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ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

Cultural Change: The How and the Why

Perspectives on Psychological Science
1–17

DOI: 10.1177/1745691617699971
www.psychologicalscience.org/PPS
SAGE

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Abstract
More than half a century of cross-cultural research has demonstrated group-level differences in psychological and behavioral phenomena, from values to attention to neural responses. However, cultures are not static, with several specific changes documented for cultural products, practices, and values. How and why do societies change? Here we juxtapose theory and insights from cultural evolution and social ecology. Evolutionary approaches enable an understanding of the *how* of cultural change, suggesting transmission mechanisms by which the contents of culture may change. Ecological approaches provide insights into the *why* of cultural change: They identify specific environmental pressures, which evoke shifts in psychology and thereby enable greater precision in predictions of specific cultural changes based on changes in ecological conditions. Complementary insights from the ecological and cultural evolutionary approaches can jointly clarify the process by which cultures change. We end by discussing the relevance of cultural change research for the contemporary societal shifts and by highlighting several critical challenges and future directions for the emerging field of cross-temporal research on culture and psychology.

Keywords
cultural change, cultural evolution, cultural transmission, culture/diversity, evoked responses, evolutionary psychology, environment, behavioral ecology, history, language/communication, scientific methodology

Britain leaves the European Union. Donald Trump is elected U.S. President. Hungary, Poland, Turkey (and arguably the United States) move toward highly conservative and, in some cases, semiauthoritarian systems of government, a trend political scientists and commentators identify as a shift to illiberal democracies (O'Neil, 2015; Zakaria, 1997). In other societies where political norms had been shifting in a more democratic direction, the pendulum appears to swing back toward political repression. Clearly, human cultures are not static. Not only do political attitudes and norms change, but societies develop new technologies, many of which dramatically influence how people work and live (i.e., the automobile, the television, the internet). Social norms and attitudes can shift in a matter of decades or years (e.g., attitudes toward gay marriage in Western societies, views on immigration in developed countries, and more broadly norms regarding corporal punishment of children). Institutions and political and economic systems may change fairly quickly as well: Consider the end of Apartheid in South Africa, the collapse of the Communist regimes in Eastern Europe, the rise of ISIS in the Middle East, or the ongoing shift toward illiberal democracies in many countries.

Why do such changes occur? In the past, the study of cultural change has been mostly the domain of historians and political scientists with shifts viewed as relatively idiosyncratic or loosely linked with other social trends. However, recent theoretical and methodological advances have led to the emergence of more systematic and rigorous approaches in psychology to understanding cultural change.

To study cultural change, psychologists have employed a range of approaches. Until now, however, these approaches have not been compared against each other, and few attempts have been made to integrate the diverse methodologies and theoretical viewpoints underpinning various bodies of research on cultural change. Descriptive research on cultural change has a history dating back to the 1970s (Veroff, Douvan, & Kulka, 1981). Scholars have documented cultural changes as a broad range of psychological and behavioral patterns (e.g., Bond & Smith, 1996; Flynn, 1987; Inglehart & Baker, 2000). More recently,

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scholars have started to test ideas about how and why cultures may change, building on theories of cultural evolution and social ecology. We consider these approaches to studying cultural change, outlining several connections between them that generate novel insights into the process of cultural change. Subsequently, we highlight central questions and challenges for the future directions in the emerging field of cultural change research.

Key Concepts for Research on Cultural Change: Culture, Time, Ecology, and Cultural Evolution

Before we begin our review of the literature on cultural change, it is important to reflect on several key concepts often used when discussing this topic. First, it appears necessary to provide a working definition of culture. Though there are myriad definitions of culture (e.g., Bruner, 1990; D'Andrade, 1984; Dimaggio, 1997; Grossmann & Na, 2014; Shweder, 1991), we believe most share certain commonalities including an emphasis on shared knowledge and practices. For our purposes, we define culture as a set of ideas, beliefs, norms, and behaviors shared by or common to a group inhabiting a geographic location (see Table 1).

Human societies vary in a range of psychological and behavioral tendencies. Scholars have observed cross-cultural variations in processes ranging from visual illusions to reasoning about the causes of others behavior (Henrich, Heine, & Norenzayan, 2010). Further, a growing body of research has shown such differences exist not only in downstream behavior and self-report but also in neural responses (Han et al., 2013; Kitayama & Uskul, 2011). Thus, any understanding of the mind that does not take culture into account is almost certain to be incomplete (Henrich et al., 2010; Markus & Kitayama, 1991; Nisbett, Peng, Choi, & Norenzayan, 2001; Wang, 2016).

Second, it is important to consider the concept of time in such research. Time is an abstract concept and often functions as a proxy for other processes. To understand this claim, consider several metaphors. On an individual time scale, factors such as "age" can reflect biological maturation, sociological shifts, adjustment of psychological functioning, or a combination of these factors (Wohlwill, 1970). Void of such processes, the notion of "aging" appears to be meaningless. Similarly, change at the level of an organization can reflect a change in the organization's revenues, shifts in organizational structure, or the process through which certain outputs have been achieved (Pettigrew, Woodman, & Cameron, 2001).

Though macrocultural processes are not identical to those found on the level of an individual (Na et al., 2010) or a small group (Pettigrew et al., 2001), the notion of change on the cultural scale likely also concerns a multitude of factors, including evolution of ideas, refinement of practices, reactions to shifts in social-ecological affordances, and so on. As we discuss below, unpacking temporal changes in culture requires a rigorous evaluation of theoretical and empirical links between shifts in particular cultural psychological variables and shifts in theorized ecological and evolutionary factors believed to underpin these changes.

It is also noteworthy that different approaches to cultural change tend to focus on changes occurring at somewhat different time scales (see Table 1). Cultural evolutionary approaches tend to focus on millennia-long time scales in theoretical work as well as on micro-time scales in experiments. Ecological approaches to cultural change have so far covered periods ranging from several decades to a few centuries (for a detailed discussion of the study of

Table 1. Key Terms Defined

Term	Definition
Culture	A shared set of ideas, norms, and behaviors common to a group of people inhabiting a geographic location.
Cultural change	Changes in ideas, norms, and behaviors of a group of people (or changes in the contents or themes of their products reflecting such changes), over time, typically on the scale of decades or centuries.
Cultural evolution	An approach to the study of cultural change emphasizing the role of evolutionary processes in the development (both regarding a capacity for culture and specific cultural contents) and transmission of culture.
Ecological approach	An approach to understanding the causes of specific variations in culture across human societies, as well as changes in culture over time within societies This approach emphasizes evolved responses to particular ecological pressures or cues.
Ecological dimensions	Basic features of the physical and social environment that cue adaptive psychological and or behavioral responses. These features are mostly derived from behavioral ecology but may also be considered to include certain intermediate features of human societies such as modes of subsistence (see Table 2).

cultural change at different time scales, see Kashima, 2014). Due to the pragmatic considerations of compiling an evidence-based review, in the present piece we are focusing on this latter time scale, given that the relevant data at this level of granularity are most readily available.

