PSYCHOLOGY AS A HISTORICAL SCIENCE

Michael Muthukrishna

Department of Psychological and Behavioral Science

London School of Economics and Political Science

Joseph Henrich

Department of Human Evolutionary Biology

Harvard University

Edward Slingerland

Department of Asian Studies

University of British Columbia

Abstract

Psychology has traditionally seen itself as the science of universal human cognition, and has only recently begun seriously grappling with the issue of cross-cultural variation. Here we argue that the roots of cross-cultural variation often lie in the past. Therefore, to understand not just the way, but also why psychology varies, we also need to grapple with cross-temporal variation. Psychology needs to become a historical science. The traces of past human cognition accessible through historical texts and artifacts can also serve as a valuable, and yet currently almost completely unutilized, source of psychological data. This data from dead minds opens up a new and untapped, highly diverse subject pool. The cohort effects we measure are a sliver of the temporal variation we should expect over history. We review examples of research that may be classified as historical psychology, introduce sources of data and methods for analyzing historical data, explain for the critical role of theory, and discuss the variety of ways in which psychologists can add historical depth and nuance to their work. Historical psychology is a critical next step toward becoming a genuinely universal science.

Keywords: cultural evolution, cultural psychology, culture, historical databases, large-scale textual analysis, science-humanities integration

Introduction

Our psychology is shaped by our societies (Henrich 2016; Henrich et al. 2010b) and our societies are shaped by their history. Humans living in different societies across the world vary in multiple ways, from normative behaviors about how and to whom we should be prosocial (Henrich et al. 2001, 2010a; Muthukrishna et al. 2020; Santos et al. 2017) to the ways that our brains process visual information (Dehaene et al. 2010; Han et al. 2013). Understanding present-day psychology requires understanding the past processes, environments, and constraints that led to that psychology. Thus, for psychology to develop a full theoretical understanding of human behavior (Muthukrishna & Henrich 2019), psychology needs to also be a historical science.

Cultural evolution offers a theoretical framework for explaining cross-cultural psychological differences (Boyd 2018; Boyd & Richerson 1985; Chudek et al. 2015; Henrich 2016; Muthukrishna & Henrich 2019). Part of our psychology includes a suite of social learning strategies (reviewed in Kendal et al. 2018) that allow us to acquire adaptive beliefs and behaviors by selectively overimitating (Hoehl et al. 2019), for example, successful people, those whom others copy (prestige), or the majority or plurality (conformist bias). Through these selective social learning processes, we acquire many aspects of psychology, such as norms of what constitutes fairness (Blake et al. 2015), overprecision in confidence (Moore et al. 2018; Muthukrishna et al. 2018), and the tendency to discount the future (Amir et al. 2019). Some of this acquired psychology overrides genetic tendencies. Chili peppers, for instance, induce pain in mammals as a deterrent to being consumed, but in regions where people stand to benefit from the antimicrobial properties of capsaicin, cultural training causes them to interpret this pain as pleasure (Billing & Sherman 1998; Tewksbury & Nabhan 2001).

This selective retention of successful beliefs, behaviors, norms, institutions, skills, and technology allows cultures to evolve solutions to problems that are beyond the comprehension of any single person. We need not understand the causal mechanism of a particular belief or behavior to practice it (Derex et al. 2013, 2019; Muthukrishna et al. 2013; Muthukrishna & Henrich 2016)—spice consuming societies do not enjoy spiciness because of their understanding of the interaction between spice and health. Indeed, we typically have a shallow understanding of the beliefs, behaviors, and technologies we possess, despite overestimating our true level of understanding (illusion of explanatory depth; Rozenblit & Keil 2002; Sloman & Fernbach 2017). Just as genetic evolution has led to physiology that no genetic engineer could design, cultural evolution has led to norms, practices, technologies, and institutions that not even the brightest among us could recreate (Henrich 2016; Muthukrishna & Henrich 2016).

Cultural evolutionary theory describes the processes by which important aspects of human psychology evolve and persist as adaptations to environments over time. Thus, cultural evolution offers not only a theoretical framework for explaining cross-cultural psychological differences, but also cross-*temporal* psychological differences. Important aspects of present-day psychology lie in the past—either the past environments of present-day societies or the past environments of migrants who live in these present-day societies. These beliefs and behaviors may persist even after the environment changes or after the group moves to a new environment (De Leersnyder et al. 2011; Dinesen 2012; Giavazzi et al. 2014; Mesoudi et al. 2016; Norris & Inglehart 2012).

Innovations, of course, occur in each new generation, but innovation too, is built on the existing cultural repertoire accumulated over many previous generations (Muthukrishna & Henrich 2016). Historical path dependence (Page 2006) can constrain our technology and institutions, particularly in the absence of sufficiently strong countervailing selection pressures. We use QWERTY keyboards today not because they are efficient, but because they needed to be inefficient on early typewriters to avoid keys jamming. If the US Constitution were written today, it would look very different (Rockmore et al. 2018). Consider the many challenges to switching to the more efficient Dvorak keyboard layout or amending the US constitution.

Path dependence also affects our psychology. For example, industrialization may have increased both our color terms and our ability to distinguish and recall different shades (Gibson et al. 2017). The speed at which WEIRD children master their color terms has increased just within the last half century (Pitchford & Mullen 2002). Less materially secure environments develop norms against deviation, because the potential cost of deviating from the current accumulated adaptive norms can be high, often threatening the group welfare (Hruschka et al. 2014; Hruschka & Henrich 2013; Jackson et al. 2019; Muthukrishna & Henrich 2016). Norms against deviation, often referred to as *cultural tightness*, are a particularly interesting example, because they affect the rate of cultural innovation itself; tighter societies produce more incremental rather than revolutionary inventions (Chua et al. 2019; Gelfand 2018; Muthukrishna & Henrich 2016). Societies more resistant to change may also be more constrained by existing practices, though this same conformist, norm-adhering psychology, may also make them more vulnerable to abrupt society-wide shifts (Muthukrishna & Schaller 2019).

At any given time, cultural evolution is constrained by what's known as the *adjacent possible* (Muthukrishna & Henrich 2016). To see this, consider an analogy in genetic evolution (Chatterjee et al. 2014; Kauffman 2003): an organism is constrained by its current genome. New mutations

need to fit with the current complex interaction of genes that produce the organism. Human populations have optimized levels of skin-darkening melanin to match levels of UV radiation that vary with latitude: skin light enough to synthesize sufficient Vitamin D, but dark enough to avoid skin cancer (Jablonski 2018; Jablonski & Chaplin 2010). But no human population could evolve wings in any reasonable timeframe. Within cultural evolution, we see similar constraints on how countries select new industries in which to invest (Hidalgo et al. 2007) and how cultural and psychological innovations emerge (Muthukrishna & Henrich 2016). These tend to be incremental changes, serendipitous discoveries, or recombinations of existing practices. Of course, unlike genes in complex organisms, culture can be recombined and transmitted horizontally, allowing for innovations in one place to spread to another through processes of cultural-group selection, such as migration, relative population growth, conflict, and prestige-biased group-level transmission (Henrich 2016; Henrich & Muthukrishna 2020; Richerson et al. 2016). The spread of monogamous marriage offers a historical example. Approximately 85% of human societies in the anthropological record have permitted polygynous marriage and evolutionary models suggest that large wealth inequality should favor polygyny, but monogamous marriage spread rapidly with religion, in particular, Christianity (Henrich et al. 2012). Although polygyny may be more economically efficient under conditions of large wealth inequality (polygyny threshold model; Orians 1969; Verner & Willson 1966), monogamy can create more stable, safe societies by resolving the problem of young men without sufficient resources to marry and reproduce (Henrich et al. 2012). History suggests that while we might think that cultural evolution can be driven by radically new ideas generated by the powerful rationality and creativity of our big brains, in reality each of us is stuck thinking with the mental tools, heuristics, beliefs, expectations and worldviews bequeathed to us by earlier generations.

Thus, our psychology is shaped by millions of years of genetic evolution, thousands of years of cultural evolution, and a short lifetime of experience. When most animals encounter a new environment, they are forced to genetically adapt. Our species has some local genetic adaptations (for review, see: Fan et al. 2016; e.g. adaptation to UV radiation, Jablonski & Chaplin 2017; malaria, Kwiatkowski 2005; altitude, Yi et al. 2010), but most differences we see around the world are cultural rather than genetic (Bell et al. 2009). To develop better theories of human behavior (Muthukrishna & Henrich 2019) requires moving beyond cataloguing cross-cultural differences and toward understanding where they come from and how they change. The WEIRD people problem is not just a matter of geography, but of history (Henrich et al. 2010b; Nisbett 2003).

Societies in the past can be as culturally distant as societies in another place. The same argument for geographical variation in psychology also applies to temporal variation. What we measure as cohort effects are a sliver of the cross-temporal variation we would expect in a culturally evolving species. History serves as a kind of psychological fossil record, which opens up an exciting, and hitherto mostly untouched, source of "data from dead minds" (Martin 2014). Patterns of past cognition are captured in historical artifacts, ranging from archeological remains to written texts, that are not only important for understanding the roots of modern psychological patterns, but also represent an important source of less-WEIRD data (Slingerland 2014, 2015). Although our inability to experimentally manipulate or directly observe historical participants places limits on what we can learn from this data, traces of human thought can be a rich and informative source of descriptive information on past cognition, both explicit and implicit.

With few exceptions, psychology has largely ignored history and historical data, perhaps in part due to its lack of focus on building cumulative theories to explain human behavior (Muthukrishna & Henrich 2019). But just as economic history helps us understand present-day economics (Nunn 2009), historical psychology can help us understand the psychology of the past, which is crucial to understanding the psychology of the present and its many cross-cultural differences. Here we will (1) review work that might be classified as historical psychology; (2) introduce some methods that may be useful to historical psychologists, including how to extract data from dead minds; (3) explore the role of theory in mapping history to psychology; and (4) provide some conclusions concerning the future of this emerging field.

Historical Psychology Today

To explain contemporary behavior and psychology, an increasing number of researchers have found themselves turning to cultural evolutionary theories and historical data. Here, we describe some illustrative examples that link contemporary psychological variation—including cooperation, trust, personality and gender differences—to historical processes focused on religion, kinship, formal institutions (democracy), economic patterns and ecological factors.

Religious evolution and social psychology

What, if anything, is the connection between religion and social motivations? This question has frequently been asked within psychology, but few efforts to tackle it have brought a clearly articulated theory, an appreciation for how and why religions have changed over millennia, or a recognition of the extent of global religious diversity. Indeed, "religion" in psychology has often meant Christianity, though most people in the world are not Christians and Christianity is, over the scale of world history, a relatively recent development.

Addressing these issues within a historical and cultural evolutionary framework (Atran & Henrich 2010; Norenzayan et al. 2016), a recent approach proposes that the supernatural beliefs and ritual practices of contemporary religions have been shaped by intergroup competition over millennia (as well as by our evolved psychology) in ways that favor their success in competition against other religions. The argument proposes that this intergroup competition may have favored supernatural agents (e.g. deities) and/or cosmic forces (e.g. karma) along with prescribed beliefs and behaviors that promote more intensive cooperation within a broader social sphere. The resulting psychological shifts permitted societies to scale up in size and complexity and/or remain stable for longer. Particular religions therefore may have provided a kind of social technology for scaling up from the relatively small-scale hunter-gatherer populations of the Paleolithic to modern-nation states with millions or even billions of people. In some traditions, the gods became increasingly morally concerned about precisely those areas of life in which people struggle to cooperate with strangers or suppress their inclinations to exploit others through theft, murder, dishonesty and adultery (Wright 2009). These supernatural police became increasingly equipped with the power to monitor and punish violators of new universal codes of morality (McNeil 1991). Some deities even gained the ability to see into people's hearts and control their fate in an afterlife, which became contingent on their compliance with divine decrees. In many large-scale societies, these gods gradually acquired the traits of omniscience, omnipotence, and omnibenevolence, co-evolving with the scale of their societies.

To test this historical theory, researchers have taken a variety of approaches. The first approach involves taking advantage of the contemporary diversity in religious beliefs to see if, indeed, those who believe more strongly in powerful moralizing gods are relatively more prosocial or fair-minded toward socially or even physically distant co-religionists. That is, can a religious group serve as a super-ethnic identity for cooperation? This research involved an interdisciplinary team of psychologists, anthropologists, and religious studies scholars who conducted two waves of ethnographic and experimental research in 15 diverse populations around the globe (Lang et al. 2019a; Purzycki et al. 2016, 2018a). Their sample of hunter-gatherers, pastoralists, horticulturalists and wage laborers belonged to a diversity of religious traditions, including Buddhism, Christianity, and Hinduism, as well as local traditions that incorporate ancestor worship and animism. Based on a preliminary interview, the researchers selected two local deities in each population: (1) the most powerful moralizing god (e.g. Yahweh, Shiva, etc.) entertained by the population and (2) a salient, but less powerful supernatural being (e.g. an ancestor god or forest spirit). In subsequent interviews, the researchers assessed participants' beliefs about the monitoring, punishing and rewarding powers and inclinations of these gods, including their influence over the afterlife. Finally, to assess people's prosocial inclinations (as specified by the theory), the team administered two different one-shot experimental games involving an anonymous stranger: The Dictator and Random Allocation Games (RAG). In the Dictator Game, a "dictator" is given a sum of money, which they can divide as they wish between themselves and a recipient. In the RAG, a sum of money is also divided between the participant and a recipient, but the allocation should be random, such as based on rolls of a die; the outcomes of these rolls is only known to the participant, offering an opportunity for cheating. To test the effects of religious identity, these tasks were modified: participants were asked to make two monetary allocations, one between a co-religionist in a distant town and themselves (Self-game) and a second between another distant co-religionist and a local co-religionist from the participant's home community (Local co-religionist game). In the Dictator Game, participants simply decided how much money to put in each cup (each assigned to one of the recipients). In the RAG, participants rolled a six-sided die and had to allocate either to their preferred cup or the other cup. This die roll concealed each allocation decision from the researchers, but not from an omniscient god. The researchers did not have omniscience but did have probability and statistics, which allowed them to estimate biases in people's allocations.

