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The Psychology of Cultural Dynamics: What Is It, What Do We Know, and What Is Yet to Be Known?

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Abstract

The psychology of cultural dynamics is the psychological investigation of the formation, maintenance, and transformation of culture over time. This article maps out the terrain, reviews the existing literature, and points out potential future directions of this research. It is divided into three parts. The first part focuses on micro-cultural dynamics, which refers to the social and psychological processes that contribute to the dissemination and retention of cultural information. The second part, on micro–macro dynamics, investigates how micro-level processes give rise to macro-cultural dynamics. The third part focuses on macro-cultural dynamics, referring to the distribution and long-term trends involving cultural information in a population, which in turn enable and constrain the micro-level processes. We conclude the review with a consideration of future directions, suggesting behavior change research as translational research on cultural dynamics.

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INTRODUCTION

Culture is squarely on the research agenda of psychological science. The conception of the person as a meaning-making and meaning-consuming being is now embedded in psychology, and culture as a source of meaning is now integral to psychological theorizing (Kashima 2016b). In the past, much of the research on the culture–mind interface took a synchronic perspective, documenting contemporary cultural differences by comparing human populations around the globe or priming cultural ideas and practices (for a recent review, see Oyserman 2017). More recently, however, a diachronic perspective called cultural dynamics has emerged (Kashima 2014, 2016b); this perspective examines how psychological processes are involved in the stability and change of culture over time. In the changing global landscape of the early twenty-first century, a psychological science of cultural dynamics is a necessary complement to the synchronic perspective in culture and psychology.

WHAT IS CULTURE, AND WHAT ARE ITS DYNAMICS?

We conceptualize culture as the set of socially transmittable information in a population, which can influence cognition, affect, and behavior (e.g., Kashima 2016b). This includes ideas and practices and can be represented in the brain and body as well as in the artefacts produced by people (e.g., technologies, mass media, books, websites). Foundational to this perspective is population thinking, i.e., considering cultural information available to a human population as a whole, where

a population may be geographically localized or distributed over a wide spatial area, the Internet, or even the totality of humanity. This perspective is largely in line with the conception of culture in psychology (e.g., Hong et al. 2000), anthropology and cognitive science (e.g., Boyd & Richerson 1985, Sperber 1996), and biology (e.g., Cavalli-Sforza & Feldman 1981, Dawkins 1976). Cultural dynamics is about the formation, maintenance, and transformation of culture over time in this sense. Although this approach is often called cultural evolution, we prefer to call it cultural dynamics to clearly demarcate it from social evolutionary theories of the late nineteenth and early twentieth centuries.

Processes of Cultural Dynamics

There are three main processes in cultural dynamics: how novel cultural information is introduced to a population, how it is transmitted, and how its prevalence changes.

Introducing novel cultural information. How does cultural information become available to a human population? One pathway is invention—novel cultural information that has not previously existed in the population is endogenously produced within the population (for a broad review, see Muthukrishna & Henrich 2016). Simonton (2011) suggests that inventive psychological processes often result from combining existing cultural ideas and practices. Innovations appear to show this pattern in online music catalogs and Wikipedia (Tria et al. 2014), and US patents (Youn et al. 2015). Another pathway is importation, which occurs when cultural information invented elsewhere is brought into a population. There is a growing literature on reactions to imported cultural artefacts (for a recent review, see Morris et al. 2015).

Social transmission of cultural information. Cultural information, once introduced, may be socially transmitted to other individuals. Cavalli-Sforza & Feldman (1981) distinguished three types of cultural transmission: vertical (from parents to their offspring), oblique (from one generation to the next without a genetic relationship), and horizontal (within the same generation). In addition, a reverse-vertical or oblique transmission, where cultural transmission progresses from a younger to an older generation, is possible, especially in new technology domains.

Altering the prevalence of cultural information. As cultural information is transmitted throughout a population and across generations, its prevalence (i.e., the proportion of people who use it at a given point in time) changes. The term cultural drift describes prevalence changes due to random fluctuations. Bentley et al. (2004) provided some evidence of cultural drift in baby names in the twentieth-century US census, pottery motifs in Neolithic Germany, and patents and their citations in the United States. However, Acerbi & Bentley (2014) found some evidence that prevalence changes are not purely random cultural drift in color terms, US baby names, and music preferences, as did Sindi & Dale (2016) with a large corpus of word frequency data in Google Ngram (for more information about Ngram, see Michel et al. 2011).