The First Wave of Cross-Temporal Research: Mapping Out Changes in Culture

In the last few decades, psychologists, anthropologists, and sociologists have begun to describe cross-temporal variability in a wide range of psychological tendencies, behaviors, practices, and products. Some of these investigations concerned shifts in dominant social orientations toward individualism and collectivism. Other studies have examined related psychological factors such as conformity, self-esteem, and narcissism. Moreover, there is research on shifts in intelligence, social capital, and gender inequality.

Individualism and collectivism

A substantial amount of initial descriptive work on cultural change has also examined the concept of individualism-collectivism. Individualism-collectivism can mean many things (e.g., Greenfield, Keller, Fuligni, & Maynard, 2003; Kağıtçıbaşı, 1997; Kashima et al., 1995; Triandis, 1995, 1996). Here we specifically refer to an orientation in which people view the self as autonomous and bounded and prioritize individual goals and uniqueness (e.g., Keller, 2012). We refer to collectivism as an orientation in which people view the self as interconnected with close others and prioritize relationships and fitting in (Markus & Kitayama, 1991; Varnum, Grossmann, Kitayama, & Nisbett, 2010). At the group level (as compared to the individual level), these dimensions are often used as opposite poles of the same dimension (e.g., Na et al., 2010), though there is also some evidence that these dimensions can coexist on a macrolevel as well (e.g., Tamis-LeMonda et al., 2008).

An early study in this line of research was a project conducted by Veroff et al. (1981). The authors analyzed nationwide mental health surveys between 1950 and 1970 and found substantial reductions in traditional (e.g., being married or not) and communal norms and an increase in the values related to self-expression, self-direction, and intimacy. Following this seminal work, more recent studies documented an increase in the importance of self-expression and greater emphasis on independence in many societies around the world (Inglehart & Baker, 2000; Santos, Varnum, & Grossmann, in press). Cultural change in individualism and collectivism has also been studied by examining shifts in products and practices (cf. Morling & Lamoreaux, 2008). Researchers have observed a decrease in the frequency of giving children popular names in the United States and Japan (Grossmann & Varnum, 2015; Ogihara et al., 2015; Twenge, Abebe, & Campbell, 2010), decreases in rates of intergenerational living arrangements,[1] and increases in divorce rates in the United States from the 1860s to the 2010s (Grossmann & Varnum, 2015), all of which indicate rising levels of individualism. Similarly, the last two centuries have seen an increase in the use of language reflecting an individualist orientation in the body of books published in the United States (Greenfield, 2013; Grossmann & Varnum, 2015; Twenge et al., 2012, 2013), the United Kingdom (Greenfield, 2013), and China (Hamamura & Xu, 2015; Zeng & Greenfield, 2015).

It is also worth noting that in some societies, such as Japan, rising individualism has also coincided with increases in collectivism (Hamamura & Xu, 2015). This may seem puzzling at first, as individualism would seem to be linked to less collectivism. However, individualism-collectivism may best be conceptualized as a multifaceted construct (e.g., Vignoles et al., 2016), such that some aspects of individualism and collectivism may be orthogonal to each other. It may be the case that in a given culture one may observe increases in some aspects of individualism (i.e., self-expression) while observing a simultaneous increase in psychological tendencies reflective of collectivism (i.e., external locus of control; Twenge, Zhang, & Im, 2004). A fuller appreciation of these diverging trends in individualism and collectivism can benefit from a simultaneous examination of the relevant social-ecological factors. For instance, social-ecological pressures to perform well due to greater levels of competition and lower prospects of finding a job may both promote greater self-focus/individualism and simultaneously increase students' dependence on the resources in their social network. We will return to the role played by ecological forces in cultural change in the following sections.

Conformity, self-esteem, and narcissism

An early meta-analysis conducted by Bond and Smith (1996) has revealed that levels of conformity in experimental settings have declined from the 1950s to the 1990s. Another cross-temporal meta-analysis found a decrease in U.S. children's self-esteem from 1965 to 1979 and an increase from 1980 to 1993 (Twenge & Campbell, 2001). Moreover, researchers have observed an increase in narcissism among U.S. American college students from the 1950s to the 1990s (Roberts & Helson,

1997; Twenge & Foster, 2008; Twenge, Konrath, Foster, Keith Campbell, & Bushman, 2008), as well as increases in illusory superiority among U.S. American college students from the 1960s to the 2000s (Twenge, Campbell, & Gentile, 2012a).

Intelligence

Cultural changes are not confined to social psychological and personality processes. In fact, some countries have seen a striking increase in fluid and crystallized intelligence on standardized test scores from the 1930s until the end of the 20th century. This phenomenon, known as the Flynn Effect (Flynn, 1987; also see Thorndike, 1975), is well documented and has been confirmed by several meta-analyses (e.g., Pietschnig & Voracek, 2015; Raven, 2000; Trahan, Stuebing, Fletcher, & Hiscock, 2014). It is also worth noting that increases in other types of abilities have also been observed over the past century, especially in the domain of athletic performance (Kaufman, 2013).

Social capital

Another area in which cultural change has been documented is in levels of social capital. In seminal work, Putnam (1995, 2000) has found declines in the United States from the 1950s to the 2000s in a host of variables that fall under the broad umbrella of social capital. These variables include declining membership in voluntary civic organizations (such as bowling leagues, adult fraternal orders, the red cross, the boy scouts), lower levels of voter turnout, and declining trust in government. Putnam hypothesizes a number of possible causes for declining social capital, including increased geographic mobility, increased female participation in the workforce, changes in family structure, and a shift toward more individual and solitary forms of entertainment (i.e., watching movies at home, playing video games, or in more recent times, consuming entertainment online).