The results from both experimental tasks demonstrate that those who believe more strongly in a moralizing, punishing god allocated the game money more equitably toward the distant co-religionist in both the Dictator and Random Allocation Games. Using the data from the RAG, Figure 1 shows some of the major findings. For both the Self and Local co-religionist games, the squares and circles give the odds ratios for six key variables in a multi-level binary logistic regression. The stronger were people's beliefs in the punishing and monitoring powers of their moralizing god, the more equally they allocated towards the distant co-religionist. This suggests that some kinds of deities can expand the moral circle. Notably, these analyses only compare individuals within each population, so site-level differences like national GDP, climate, ecology, etc. cannot explain these patterns. The researchers also controlled for the participants' age, sex, number of children (Figure 1), household size, material insecurity (Figure 1) and emotional closeness to the recipient. Interestingly, only beliefs about the punishing and monitoring capacities of the big, moralizing god mattered; beliefs about the weaker, less moralizing supernatural agents did not account for significant behavioral variation. This follows directly from the theory since most "small gods" are either not particularly morally concerned or only locally concerned with the behavior of other clan

or community members (Hadnes & Schumacher 2012; McNamara & Henrich 2018; Norenzayan et al. 2016).
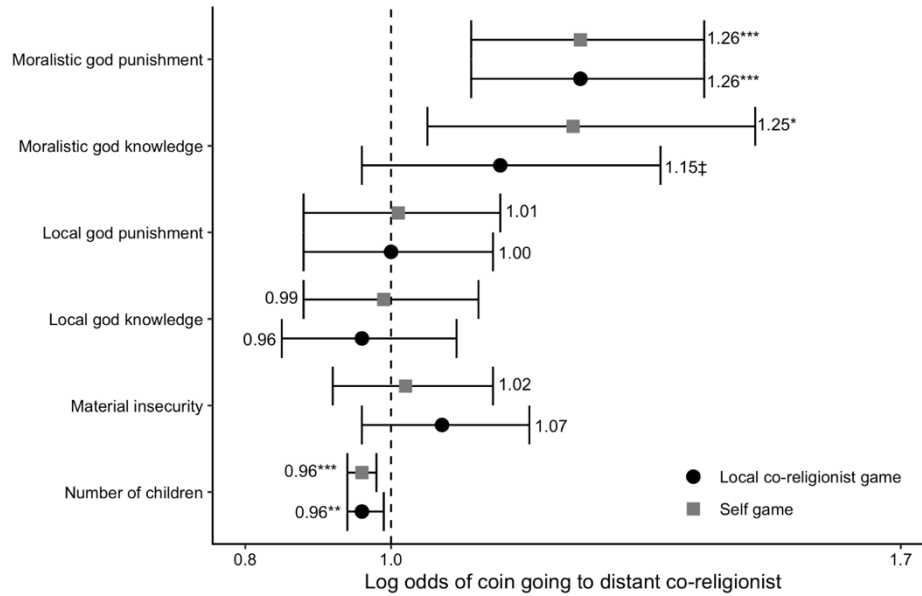

FIGURE 1. EFFECTS OF DIVINE PUNISHMENT AND MONITORING ON ALLOCATIONS TO DISTANT CO-RELIGIONISTS IN THE RANDOM ALLOCATION GAME FOR BOTH THE SELF AND LOCAL CO-RELIGIONIST GAMES. THESE ODDS RATIOS ARE DERIVED FROM A MULTI-LEVEL BINARY LOGISTIC REGRESSION IN WHICH THE ALLOCATION OF EACH COIN TO ONE OF THE TWO CUPS IS REGRESSED ON A BATTERY OF PREDICTORS. THE MODELS INCLUDE FIXED EFFECTS FOR EACH POPULATION AND, AT THE INDIVIDUAL LEVEL, CONTROLS FOR AGE, SEX, NUMBER OF CHILDREN, HOUSEHOLD SIZE, MATERIAL INSECURITY AND EMOTIONAL CLOSENESS TO THE RECIPIENT. ADAPTED FROM PURZYCKI ET AL. (2016). PLOTS AVAILABLE UNDER CC BY 4.0 AT HTTPS://FIGSHARE.COM/S/42A01647BAAD82157B1B

SIDEBAR: Researchers have proposed that moralizing religions arose in response to evoked psychological recalibrations created by rising security over historical time, especially due to greater food security among elites (Baumard & Chevallier 2015; Baumard et al. 2015). With their changed psychology, elites revised religious doctrines and formulated moralizing gods concerned with cooperation and sex. Unfortunately, efforts to test this hypothesis using detailed data on people's material security, morality and supernatural beliefs have not yet provided support (Banerjee & Bloom 2015; Purzycki et al. 2018b).

Notably, in testing this theory, Lang et al. (2019a) did not find the sharp border their theory predicts in how people should treat distant co-religionists vs. people from other religions; however, the particular contexts used in this study created a number of methodological challenges for properly testing this prediction. In some sites, for example, religion was highly correlated with ethnicity, and in some cases divisions between the ingroup and outgroup were not clear cut (Protestants in different denominations; Protestants vs Catholics; Christians vs Muslims or Hindus).

This cross-cultural work dovetails with a large body of laboratory experiments testing whether religious primes influence prosociality: dozens of studies reveal how unconsciously reminding

believers (but not non-believers; Shariff et al. 2016)of their moralizing gods or supernatural forces (karma) can increase fairness in dictator games, cooperation in prisoner's dilemmas and honesty in a variety of tasks (Shariff et al. 2016; White et al. 2019). Although most work has focused on priming Christians, the literature has gradually expanded to reveal parallel effects among Muslims, Hindus and Buddhists (Aveyard 2014; Duhaime 2015; Rand et al. 2014; Xygalatas 2013; Yilmaz & Bahçekapili 2016).

Turning to the historical dimension, other historical and anthropological data suggest that powerful gods, contingent afterlives, universal moral codes, and divinely infused notions of free-will only gradually arose and spread as societies scaled up in size and complexity (Atran & Henrich 2010; Henrich forthcoming; Norenzayan et al. 2016). To test this claim, psychologists and their collaborators have analyzed a global anthropological database of over 1200 different societies. The results confirm that the presence of moralizing gods is unambiguously associated with measures of sociopolitical complexity (Botero et al. 2014). Similarly, using a database of ethnographic observations from Oceania at the time of European contact (Watts et al. 2015b), researchers have applied phylogenetic techniques for the historical reconstruction of cultural history to examine the coevolution of societal political complexity and the presence of moralizing gods who use supernatural punishment. These analyses suggest that notions of broad supernatural punishment likely facilitated increases in political complexity and scale of societies (Watts et al. 2015a).

Despite some fascinating findings, the major shortcoming of this research program is a lack of systematic, historical and longitudinal data on either religion or psychology. As we will discuss below, the advent of large-scale, coded historical databases, such as the Database of Religious History (DRH; Slingerland & Sullivan 2017) or the Seshat Databank (seshatdatabank.info; Francois et al. 2016), will allow future studies to incorporate historical data in a much more rigorous and comprehensive manner.

The historical origins of WEIRD psychology

During late antiquity the branch of Christianity that evolved into the Roman Catholic Church began developing a package of prohibitions and prescriptions surrounding marriage and the family. The Church banned polygamy, cousin marriage, levirate marriage, and arranged marriage while promoting testamentary inheritance and individual land ownership (not family ownership). The bans on marrying relatives began with first cousins (and closer) but eventually expanded to include sixth cousins; the forbidden circle prohibited not only all blood relatives, but also all affines and spiritual kinfolk (e.g. god daughters). As the Church diffused across Europe over the next millennium, the imposition of these policies dramatically altered the social organization of indigenous Europeans, breaking them down into monogamous nuclear families while at the same time dissolving tribal distinctions. Consequently, centuries before industrialization and even Europe's global expansion, the populations of Latin Christendom came to possess a virtually unique form of social organization, one not built primarily on kinship (Goody 1983; Mitterauer & Chapple 2010).

In light of these historical findings, researchers have proposed that the medieval Catholic Church, particularly through the Church's impact on kinship organizations, can explain a substantial swath of contemporary psychological variation, along dimensions such as individualism, tightness,

conformity, independence, moral judgment and impersonal prosociality, which includes cooperation, trust and fairness toward strangers and anonymous others as well as third-party punishment (Henrich forthcoming; Schulz et al. 2019). To test these hypotheses derived from this theory, they assembled historical, anthropological and psychological databases. By tracking the historical diffusion of bishoprics across Europe, Schulz et. al. calculated the duration of exposure to the Church from roughly 500 to 1500 CE and used this to predict contemporary psychological variation within Europe on four psychological measures: individualism-independence, conformity-obedience and both impersonal fairness and trust. As expected, Europeans from populations with more centuries under the Church are now more individualistic and independent, less inclined toward conformity and obedience, and show greater trust and fairness towards strangers. These results only compare individuals living in the same country and hold constant a vast array of control variables, including individual religiosity, religious denomination, income and education, as well as regional variables including historical prosperity, latitude, agricultural potential, pathogen stress and terrain ruggedness.

This research also reveals links between kinship intensity and both medieval Church exposure and contemporary psychological variation. Within Europe, detailed analyses show that the more centuries a local population had under the Church, the lower the rate of cousin marriage in the 20th century. They also demonstrate that less cousin marriage is associated with less conformity and obedience, less individualism and independence, and reduced level of impersonal trust and fairness.

SIDE BAR: Some researchers have sought to explain contemporary psychological variation as a consequence of differences in wealth or material security, arguing in part that the experience of more secure or abundant environments during early childhood evokes life-long psychological calibrations (Frankenhuis et al. 2016; Nettle 2010). While some evidence supports this view (Baumard 2017), the impact of Church exposure and kinship intensity on psychology shown here are independent of individual-level measures of income, wealth and education measures, regional level measures of historical prosperity and national wealth.

Extending this analysis globally using 17 different psychological measures, Schulz et al. (2019) also show that national populations that have experienced more centuries under the Church are more individualistic (Figure 2a), analytic in their thinking (Figure 2b), and impersonal in their prosociality towards strangers, including greater impartiality (in experiments and observational data), higher public goods contributions (in experiments and blood donations), and more trust in out-groups, (relative to in-groups, Figure 2c). They also show less conformity (Asch task and surveys; Asch 1956; Bond & Smith 1996)(Asch task and surveys; Asch 1956; Bond & Smith 1996), greater tightness (Gelfand et al. 2006), more embeddedness (Schwartz 2006), stronger obedience (based on the World Values Survey), and less nepotism (Figure 2d). These results are further confirmed by comparing second-generation immigrants living in the same European countries, but who traced descent back to populations scattered around the globe. Studies by other researchers confirm the key relationship between kinship intensity and the predicted psychological outcomes (Akbari et al. 2019; Enke 2019).
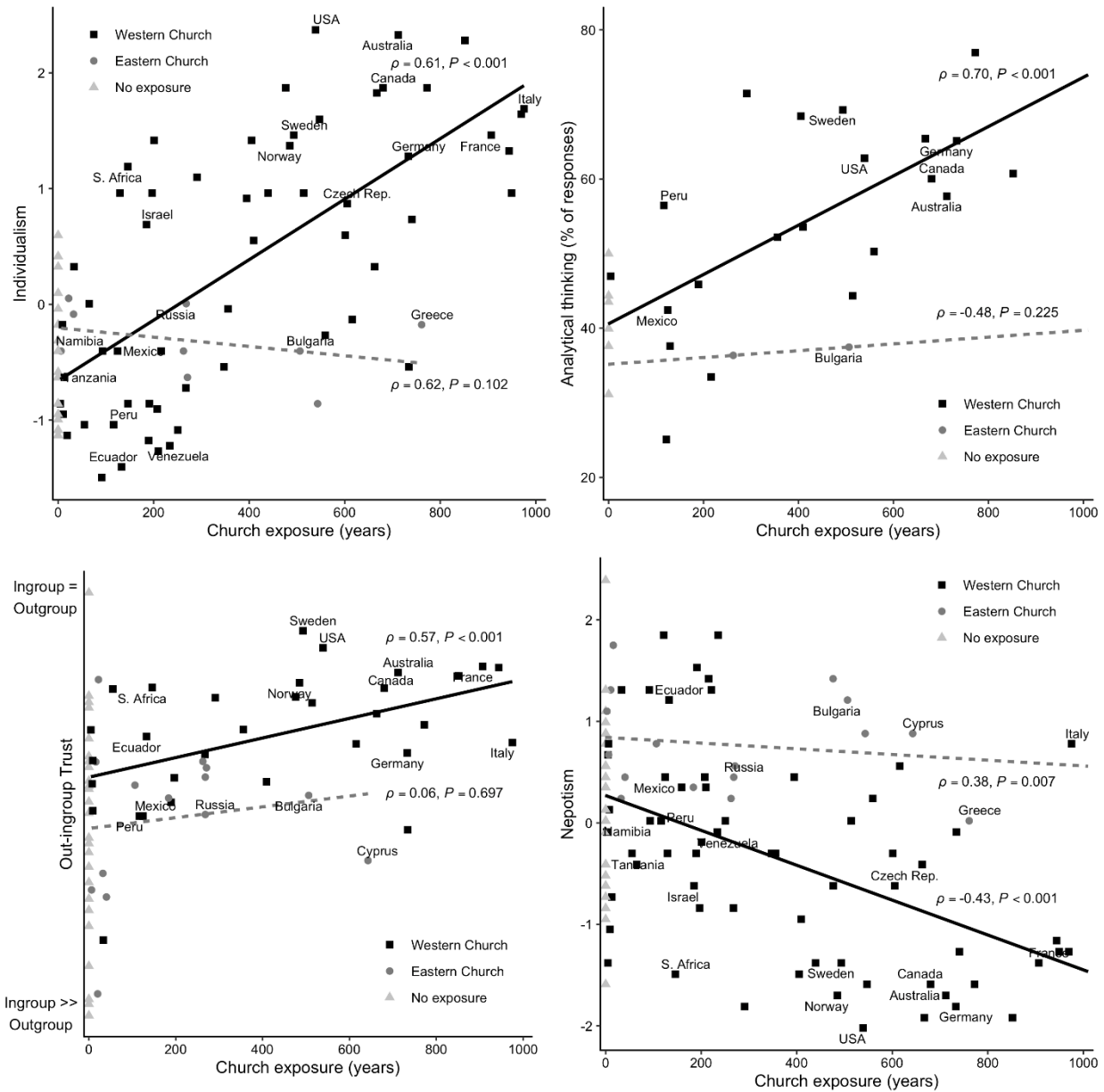
FIGURE 2. THE CROSS-NATIONAL RELATIONSHIPS BETWEEN CHURCH EXPOSURE, MEASURED AS YEARS UNDER THE WESTERN CHURCH, AND FOUR DIFFERENT PSYCHOLOGICAL OUTCOMES: (A) HOFSTEDE'S INDIVIDUALISM MEASURE, (B) ANALYTIC THINKING (ASSESSED USING TRIADS), (C) OUT-GROUP VS. IN-GROUP TRUST (BASED ON 6 WORLD VALUES SURVEY QUESTIONS) AND (D) NEPOTISM (BASED ON INTERVIEWS OF EXECUTIVES AT WORLD ECONOMIC FORUM ON HIRING RELATIVES). ADAPTED FROM SCHULTZ ET AL. (2019). PLOTS AVAILABLE UNDER CC BY 4.0 AT HTTPS://FIGSHARE.COM/S/42A01647BAAD82157B1B