The distribution of cultural information may also change due to selection. If cultural information confers some benefits in adapting to the environment, its use is likely to be reinforced and the likelihood of its future reuse increases. In contrast, if it incurs some costs, the likelihood of its future use is reduced. The net adaptiveness is often called fitness, and fitness-enhancing information is likely to become more prevalent. Although fitness in biological evolution is measured in terms of reproductive success, cultural fitness captures a far broader set of costs and benefits.

Kashima (2018) considered cultural adaptation to a variety of environments. Within a niche constructionist perspective (e.g., Laland et al. 2000, Oishi 2014), a human population constructs

Table 1 A variety of environmental challenges

Type of Environment			Examples
Natural			Climate (Van de Vliert 2013)
			Pathogen (Fincher et al. 2008)
Human-made	Built		Carpentered world (Segall et al. 1966)
	Social	Economic	Mode of production (Talhelm et al. 2014, Uskul et al. 2008)
		Intergroup	Competition (Richerson et al. 2016)
			War (Turchin et al. 2013)
		Intragroup	Population density (Gelfand et al. 2011)
			Residential mobility (Oishi & Talhelm 2012)
			Free riders (Nowak 2006)
	Psychological		Anxiety (Pyszczynski et al. 2015)
			Cognitive and communicative capacities (Kemp et al. 2018)

the human-made environment using cultural information available to them (i.e., cultural niche construction) in adaptation to the natural environment. However, the human-made environment itself—including the built, social, and psychological environments—also presents environmental challenges to the human population. **Table 1** summarizes these challenges and lists examples. Cultural information that increases adaptiveness to these environments is selected in, and information that decreases adaptiveness is selected out—in this sense, the selection process is said to be Darwinian (Mesoudi 2011). Thus, fitness in a cultural context can include how well the cultural information is adapted to the psychology of the individuals involved, constraints on efficient communication, and the physical and social environments. The complex interaction among these factors appears to play an important role in the evolution of words and concepts in color, kinship, spatial, and numerical domains (Kemp et al. 2018).

While acknowledging that culture aids in adaptation and that selectionist mechanisms are at play, Sperber and his colleagues (e.g., Claidière et al. 2014) have suggested that culture changes via attraction as well: Transmitted cultural information undergoes transformation and eventually ends up in a cultural attractor within the complex cultural dynamical system. Bloodletting as a treatment for illness may be an example (Miton et al. 2015)—the idea that a physical ailment can be cured by letting blood out from the same location (e.g., bloodletting from the head to cure headache) appears to be widespread in diverse traditional cultures, and a story about bloodletting is more likely to be communicated than stories about other equally questionable treatments. Although its precise formulation is still to be worked out, this perspective aspires to present an alternative metatheoretical perspective to the neo-Darwinian theory of cultural evolution. Nonetheless, attraction processes may still be understood as adaptation to the psychological environment.

LEVELS OF ANALYSIS IN CULTURAL DYNAMICS

Cultural dynamics have been examined at two levels: cultural changes over time at the macro-level and cultural transmission processes at the micro-level. Macro-level cultural trajectories are often perceived by individuals in their social environment and represented as norms (Kashima et al. 2013b) that impact micro-level cultural transmission (Kusumi et al. 2017). However, the converse also holds: The micro-level activities of individuals interacting in social networks aggregate to

affect macro-level cultural dynamics. We first review the literatures that attempt to examine this process of emergence.

MICRO-LEVEL CULTURAL DYNAMICS

Central to micro-level cultural dynamics is the idea that cultural information is socially transmitted: A person who possesses cultural information acts as its sender, and the information is taken up by receivers; these transmissions all occur in some context. Kashima (2016a) distinguished four subprocesses—production, grounding, interpretation, and memory. In production, cultural information is put into a form that can be interpreted by receivers. Through grounding, the sender and receivers establish a mutual understanding of the cultural information and add it to their common ground. During interpretation, the information is translated to representations in the brain and body of the receiver and stored in memory (**Figure 1**).