Gender inequality

Finally, various scholars in the social sciences and humanities have discussed dramatic cultural shifts toward lower gender inequality in many societies. In most societies, women did not have the right to vote before the 20th century. In the United States, women could not serve on juries in many jurisdictions until well into the 20th century (McDonald, 2011). In the United Kingdom, until the latter part of the 19th century, husbands had control over most of their wives' property (including children) and women had no right to vote until 1923 (Anthony & Kanu, 2012). These shifts are reflected not only in changes in the legal rights afforded to women but also in attitudes and cultural products. For example, large-scale survey data show that there has been a marked increase in support for gender equality from the 1960s to the 2000s in the United States (Thornton & Young-DeMarco, 2001). Similarly, meta-analysis data on the Attitudes Towards Women Scale gathered from American college students show increased support for feminist ideas among both women and men from the 1970s to the mid-1990s (Twenge, 1997). Further, from the 1960s to the 2000s, the proportion of female to male pronouns in American books increased as well (Twenge, Campbell, & Gentile, 2012b). Rising support for gender equality has been found not only in the United States but also in other countries (e.g., Varnum & Grossmann, 2016), suggesting it may be a global phenomenon (Inglehart & Welzel, 2005).

Distinct Approaches to Cultural Change Research?

The descriptive research has provided valuable evidence that cultural changes have occurred. However, such mapping does not explain *why* changes occur. Nor do examples of cultural change have any predictive power to forecast the direction and magnitude of future cultural changes. To do so requires theoretical frameworks grounded in an understanding of how cultures evolve and which ecological pressures may cause change to occur. In other words, one needs to understand the *how* and the *why* of cultural change, which we examine next.

The how: The cultural evolutionary approach

Many researchers who adopt an evolutionary framework have focused on understanding the mechanisms through which cultural change, writ large, may occur. Much research on cultural evolution takes as its starting point the notion that the development of cultural contents may be analogous to the biological evolution, with reproduction occurring through the transmission of information rather than genes (Campbell, 1965; Dawkins, 1976).

It is worth noting that memetic accounts of cultural evolution have been widely criticized, with some questioning the notion of memes as discrete replicators and the importance of high-fidelity transmission in cultural evolution (i.e. Boyd & Richerson, 1988; Sperber, 1998). Further, other theories, such as dual inheritance theory (Boyd & Richerson, 1988), give more emphasis to interactions between cultural and biological evolutionary processes. In another vein, Sperber's (1998) epidemiological approach to cultural evolution emphasizes the importance of understanding cognitive processes. Furthermore, it highlights the role of human-made changes to and interaction with the physical environment in the spread

of ideas. Despite such disagreements, the general idea that evolutionary principles can help us to understand cultural change is at the core of research in cultural evolution.

Frameworks from cultural evolution yield insights into information transmission processes that enable cultural change. Human transmission of information is often biased. Consider the classic study by Bartlett (1932) on "serial reproduction" of short stories. Participants were presented with an unfamiliar story and were asked to recall the story and repeat it to another participant. When looking at the quality of reproduction, Bartlett famously observed a set of systematic distortion biases, including assimilation with culturally typical expectations and norms, leveling of the story by omitting information seen as not essential, and sharpening of the story by changing the order of the study in line with culture-typical expectations. Since this seminal work, theoretical and empirical work on cultural evolution has demonstrated a set of broad biases contributing to cultural evolution via information transmission, including conformity bias (the tendency to copy others or adopt their ideas if such behaviors or ideas are widely spread), the prestige bias (the tendency to copy others or adopt their ideas if those others are high in status) (Boyd & Richerson, 1988), self-similarity bias (the tendency to copy others who share one's characteristics or group memberships) (Chudek, Muthukrishna, & Henrich, 2015), and innovation (i.e., creation of new ideas, tools, or behaviors, which are then selectively copied by others (Henrich, 2001). Cultural evolution may also occur via other routes, including group-level mechanisms such as cultural group selection (Richerson et al., 2016).

The cultural evolutionary perspective has also shed light on what kinds of information may be more versus less likely to be remembered and transmitted (for an extensive review, see Conway & Schaller, 2007). What features of information enable its successful transmission? One such feature is the extent to which information has a bearing on one's survival. Threat-relevant trait information is easier to communicate (Schaller, Faulkner, Park, Neuberg, & Kenrick, 2004), and urban legends that evoke disgust are more likely to be communicated than others (Heath, Bell, & Sternberg, 2001). Information that is relevant for child-rearing also appears to enjoy a particular bias. For example, the so-called Mozart effect, the discredited notion that playing Mozart to children enhances their intelligence, received an inordinate amount of media attention compared to other scientific notions, and mentions of the effect appear linked to times of heightened societal concern regarding child development (Bangerter & Heath, 2004).

Another feature that makes information more likely to be successfully transmitted is if it is minimally counterintuitive. Minimally counterintuitive stories (those containing two to three ontological violations) have been shown to enjoy better recall and high rates of transmission than those that contain no ontological violations or that include too many (Norenzayan, Atran, Faulkner, & Schaller, 2006). Why might this be? It turns out that information that stands out, by for example contradicting our stereotypes or lay theories of physics, tends to grab our attention and is better recalled, but so too is information that fits with our preexisting schemas (Conway & Schaller, 2007). Thus, such stories may be especially memorable as they take advantage of both of these biases. However, it is worth noting that when narratives contain both schema-consistent and -inconsistent information that is contradictory (i.e., both stereotype-consistent and -inconsistent information about individuals), although the schema-inconsistent information is initially more likely to be successfully transmitted, further in the chain of transmission the pattern shifts such that schema-consistent information is what is ultimately retained (Kashima, 2000).

Cultural evolution has also helped to explain why particular cultural contents may have developed. Consider three examples: the evolution of honor culture, the emergence of "big gods," and cultural evolution of strong versus weak social norms. The culture of honor, which involves extreme retaliation in response to insult or aggression, is a puzzle from an evolutionary framework given the high costs involved. Nowak et al. (2016) recently used agent-based modeling to test Nisbett and Cohen's (1996) hypothesis that honor cultures are the product of environments with harsh conditions paired with weak and unreliable institutions. Nowak et al.'s simulations suggest that honor may prevent unbridled aggression when institutions are weak and unreliable. Conversely, rational and self-interested norms are more likely to develop when institutions are strong.