Successful democratic institutions

Institutions rest on invisible cultural and psychological pillars. For example, a constitution's proclamations are irrelevant without a belief in the rule of law or norms of punishment for violations of this rule; markets require traders to trust one another; and cooperation at the scale of

family and friends can corrupt impartiality (Muthukrishna 2017; Muthukrishna et al. 2017). Institutions coevolve with their underlying psychological foundations, which can make transplanting them a challenge. Thus, as research in the adjacent field of economic history shows, the success of institutions and their psychological foundations have their origins in the past. Giuliano and Nunn (2013) tested whether the degree to which a country is democratic today (as measured by the Polity2 variable in the Polity IV database; Polity 2011) is predicted by the extent of village-level democratic practices prior to industrialization. These practices were coded by combining data from the Ethnographic Atlas with data from Ethnologue (Lewis 2009) and data from Landscan 2000 (Dobson et al. 2000) to create an Ancestral Characteristics Database (Giuliano & Nunn 2018). The effect of these traditional local democracies on present political institutions was robust to a range of controls, including the quality of the land for agriculture and European influence.

One aspect of the beliefs and norms that support institutions can be captured by attitudes towards those institutions. Giuliano and Nunn (2013) also tested the effect of traditional democracy on present-day individual-level self-reported attitudes toward democracy using three variables from the World Values Survey: (1) Support for the statement "Democracy may have problems but it is better than any other form of government"; (2) whether having a democratic political system is very good, fairly good, fairly bad, or very bad; and (3) "How important is it to live in a country that is governed democratically?". Once again, traditional local democracy was a strong and significant predictor, robust to a range of controls. The study illustrates institutional persistence and historical path dependence of political psychology. On the other hand, historical events can also change culture and institutions. For instance, Sinding Bentzen, et al (2019) show that the disruption of local indigenous democracy by colonial powers has weakened present day democratic institutions in these places.

These studies of democratic institutions are from economic history and therefore focus primarily on the economic implications. However, there is considerable overlap with psychology, particularly political psychology (e.g. foundations of egalitarianism; Sheehy-Skeffington & Thomsen 2020). Moreover, the psychology in these studies is shallower than it would be if studied by historical psychologists. Underlying the effects of local democracy may be increases in rule of law, norms of fair redistribution and fair rewards for production, modes of free expression, efficient and meritocratic allocations of talent, less temporal discounting, more abstract reasoning, impartiality toward non-kin and outgroups, and trust within a group. A deeper understanding of these psychological foundations of democracy would benefit from the toolkits of both history and psychology.

Trust in strangers

Psychologists have long studied people's willingness to trust other people, especially strangers (Evans & Krueger 2009). In recent decades, a rapidly growing body of research is explaining global differences in trust, often linking them back centuries in time to past events, processes and migrations (Algan & Cahuc 2010). Strikingly, Nunn and Wantchekon (2011) tested the causal effect of the African slave trade (1500-1800) on present-day levels of trust in Africa. Motivated by the powerful financial incentives created by the slave trade, neighboring ethnic groups, villages and even families turned on each other as a source of chattels for the coastal slave markets. The authors

show that more impacted an ethnic group was by the slave trade (in turns of the extraction of individuals), the less trusting they are today.

Of course, this raises the question of whether lower levels of trust led to higher levels of slave trading, higher levels of slave trading led to lower levels of trust, or some third variable affected both. Trust levels and slave trade severity are correlated with one another, but causation is harder to establish. Nunn and Wantchekon used various causal inference techniques to investigate this relationship, among which an instrumental variable analysis proved particularly useful. An instrumental variable allows one, under certain assumptions, to effectively pull that fraction of the variation in the outcome variable (trust in this case) that randomly assigned to differing intensities of slaving (Angrist & Pischke 2009; Angrist et al. 1996). Just as a weighing scale is an instrument for measuring weight, Nunn and Wantchekon used distance from the coast as an instrument for measuring the severity of the slave trade. Distance from the coast does not predict levels of trust in other places, but it does predict the severity of the slave trade in Africa. Therefore, if distance from the coast predicts levels of trust in Africa, we can at least make a case for excluding the possibility of reverse causality of trust on the slave trade. To make the causal case more convincing, other possibilities, such as a third variable explanation, also need to be excluded. The effect of the slave trade on other aspects of African psychology remains unknown. However, as previously noted, historical circumstances can potentially help explain a wide range of psychological differences captured by measures of analytic thinking, conformism, individualism, endowment effects and impersonal prosociality, including measures ranging from psychological scales and behavioral games to 'lost wallets' and voluntary blood donations to strangers (Apicella et al. 2014; Cohn et al. 2019; Herrmann et al. 2008; Schulz et al. 2019; Thomson et al. 2018).

Modes of production and sex differences

Sex differences have been found across a broad range of psychological measures, including personality (Kaiser et al. 2019), interests (Lippa 2010), preferences for altruism, trust, reciprocity, risk taking, and patience (Falk & Hermle 2018), and even the propensity to be a serial killer (Harrison et al. 2019). Apart from differences in the psychology of the sexes, attitudes towards the sexes also differ. These differences in attitudes affect outcomes such as the wage gap: the economic penalty on women's wages caused by the birth of a child is larger in countries with a larger fraction of people who agree with the statement, "Women with children under school age or in school should stay at home" (Kleven et al. 2019). Sex differences and attitudes towards the sexes go hand-in-hand, may have a genetic basis shared with other primates (Benenson & Abadzi 2020), but also differ cross-culturally (Henrich 2016). Understanding some of the ultimate sources of these cross-cultural differences may help in understanding what drives greater gender equity.

One cultural evolutionary explanation for variation in the nature and strength of sex differences across contemporary populations is that they arise from historical differences in the division of labor, which favor integrated cultural complexes of norms, practices, beliefs and rituals that can persist long after the actual economic or social constraints lift (Henrich & Boyd 2008). As the cultural repertoire expanded beyond what could be learned by a single individual in a single lifetime, one natural division of information and labor prior to job specialization was sex. Comparative advantages of male and female bodies may have exacerbated the size of this division. For example, Alesina et al. (2013) investigated the relationship between ancestral farming practices

and present-day gender norms. Different crops and land are better suited to plowing compared to hoeing. The plow is best suited to large areas that are deep, flat, and not rocky. In contrast, shallow, sloped, rocky soils are difficult to plow and are more suited to hoeing. Driving a plow requires more upper body strength than hoeing, even when assisted by an animal. Humans are sexually dimorphous, with males being on average larger and stronger, giving men a comparative advantage in plow agriculture. As a consequence, plowing tends to be a male activity compared to hoeing, which can be done by both sexes, resulting in a situation where, relative to hoe-based societies, plow-based societies tend to have a sex-based division of labor.

Testing this idea, Alesina, et al. show that traditional plow use is a negative predictor of present-day female labor market participation and share of firms owned by females, controlling for a range of historical controls including agricultural suitability, climate, the presence of large animals, political hierarchies and economic complexity, and contemporary controls, including income. Traditional plow use also predicts individual characteristics, such as whether a woman is in the labor force, and attitudes regarding whether men should be prioritized when jobs are scarce and whether men make better political leaders. The same relationship is found at a national and subnational level. To try to make a convincing causal case, Alesina et al. also use an instrumental variable analysis to infer causality, using land plow suitability as an instrument. This analysis showed the same robust finding. Finally, Alesina et al. show the persistence of these beliefs in migrants in the US and Europe. Daughters of immigrants with either a mother or father (or both) from a traditional plow agriculture country are themselves less likely to be in the labor force. Similarly, children of immigrants with either a mother or father (or both) from a traditional plow agriculture country are themselves more likely to endorse the statement that "when jobs are scarce, men should have more right to a job than women".

The psychology of sex differences has emphasized hypothesized human universals, such as differences in sexual behavior (Buss 1994), often driven by evolutionary logic, such as parental investment theory (Trivers 1972); socialization through social learning processes (Bussey & Bandura 1999); or sometimes cross-cultural differences, such as societal divisions of labor (Wood & Eagly 2012). A historical psychological approach offers a way to integrate these different emphases. It would be surprising if humans have not phylogenetically inherited sex differences due to evolutionary logic described by theories, such as parental investment, but it would be equally surprising if norms and institutions did not strengthen, weaken, or change these sex differences and attitudes towards the sexes. Furthermore, it would be surprising if at least some of these norms and institutions were not an evolved product of present and past problems faced by a particular society, interacting in complex ways with other cultural traits. However, to understand how and why these differences persist requires both an evolutionary and historical approach. Some sex differences may be a downstream product of exogenous features of the environment, such as the division of labor created by the difficulties of growing food in different geographies, as in the case of plowing and hoeing. We might expect that these differences persist, but equally that they may slowly change in the presence of alternative norms and absence of the original selection pressures; migrants and their children acculturate over generations (Mesoudi et al. 2016).

In other cases, the fundamental evolutionary challenge created by long gestation and longer childhood can be heightened by historical cultural practices that reduce paternal certainty, such as pastoralism. Becker (2019) shows that a particular form of pre-industrialized pastoralism favored the adoption of restrictions on female sexuality. Because pastoralism required males to be absent

for long periods of time, paternal uncertainty is increased. This led to normative restrictions of women's freedom in terms of mobility, sexual behavior and even female genital cutting, enforced by both men and women. Becker shows that historical dependence on pastoralism predicts a range of contemporary norms and practices, including female genital cutting, attitudes towards female genital cutting, norms about the faithfulness of married women, premarital sex, number of sexual partners, and whether women could go out without asking permission, talk to men, visit relatives, go somewhere without their husband knowing, or more generally have freedom of movement. Becker's analysis uses an array of historical and contemporary controls, similar to Alesina et al. Causality is inferred through an instrumental variable analysis using suitability for pastoralism as the instrument. Becker also used placebo tests (where variables that should not be predictive are used instead and shown to not be predictive)—a useful technique in historical psychology.

Adopting a historical perspective may also help make sense of a new literature arguing over the relationship between measures of gender equality and gender disparities in preferences (Falk & Hermle 2018), STEM outcomes (Stoet & Geary 2018), and personality (Mac Giolla & Kajonius 2018). Some results suggest that this disparity is larger in countries with more gender equality (though also see Richardson et al. 2020; Schmitt 2015). Here gender equality has been measured the Global Gender Gap Index of the World Economic Forum (Stoet & Geary 2018), the Gender Equality Index of the United Nations (Mac Giolla & Kajonius 2018), or an index created using both of these as well as the ratio of female to male labor force participation rates, and the number of years since women's suffrage (Gender Equality Index; Falk & Hermle 2018). These findings remain a puzzle, but it is likely that the answer lies not only in present features of societies, but in their past.