The subprocesses differ in the extent of subjectivity and intersubjectivity, with memory being most subjective, grounding being most intersubjective, and production and interpretation being in between at the interface of the subjective and the intersubjective. They are conceptually interdependent and do not have to occur in sequence. Cultural transmission can go straight from production to interpretation without grounding, e.g., in instruction, where a sender provides information largely without receivers' acceptance, or in imitation, where a receiver learns information from a sender through observation without the sender intending to give the information (for a review of instruction and imitation, see Legare 2017). When both the sender and receiver collaboratively exchange information, however, grounding is essential. Cultural artefacts such as songs, books, and other products, including television entertainment and other mass media (Morling & Lamoreaux 2008), are intersubjectively available to the extent that they can be interpreted by those who share a culture. Every time people meaningfully engage with a cultural artefact, the artefact is interpreted, and its meaning and memory traces are strengthened for future use. Cultural artefacts can, thus, represent cultural information and contribute to cultural dynamics regardless of the producers' intent.
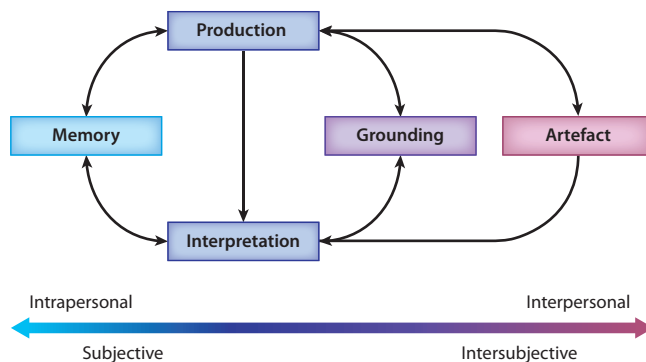
Figure 1

Subprocesses of social transmission of cultural information (Kashima 2016b), which translate between, on the one hand, intrapersonal and subjective representations and, on the other hand, interpersonally observable and potentially intersubjective representations of cultural information. Production transforms the intrapersonal into the interpersonal; grounding establishes mutual understanding of the interpersonal; interpretation transforms the interpersonal into the intrapersonal; and memory stores the intrapersonal representations. Artefacts—enduring things in the world that are interpersonally observable—can also intersubjectively represent cultural information.

Production

Production is constrained by the accessibility of cultural information in the sender's memory, as well as by the comprehensibility and acceptability of the cultural information to the receiver. Given the interdependence among the subprocesses, the method of serial reproduction (Bartlett 1932) is often used to examine production in cultural transmission. In this method, cultural information is transmitted from one generation of participants to the next generation, which then transmits it to the subsequent generation, and so forth, in a chain. Thus, all subprocesses of cultural transmission are included in the task structure. Typically, each generation consists of one individual but may include multiple individuals. The use of this method is extensive, spanning animal and human cultural transmission literatures (for a review, see Whiten et al. 2016).

Grounding

Grounding establishes a mutual understanding, called common ground (Clark 1996, Kashima et al. 2007), between the sender and receiver about the produced cultural information. Grounding typically requires the sender's presentation and the receiver's acceptance of the information; the sender and receiver, then, believe or take for granted that they both accept the information for the current purpose. Mutuality is achieved by sending verbal or nonverbal acknowledgment to each other when both people assume or establish that they share the same common ground. When cultural information is grounded and mutually shared, the information may take on the status of shared reality (Echterhoff et al. 2009) and powerfully engages human psychological processes, inducing stronger emotions (Boothby et al. 2014, Peters & Kashima 2007) and motivations (Carr & Walton 2014, Shteynberg & Galinsky 2011), both of which help to consolidate the memory of the information (Echterhoff et al. 2008).