The cultural evolutionary framework can also help us to understand the emergence of large-scale religions with very powerful deities, whom Norenzayan (2013) characterized as "big gods." Norenzayan (2013) drew together several lines of evidence that support the notion that "big gods" facilitate better cooperation within groups and enable larger group sizes, which in turn gives groups with bigger gods a competitive advantage over those with smaller gods. How might bigger gods accomplish this? All-seeing gods may motivate people to behave morally in the absence of other types of surveillance more effectively than smaller gods may. Bigger gods may also encourage costlier signaling behavior, which may help attract converts, leading to a larger group size. Also, bigger gods may facilitate fictive kinship, promoting sacrifice and altruism within groups even when genetic relatedness is low (Norenzayan et al., 2016). Further, a belief in such deities can increase the likelihood of prosocial

behavior toward strangers who are co-religionists even if they are geographically distant (Purzycki et al., 2016).

Finally, the cultural evolutionary approach can be useful for understanding how societies develop strong or weak social norms. In societies where there are more threats (e.g., war, pathogens), social norms tend to be stronger, punishments more severe for deviance, and adherence to the rules more frequent (Gelfand et al., 2011). Recent work using agent-based modeling has confirmed these results, demonstrating that stronger norms in a variety of settings (cooperation, coordination) evolve when levels of threat are high (Roos, Gelfand, Nau, & Lun, 2015). The results of these simulations suggest that stronger norms facilitate social coordination.

Beyond shedding light on the development of distinct sets of cultural values or behaviors in a given society or region, cultural evolution can also be used to explain the emergence of human tendencies at the species level, such as cooperation (Boyd & Richerson, 2009) and fairness (Rand, Tarnita, Ohtsuki, & Nowak, 2013). For example, using a combination of simulations and experiments, Rand and colleagues (2013) provide evidence that under conditions of relatively weak selection, uncertainty could have led to the evolution of fairness. Based on data from computer simulations and experiments, researchers have also proposed that the evolution of indirect reciprocity, as a way to build and manage one's reputation, can contribute to altruistic tendencies among our species (Nowak & Sigmund, 2005).

The cultural evolutionary approach provides insight into how certain general human capacities may have evolved and mechanisms that enable cultural transmission and has provided some insight into the development of specific cultural features (both regarding variations and writ large). It has been argued that communication alone is sufficient for understanding the development of culture (e.g., Latané, 1996) and presumably for understanding patterns of cultural change and that many types of cultural changes may occur through cultural evolutionary mechanisms without regard to environmental pressures (e.g., Henrich, 2001). Thus, some might argue that, in fact, this approach answers questions not only about *how* but also about *why* cultural changes (including specific changes) occur. However, we suspect that many kinds of cultural changes along dimensions of interest to psychologists are at least in part responses to ecological changes. We believe it may not be possible to accurately predict patterns of cultural change in many variables without some knowledge of the relevant ecological conditions and the adaptive responses that such conditions typically entail. Group selection, biases in transmission mechanisms, and gene-culture coevolution are all useful ideas for understanding the *process* of cultural change writ large, but on their own, they do not readily enable predictions regarding whether say individualism, gender equality, violence, or racism in a given country will be higher or lower in 10 years time. Often this is precisely what scholars, policy makers, and lay people wish to know, and ultimately the goal of a psychology of cultural change should be to produce a predictive science. Although some researchers studying cultural evolution have explicitly incorporated ecology into their models (e.g., Nowak et al., 2016; Roos et al., 2015), to date such work has largely not used empirical data, limiting the power to draw possible inferences. In the next section, we turn our attention to emerging empirical work that has used an ecological framework to explain specific patterns of cultural change.

The why: The ecological approach

The ecological approach to studying cultural change is grounded in ideas from behavioral ecology (Davies, Krebs, & West, 2012), which takes as its starting point the notion that different ecological affordances and constraints lead to distinct patterns of behaviors, values, and norms that have historically been adaptive under such circumstances. This work is also grounded in the notion of inclusive fitness, which holds that organisms (including humans) have evolved to behave in ways that increase the likelihood that their genes will be transmitted even if such transmission is indirect (Hamilton, 1964). In this vein, it has been proposed that humans possess psychological adaptations that predispose them to acquire elements of culture (ideas, tools, dialects, preferences for certain qualities in mates, etc.) that increase their inclusive fitness (or did so ancestrally) in response to the presence of particular ecological conditions (Gangestad, Haselton, & Buss, 2006; Schaller & Murray, 2011; Thornhill & Fincher, 2014). Ecological dimensions such as resource scarcity/abundance, pathogen prevalence, and population density have been linked to variations in behavior among nonhuman animals (Agnew, Koella, & Michalakis, 2000; Collins & Cheek, 1983; Davies et al., 2012; Forsgren, Amundsen, Borg, & Bjelvenmark, 2004) and also have been associated with systematic variations in parallel behavior across human societies (i.e., Sng, Neuberg, Varnum, & Kenrick, 2017; Thornhill & Fincher, 2014; Van de Vliert, 2013).

In this approach to cultural change, predictions linking changes in ecological pressures to certain kinds of cultural change are largely derived from research that seeks to explain variations across human societies based on ecology (Table 2). This approach does not imply that ecological approaches are confined to theoretical frameworks based on behavioral ecology. Other ecological approaches in cultural psychology have focused on such dimensions as residential mobility (Oishi, 2014) or means of subsistence

Table 2. Ecological Pressures and Evoked Responses

Ecological pressure/affordance	Evoked response	Evidence of link in humans
Pathogen prevalence	Slow vs. fast life history strategies	Hill, Boehm, & Prokosch, 2016
	Mate preferences	Gangestad et al., 2006
	Individualism-collectivism	Fincher & Thornhill, 2012; Thornhill & Fincher, 2014
	Aggression	Thornhill & Fincher, 2011
	In-group bias	Fincher & Thornhill, 2012
	Trust	Varnum, 2013
	Tightness-looseness	Gelfand et al., 2011
Population density	Slow vs. fast life history strategies	Sng, Neuberg, Varnum, & Kenrick, 2017
	Competition	Sng et al., 2017
Resource scarcity/abundance	Slow vs. fast life history strategies	Griskevicius et al., 2013
	Individualism-collectivism	Grossmann & Varnum, 2015; Santos et al., in press
	Contempt vs. tolerance	Varnum & Grossmann, in press
Resource inequality	Aggression	Krems & Varnum, in press
Sex ratio	Aggression	Krems & Varnum, in press
	Mate preferences	Stone, Shackelford, & Buss, 2006
Threat (i.e., wars, external conflict)	Aggression	White et al., 2012
	Cooperation	White et al., 2012
	Tightness-looseness	Gelfand et al., 2011
Mode of subsistence	Analytic vs. holistic cognitive style	Uskul et al., 2008
	Individualism-collectivism	Talhelm et al., 2014
Frontier settlement	Analytic vs. holistic cognitive style	Kitayama et al., 2006
	Individualism-collectivism	Kitayama et al., 2010
	Conformity	Varnum & Kitayama, 2011; Varnum, 2012, 2013
Residential mobility	Individualism-collectivism	Oishi, 2010
	Relational mobility	Oishi, 2010

Note: Rows above the dashed line contain linkages derived from behavioral ecology and are largely observed across species. Rows below the dashed line contain linkages derived from social ecology.