Personality

The Big Five personality trait scores differ between societies in mean and variance (McCrae & Terracciano 2005), as well as the degree to which they are intercorrelated (Lukaszewski et al. 2017). These patterns are not arbitrary: as Lukaszewski et al. (2019) analyses show, less socioecologically complex societies have greater intercorrelation between these five factors. People's personalities can theoretically vary in a variety of ways. Smaldino et al. (2019) model a "niche diversity hypothesis", where these variations are able to form reliable profiles to match greater diversity in social and ecological niches. For example, in a society in which deviating from prescribed norms is more dangerous, those who would otherwise be more open to new experiences cannot nurture this trait and may even be forced to suppress this desire. In contrast, in a society that tolerates large deviations in behavior, this tendency can manifest and may even be rewarded through higher levels of creativity and innovation (Muthukrishna & Henrich 2016). Indeed, openness to new experiences can be difficult to extract as a factor, and was less reliable in measurement among Tsimane forager-farmers of the Bolivian Amazon (Gurven et al. 2013). Ultimately this theory describes the correlates of cross-cultural differences, but not their source. Theories exist to predict what creates differences in socioecological complexity (Henrich 2004; Henrich et al. 2016; Henrich & Muthukrishna 2020; Powell et al. 2009) and these have been tested using anthropological (Kline & Boyd 2010) and experimental data (Derex et al. 2013; Muthukrishna et al. 2013), but have yet to be tested using historical data.

A recent paper by Obschonka et al. (2018) offers an example of a historical psychological approach to understanding present-day differences in personality and well-being. Obschonka et al.

investigated the effects of the industrial revolution in different regions of England and Wales on the Big Five and life satisfaction and life expectancy. To infer causality, Obschonka et al. used an instrumental variable approach. Since the location of coal fields drove the locations of large-scale industries, the instrument used was distance of the region to the nearest coalfield as an instrument for employment share in large-scale, coal-based industries. Their results suggested a negative effect of industrialization on conscientiousness and a positive effect on neuroticism, as well as a negative effect on both life satisfaction and life expectancy. Their analysis controlled for other economic sectors in 1813-1820, as well as historical energy supply, education, wealth, geology, climate, and population density. This research represents the next step in cross-cultural psychology: not only documenting the psychology of populations more culturally distant from more WEIRD nations (Muthukrishna et al. 2020), but developing and testing theoretical explanations for these differences.

Individualism-Collectivism and Relational Mobility

Two of the most cited cross-cultural psychological differences are individualism-collectivism and relational mobility. Some societies tend to be highly collectivist, emphasizing family and group welfare. Others tend to be more individualist, where decisions are made based on one's own goals and preferences, and accomplishments are seen as personal. These traits are often correlated with other identified features of a society, such as relational mobility—the ease with which people can choose and lose relationships. Cultural psychology has traditionally emphasized collectivism and low relational mobility of Eastern countries and the individualism and high relational mobility of Western countries. However, countries and societies are not homogenous, but instead represent different distributions of cultural traits structured by embedded and overlapping cultural-groups (Muthukrishna et al. 2020). Earlier, we discussed the breaking of kin bonds as a crucial factor increasing individualism and relational mobility, which may be the more recent and unusual social arrangement (Schulz et al. 2019). Cultural traits are connected to one another in complex ways and these institutional shifts may have necessary preconditions. For example, one can only really afford to lose relationships or prioritize one's own preferences where they differ from others to the degree that one can succeed without these relationships or support. In light of this logic, Thomson et al. (2018) use data from around 17,000 people in 39 countries to show that more interdependent subsistence style (rice farming compared to herding) and historical and ecological threats to material security (such as natural disasters, disease, and resource scarcity) are both highly correlated with lower levels of relational mobility (r = -0.63; r = -0.54); see Figure 3a. Relational mobility in turn is associated with a host of psychological outcomes, such as trust, intimacy, willingness to offer help, homophily, and so on. However, all relationships remained correlations with no convincing causal identification strategy.

Even within traditionally individualist or collectivist societies, there may be large regional differences in these traits. Talhelm et al. (2014) attempt to causally identify the effect of more interdependent agricultural practices (rice farming) on collectivist attitudes. The researchers used an instrumental variable design using environmental suitability for rice growing (over the more individually farmable wheat); see Figure 3b. Rice suitability was highly predictive of actually growing rice, but also of higher levels of holistic reasoning and lower levels of individualism.
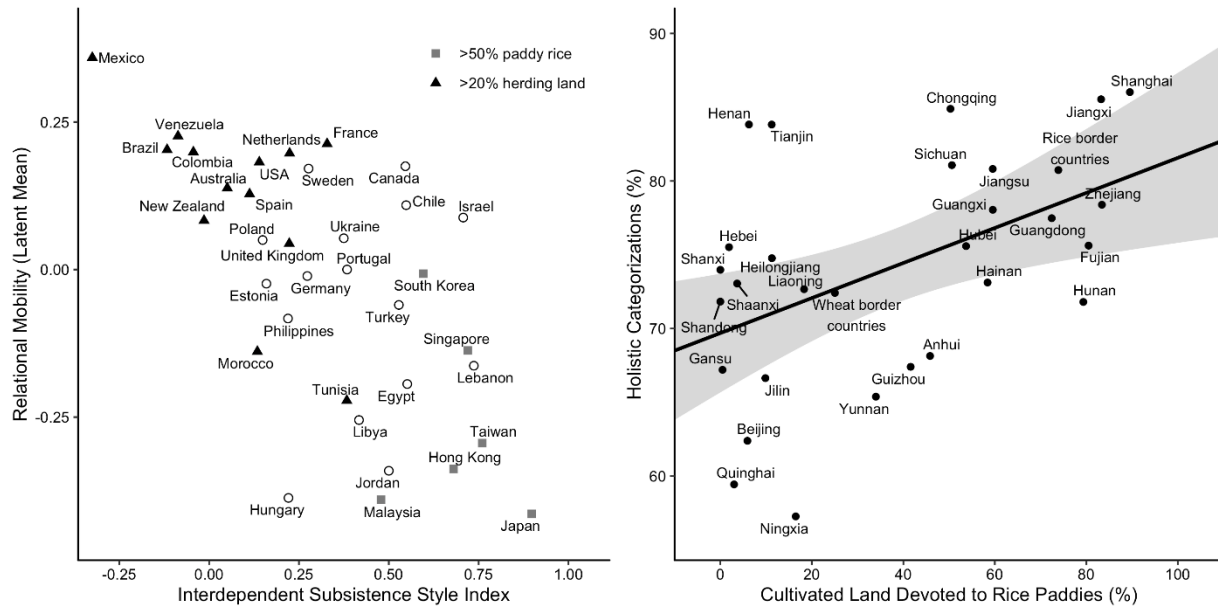
FIGURE 3. (A) RELATIONSHIP BETWEEN RELATIONAL MOBILITY AND INTERDEPENDENT SUBSISTENCE STYLES. FIGURE RECREATED FROM THOMSON ET AL. (2018). (B) RELATIONSHIP BETWEEN HOLISTIC COGNITION AND CULTIVATED LAND DEVOTED TO RICE PADDIES IN DIFFERENT PROVINCES OF CHINA. FIGURE RECREATED FROM TALHELM ET AL. (2014). PLOTS AVAILABLE UNDER CC BY 4.0 AT HTTPS://FIGSHARE.COM/S/42A01647BAAD82157B1B

Data from Dead Minds

There are at least two ways in which an engagement with history can be useful for psychologists. In the previous section, we focused on how contemporary cross-cultural psychological patterns might be driven by past cultural or ecological dynamics. In this section, we turn to a discussion of how traces of past cognition can be extracted from historical artifacts or texts.

Historical subjects consist of the collection of people across the globe and throughout time who have left records of their cognition in various physical objects, from archeological remains to transmitted texts. The dead represent a remarkably diverse subject pool, especially compared to the sample typically studied by psychologists. They thus constitute an important and relatively untapped source of data for psychological researchers.

There are, to be sure, limitations to studying dead subjects. We cannot actively manipulate the dead's thoughts and behaviors and so have to infer their psychology from texts and objects. If the data source is texts from ancient societies, the subject pool often consists entirely of educated elites, and in many societies, exclusively educated elite males. However, despite these drawbacks, there are advantages to studying the dead. Long dead subjects do not require payment or human subject approval, and more importantly, represent considerable cultural and cognitive diversity.

Sources of Historical Data

It is helpful to think of historical data in terms of a spectrum from unstructured to structured. Fully unstructured data consists of uninterpreted artifacts or physical texts from the past, the raw data upon which scholarly interpretation is built. As the identity and function of artifacts are inferred, or texts are deciphered, standardized and interpreted, this historical data becomes more structured and abstracted from the original objects of study. A dividing line of sorts is crossed when qualitative data, such as archeological site descriptions or analyses of ancient texts, is converted into quantitative data: for instance, the presence or absence of a certain type of artifact, belief or practice, a population estimate, or a continuous, standardized variable such as level of social complexity or frequency of ritual practice.

The objects of historical study can be mined to glean traces of past human cognition, either directly or indirectly. The structure and contents of tombs from a given culture can, for instance, provide insight into afterlife beliefs, which in turn can tell us something about views on mind-body dualism. The presence or absence of certain cultural technologies or institutions—coinage, professional priesthood, rice paddies—can be linked indirectly to psychology. The presence of coins, for instance, suggests the existence of market-based economies, which might bring in its wake certain specific forms of cognition (Henrich et al. 2010a). Historical evidence of rice-based agriculture can similarly be used as a proxy for a more collectivist sense of self (Talhelm et al. 2014). Physically-transmitted texts, such as inscriptions on objects or ancient manuscripts, can provide us direct introspective reports from past human minds. Received texts—texts of ancient origin that have been transmitted over time, copied and re-copied in various physical forms—also tell us a great deal, although in these cases concerns about potential alteration (deliberate or not) in the transmission process need to be addressed.

Whatever its specific medium, most of the data studied by professional historians remains in qualitative form. The process of assessing its psychological significance requires acts of interpretation on the part of historical experts, who have the necessary linguistic and cultural knowledge. This sort of qualitative, descriptive data can play an important role in ruling out certain hypotheses. For instance, work on folk mind-body dualism (e.g. Bloom 2004) has been criticized for focusing on modern, Westernized populations (Astuti & Harris 2008), with the possibility being raised that what has been presented as a cognitive universal might, instead, be a product of a particular linguistic system, or reflect the conceptual influence of Christianity or philosophers such as Descartes (Wierzbicka 2006; Xiang 2010; Yu 2007). A review of qualitative historical data from various ancient cultures instead suggests that mind-body dualism is a folk cognitive universal, although this dualism does not take a Cartesian form (Hodge 2008). Similarly, claims that moralizing, punishing gods are entirely absent from certain important cultures, such as early China (Gernet 1985), can be dismissed by simply demonstrating the presence of such concepts in texts that can be reliably dated to ancient China (Clark & Winslett 2011).

Ideally, however, psychologists making use of historical data would like to turn these qualitative assessments into quantitative data that can then be analyzed statistically. Such highly structured historical data can take the form of databases of coded cultural history or cross-cultural surveys conducted repeatedly over the course of years or decades.

Historical Databases

Databases are sometimes constructed on a study-by-study basis, designed to test specific hypotheses. For instance, Sosis and Bressler (2003) employed a team of undergraduate RAs to scour secondary sources concerning 83 nineteenth-century American communes, answering a survey in order to code each commune's rituals and taboos, behavioral restrictions and other costly demands. They found that more costly demands were correlated with commune longevity, supporting experimental evidence with contemporary subjects linking costly signaling to enhanced group solidarity and within-group cooperation (Henrich 2009; Irons 2001; Xygalatas et al. 2013). Matthews and colleagues (2013) similarly created a custom dataset coding 44 features of the religious beliefs and practices of sixteenth-century Anabaptist groups. Comparing these features to a phylogenetic tree depicting the known descent of generations of congregations from one another, they found that most theological traits were borrowed from contemporaneous sects, with the exception of advocacy of group violence, which was instead inherited from parent congregations. This suggests that there is something psychologically distinct about beliefs concerning religious-motivated violence, which might perhaps be linked to congregationally-inherited economic or political factors rather than theology.

More useful for psychologists lacking funds for large teams of RAs, or without access to collaborators with the expertise to analyze qualitative historical data, is pre-coded historical data, ideally with broad enough coding rubrics to be useful for answering a wide range of research questions. The creation of such databases is still in its early stages, and is characterized by multiple challenges (Slingerland et al. revision). For instance, large-scale societies are characterized by huge quantities of artifacts and texts in ancient languages, as well as massive secondary scholarly literatures analyzing these traces of past cognition. Coding decisions concerning variables that involve significant degrees of interpretation, such as whether a particular supernatural being is concerned with human morality, are probably best made by experts in a relevant field. Expert opinion on such topics often differs, however, and it is extremely difficult in practice to interest historians and archeologists in coding historical data. Having research assistants review some sample of historical data and create codings results in more reliable data accumulation and likely higher inter-coder reliability, but runs the risk of producing inaccurate codes, or failing to reflect differences in scholarly opinion (Slingerland et al. revision).

A representative sample of coded databases with at least some historical depth is presented in Table 1.