Interpretation

Although cultural information is often treated as if it is simply copied in cultural transmission (e.g., Dawkins 1976), it often involves the receiver's active interpretation (e.g., Bartlett 1932). Consider the situation where hunter gatherers are foraging for fruits. An experienced forager performs a culturally meaningful action by collecting some fruits and discarding others. Cultural learners can learn to perform the same action by imitation but may go further and interpret that the collected fruits are good in some sense. Kashima and colleagues' (2015) research suggests that cultural learners acquire the meaning of action by active interpretation. In a simulated foraging task, a cultural learner was placed beside a cultural old-timer who was knowledgeable about their foraging context. On a shared computer screen, a novel stimulus that represented a fruit was presented, and the old-timer either collected or discarded the fruit using a joystick. The learner learned to perform the same actions by imitation but also acquired implicit attitudes toward the stimuli—feeling more positively toward the collected than the discarded fruits—in alignment with the old-timer's actions.

Similar processes can occur through cultural artefacts. Weisbuch et al. (2009) found that the nonverbal behaviors directed toward a group member (e.g., African Americans) by other characters in television shows can transmit cultural information about attitudes toward the target group. In many US television shows, more negative nonverbal behaviors are directed toward African American characters than toward White American characters, and viewers of more race-biased television shows tend to have more negative implicit attitudes toward African Americans. When participants were exposed to silent video clips of race-biased television programs, they later showed more negative implicit attitudes toward African Americans. Analogously, Weisbuch & Ambady

(2009) found an effect of exposure to nonverbal behaviors on women's ideal body size, which they found was mediated by perceived cultural ideal body size, suggesting the importance of the perceived norms of the cultural group.

Memory

The very act of cultural transmission can affect memory. When senders converse with receivers about an event, some aspects are selected and explicitly discussed, whereas other aspects are left out. Hirst, Coman, and their colleagues (e.g., Coman et al. 2009, Cuc et al. 2006) have shown that what is said in cultural transmission is cognitively rehearsed and more likely to be remembered, but what is left out is more likely to be forgotten through retrieval-induced forgetting (Anderson & Bell 2001). When people learn pairs of items that belong to two different categories (e.g., animal–cat, animal–dog; vegetable–broccoli, vegetable–pea) but are induced to retrieve only one pair (e.g., animal–dog), they tend to forget the other pair in the same category (i.e., animal–cat) even more often than those pairs that were not induced (i.e., vegetable pairs).

Analogous processes occur in the context of cultural transmission in socially shared retrieval-induced forgetting (Cuc et al. 2006). For instance, Coman et al. (2009) recruited residents of the New York City area to ascertain their memories of the September 11 attacks. Their memories were classified into categories such as time (e.g., "I heard about the attacks at 9:00 AM, I woke up at 8:00 AM that day") and location (e.g., "I heard about the attacks at home"). Two participants were randomly paired to converse about their experiences of the September 11 attacks. The conversations were coded for the memories mentioned in the conversation for each participant. The researchers hypothesized that participants who listened to their partner mention their memory in a category (time, e.g., "I woke up at 7:30 AM") would be induced to covertly retrieve their own memory of that type (e.g., "I woke up at 8:00 AM") but to forget their related but unmentioned memory of that type (e.g., "I found out about the attacks at 9:00 AM") even more than their memories that were both unrelated and unmentioned (location, e.g., "I heard about them at home"). Consistent with this reasoning, a recognition test showed that participants responded to the related but unretrieved items more slowly and with more errors than to either the retrieved items or the unrelated ones. Thus, the act of cultural transmission can select for the transmitted information, but it may also inadvertently select out other information.

Factors that Influence Cultural Transmission

People tend to transmit information that is instrumental for adaptation to and survival in their environmental niche, as well as socially adaptive to their social environment. Nonetheless, the context of transmission profoundly affects which information is likely to be transmitted. We address each of these factors in the sections below.

Agency and sociality. Humans appear to be particularly attuned to information about agency. For instance, people tend to recall words for animate beings (e.g., baby, bee, engineer) better than those for inanimate objects (e.g., doll, drum, journal) even after controlling for word frequency and other factors known to influence recall (Nairne et al. 2013). Nairne & Pandeirada (2008) argued that the human memory system evolved in adaptation to the hunter–gatherer environment, so people tend to recall information better when it is encoded in terms of its relevance for survival in a hunter–gatherer setting, such as foraging, than when it is encoded for its relevance for scavenging (Nairne et al. 2009). Arguably, animacy would be critical information

in the human ancestral environment, where humans would be foraging animals and plants for survival. Animate beings may be a threat to be avoided or a prey to hunt.