(Talhelm et al., 2014; Uskul, Kitayama, & Nisbett, 2008) to explain patterns of cultural variation. Such variables conceivably contribute to cultural change but have not so far been the primary focus of theorizing in ecologically focused approaches to cultural change.

Studies using this approach typically contrast several theoretically derived ecological predictors and assess their relative effects on levels of a psychological or behavioral tendency (or cultural products that may be a correlate of such trends) over time within a society. Going back to the examples of individualism and collectivism, Grossmann and Varnum (2015) compared the effect of shifts along a variety of ecological dimensions (including pathogens, climate, density, and socioeconomic status [SES]) on levels of individualism versus collectivism in the United States over a period of 150 years and found strongest support for the role of increasing levels of occupational status (a factor related to resource scarcity/abundance). Further, time-lagged analyses established that changes in levels of occupational status led to changes in individualism rather than the other way around. Similar links have also been shown when examining the relationship between unemployment rates and levels of individualism during the time of the first economic recession in the 21st century, such that individualism is higher in the United States when unemployment levels are lower (Bianchi, 2016). Notably, the relationship between socioeconomic factors and individualism is not restricted to the United State. Conceptually similar findings emerged in a study of changes in values and practices reflecting individualism in 77 societies over the course of the second half of the 20th century, with the strongest effect observed for socioeconomic development (Santos et al., in press). In the majority of societies included in the sample, levels of individualism increased nonnegligibly over time. This effect appeared to be driven by increasing socioeconomic development. Overall, these findings are consistent with the idea that increases in the abundance of resources reduce people's need to rely on others and favor a focus on individual goals. A similar approach documented changes in expressions of contempt over the course of the 20th century in American cultural products. This research found that shifts in markers related to the ecological dimension of scarcity/abundance (including unemployment and SES levels) were bidirectionally linked to decreases in the prevalence of contempt (Varnum & Grossmann, in press).

Further, an ecological approach has also been used to understand changes in gender equality (Varnum & Grossmann, 2016). Increases in levels of gender equality

(including changes in wage parity, female representation in government, female pronoun use in books, and attitudes regarding gender) in both the United States and Britain from the 1950s to the 2010s appear to be driven by decreases in the prevalence of infectious diseases over time, an effect which is in part mediated by a shift toward slower life history strategies. Of note, these effects were not mediated by changes in individualism-collectivism during this period and were only weakly related to changes in levels of unemployment, suggesting that changes in gender equality may be orthogonal to changes in individualism-collectivism and are driven by different types of ecological pressures.

In summary, by testing the association between changes in major dimensions of ecology with cultural changes in variables like individualism, contempt, and gender equality, the ecological approach not only provides insight into the *how* of cultural change but also may enable us to understand the *why*—that is, knowledge about the role of ecological factors in promoting specific cultural shifts in a particular temporal order. Beyond describing and explaining past variations in psychological processes linked to individualism and gender equality, insight from these studies enables us to make informed predictions regarding how *future* shifts in the ecology of a given society might affect changes in such variables. Thus, the ecological approach has the potential to turn the study of cultural change into a predictive (as opposed to a descriptive) enterprise.

Combining the cultural evolutionary and ecological approaches

Up to this point, we have described distinct approaches to understanding the mechanisms promoting cultural change, including the cultural evolutionary and ecological approaches. Descriptive work on cross-temporal research has provided numerous existence proofs of cultural changes in psychology. Psychological processes are not static; understanding of how such processes change with the culture over time have fundamental insights for getting a fuller theoretical and methodological picture about the human condition. However, a mere description of cultural changes has limited utility going forward. It does not enable a shift toward a predictive science of cultural change, nor does it provide rigorous insight into the causes and mechanisms enabling such changes. Below we consider some ways in which cultural evolutionary and ecological approaches may be combined to yield new insight into the science of cultural change. Before doing so, we should note some early attempts to combine ideas from the cultural evolution tradition and the ecological tradition (Nowak et al., 2016; Oishi, Kesebir, Eggleston, & Miao, 2014; Roos et al., 2015). We hope to encourage further attempts along these lines and offer several ways in which cultural evolution and ecological approaches may be combined to yield new insight.

Cultural evolution provides mechanisms for the impact of ecological pressures. So far, the emerging literature on how ecological shifts may lead to cultural changes has been relatively agnostic regarding the paths by which such changes take place. At the individual level, ecological cues like pathogens or density have been shown to lead to evoked responses. Thus, one possibility is that ecological threats and affordances lead to cultural change largely through the aggregation of such responses. Further, direct effects of ecological pressures on cultural change may occur due to interactions between such factors. For instance, it is possible that pathogens play a bigger role for cultural change in individualism-collectivism or traditionalism in poorer regions with warmer climates as compared to more developed regions with colder climates. Along similar lines, regional variations in dominant modes of production (e.g., rice vs. wheat production; Talhelm et al., 2014) likely result in different interpersonal relations in regions in which agricultural production is the primary basis of the economy (or has been so recently). However, such effects may become less evident if there are dramatic increases in overall resource levels. In short, ecological pressures likely act in a multiplicative fashion. Though this idea has been implied in much prior research, it has not been sufficiently explored empirically, in part due to limited cross-temporal data available to estimate such complex models.

In addition to these direct paths to cultural change, the links between ecology and cultural change could also be indirect, operating through cultural transmission. Thus, one area in which cultural evolution may inform research using the ecological approach will be to help identify the relative contributions of evoked and transmitted responses to cultural change in response to particular environmental pressures. We suspect that one way in which ecological shifts may lead to cultural change first is by first eliciting behavioral and psychological responses in individuals, which in turn are transmitted to others, ultimately leading to changes in the values, attitudes, products, and practices of society.