TABLE 1. SOME EXAMPLES OF STRUCTURED HISTORICAL DATABASES RELEVANT TO HISTORICAL PSYCHOLOGY. RECREATED FROM SLINGERLAND ET AL. (REVISION)

Database	Acronym	URL	Type of data	Current content (* indicates expanding annually)
eHRAF World Cultures	eHRAF	ehrafworldcultures.yale.edu	General culture (ethnographic)	320 cultures comprising ethnographic documents subject-coded at the paragraph-level to facilitate searching.*
eHRAF Archaeology	eHRAF	ehrafarchaeology.yale.edu	General culture (archeological)	102 archaeological traditions comprising archaeological documents subject-coded at the paragraph-level to facilitate searching.*
Database of Religious History	DRH	religiondatabase.org	Religion	397 entries on religious groups or places from 195 experts or RAs, with coded responses to poll questions*
Pulotu: Database of Pacific Religious Beliefs and Practices	Pulotu	pulotu.shh.mpg.de	Religion	116 Austronesian cultures coded for 62 variables on religion, history, society, and the natural environment.
Seshat: Global History Databank	Seshat	seshatdatabank.info	General culture	Coded historical political, economic and religious variables for 30 "natural geographic areas" around the world*
Grambank	Grambank	grambank.clld.org	Grammar	195 structural features coded for over 1400 languages*
Database of Places, language, culture and environment	D-Place	d-place.org	Culture, environment, language	Cultural, linguistic, environmental and geographic information coded for over 1400 human societies.
World Atlas of Language Structures	WALS	wals.info	Language	A large database of structural (phonological, grammatical, lexical) properties of languages gathered from descriptive materials (such as reference grammars)
Natural History of Song Project database	NHSP	osf.io/jmv3q	Music	NHS Ethnography contains 50 variables coded from eHRAF for 60 human cultures. NHS Discography contains 40 variables coded from field recordings from 86 societies.

The Pulotu Database of Pacific Religions (pulotu.econ.mpg.de) and the Seshat Databank (seshatdatabank.info) were recently employed in published studies. One study produced by the Pulotu team (Watts et al. 2015a) drew upon coded data concerning religious beliefs and social complexity in 96 Austronesian cultures to argue that broad supernatural enforcement of moral norms, rather than moralistic high gods *per se*, precede political complexity. Turchin et al. (2018) analyzed coded historical data concerning features such as social scale, economies and governance from Seshat on 414 societies from 30 regions around the world demonstrated that various aspects of social complexity have strong relationships with one another, suggesting that these features tend to co-evolve in disparate societies across time and space. A third database with deep historical depth, the Database of Religious History (DRH; religiondatabase.org), is slowly expanding its coverage, but to date this still remains insufficiently broad or representative for a proper cross-cultural analysis.

Other structured databases with some historical depth, typically on the order of decades, include the World Values Survey (WVS), Eurobaromter, Afrobarometer, the US general social survey and its equivalent in other societies, and broader surveys that include data relevant to psychology, such as the UK Biobank or the Household, Income and Labour Dynamics in Australia (HILDA) Survey. A final useful source of relatively structured historical data is economic or crime statistics. Henrich, for example, has argued that a long-term rise in patience or self-regulations is captured by long-term declines in both murder and interest rates, which can be traced back into the High Middle Ages in some European countries (Henrich, forthcoming).

Large-scale Textual Analysis

Large-scale databases of coded, quantitative data need to become larger, broader and more reliable to be of genuine use to psychologists. Fortunately, psychologists also have access to a variety of tools that allow them to analyze relatively unstructured historical data—the actual texts and artifacts of historical cultures—in a quantitative manner.

One approach to analyzing texts from the past is to rely upon summaries of them in contemporary sources, such as Wikipedia. This is the method adopted by Baumard et al. 2018, who combined human coding and word counts to analyze Wikipedia entries concerning the biographies of saints in Europe from 600 to 1300 CE and novels from 800 to 1600 CE. They found that increases in economic prosperity correlated with higher degrees of asceticism in the accounts of saintly exemplars and an increased mention of romantic love in fictional narratives. This was seen as supporting the authors' hypothesis that increases in material security push human psychology toward "higher" motivational drives, such as self-discipline, emotional attachment and altruism.

Modern summaries of historical texts, however, are likely to be heavily filtered by contemporary psychology. A preferred approach is to analyze historical texts directly, in their original languages. A study by Munson et al. (2014) surveyed a large collection of classical Mayan (250-900 CE) hieroglyphic texts and found that mentions of ritual bloodletting, a dramatic costly display, suggest that the practice spread along social networks and served to signal commitment between allied royal families. Slingerland and Chudek (2011) explored the structure of mind-body dualism in an early Chinese corpus by using teams of human coders to produce data on the conceptions of mind and mind-body relations in these early (pre-221 BCE) texts. The results suggest that the *xin*

("heart"/ "heart-mind" / "mind"), uniquely among all of the bodily organs, was frequently contrasted with the physical body, despite at least nominally being identified with the organ in the human chest. Moreover, although *xin* serves as a generic locus of both emotions and higher cognition in the earliest texts, by the end of the 3rd century BCE it is functioning primarily as the locus of higher cognition: reflecting, planning, choosing, etc. The authors conclude that the pressure of innate folk mind-body dualism is the best explanation for these semantic patterns.
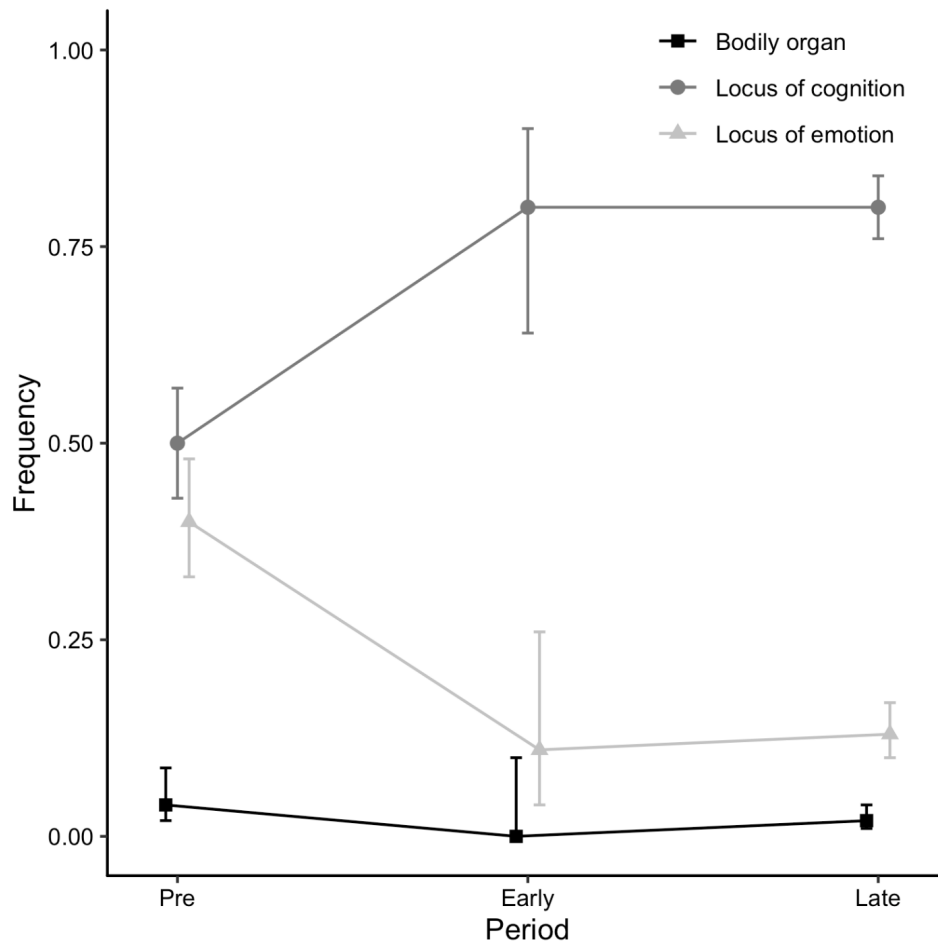

FIGURE 4. FREQUENCY WITH WHICH XIN IS PORTRAYED AS A BODILY ORGAN, GENERIC LOCUS OF EMOTION OR GENERIC LOCUS OF COGNITION BY HISTORICAL PERIOD: PRE-WARRING STATES (PRE-475 BCE), EARLY WARRING STATES (475-C. 350 BCE) AND LATE WARRING STATES (350-221 BCE). AVAILABLE UNDER CC BY 4.0 AT HTTPS://FIGSHARE.COM/S/42A01647BAAD82157B1B

This method of large-scale qualitative coding was borrowed by Clark and Winslett (2011), who pulled passages containing keywords related to high gods from a large, early Chinese corpus and found that they were commonly associated with verbs related to moralistic reward and punishment.

One limitation of these sorts of approaches is the need to employ a team of highly-qualified coders to manually read and code passages, a very time-consuming process. A follow-up study to Slingerland and Chudek (2011) employing a much larger corpus, turned to automated, "distant reading" (Moretti 2013) techniques, such a word-collocation (Bullinaria & Levy 2012), topic modeling (Blei 2012) and hierarchical cluster analysis (Zhao et al. 2005) and replicated the findings of Slingerland and Chudek (2011). They showed that the *xin* has an unusual relationship to body terms, and clusters with other words related to higher cognition, planning and choice. A similarly automated approach to analyzing terms related to supernatural punishment in ancient Chinese texts suggests that supernatural enforcement of morality in early China might be spread among a variety of extra-human agents, including high gods, but also legendary sage-kings and minor deities (Nichols et al. 2020).

A potential concern with using texts to get at thought is that a focus on written statements rather than actual behavior limits one to explicit forms of cognition. Large-scale textual analysis is helpful in this regard. Techniques such as word colocation or word embedding analysis (Pennington et al. 2014) appear to track implicit rather than explicit attitudes, as seen, for instance, in studies of explicit versus implicit attitudes and beliefs about social groups drawn from a study of a massive contemporary textual corpus (Caliskan et al. 2017; Garg et al. 2018). For instance, (Kurdi et al. 2019)) note that, in explicit judgements, warmth and competence are often diametrically opposed: in self-reports, subjects claim to view elderly people as warm but incompetent. Experimental measures of implicit attitude and belief, such as the Implicit Association Test (IAT), instead show that warmth and competence track one another, with people's judgements of valence (likable/warm) corresponding to beliefs about competence, ability or intelligence. Semantic patterns derived from word embedding, they found, matched experimental measures of implicit belief, suggesting that such patterns reflect implicit rather than explicit cognition.

Another advantage of automated text analysis techniques is that many of them have long been used by psychologists to analyze contemporary or near-contemporary discourse (Boyd 2017; Iliev et al. 2016; Tausczik & Pennebaker 2010). These same methods can then be adapted to the analysis of pre-modern or ancient texts with a minimum of expert input and involvement. One example of how a moderate degree of historical depth can be added to an analysis of contemporary discourse is Garg et al. (2018), which drew upon Google Books and the Corpus of Historical American English (COHA; https://www.english-corpora.org/coha/, Davies et al. 2012) to trace changes in implicit gender and ethnic stereotypes in the United States from the early 1900s to the present.

The existence of historical textual corpora from around the world, in a wide variety of languages, makes it possible to greatly extend both the cross-cultural reach and historical depth of such textual analysis studies. In the case of China, the transmitted textual tradition goes back approximately three thousand years; millennia of time-depth can also be achieved by utilizing Latin or Greek corpora. Moreover, most of these corpora are now available in digitized, fully-searchable form, which makes them an easily-accessed and surprisingly underutilized resource for psychologists.

A good example of how deep historical sources can easily be added to studies of contemporary subjects is Thornton et al. (in preparation). The authors noted that the "3D Mind Model," which classifies mental states along three dimensions—rationality (calculation or planning vs. ecstasy or grief), social impact (love or envy vs. exhaustion or stupor) and valence (awe or gratitude vs. sadness or anger) (Tamir et al. 2016)—had been developed by analyzing the discourse of primarily

Northeast North Americans. In order to test the robustness of this model in other populations, they first analyzed a large corpus of English tweets from 57 countries, finding an excellent fit. Since English twitter users, even in countries such as Nigeria or Pakistan, are likely to be influenced by American culture and norms, they then expanded their analysis to Wikipedia entries in 17 other languages. Finally, noting that contemporary cultures influence each other in unpredictable ways, they turned to historical textual corpora: 17th-19th century English and French texts drawn from the Standardized Project Gutenberg Corpus and the corpus of pre-Qin and Han Dynasty (c. 1000 BCE – 200 CE) Chinese texts employed in Slingerland et al. 2017. In all of these latter cases the model held up quite well, especially along the dimensions of rationality and valence, bolstering the case that the 3D Mind Model captures something genuinely universal about how humans organize mental states.

Another important, relatively unstructured resource for accessing the history of cognition are digitized newspaper archives, which sometimes provide considerable historical depth. Recently, Winkler (2020) applied a dictionary of "tightness-looseness" developed by Jackson et. al. (2019), to a corpus of U.S. daily newspapers from around the country going back to 1840. This provides a nearly continuous measure of "tightness-looseness" that varies through time and space. Not surprisingly, the newspaper data show a long-term decline in average tightness as well as a great deal of spatial variation. To benchmark this newspaper measure, Winkler correlated contemporary measures from newspapers with both Harrington and Gelfand's state-level measures of tightness-looseness and an aggregate of the "strength of norms" questions from the Moral Foundations Questionnaire (Graham et al. 2013). Both correlations are roughly 0.4. Then, comparing only the tightness-looseness of newspapers with themselves at different times and across states, Winkler shows that economic downturns cause people to tighten up. Employing an econometric technique called difference-in-differences, he finds that a one percent increase in unemployment results in a rise in tightness of 6% of a standard deviation in normative tightness. Winkler than links these psychological shifts to both greater parochial cooperation and more votes for Donald Trump in 2016, relative to the average for Republicans in these counties.