People also tend to transmit information relevant for sociality (e.g., Stubbersfield et al. 2015). Gossip is a case in point. When Feinberg et al. (2012) had people witness someone's moral transgression and gave them an option to communicate to another person who is about to interact with the deviant, they spontaneously sent gossip about the deviant. Similarly, Peters & Kashima (2015) found that people tend to transmit gossip about a person's moral character and regard those who transmit such information favorably. Gossip can provide information about the reputation of a person (Smith 2014) and the norms of a group (Foster 2004) and is therefore beneficial for negotiating and regulating social relationships (i.e., whom to approach or avoid) and for sustaining cooperation for collective action in the environmental niche (Feinberg et al. 2014, Foddy et al. 2009, Sommerfeld et al. 2007, Thomas et al. 2014).

Agency and sociality may be particularly meaning rich for humans; that is, information about agency and sociality is rich with implications and helps humans make inferences because of its associations with other information. This information has obvious links to competence and warmth (Fiske et al. 2006) in social perception, for instance, and such information may be preferentially transmitted. Cultural transmission of information about supernatural beings may be interpreted in this light. Boyer & Ramble (2001) showed that information about supernatural artefacts or persons that violates ontological knowledge about the world (e.g., a man who could walk through a mountain) is recalled better than the information that does not violate it (e.g., a man who was slightly taller than a woman). This suggests that cultural information about supernatural agents that interact with humans is particularly likely to be retained by the human memory system. As such, supernatural beliefs and religion may be a natural part of human culture (Boyer & Bergstrom 2008).

Validity and emotionality. The validity and emotionality of cultural information also appear to contribute to cultural transmission. In the case of validity, cultural information is more likely to be produced if the sender believes it to be true and informative (Lyons & Kashima 2003), especially when the receivers lack the cultural information. Thus, in an instructional context, validity is a main driver, presumably because objectively valid information helps its possessors to adapt and survive.

Socially validated cultural information is also more likely to be transmitted than nonsocial information. According to Echterhoff et al. (2009), when the sender and receiver establish that they have similar psychological reactions to given information, this information is seen to constitute their shared reality. Bratanova & Kashima (2014) found that the senders who established their shared reality about information with their audience tended to repeat the same information to others, further disseminating it. Social validation can be facilitated by allowing the sender and receiver to communicate bidirectionally (e.g., Tan & Fay 2011), as in conversation, and by giving receivers an opportunity to obtain information from multiple sources (e.g., Eriksson & Coultas 2012). Indeed, the latter has been found to contribute to cumulative culture (Muthukrishna et al. 2014). This suggests that even misinformation may form part of a culture if it is socially validated—a critical contemporary issue awaiting further investigation (Lewandowsky et al. 2017).

Emotive information is more likely to be transmitted than non-emotive information. As Rimé (2009) argued, this may be because the transmission of emotive information can help its senders to regulate their own emotions. By sharing information that instigates negative emotions, the senders can often downregulate their emotions with the help of the receivers; conversely, they can savor their positive emotions by transmitting positively emotive information. Although some studies have found that negatively valenced information is more likely to be shared (Bebbington et al. 2017, Brennan et al. 2016), others have not (Stubbersfield et al. 2017). Berger's (2011)

experiments suggest that arousal per se drives emotive cultural transmission. When he had participants jog on the spot for a minute and gave them a newspaper article in an ostensibly unrelated task, the joggers were more likely than those who did not jog to transmit the news to others. Social transmission of emotive information occurs on the Internet as well. Heath et al. (2001) found that the more disgusting urban legends are (e.g., animal parts in a popular fast food restaurant), the more widespread on the Internet they become, although this may not be the case in India (Eriksson et al. 2016). Berger & Milkman (2012) found evidence for emotiveness as a predictor of online information sharing.

