflict." *Evolutionary Psychology* 11 (5): 147470491301100. doi:10.1177/147470491301100504.

Sarkees, Meredith, and Frank Wayman. 2010. *Resort to War, 1816-2007*. Washington, DC. doi:10.4135/9781608718276.

Sepe, Agostino. 2011. "Back to the Roots: The Imperial City of Shenyang as a Symbol of the Manchu Ethnic Identity of the Qing Dynasty." *MING QING YANJIU* 16 (01): 129–76. doi:10.1163/24684791-01601006.

Shin, Jaeweon, Michael Holton Price, David H. Wolpert, Hajime Shimao, Brendan Tracey, and Timothy A. Kohler. 2020. "Scale and Information-Processing Thresholds in Holocene Social Evolution." *Nature Communications* 11 (1): 2394. doi:10.1038/s41467-020-16035-9.

Slingerland, Edward, Quentin D. Atkinson, Carol R. Ember, Oliver Sheehan, Michael Muthukrishna, Joseph Bulbulia, and Russell D. Gray. 2020. "Coding Culture: Challenges and Recommendations for Comparative Cultural Databases." *Evolutionary Human Sciences* 2: e29. doi:10.1017/ehs.2020.30.

Slingerland, Edward, M. Willis Monroe, and Michael Muthukrishna. 2023. "The Database of Religious History (DRH): Ontology, Coding Strategies and the Future of Cultural Evolutionary Analyses." *Religion, Brain & Behavior*, May, 1–30. doi:10.1080/2153599X.2023.2200825.

Slingerland, Edward, and Brenton Sullivan. 2017. Durkheim with Data: The Database of Religious History. *Journal of the American Academy of Religion* 85 (2): 312–47. doi:10.1093/jaarel/lfw012.

Spicer, Rachel, M. Willis Monroe, Matthew Hamm, Andrew Danielson, Gino Canlas, Ian Randall, and Edward Slingerland. 2022. "Religion and Ecology: A Pilot Study Employing the Database of Religious History." *Current Research in Ecological and Social Psychology* 3 (January): 100073. doi:10.1016/j.cresp.2022.100073.

Turchin, Peter. 2018. "Fitting Dynamic Regression Models to Seshat Data." *Cliodynamics* 9 (1). doi:10.21237/C7clio9137696.

Turchin, Peter, Rob Brennan, Thomas E. Currie, Kevin C. Feeney, Pieter Francois, Daniel Hoyer, Joseph G. Manning, et al. 2015. "Seshat: The Global History Databank." http://uhra.herts.ac.uk/handle/2299/16139.

Turchin, Peter, Thomas E. Currie, Harvey Whitehouse, Pieter François, Kevin Feeney, Daniel Mullins, Daniel Hoyer, et al. 2018. "Quantitative Historical Analysis Uncovers a Single Dimension of Complexity That Structures Global Variation in Human Social Organization." *Proceedings of the National Academy of Sciences* 115 (2): E144–51. doi:10.1073/pnas.1708800115.

Turchin, Peter, Harvey Whitehouse, Sergey Gavrilets, Daniel Hoyer, Pieter François, James S. Bennett, Kevin C. Feeney, et al. 2022. "Disentangling the Evolutionary Drivers of Social Complexity: A Comprehensive Test of Hypotheses." *Science Advances* 8 (25): eabn3517. doi:10.1126/sciadv.abn3517.

Valdez, Lidio M. 2009. "Walled Settlements, Buffer Zones, and Human Decapitation in the Acari Valley, Peru." *Journal of Anthropological Research* 65 (3): 389–416. https://www.jstor.org/stable/25608224.

Valentino, Benjamin, Paul Huth, and Dylan Balch-Lindsay. 2004. "'Draining the Sea': Mass Killing and Guerrilla Warfare." *International Organization* 58 (02). doi:10.1017/S0020818304582061.

Watts, Joseph, Simon J. Greenhill, Quentin D. Atkinson, Thomas E. Currie, Joseph Bulbulia, and Russell D. Gray. 2015. "Broad Supernatural Punishment but Not Moralizing High Gods Precede the Evolution of Political Complexity in Austronesia." *Proceedings of the Royal Society B: Biological Sciences* 282 (1804): 20142556. doi:10.1098/rspb.2014.2556.