Theory in Historical Psychology

A society is a cultural complex of interconnected, sometimes codependent norms, values, beliefs, behaviors, and institutions. If we take an exploratory approach looking for correlations in history, there are many to be found (Slingerland et al. revision). Theories built on formal theoretical frameworks help clarify the causal nature of these relationships, patterns we should expect, and how we might test theory against data. Perhaps even more so than in experimental psychology, testing theories are critical for developing psychology as a historical science (Muthukrishna & Henrich 2019).

The large-scale collaborative research project on the origins of prosocial religions that we discussed above provides one such example of how theory can drive data gathering (Norenzayan et al. 2016). Early instantiations of the Big Gods hypothesis proposed that particular features of religion, such as expectations of costly aid for coreligionists, might be explained as an evolutionary adaptation that promotes cooperation rather than simply a cultural by-product of evolve psychology (Norenzayan & Shariff 2008; Shariff & Norenzayan 2007). The idea was linked to the broader literature on the evolution of large-scale cooperation, with the idea that religions with cooperative and pronatalist

prescriptions might sustain larger-scales of cooperation than cooperation based on other mechanisms, such as kinship and/or direct reciprocity (Henrich & Muthukrishna 2020). The theory made several predictions, for example: (1) religion should invoke costly prosocial behaviors in which people would not otherwise engage, (2) the prosocial behaviors should be primarily directed at coreligionists, and (3) the behaviors that the religion encourages and the beliefs that sustain the behaviors will coevolve with the scale of cooperation.

Correlations between religion and prosociality established the plausibility of the hypothesis, but some of the first experimental tests were performed in a WEIRD lab setting, reminding participants of their religious beliefs using a sentence unscrambling task with religious words embedded. These reminders increased giving in a dictator game (Shariff & Norenzayan 2007). Later experiments nuanced these findings by testing with larger, more diverse samples with different populations around the world (Lang et al. 2019b; Purzycki et al. 2016). This project required collaboration between psychologists, anthropologists, historians and religious studies scholars. The claim of coevolution has been tested to different degrees, establishing the relationship between broad supernatural punishment and prosociality in Polynesia (Watts et al. 2015a).

A final, more comprehensive test of the theory required testing it against a large body of deep historical data from around the world. Munson et al. 2014, Slingerland et al. 2017 and Nichols et al. 2020 represent attempts by team members to bring unstructured textual data to bear on the question. The Database of Religious History (DRH) was created in order to provide a large historical dataset on both the beliefs and behaviors of religious groups around the world and through time to provide another test of the theory. These data gathering efforts are still in progress (Slingerland & Sullivan 2017). Other historical databases, such as Seshat, have also recently been employed to test the prosocial religions hypothesis against competing ones (Whitehouse et al. 2019), although there has been some controversy over both data analysis (Beheim et al. 2019) and coding procedures (Slingerland et al. 2019). In any case, this multi-year, interdisciplinary effort gives a sense of how experimental data can be combined with historical data to provide broad and rigorous tests of psychological hypotheses.

History is full of correlations, the vast majority of which are likely spurious. Establishing the causal pathways between historical events and subsequent psychology demands a theory-first approach to reduce the hypothesis-space of plausible relationships, connect to broader theoretical frameworks, and specify more precisely expected and testable relationships (Muthukrishna & Henrich 2019). Schulz, et al. (2019) paper on the origin of WEIRD psychology implicates a package of prescriptions and proscription regarding marriage and the family by the Roman Catholic Church. The data and statistics alone are insufficient to make a compelling case for the importance of this package, however, here to the theory connects to a broader theoretical frameworks - the mechanisms that sustain cooperation and the ways in which they interact with one another. Undermining a lower scale of cooperation can help a higher scale flourish (Muthukrishna 2017). Here too, in the ongoing conversation between theory and evidence in science, the precise pathways between this historical event and the many aspects of psychology it predicts need to be formally established.

SIDE BAR: Historical psychologists require additional tools in their analysis of history. We have discussed some of these tools in the context of the discussed research, but here we briefly summarize. Theories that generate historical hypotheses can sometimes be tested in terms of their downstream consequences--exposure to historical circumstances that have been conserved through path dependence may predict variation between communities. In this case, the standard experimental toolkit is sufficient. In other cases, historical datasets need to be created or merged and then analyzed. This process of creation may require disciplined interpretive historical methods (e.g. Database of Religious History) or combining previously separate datasets (e.g. Ancestral Characteristics Database). Finally, there is the broader question of analyzing these datasets and how causal connections can be drawn when experiments are not an option. The field of causal identification has come a long way in the last few decades. Key to establishing causality (or at least making a strong case for it) is taking advantage of natural experiments that effectively randomly allocate participants to treatments or excluding the possibilities of reverse causality and third variables.

Instrumental variables, difference in difference, and regression discontinuities are just a few examples of statistical approaches that make it possible to argue for causality based on correlational data (Angrist & Pischke 2009; Pearl & Mackenzie 2018; Pearl et al. 2016). Although many of these causal identification techniques are not commonly used or taught within psychology today (perhaps due to the dominance of the laboratory experimental paradigm), they do have a long history within psychology (e.g. Shadish et al. 2001); indeed the regression discontinuity design, for analysis of natural experiments created by a geographic or temporal separation, was first developed by Thistlethwaite and Campbell (1960). Within psychology, a common source of historical temporal regression discontinuities are educational policies with strict inclusion criteria that cleanly separate similar people for arbitrary reasons. For example, date of birth determines schools start dates and can separate those born just days apart (e.g. end of August vs beginning of September) into the youngest and oldest in separate year groups. This particular policy allowed for identifying effects of relative age on ADHD diagnoses (Layton et al. 2018). Similarly, an education policy that increased years of compulsory schooling for Norwegian children allowed for the identification of the effects of education on IQ (Brinch & Galloway 2012).

The Future of Historical Psychology

Interdisciplinary research is always a challenge and it remains an unfortunate fact that psychologists making inherently historical claims typically do not engage substantively with historical scholarship or with colleagues from the humanities. For example, Finkel et al. (2014), have argued that modern American marriage norms are historically unusual in the amount of pressure they place upon couples to serve multiple roles for one another, including a strong and novel emphasis upon the importance of romantic love. The historical evidence for this claim marshalled by the authors is, however, confined to a few sources in the American context, extending back into North American colonial times. Human civilizations around the world have been designing marriage norms for millennia, and at least a cursory survey of broader world history would allow modern American norms to be put into a more complete and arguably more useful context. The work of Baumard et al. (2018), for instance, suggests that an emphasis on the importance of romantic love might be traced back hundreds of years in Western Europe. It is critical for historical psychology to get the history correct. Just as it is useful to reach out to colleagues in neuroscience for an fMRI study or colleagues in genetics for a gene study, trained expertise is useful when delving into historical data. However, as with any interdisciplinary work, there are many challenges.

In an ideal world, historical psychology would involve genuine collaboration between psychologists with historians and other humanities scholars, from the beginnings of hypothesis formation to study design and data gathering methods. However, humanities scholars, for their part, are typically unused to working in research teams, and have very little professional incentive to take part in scientific studies. Attempts to advocate for closer coordination between the humanities and the sciences (Slingerland 2008; Wilson 1998) have typically fallen on deaf ears among humanities scholars. Large-scale database projects that have attempted to rely primarily upon humanistic expertise, such as the Database of Religious History (DRH) project, have experienced serious difficulties in gathering data, and have had to reconfigure their projects to include features or functions appealing to humanities scholars but orthogonal to their original scientific purpose.

When collaboration or consultation with historians is not feasible, and particularly in more circumscribed cases, it may be possible to rely on existing historical data. For instance, economic historians interested in a small set of proxy values have often been able to perform their own archival work, in effect making themselves experts on the slice of the historical record of interest to them (e.g. Blaydes & Chaney 2013; Chaney 2016; Nunn 2009; Nunn & Wantchekon 2011). The advent of reliable, structured databases of historical cultural data will also make it easier for psychologists to incorporate data from past minds into their analyses. Historical textual corpora can similarly be accessed with minimal effort, as long as appropriate attention is given to potential problems of translation when dealing with foreign language texts, especially those written in archaic languages.

Historical archives can provide other unexpected sources of data relevant to contemporary human psychology. For instance, the dataset created by Nunn (2008) combined slave trade shipments with a variety of other archival sources suggesting the ethnic identity of slaves to construct estimates of the total number of slaves taken from different regions of Africa during the slave trade from 1400 to 1900 CE. He found a negative correlation between the intensity of historic slaving activity and current economic development. Nunn and Wantchekon (2011) were then able to combine this work with data from the 2005 Afrobarometer survey to discern a correlation between slave trade activity and levels of trust in contemporary African societies.

In a recent paper, Muthukrishna et al. (2020) develop a cultural distance scale. They find that cultural distance from the United States, which may serve as an indication of relative WEIRDness (a WEIRD scale), predicts other cultural differences, such as individualism, power distance, and indulgence, many of Schwart's Values, cultural tightness, as well as norms such as blood donation, honesty, and corruption and traditional psychological differences, such as mean extraversion, and intrasocietal variation in personality. While these are correlated with cultural distance, the origin of these differences is yet unknown and may lie in the historical differences between these societies.

The roots of modern psychology are to be found not only in the genetic past, but also the cultural past. Historical data also provides an excellent and underutilized source of information about the structure and function of a much broader range of human minds than psychologists typically study. Taking history more seriously is an important part of moving beyond the WEIRD problem and making psychology a genuinely universal science of human cognition and behavior.

Acknowledgments

References

Akbari M, Bahrami-Rad D, Kimbrough EO. 2019. Kinship, fractionalization and corruption. *Journal of Economic Behavior & Organization*. 166:493–528

Alesina A, Giuliano P, Nunn N. 2013. On the Origins of Gender Roles: Womenand the Plough. *The Quarterly Journal of Economics*. 128(May):469–530

Asch SE. 1956. Studies of independence and conformity: I. A minority of one against a unanimous majority. *Psychological Monographs: General and Applied*. 70(9):1–70

Astuti R, Harris P. 2008. Understanding Mortality and the Life of the Ancestors in Rural Madagascar. *Cognitive Sc.: A Multidisciplinary J.* 32(4):713–40

Atran S, Henrich J. 2010. The Evolution of Religion: How Cognitive By-Products, Adaptive Learning Heuristics, Ritual Displays, and Group Competition Generate Deep Commitments to Prosocial Religions. *Biological Theory*. 5(1):18–30

Aveyard ME. 2014. A call to honesty: Extending religious priming of moral behavior to Middle Eastern Muslims. *PLoS One*. 9(7):e99447

Banerjee K, Bloom P. 2015. "Everything Happens for a Reason": Children's Beliefs About Purpose in Life Events. *Child Dev*. 86(2):503–18

Baumard N. 2017. The Psychological Origins of the Industrial Revolution. . 1–58

Baumard N, Chevallier C. 2015. The nature and dynamics of world religions: a life-history approach. *Proceedings of the Royal Society B: Biological Sciences*. 282(1818):20151593

Baumard N, Huillery E, Zabrocki L. 2018. The origins of romantic love and asceticism: How economic prosperity changed human psychology in medieval europe. *Working Paper*

Baumard N, Hyafil A, Morris I, Boyer P. 2015. Increased Affluence Explains the Emergence of Ascetic

Wisdoms and Moralizing Religions. *Current Biology*. 25(1):10–15

Becker A. 2019. On the Economic Origins of Restrictions on Women's Sexuality. *SSRN Electronic

Journal*. 63

Bell AV, Richerson PJ, McElreath R. 2009. Culture rather than genes provides greater scope for the

evolution of large-scale human prosociality. *Proceedings of the National Academy of Sciences

of the United States of America*. 106(42):17671–74

Benenson JF, Abadzi H. 2020. Contest versus scramble competition: sex differences in the quest for

status. *Current Opinion in Psychology*. 33:62–68

Billing J, Sherman PW. 1998. Antimicrobial Functions of Spices: Why Some Like it Hot. *The Quarterly

Review of Biology*. 73(1):3–49

Blaydes L, Chaney E. 2013. The Feudal Revolution and Europe's Rise: Political Divergence of the

Christian West and the Muslim World before 1500 CE. *Am Polit Sci Rev*. 107(1):16–34

Blei DM. 2012. Probabilistic topic models. *Commun. ACM*. 55(4):77

Bloom P. 2004. *Descartes' Baby: How the Science of Child Development Explains What Makes Us

Human*. New York: Basic Books

Bond R, Smith PB. 1996. Culture and conformity: A meta-analysis of studies using Asch's (1952b,

1956) line judgment task. *Psychological Bulletin; Psychological Bulletin*. 119(1):111–37

Botero CA, Gardner B, Kirby KR, Bulbulia J, Gavin MC, Gray RD. 2014. The ecology of religious

beliefs. *Proceedings of the National Academy of Sciences*. 111(47):16784–89

Boyd R. 2018. *A Different Kind of Animal: How Culture Transformed Our Species*. Princeton:

Princeton University Press

Boyd R, Richerson PJ. 1985. *Culture and the Evolutionary Process*. University of Chicago press

Boyd RL. 2017. Psychological text analysis in the digital humanities. In *Data Analytics in Digital

Humanities*, pp. 161–89. Springer

Bullinaria JA, Levy JP. 2012. Extracting semantic representations from word co-occurrence

statistics: stop-lists, stemming, and SVD. *Behav Res*. 44(3):890–907

Buss DM. 1994. *The Evolution of Desire: Strategies of Human Mating*. New York: BasicBooks

Bussey K, Bandura A. 1999. Social cognitive theory of gender development and differentiation.