Context of cultural transmission. First, contextual prominence facilitates the transmissibility of information. Cultural information primed by environmental cues (e.g., artefacts) in the context tend to be transmitted (Berger & Heath 2005). For instance, Oishi et al. (2014) found that, when students had many environmental cues of hedonism in their environment, i.e., party advertisements on campus, they were increasingly likely to transmit a hedonic story about a fun-loving student than a eudaimonic story about a student in search of meaning in life.

Second, according to Clark & Kashima's (2007) situated functional model, of particular importance is social context—whether informativeness or social coordination is a prominent goal for cultural transmission. Cultural information inconsistent with the senders' and receivers' common ground is likely to be novel and therefore informative, but it is also not socially connective because it can signal a difference between the sender and receiver. This may incur a social cost because it can disrupt smooth conversational flow (for the importance of conversational flow, see Koudenburg et al. 2017). In contrast, cultural information consistent with the common ground is uninformative, but it is likely to be meaning rich and socially connective because it emphasizes sender–receiver similarity (i.e., "We are on the same wavelength")—we-ness and cultural identity. In other words, the sender faces a dilemma in cultural transmission whether to send novel but socially disconnecting information or to send old but socially connective information. Depending on which is more important—informativeness or connectivity—different types of information are likely to be transmitted.

Thus, in the typical social context, where there is no strong need to be informative, common ground–consistent (CGC) information is more likely to be transmitted than common ground–inconsistent (CGI) information. This is in accordance with what Bartlett (1932) called conventionalization in serial reproduction, i.e., serially transmitted information becomes more conventional in form and content as it is passed along. Analogously, assuming that culturally shared stereotypes are seen to be in most people's common ground, stereotype-consistent information is generally more likely to be transmitted than stereotype-inconsistent information (Hunzaker 2016, Kashima et al. 2013a). Stereotype-consistent information is seen as more socially connective but less informative than information inconsistent with stereotypes, and it is more likely to be transmitted and passed along down the serial reproduction chain than informative information. However, this CGC bias was reduced when the participants were led to believe that their community did not endorse related cultural stereotypes, that is, when perceptions of common ground were reduced (Clark & Kashima 2007).

More generally, in the typical social context, socially connective information tends to be transmitted (Clark & Kashima 2007). Thus, information that is socially desirable (Bergsieker et al. 2012, Schaller & Conway 1999), prominent (Fast et al. 2009), and socially beneficial for in-group solidarity (Lee et al. 2014) is likely to be transmitted, presumably due to its social connectivity. Arguably, collectivist values are socially connective, and Schönpflug (2001) found that collectivist values (e.g., traditionalism, conformism, security) are more likely to be vertically transmitted from fathers to sons than individualist values (e.g., self-direction, stimulating life, hedonism) among

Turkish individuals in Turkey and Germany. Phalet & Schönpflug (2001) also reported a vertical transmission of family collectivist attitudes among Turkish families in Germany and Turkish and Moroccan families in the Netherlands. Sabatier & Lannegrand-Willems (2005) found a similar transmission pattern in three generations of French women. However, as the importance of informativeness increases in the context of cultural transmission, CGI information becomes more likely to be transmitted (Goodman et al. 2009, Lyons & Kashima 2003).

Summary

Micro-level cultural dynamics are driven by interdependent cognitive and communicative processes. Generally, cultural information that is more adaptive for the sender and receiver individually, and for their in-group collectively, appears to be more likely to be transmitted. Although what information is adaptive depends on the natural and human-made environments, common ground within a population appears to be a significant factor in micro-cultural dynamics. Once cultural information is established as part of the population's common ground, it tends to perpetuate itself.

MICRO–MACRO DYNAMICS

Cultural information that is more likely to be transmitted in micro-level interactions is also likely to increase its prevalence in a population (Schaller et al. 2002); thus, micro-level cultural dynamics would generate macro-level cultural trajectories in the long run. However, precisely how micro–macro linkages occur is often difficult to ascertain. A promising approach is to use formal analytical or agent-based simulation models. In this section, we selectively review three broad approaches to modeling links between micro- and macro-level cultural dynamics in psychology.