Watts, Joseph, Joshua Conrad Jackson, Chris Arnison, Elise M. Hamerslag, John H. Shaver, and Benjamin Grant Purzycki. 2021. "Building Quantitative Cross-Cultural Databases From Ethnographic Records: Promise, Problems and Principles." *Cross-Cultural Research*, December, 10693971211065720. doi:10.1177/10693971211065720.

White, Douglas R. 1990. "World-System and Regional Linkages as Causally Implicated in Local Level Conflicts at the Ethnographic Horizon." *Zeitschrift Für Ethnologie* 115: 111–37. https://www.jstor.org/stable/25842146.

White, Douglas R., and Michael L. Burton. 1988. "Causes of Polygyny: Ecology, Economy, Kinship, and Warfare." *American Anthropologist* 90 (4): 871–87. doi:10.1525/aa.1988.90.4.02a00060.

White, Douglas R., Laura Betzig, Monique Borgerhoff Mulder, Garry Chick, John Hartung, William Irons, Bobbi S. Low, Keith F. Otterbein, Paul C. Rosenblatt, and Paul Spencer. 1988. "Rethinking Polygyny: Co-Wives, Codes, and Cultural Systems [and Comments and Reply]." *Current Anthropology* 29 (4): 529–72. doi:10.1086/203674.

Whitehouse, Harvey. 2018. "Dying for the Group: Towards a General Theory of Extreme Self-Sacrifice." *Behavioral and Brain Sciences* 41 (January): e192. doi:10.1017/S0140525X18000249.

Whitehouse, Harvey, Jonathan Jong, Michael D. Buhrmester, Ángel Gómez, Brock Bastian, Christopher M. Kavanagh, Martha Newson, et al. 2017. "The Evolution of Extreme Cooperation via Shared Dysphoric Experiences." *Scientific Reports* 7 (1): 1–10. doi:10.1038/srep44292.

Whitehouse, Harvey, and Jonathan A. Lanman. 2014. "The Ties That Bind Us: Ritual, Fusion, and Identification." *Current Anthropology* 55 (6): 674–95. doi:10.1086/678698.

Whitehouse, Harvey, and Brian McQuinn. 2012. "Divergent Modes of Religiosity and Armed Struggle." In *The Oxford Handbook of Religion and Violence*, edited by Michael Jerryson, Mark Juergensmeyer, and Margo Kitts. Vol. 1. Oxford University Press. doi:10.1093/oxfordhb/9780199759996.013.0039.

Whitehouse, Harvey. 2021. *The Ritual Animal: Imitation and Cohesion in the Evolution of Social Complexity*. Oxford: Oxford University Press.

Whitehouse, Harvey, Pieter François, Patrick E. Savage, Daniel Hoyer, Kevin C. Feeney, Enrico Cioni, Rosalind Purcell, et al. 2023. "Testing the Big Gods Hypothesis with Global Historical Data: A Review and 'Retake.'" *Religion, Brain & Behavior* 13 (2): 124–66. doi:10.1080/2153599X.2022.2074085.

Wilson, Christopher G. 2008. "Male Genital Mutilation: An Adaptation to Sexual Conflict." *Evolution and Human Behavior* 29 (3): 149–64. doi:10.1016/j.evolhumbehav.2007.11.008.

Wormley, Alexandra S., and Adam B. Cohen. 2022. "Pathogen Prevalence and Food Taboos: A Cross-Cultural Analysis." *Current Research in Ecological and Social Psychology* 3 (January): 100056. doi:10.1016/j.cresp.2022.100056.

Wrangham, Richard W., and Luke Glowacki. 2012. "Intergroup Aggression in Chimpanzees and War in Nomadic Hunter-Gatherers: Evaluating the Chimpanzee Model." *Human Nature* 23 (1): 5–29. doi:10.1007/s12110-012-9132-1.

Wrangham, Richard W., Michael L. Wilson, and Martin N. Muller. 2006. "Comparative Rates of Violence in Chimpanzees and Humans." *Primates* 47 (1): 14–26. doi:10.1007/s10329-005-0140-1.

Yoffee, Norman. 2005. *Myths of the Archaic State: Evolution of the Earliest Cities, States, and Civilizations*. https://doi.org/10.1017/CBO9780511489662.

Zefferman, Matthew R., and Sarah Mathew. 2015. "An Evolutionary Theory of Large-Scale Human Warfare: Group-Structured Cultural Selection." *Evolutionary Anthropology: Issues, News, and Reviews* 24 (2): 50–61. doi:10.1002/evan.21439.