Psychological Review. 106(4):676–713

Caliskan A, Bryson JJ, Narayanan A. 2017. Semantics derived automatically from language corpora

contain human-like biases. *Science*. 356(6334):183–86

Chaney E. 2016. Religion and the Rise and Fall of Islamic Science. . 41

Chatterjee K, Pavlogiannis A, Adlam B, Nowak M a. 2014. The Time Scale of Evolutionary

Innovation. *PLoS Computational Biology*. 10(9):e1003818

Chua RYJ, Huang KG, Jin M. 2019. Mapping cultural tightness and its links to innovation,

urbanization, and happiness across 31 provinces in China. *Proc Natl Acad Sci USA*.

116(14):6720–25

Chudek M, Muthukrishna M, Henrich J. 2015. Cultural evolution. *The handbook of evolutionary

psychology*

Clark KJ, Winslett JT. 2011. The Evolutionary Psychology of Chinese Religion: Pre-Qin High Gods as

Punishers and Rewarders. *Journal of the American Academy of Religion*. 79(4):928–60

Davies M, Hegedűs I, Fodor A. 2012. The 400 million word corpus of historical American English

(1810–2009). *English Historical Linguistics 2010: Selected Papers from the Sixteenth

International Conference on English Historical Linguistics (ICEHL 16), Pécs, 23-27 August

2010*. 325:231

De Leersnyder J, Mesquita B, Kim HS. 2011. Where Do My Emotions Belong? A Study of Immigrants'

Emotional Acculturation. *Pers Soc Psychol Bull*. 37(4):451–63

Dehaene S, Pegado F, Braga LW, Ventura P, Nunes Filho G, et al. 2010. How learning to read changes

the cortical networks for vision and language. *Science*. 330(6009):1359–64

Derex M, Beugin M-P, Godelle B, Raymond M. 2013. Experimental evidence for the influence of group size on cultural complexity. *Nature*

Derex M, Bonnefon J-F, Boyd R, Mesoudi A. 2019. Causal understanding is not necessary for the improvement of culturally evolving technology. *Nat Hum Behav*. 3(5):446–52

Dinesen PT. 2012. Does Generalized (Dis)Trust Travel? Examining the Impact of Cultural Heritage and Destination-Country Environment on Trust of Immigrants: Does Generalized (Dis)Trust Travel? *Political Psychology*. 33(4):495–511

Dobson JE, Bright EA, Coleman PR, Durfee RC, Worley BA. 2000. LandScan: a global population database for estimating populations at risk. *Photogrammetric engineering and remote sensing*. 66(7):849–57

Duhaime EP. 2015. Is the call to prayer a call to cooperate? A field experiment on the impact of religious salience on prosocial behavior. *Judgment and Decision Making*. 10(6):593–96

Enke B. 2019. Kinship, Cooperation, and the Evolution of Moral Systems. *Q J Econ*. 134(2):953–1019

Evans AM, Krueger JI. 2009. The Psychology (and Economics) of Trust. *Social and Personality Psychology Compass*. 3(6):1003–17

Falk A, Hermle J. 2018. Relationship of gender differences in preferences to economic development and gender equality. *Science*. 362(6412):eaas9899

Fan S, Hansen MEB, Lo Y, Tishkoff SA. 2016. Going global by adapting local: A review of recent human adaptation. *Science*. 354(6308):54–59

Finkel EJ, Hui CM, Carswell KL, Larson GM. 2014. The Suffocation of Marriage: Climbing Mount Maslow Without Enough Oxygen. *Psychological Inquiry*. 25(1):1–41

Francois P, Manning J, Whitehouse H, Brennan R, Currie T, et al. 2016. A macroscope for global history-Seshat global history databank: a methodological overview. *Digital Humanities Quarterly*

Frankenhuis WE, Panchanathan K, Nettle D. 2016. Cognition in harsh and unpredictable

    environments. *Current Opinion in Psychology*. 7:76–80

Garg N, Schiebinger L, Jurafsky D, Zou J. 2018. Word embeddings quantify 100 years of gender and

    ethnic stereotypes. *Proc Natl Acad Sci USA*. 115(16):E3635–44

Gelfand MJ. 2018. *Rule Makers, Rule Breakers: How Tight and Loose Cultures Wire Our World*. New

    York: Scribner. First Scribner hardcover edition ed.

Gelfand MJ, Nishii LH, Raver JL. 2006. On the nature and importance of cultural tightness-looseness.

    The Journal of applied psychology. 91(6):1225–44

Gernet J. 1985. *China and the Christian Impact: A Conflict of Cultures*. Cambridge [Cambridgeshire] ;

    New York : Paris: Cambridge University Press ; Editions de la Maison des sciences de

    l'homme

Giavazzi F, Petkov I, Schiantarelli F. 2014. Culture: Persistence and Evolution

Gibson E, Futrell R, Jara-Ettinger J, Mahowald K, Bergen L, et al. 2017. Color naming across

    languages reflects color use. *Proceedings of the National Academy of Sciences*.

    114(40):10785–90

Giuliano P, Nunn N. 2013. The Transmission of Democracy: From the Village to the Nation-State.

    American Economic Review. 103(3):86–92

Giuliano P, Nunn N. 2018. Ancestral characteristics of modern populations. *Economic History of

    Developing Regions*. 33(1):1–17

Goody J. 1983. *The Development of the Family and Marriage in Europe*. Cambridge; New York:

    Cambridge University Press

Graham J, Haidt J, Koleva S, Motyl M, Iyer R, et al. 2013. Moral Foundations Theory. In *Advances in

    Experimental Social Psychology*, Vol. 47, pp. 55–130. Elsevier

Gurven M, von Rueden C, Massenkoff M, Kaplan H, Lero Vie M. 2013. How Universal Is the Big Five? Testing the five-factor Model of Personality Variation Among Forager–Farmers in the Bolivian Amazon. *Journal of Personality and Social Psychology*. 104(2):354–70

Hadnes M, Schumacher H. 2012. The Gods Are Watching: An Experimental Study of Religion and Traditional Belief in Burkina Faso. *Journal for the Scientific Study of Religion*. 51(4):689–704

Han S, Northoff G, Vogeley K, Wexler BE, Kitayama S, Varnum MEW. 2013. A Cultural Neuroscience Approach to the Biosocial Nature of the Human Brain. *Annual Review of Psychology*. 64(1):335–59

Harrison MA, Hughes SM, Gott AJ. 2019. Sex differences in serial killers. *Evolutionary Behavioral Sciences*

Henrich J. forthcoming. *The WEIRDest People in the World: How the West Became Psychologically Peculiar and Particularly Prosperous*. New York: Farrar, Straus and Giroux

Henrich J. 2004. Demography and cultural evolution: How adaptive cultural processes can produce maladaptive losses - the Tasmanian case. *American Antiquity*. 69(2):197–214

Henrich J. 2009. The evolution of costly displays, cooperation and religioncredibility enhancing displays and their implications for cultural evolution. *Evolution and Human Behavior*. 30(4):244–60

Henrich J. 2016. The secret of our success: How learning from others drove human evolution, domesticated our species, and made us smart

Henrich J, Boyd R. 2008. Division of Labor, Economic Specialization, and the Evolution of Social Stratification. *Current Anthropology*. 49(4):715–24

Henrich J, Boyd R, Bowles S, Camerer C, Fehr E, et al. 2001. In search of Homo economicus: Behavioral experiments in 15 small-scale societies. *American Economic Review*. 91(2):73–84

Henrich J, Boyd R, Derex M, Kline MA, Mesoudi A, et al. 2016. Understanding cumulative cultural

evolution. *Proceedings of the National Academy of Sciences of the United States of America*.

113(44):

Henrich J, Boyd R, Richerson PJ. 2012. The puzzle of monogamous marriage. *Philosophical*

transactions of the Royal Society of London. Series B, Biological sciences. 367(1589):657–69

Henrich J, Ensminger J, McElreath R, Barr A, Barrett C, et al. 2010a. Markets, religion, community

size, and the evolution of fairness and punishment. *Science (New York, N.Y.)*.

327(5972):1480–84

Henrich J, Heine SJ, Norenzayan A. 2010b. The weirdest people in the world? *The Behavioral and*

brain sciences. 33(2–3):61–83; discussion 83-135

Henrich J, Muthukrishna M. 2020. The Origins and Psychology of Human Cooperation. *Annual*

Review of Psychology

Hidalgo CA, Klinger B, Barabási A-L, Hausmann R. 2007. The Product Space Conditions the

Development of Nations. *Science (New York, N.Y.* 317:

Hodge KM. 2008. Descartes' Mistake: How Afterlife Beliefs Challenge the Assumption that Humans

are Intuitive Cartesian Substance Dualists. *J Cogn Cult*. 8(3–4):387–415

Hoehl S, Keupp S, Schleihauf H, McGuigan N, Buttelmann D, Whiten A. 2019. 'Over-imitation': A

review and appraisal of a decade of research. *Developmental Review*. 51:90–108

Hruschka D, Efferson C, Jiang T, Falletta-Cowden A, Sigurdsson S, et al. 2014. Impartial Institutions,

Pathogen Stress and the Expanding Social Network. *Human Nature*. 25(4):567–79

Hruschka DJ, Henrich J. 2013. Economic and evolutionary hypotheses for cross-population variation

in parochialism. *Front. Hum. Neurosci.* 7:

Iliev R, Hoover J, Dehghani M, Axelrod R. 2016. Linguistic positivity in historical texts reflects

dynamic environmental and psychological factors. *Proc Natl Acad Sci USA*. 113(49):E7871–

79

Irons W. 2001. Religion as a hard-to-fake sign of commitment. In *Evolution and the Capacity for Commitment*, pp. 292–309. New York, NY: Russell Sage Foundation

Jablonski NG. 2018. Evolution of Human Skin Color and Vitamin D. In *Vitamin D*, pp. 29–44. Elsevier

Jablonski NG, Chaplin G. 2010. Human skin pigmentation as an adaptation to UV radiation. *Proceedings of the National Academy of Sciences*. 107(Supplement_2):8962–68

Jablonski NG, Chaplin G. 2017. The colours of humanity: the evolution of pigmentation in the human lineage. *Phil. Trans. R. Soc. B*. 372(1724):20160349

Jackson JC, Gelfand M, De S, Fox A. 2019. The loosening of American culture over 200 years is associated with a creativity–order trade-off. *Nature Human Behaviour*

Kaiser T, Del Giudice M, Booth T. 2019. Global sex differences in personality: Replication with an open online dataset. *J Pers*. jopy.12500

Kauffman SA. 2003. *Investigations.* New York: Oxford University Press

Kendal RL, Boogert NJ, Rendell L, Laland KN, Webster M, Jones PL. 2018. Social Learning Strategies: Bridge-Building between Fields. *Trends in Cognitive Sciences*. 22(7):651–65

Kleven H, Landais C, Posch J, Steinhauer A, Zweimüller J. 2019. Child Penalties Across Countries: Evidence and Explanations. *NBER Working Paper*. 20

Kline M a, Boyd R. 2010. Population size predicts technological complexity in Oceania. *Proceedings. Biological sciences / The Royal Society*. 277(1693):2559–64

Kurdi B, Mann TC, Charlesworth TES, Banaji MR. 2019. The relationship between implicit intergroup attitudes and beliefs. *Proc Natl Acad Sci USA*. 116(13):5862–71

Kwiatkowski DP. 2005. How Malaria Has Affected the Human Genome and What Human Genetics Can Teach Us about Malaria. *The American Journal of Human Genetics*. 77(2):171–92

Lang M, Purzycki BG, Apicella CL, Atkinson QD, Bolyanatz A, et al. 2019a. Moralizing gods, impartiality and religious parochialism across 15 societies. *Proceedings of the Royal Society B: Biological Sciences*. 286(1898):20190202

Lang M, Purzycki BG, Apicella CL, Atkinson QD, Bolyanatz A, et al. 2019b. Moralizing gods,

impartiality and religious parochialism across 15 societies. *Proceedings of the Royal Society

B: Biological Sciences*. 286(1898):20190202

Lewis MP. 2009. *Ethnologue: Languages of the World*, Vol. 16. Dallas, TX: SIL International

Lippa RA. 2010. Gender Differences in Personality and Interests: When, Where, and Why?: Gender

Differences in Personality and Interests. *Social and Personality Psychology Compass*.

4(11):1098–1110

Lukaszewski AW, Gurven M, von Rueden CR, Schmitt DP. 2017. What Explains Personality

Covariation? A Test of the Socioecological Complexity Hypothesis. *Social Psychological and

Personality Science*. 8(8):943–52

Mac Giolla E, Kajonius PJ. 2018. Sex differences in personality are larger in gender equal countries:

Replicating and extending a surprising finding: SEX DIFFERENCES IN GENDER EQUAL

COUNTRIES. *International Journal of Psychology*

Martin L. 2014. Introduction to the Issue. *jch*. 1(1):10–13

Matthews LJ, Edmonds J, Wildman WJ, Nunn CL. 2013. Cultural inheritance or cultural diffusion of

religious violence? A quantitative case study of the Radical Reformation. *Religion, Brain &

Behavior*. 3(1):3–15

McCrae RR, Terracciano A. 2005. Personality profiles of cultures: aggregate personality traits.