Although cultural evolution may primarily operate through relatively high-fidelity transmission (e.g., Lewis & Laland, 2012), cultural change need not always occur through high-fidelity transmission. To some extent, cultural contents, like genes, may also change in ways that are not necessarily adaptive responses to the environment but rather reflect low-fidelity transmission (Heine, 2015). One can think of the "telephone game" studies similar to those utilized by Bartlett (1932) and Kashima

(2000) when assessing the serial reproduction of verbally communicated information. Typically, in such studies, there is a fair amount of variation between the initial information and the information that is transmitted to the last individual in a communication chain. Some of these variations are systematic, but others are random error. It is plausible then that at least some types of cultural changes in human societies may essentially be due to random mutation during the process of information transmission. Thus, it will also be important to account for the role of fidelity of information transmission in future work that seeks to understand how changes in ecological pressures lead to specific forms of cultural change. This may help to ensure that correlational relationships observed between ecological factors and cultural changes are not spurious. What might this look like in practice? One possible approach may be comparing the results of laboratory experiments manipulating ecological cues and observing the effects of such manipulations on transmission of theoretically related cultural contents with the results experiments in which fidelity of information transmission regarding the same cultural contents is measured without an ecological manipulation or by using simulations to estimate the relative effects that are due to ecological pressures versus noisy information transmission.

Ecological pressures favor different transmission mechanisms. Another possible way in which ecological and cultural evolutionary processes may interact is that ecological pressures may differentially support various means of cultural transmission, which would differentially impact retaining, transmitting, or receiving information (e.g., Conway & Schaller, 2007) and thereby produce unique paths to cultural change.

For example, some studies suggest that higher levels of pathogens are linked to higher levels of conformity (Murray et al., 2011, 2012). Conformity has been posited as an adaptive response to high-pathogen environments, as all other things being equal, it should reduce one's chance of contracting infectious diseases (Schaller & Murray, 2011). Thus, one might predict that in places and times where infectious disease loads are high, conformity bias may play a stronger role in information transmission than prestige bias. Prestige bias, in turn, might seem particularly relevant in conditions of resource scarcity. Thus, when resources are scarce, people may be more likely to imitate others who are successful (i.e., high in status) than the majority, as high-status others' behavior may provide clues as to how to best acquire and hold resources, something that would be a more pressing concern when such resources are in short supply. Thus, in times when resources are scarce, people may be more susceptible to the prestige bias than to other types of biases in imitation and information transmission.

One might also predict that self-similarity bias might be stronger in some circumstances than in others. For example, we suspect that this bias may trump others during times of conflict between societies, as such events make in-group/out-group boundaries highly salient. Hence, we would predict that when societies are at war self-similarity bias should be a more likely route of cultural transmission than prestige or conformity biases. As these examples illustrate, the ecological approach might help scholars to develop a more fine-tuned understanding of when various types of cultural transmission are more likely to take place.

From cultural change to ecological change. Ecological and cultural evolutionary approaches may also be combined to address the processes by which changes in societies lead to changes in their ecologies. This possibility is acknowledged by scholars of cultural evolution (e.g., Richerson & Boyd, 2000) and has been theorized about by psychological scientists studying social ecology. For example, Oishi (2014) suggested that human psychological tendencies may give rise to niche construction, which may explain the proliferation of chain stores in regions with high residential mobility (reflecting a desire for familiarity in an unfamiliar ecology) and the popularity of headphones in places with high population density (indicating a desire for personal space in a dense environment). Thus, humans may attempt to modify their ecologies to suit their psychological needs. One might imagine then that as cultural changes occur in such needs, one might see different types of attempts to change the ecological conditions of society.

Further, evidence of bidirectional relationships between ecological shifts and cultural changes suggests that there may be instances of bidirectional causality or feedback loops. For example, the finding that changes in scarcity and contempt are bidirectionally related (Varnum & Grossmann, in press) might indicate not only that increasing resource abundance decreases intolerance but also that greater levels of tolerance and a dignity culture promote economic development (Florida, 2014). Such feedback loops may, in fact, be common and might be more evident on larger time scales. Notably, a full description of such loops involves cultural transmission processes. Different cultural values and tendencies may cause people to attend, encode, and transmit various types of information (Henrich et al., 2010). This process may also lead societies to modify their environments in ways that may be consistent with those values and habits (Miyamoto, Nisbett, & Masuda, 2006). Thus, it stands to reason that as cultural contents change, this may lead societies to modify their ecologies. In short, certain types of information regarding desirable ecological conditions or modes of

transmitting such information may vary as a function of a culture's orientation.

On a related note, societies often attempt to engage in intentional ecological engineering, trying to change their ecology from the top down (e.g., reforestation efforts, enforced or encouraged migration to urban or rural areas). The study of such efforts has largely been the domain of political scientists and historians, but it would be worthwhile for psychologists to begin to think about how to account for these types of influences in their models of cultural change. Cultural evolutionary frameworks may be especially useful here, as they can provide us with insight regarding when top-down versus bottom-up modes of transmission aimed at changing society's ecology may be more effective.

The Future of Cultural Change Research

There are several important considerations for the field of cultural change research as it goes forward. Here we outline several key issues to be addressed in future cultural change research, including areas for future theory building and key methodological challenges.

Cultural susceptibility to change

There are possible features of societies that facilitate or impede cultural change. The extent to which society has tight versus loose social norms, whether society is ethnically homogeneous versus heterogeneous, or whether society is relatively isolated versus in frequent contact with other cultures all may affect the degree to which its culture is stable versus malleable. One might imagine, for example, that relatively isolated communities would have more stable values and norms over time. One might also posit that tighter societies would be less likely to change, as there is less variability among their members in attitudes and behaviors and less tolerance for deviance (Gelfand et al., 2011; Uz, 2015). On the other hand, such societies might respond more quickly to dramatic ecological changes as they are better able to enforce norms and as people may be more likely to change if their leaders adopt new values or practices. One might make similar competing predictions regarding ethnic homogeneity, as in more diverse societies there may be a greater variety of beliefs and practices, making change more likely, but on the other hand, in more diverse societies, the adoption of new attitudes, values, or practices may be more uneven, leading to slower change for the society as a whole. Thus, testing potential moderators will be another important future direction in the study of cultural change.

Nonlinearity and time span of change

Many of the phenomena described in this review have changed in a relatively linear fashion during the time periods covered in these studies. However, it seems likely that cultural change is often nonlinear or potentially cyclical. It may be that data from broader spans of time than a few decades or one to two centuries are necessary to observe such cycles. Hence, an important project for the psychological science of cultural change will be to find sources of systematic data on variables of interest over longer time spans. Notably, insights from the study of cultural evolution may also be particularly useful in addressing this question, as the properties of cultural transmission are likely key to understanding nonlinear forms of cultural change.

An empirical study of longer term forms of cultural change can be challenging. Consider the recent controversy over the cultural change in violence. Pinker (2011) proposed that there have been substantial cultural changes in levels of violence over time. In his view, a decline in violence, including a reduction in armed conflict, not only has occurred over the past several decades but also has been continuous over the course of millennia. Cirillo and Taleb (2016) recently tested this claim with the help of formal statistical analysis of data on war casualties from 1 AD to 2015 and failed to find evidence of a decline in the frequency of large-scale conflicts or in the number of casualties from conflict over time. It appears that on a larger time scale, violence rates have been mostly stable. At the same time, when zeroing in on specific geographic regions, there appears to be clear evidence for a dramatic reduction in violence: Over the past 50 years, the United States has experienced a dramatic reduction in homicide rates (FBI, *Crime in the United States, 2015*, 2015). Through empirical analyses, it is therefore possible to obtain a nuanced perspective concerning the location and temporal dimension of change in such psychological phenomena as violence. Notably, at present, researchers interested in studying change over long periods of time are mostly confined to more indirect measures (such as cultural practices and products or estimates by historians), some of which may be of poor quality. The study of cultural change over longer spans of time will likely be an easier endeavor in the future, as there is a growing body of data on psychological measures that will be available as well as higher quality archival data on variables like crime rates, marriage and divorce, and voting behavior.

The validity of big data

Research exploring cultural evolution has primarily used simulations as a methodology to test theories regarding

how information transmission may lead to cultural change. As big data from Facebook, Twitter, wearable sensors, geospatial movement patterns, and other large-scale sources become increasingly available for use in social science research, such data may enable real-world tests of information transmission and behavioral theories concerning cultural change. Rich, large-scale data on the transfer of ideas and behaviors in combination with data on shifts in ecology will enable a clearer understanding of the relationship between evoked and transmitted culture.

Methodological innovations also lead to unique challenges. As an example, recent advances in the availability of massive word frequency corpora from Google Books (Michel et al., 2011) led some scientists to conduct large-scale content analyses of word use patterns over time (e.g., Greenfield, 2013; Grossmann & Varnum, 2015; Twenge et al., 2012b). Some of these analyses have been restricted to the United States, yet others aimed to use the Google Books data to compare frequencies across cultures (e.g., Uz, 2014), by using books written in different languages. Notably, Google books frequency data are based on corpora from the U.S. National Library of Congress and several university libraries (e.g., the University of California and the University of Michigan). The non-English books in these libraries are subject to dramatic selection bias, casting some doubt on the validity of cross-cultural inferences regarding cultural change made based on corpora of non-English-speaking societies.

Accounting for temporal autocorrelation

One of the biggest challenges for cross-temporal big data research on cultural change concerns potentially spurious associations between different ecological forces (and their cultural transmission) and change in cultural psychological variables of interest over time. For instance, consider the situation in which one visually observes that the pattern of change in the use of certain words in books published in a given country (e.g., "choose" vs. "obey") seems similar to the pattern of change in percentage of a country's population living in urban versus rural areas over the same span of time (e.g., Greenfield, 2013). Does this mean that urbanization *caused* a shift toward greater individualist versus collectivist word use? Unfortunately, cross-temporal data do not allow one to draw such conclusions, as the association between these variables could be due to a third variable—the degree to which each variable changes over time. In other words, two variables may appear to be strongly related solely because each shows a temporal trend. Autocorrelations of each variable can cause this problem. Autocorrelation refers to a correlation of a given variable from one point in time to another at lag k over the time series. When similar autocorrelation is present in both variables, they may seem associated over time. Such autocorrelation raises serious challenges for interpreting relationships in time-series data. High levels of autocorrelation can lead to amusing "associations," such as the visually striking associations between the marriage rate in the U.S. state of Kentucky and the number of fishing boat deaths in the United States or the number of sociology doctorates awarded in the United States and the rate of worldwide noncommercial space launches (Vigen, 2015). Of course, these associations are merely spurious. Thus, when exploring the factors contributing to cultural change, it is critical to evaluate and possibly control for temporal autocorrelations.

So far, psychological scientists have not been vigilant in controlling for autocorrelations in cross-temporal data on cultural change. Some exceptions have included the use of lagged associations (such as cross-correlation functions) and the so-called test of Granger causality (Granger, 1969), which provides a formal way within the linear regression model to evaluate the idea previously proposed by Wiener (1956). In this test, one aims to predict Y_{t+1} using the past terms of Y, as well as the past terms of X. If the addition of the past term of X sufficiently improves the predictive power of Y_{t+1} above the past term of Y alone, one can claim that the X Granger causes Y. Some researchers studying cultural change have begun to apply these methods when examining relationships between ecological factors and cultural change (e.g., Grossmann & Varnum, 2015). However, this approach does not provide a definite test of causality. Another approach to accounting for temporal autocorrelations can involve a model comparison between the hypothesized model with two time series for predictor (X) and outcome (Y) of cultural change with a baseline distribution, in which one simulates a similar degree of autocorrelation as observed empirically in X and Y, respectively (Tiokhin & Hruschka, 2017). This approach allows for a corrected threshold for significance that accounts statistically for the likelihood that an observed association between the two sets of time series data is due to autocorrelation. Additional sophisticated methods for dealing with autocorrelations have been proposed in econometrics, and psychologists interested in cultural change may be well advised to consult such literature for further guidance (e.g., Nakamura, Nakamura, & Orcutt, 1976).

Toward a "psychohistory"

Another way of dealing with the potential pitfalls of datasets high in autocorrelation would be to show that models derived from such data reasonably predict the future.

As noted earlier, research on cultural change regardless of its approach has essentially been a postdictive science to date. However, the ultimate promise of a science of cultural change is not to give us a clearer understanding of the past (although this is a lofty goal in and of itself), but rather to enable us to predict how societies will look in the future. The authors of this work read Asimov's "Foundation" novels as children, and in many ways, their work on cultural change was inspired by his fictive science of "psychohistory," in which cultural trends and events on a large scale could be predicted decades and even thousands of years in advance (Asimov, 1951). Due to recent advances, such a science no longer seems so much like science fiction. A genuine test of models developed by cultural evolutionary and ecological approaches will be the extent to which they can accurately predict future levels of critical sociocultural variables like gender equality, altruism, or individualism. Although the precision of Asimov's fictional discipline is likely impossible to attain, we eventually may be able to predict large-scale cultural trends with some degree of accuracy.