Journal of personality and social psychology. 89(3):407–25

McNamara RA, Henrich J. 2018. Jesus vs. the ancestors: how specific religious beliefs shape

prosociality on Yasawa Island, Fiji. *Religion, Brain & Behavior*. 8(2):185–204

McNeil WH. 1991. *The Rise of the West: A History of the Human Community*. Chicago: University of

Chicago Press

Mesoudi A, Magid K, Hussain D. 2016. How do people become W.E.I.R.D.? Migration reveals the

cultural transmission mechanisms underlying variation in psychological processes. *PLoS*

ONE. 11(1):1–17

Mitterauer M, Chapple G. 2010. *Why Europe? The Medieval Origins of Its Special Path*. Chicago:

University of Chicago Press

Moretti F. 2013. *Distant Reading*. London ; New York: Verso

Munson J, Amati V, Collard M, Macri MJ. 2014. Classic Maya Bloodletting and the Cultural Evolution

of Religious Rituals: Quantifying Patterns of Variation in Hieroglyphic Texts. *PLoS ONE*.

9(9):e107982

Muthukrishna M. 2017. Corruption, Cooperation, and the Evolution of Prosocial Institutions. *SSRN*

Journal

Muthukrishna M, Bell A, Henrich J, Curtin C, Gedranovich A, et al. 2020. Beyond WEIRD Psychology:

Measuring and Mapping Scales of Cultural and Psychological Distance. *Psychological Science*

Muthukrishna M, Francois P, Pourahmadi S, Henrich J. 2017. Corrupting cooperation and how anti-

corruption strategies may backfire. *Nature Human Behaviour*. 1(7):0138

Muthukrishna M, Henrich J. 2016. Innovation in the collective brain. *Philosophical transactions of*

the Royal Society of London. Series B, Biological sciences. 371(1690):137–48

Muthukrishna M, Henrich J. 2019. A problem in theory. *Nature Human Behaviour*. 9

Muthukrishna M, Schaller M. 2019. Are collectivistic cultures more prone to rapid transformation?

Computational models of cross-cultural differences, social network structure, dynamic

social influence, and cultural change. *Personality and Social Psychology Review*

Muthukrishna M, Shulman BW, Vasilescu V, Henrich J. 2013. Sociality influences cultural

complexity. *Proceedings of the Royal Society B: Biological Sciences*. 281(1774):20132511–

20132511

Nettle D. 2010. Dying young and living fast: variation in life history across English neighborhoods. *Behavioral Ecology*. 21(2):387–95

Nichols R, Nielbo K, Kirby P, Logan C, Slingerland E. 2020. Supernatural agents and prosociality in historical China. *Religion, Brain and Behavior*

Nisbett RE. 2003. *The Geography of Thought: How Asians and Westerners Think Differently...and Why*. New York: The Free Press

Norenzayan A, Shariff AF. 2008. The origin and evolution of religious prosociality. *Science (New York, N.Y.)*. 322(5898):58–62

Norenzayan A, Shariff AF, Gervais WM, Willard AK, McNamara RA, et al. 2016. The cultural evolution of prosocial religions. *Behavioral and Brain Sciences*. 39:1–86

Norris P, Inglehart RF. 2012. Muslim Integration into Western Cultures: Between Origins and Destinations. *Political Studies*. 60(2):228–51

Nunn N. 2008. The Long-Term Effects of Africa's Slave Trades [*]. *Quarterly Journal of Economics*. 123(1):139–76

Nunn N. 2009. The Importance of History for Economic Development. *Annual Review of Economics*. 1(1):65–92

Nunn N, Wantchekon L. 2011. The slave trade and the origins of Mistrust in Africa. *American Economic Review*. 101(7):3221–52

Obschonka M, Stuetzer M, Rentfrow PJ, Shaw-Taylor L, Satchell M, et al. 2018. In the shadow of coal: How large-scale industries contributed to present-day regional differences in personality and well-being. *Journal of Personality and Social Psychology*. 115(5):903–27

Orians GH. 1969. On the Evolution of Mating Systems in Birds and Mammals. *The American Naturalist*. 103(934):589–603

Page SE. 2006. Path Dependence. *QJPS*. 1(1):87–115

Pennington J, Socher R, Manning C. 2014. Glove: Global Vectors for Word Representation. *Proceedings of the 2014 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, pp. 1532–43. Doha, Qatar: Association for Computational Linguistics

Pitchford NJ, Mullen KT. 2002. Is the acquisition of basic-colour terms in young children constrained? *Perception*. 31(11):1349–70

Polity I. 2011. Polity IV project: Political regime characteristics and transitions, 1800–2010. *Polity IV*

Powell A, Shennan S, Thomas MG. 2009. Late Pleistocene demography and the appearance of modern human behavior. *Science (New York, N.Y.)*. 324(5932):1298–1301

Purzycki BG, Apicella CL, Atkinson QD, Cohen E, McNamara RA, et al. 2016. Moralistic gods, supernatural punishment and the expansion of human sociality. *Nature*. 530(7590):327–30

Purzycki BG, Henrich J, Norenzayan A. 2018a. Special Issue: The Evolution of Religion and Morality Project. *Religion, Brain & Behavior*. 8:

Purzycki BG, Ross CT, Apicella C, Atkinson QD, Cohen E, et al. 2018b. Material security, life history, and moralistic religions: A cross-cultural examination. *PLOS ONE*. 13(3):e0193856

Rand DG, Dreber A, Haque OS, Kane RJ, Nowak M a., Coakley S. 2014. Religious motivations for cooperation: An experimental investigation using explicit primes. *Religion, Brain & Behavior*. 4(1):31–48

Richardson SS, Reiches MW, Bruch J, Boulicault M, Noll NE, Shattuck-Heidorn H. 2020. Is There a Gender-Equality Paradox in Science, Technology, Engineering, and Math (STEM)? Commentary on the Study by Stoet and Geary (2018). *Psychol Sci*. 095679761987276

Richerson P, Baldini R, Bell AV, Demps K, Frost K, et al. 2016. Cultural group selection plays an essential role in explaining human cooperation: A sketch of the evidence. *Behavioral and Brain Sciences*. 39(May):e30

Rockmore DN, Fang C, Foti NJ, Ginsburg T, Krakauer DC. 2018. The cultural evolution of national

    constitutions. *Journal of the Association for Information Science and Technology*. 69(3):483–

    94

Rozenblit L, Keil F. 2002. The misunderstood limits of folk science: an illusion of explanatory depth.

    Cognitive Science. 26(5):521–62

Santos HC, Varnum MEW, Grossmann I. 2017. Global increases in individualism. *Psychological

    Science*. 1–12

Schmitt DP. 2015. The Evolution of Culturally-Variable Sex Differences: Men and Women Are Not

    Always Different, but When They Are…It Appears Not to Result from Patriarchy or Sex Role

    Socialization. In *The Evolution of Sexuality*, eds. TK Shackelford, RD Hansen, pp. 221–56.

    Cham: Springer International Publishing

Schulz JF, Bahrami-Rad D, Beauchamp JP, Henrich J. 2019. The Church, intensive kinship, and global

    psychological variation. *Science*. 366(6466):eaau5141

Schwartz S. 2006. A Theory of Cultural Value Orientations: Explication and Applications. *Comp

    Sociol*. 5(2–3):137–82

Shariff AF, Norenzayan A. 2007. God is watching you: priming God concepts increases prosocial

    behavior in an anonymous economic game. *Psychological science : a journal of the American

    Psychological Society / APS*. 18(9):803–9

Shariff AF, Willard AK, Andersen T, Norenzayan A. 2016. Religious priming: A meta-analysis with a

    focus on prosociality. *Personality and Social Psychology Review*. 20(1):27–48

Sheehy-Skeffington J, Thomsen L. 2020. Egalitarianism: psychological and socio-ecological

    foundations. *Current Opinion in Psychology*. 32:146–52

Sinding Bentzen J, Hariri JG, Robinson JA. 2019. Power and Persistence: The Indigenous Roots of

    Representative Democracy. *The Economic Journal*. 129(618):678–714

Slingerland E. 2014. Toward a Second Wave of Consilience in the Cognitive Scientific Study of

Religion. *jch*. 1(1):121–30

Slingerland E. 2015. *Big Gods* , historical explanation, and the value of integrating the history of

religion into the broader academy. *Religion*. 45(4):585–602

Slingerland E, Atkinson QD, Ember CR, Sheehan O, Muthukrishna M, et al. revision. Coding Culture:

Challenges and Recommendations for Comparative Cultural Databases. *Evolutionary Human

Sciences*

Slingerland E, Chudek M. 2011. The Prevalence of Mind-Body Dualism in Early China. *Cognitive

Science*. 35(5):997–1007

Slingerland E, Sullivan B. 2017. Durkheim with Data: The Database of Religious History. *Journal of

the American Academy of Religion*. 85:

Slingerland EG. 2008. *What Science Offers the Humanities: Integrating Body and Culture*. Cambridge ;

New York: Cambridge University Press

Sloman SA, Fernbach P. 2017. *The Knowledge Illusion: Why We Never Think Alone*. New York:

Riverhead Books

Smaldino PE, Lukaszewski A, von Rueden C, Gurven M. 2019. Niche diversity can explain cross-

cultural differences in personality structure. *Nat Hum Behav*

Sosis R, Bressler ER. 2003. Cooperation and Commune Longevity: A Test of the Costly Signaling

Theory of Religion. *Cross-Cultural Research*. 37(2):211–39

Stoet G, Geary DC. 2018. The Gender-Equality Paradox in Science, Technology, Engineering, and

Mathematics Education. *Psychological Science*. 095679761774171

Talhelm T, Zhang X, Oishi S, Shimin C, Duan D, et al. 2014. Large-scale psychological differences

within China explained by rice versus wheat agriculture. *Science (New York, N.Y.)*.

344(6184):603–8

Tamir DI, Thornton MA, Contreras JM, Mitchell JP. 2016. Neural evidence that three dimensions organize mental state representation: Rationality, social impact, and valence. *Proc Natl Acad Sci USA*. 113(1):194–99

Tausczik YR, Pennebaker JW. 2010. The Psychological Meaning of Words: LIWC and Computerized Text Analysis Methods. *Journal of Language and Social Psychology*. 29(1):24–54

Tewksbury JJ, Nabhan GP. 2001. Directed deterrence by capsaicin in chillies. *Nature*. 412(6845):403–4

Thomson R, Yuki M, Talhelm T, Schug J, Kito M, et al. 2018. Relational mobility predicts social behaviors in 39 countries and is tied to historical farming and threat. *Proceedings of the National Academy of Sciences*. 115(29):7521–26

Trivers R. 1972. *Parental Investment and Sexual Selection*, Vol. 136. Biological Laboratories, Harvard University Cambridge, MA

Turchin P, Currie TE, Whitehouse H, François P, Feeney K, et al. 2018. Quantitative historical analysis uncovers a single dimension of complexity that structures global variation in human social organization. *Proc Natl Acad Sci USA*. 115(2):E144–51

Verner J, Willson MF. 1966. The Influence of Habitats on Mating Systems of North American Passerine Birds. *Ecology*. 47(1):143–47

Watts J, Greenhill SJ, Atkinson QD, Currie TE, Bulbulia J, Gray RD. 2015a. 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

Watts J, Sheehan O, Greenhill SJ, Gomes-Ng S, Atkinson QD, et al. 2015b. Pulotu: Database of Austronesian supernatural beliefs and practices. *PLoS ONE*. 10(9):1–17

White CJM, Kelly JM, Shariff AF, Norenzayan A. 2019. Supernatural norm enforcement: Thinking about karma and God reduces selfishness among believers. *Journal of Experimental Social Psychology*

Wierzbicka A. 2006. On Folk Conceptions of Mind, Agency and Morality. *J Cogn Cult*. 6(1–2):165–79

Wilson EO. 1998. *Consilience: The Unity of Knowledge*. New York: Knopf : Distributed by Random
House. 1st ed ed.

Winkler M. 2020. Shocks, Norms and Cooperation. *Working Paper*

Wood W, Eagly AH. 2012. Biosocial Construction of Sex Differences and Similarities in Behavior. In
Advances in Experimental Social Psychology, Vol. 46, pp. 55–123. Elsevier

Wright R. 2009. *The Evolution of God*. Boston: Little, Brown and Company

Xiang C. 2010. "心为主"隐喻的认知分析 (The "Heart as Ruler" Metaphor: A Cognitive Account.
Yuyan Jiaoxue yu Yanjiu 语言教学与研究. 1:80–87

Xygalatas D. 2013. Effects of religious setting on cooperative behavior: a case study from Mauritius.
Religion, Brain & Behavior. 3(2):91–102

Xygalatas D, Mitkidis P, Fischer R, Reddish P, Skewes J, et al. 2013. Extreme Rituals Promote
Prosociality. *Psychol Sci*. 24(8):1602–5

Yi X, Liang Y, Huerta-Sanchez E, Jin X, Cuo ZXP, et al. 2010. Sequencing of 50 human exomes reveals
adaptation to high altitude. *Science (New York, N.Y.)*. 329(5987):75–78

Yilmaz O, Bahçekapili HG. 2016. Supernatural and secular monitors promote human cooperation
only if they remind of punishment. *Evolution and Human Behavior*. 37(1):79–84

Yu N. 2007. Heart and Cognition in Ancient Chinese Philosophy. *J Cogn Cult*. 7(1–2):27–47

Zhao Y, Karypis G, Fayyad U. 2005. Hierarchical Clustering Algorithms for Document Datasets. *Data
Min Knowl Disc*. 10(2):141–68