As the science of cultural change is a new endeavor, it may require not only different methods but also different ways of disseminating findings than have been typical in psychology. We would advocate that researchers begin to publish their models as well as their predictions for the future (say for at least one to two decades) given a range of ecological inputs when they publish papers explaining past patterns of cultural change. We would then advocate that journals that publish such work also be willing to accept follow-up work that assesses the fit between values predicted by the model and actual values that occur in the future. In a sense, this would constitute a kind of preregistration for papers on cultural change. This approach would help strengthen inferences regarding theories for why cultural changes occur and would help motivate researchers to look forward as well as backward.

Cultural change in the meaning of psychological processes

Finally, research on cultural change can yield unique psychological insights about the validity of various measures of psychological processes. So far, much research on cultural change has treated the attributes of extant cultural concepts, including individualism/collectivism, social capital, or gender inequality, as rather uniform over time. However, it is an empirical question whether the *psychological* meaning of such concepts remain constant or change as well. Addressing this issue adequately would require cross-temporal study of the nomological network (Cronbach & Meehl, 1955) of the relevant cultural construct and examining if and how the psychological structure of the construct changes over time. For instance, one might consider whether shifts in individualism have been equally linked to mental health factors (e.g., Roberts & Helson, 1997; Veroff et al., 1981), and whether such cross-temporal association varies across societies (e.g., Ogihara & Uchida, 2014).

Additionally, the study of potential cultural changes in the *nature* of psychological phenomena can shed new light on the reliability and validity of these phenomena over time, including such fundamental phenomena as emotions (Ellsworth, 1994), prejudice and racism (e.g., Schuman, 1997), morality, and wisdom (e.g., Grossmann, in press). Finally, in the context of assessing the robustness of psychological effects, the temporal dimension should be taken seriously as a potential explanation for variation in observed effect sizes across studies. For example, consider the observed reduction in effect sizes of conformity over several studies using the classic Ash paradigm (Bond & Smith, 1996). This reduction could reflect the overestimation of the original effect size. Alternatively, it could reflect the cultural change in the strength and/or meaning of conformity over time.

Finally, researchers who study culture using cross-sectional data often implicitly assume relative stability. However, given evidence of cultural shifts at the level of decades, such an approach may be problematic. For instance, consider the dimensional ranking of countries by Hofstede and colleagues (Hofstede, Hofstede, & Minkov, 2010) on power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance, long- versus short-term orientation, and temporal restraint. Hofstede's initial study was conducted in the 1960s, focusing on a peculiar subset of individuals (IBM employees) in 40 countries. Since that time, the list has been expanded to over 70 countries. However, data for most of these samples was collected much later (in the 1990s and 2000s). Without appreciating the temporal dimension, one may be tempted to compare Hofstede's ranks of countries for which data were collected 40 years apart. Unless one assumes that cultures do not change, and we hope the current evidence is sufficient to convince the reader otherwise, it seems prudent to avoid such comparisons.

Coda

Since ancient times, scholars have argued over how to incorporate the notion of change in the study of social phenomena. Whereas philosophers like Democritus conceptualized these phenomena as static and invariant across time, others, including Heraclitus (and more recently Dewey, James, and Whitehead), have pictured social phenomena as inherently in flux (Rescher, 1996). The debate has continued into the modern era, with research in psychology often conducted in a manner that assumes that the phenomena of interest are static, paying

little regard to the inherently temporally embedded nature of human phenomena, despite various theories emphasizing cross-temporal processes (e.g., Baltes, 1997; Bronfenbrenner, 1977; Vygotsky, 1960).

Consistent with an emphasis on dynamism in human experience, a host of studies summarized in this review have documented myriad ways in which cultures change over time. Moreover, in this review, we have highlighted and proposed several ways to integrate different approaches to the processes underpinning cultural change. Scholars have begun to generate and test theories regarding the cultural evolutionary mechanisms by which such changes have occurred (the *how*). At the same time, other researchers have begun to posit and test specific theory-driven ecological predictions regarding patterns of cultural change and to test those predictions with real-world time series data (the *why*). These two approaches are beginning to converge and will help to build a fuller account of the process and reasons for cultural change.

Although many challenges and open questions remain for emerging psychology of cultural change, important advances have been made in understanding the nature and causes of cultural shifts, ranging from changes in attitudes and values, to behaviors and practices (i.e., divorce, naming practices, wages paid to employees of different genders), to themes in cultural products (i.e., books and film). Research on cultural change is exciting, adding a temporal dimension to the growing understanding of how culture and psychology mutually influence each other. As new sources of data and new tools become available to address such questions, answers to the *how* and *why* of cultural change are poised to provide a richer, systematic, and integrative understanding of human psychology over time.

We began this piece discussing the recent rise of extremely conservative political views and a shift toward illiberal democracies or authoritarianism in many societies in the past few years. How might insights from the emerging science of cultural change help us to make sense of these events? Developments like Brexit and the election of Donald Trump took most observers by surprise; it may be though that there were clues if one only knew where to look. We suggest looking at ecology and patterns of cultural transmission. It seems plausible that increases in real and perceived threats (such as terrorism and outbreaks of infectious disease) and/or rising economic insecurity for large swaths of the population in these societies may be responsible for growing opposition to immigration, increases in public expressions of prejudice, and greater support for leaders who appear reluctant to abide by democratic norms. It may also be that these shifts in political attitudes reflect prior ecological shifts more strongly than contemporaneous ones, in which case one might be able to predict future changes in the political mood with a deal of lead time. Such propositions beg for further empirical testing. Similarly, a deluge of fake news stories on social media has been credited with aiding the election of far-right candidates. Were these stories effective? If so, why? Might they contain some properties (such as minimal counterintuitiveness, high personal relevance, and survival relevant themes) that made them especially likely to be believed and transmitted? Might such stories be particularly appealing or persuasive when certain ecological conditions prevail, such as high levels of perceived threat? These remain open questions, but here too the emerging science of cultural change may help us to understand some of the most surprising and important changes occurring in our world.

Acknowledgments

We thank Douglas Kenrick and Steven Neuberg for their insightful comments on previous versions of this manuscript, and we thank Daniel Hruschka for his input on methodological challenges in cultural change research.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

The present research was funded by Social Sciences and Humanities Research Council of Canada Insight Grant 435-2014-0685 to I.G.

Note

1. Living together with one's grandparents is a behavioral marker of stronger family ties and filial piety, which is central to the notion of collectivism (e.g., Kağıtçıbaşı, 1996; Schwartz et al., 2010).

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