Cultural Dissemination Models

In social psychology, models of social influence have been used to explain macro-level cultural phenomena such as polarization of public opinion (Abelson & Bernstein 1963) and spatial clustering, i.e., the fact that people with the same attitude tend to be close together in space (Nowak et al. 1990). Indeed, people with similar attitudes tend to cluster together in geographical space (e.g., Latané & L'Herrou 1996) and in social networks (DiFonzo et al. 2013). However, because these models capture only one cultural element (i.e., an opinion on one issue), they cannot explain cultural patterning. That is, cultural elements often show a configural pattern, and should not be considered in isolation.

Axelrod (1997) introduced a model that could explain polarization, spatial clustering, and cultural patterning. According to his model, an agent has multiple cultural features (e.g., religion, political orientation), each of which can take one of multiple possible traits (e.g., Christianity, Islam, Buddhism). He called this latter property the scope of cultural possibilities. Agents are placed on a grid and interact with their neighbors according to the following simple principles: (*a*) An agent dyadically interacts with another agent that shares some cultural elements (i.e., unless there is some cultural commonality, two agents cannot interact), and (*b*) when they interact, one of the dissimilar cultural elements becomes the same. Note that this algorithm embodies some basic principles of grounding, i.e., common ground (cultural commonality) enables and facilitates grounding and adoption (cultural transmission). If all agents start with random cultural vectors and keep interacting with each other, then the population settles into a stable state where no further change can occur, i.e., all neighboring agents have identical or completely different cultural vectors. Axelrod's simulations showed that a population of agents settles to either a monocultural state (all

agents have the same cultural vector) or a multicultural state (agents with the same cultural vector form a spatial cluster). Intriguingly, a multicultural state was likely when the scope of cultural possibilities was large, i.e., when there were many possible cultural elements that each agent could adopt.

The Axelrod (1997) model has been extended in many ways (for a review, see Kashima et al. 2017). For instance, monoculture is likely to ensue if cultural transmission is inaccurate (i.e., cultural learning is error prone) (Klemm et al. 2003a) or if spatially separated neighbors are linked by long-distance social network ties (possibly forming a small-world network) (Klemm et al. 2003b). In contrast, contrary to what one might assume, the inclusion of global mass media effects (González-Avella et al. 2005, 2006) and descriptive norm effects (Shibanai et al. 2001) increases the tendency toward multicultural states. More generally, Flache & Macy (2011) showed that the Axelrod model with multilateral social influence (i.e., agents interact with multiple neighbors at the same time rather than dyadically) effects strong local convergence, sustaining multicultural states even with error-prone cultural transmission. More recent extensions have begun to explore the effect of structure in cultural space. Valori et al. (2012) showed that the use of actual cultural vectors, as measured by surveys, as a starting point has again increased the tendency toward a multicultural state.

Evolutionary Game Theory

Because cultural transmission tends to favor adaptive cultural information, the formulations described above seem to be deficient in that they do not explicitly model the adaptiveness of the cultural information. Evolutionary perspectives can complement this deficiency (Boyd & Richerson 1985, Cavalli-Sforza & Feldman 1981), and evolutionary game theory (e.g., Axelrod & Hamilton 1981, Maynard Smith 1982) has been particularly influential in theoretical analyses of the evolution of cooperation. Because the complexity and volume of the literature (for reviews, see, e.g., Chudek & Henrich 2011, Rand & Nowak 2013) far exceed the scope of this brief review, we discuss the basic principles of this approach, primarily based on the work of Nowak (2006), to the extent that it is helpful for subsequent discussion.

In simple applications, agents adopt one of two strategies when they interact with other agents: cooperation or defection. Nowak (2006) defined cooperation as paying some cost to give benefit to the partner in a dyad, whereas defection is defined as paying nothing and giving nothing. When agents interact with each other in a dyad, each agent receives a payoff as a function of the combination of the agents' strategies. Given Nowak's definition, the payoff structure constitutes a prisoner's dilemma. If both agents cooperate, then each agent gains more than if they both defect. However, if an agent defects, it gains more than if it cooperates, regardless of what its partner does. The payoff that an agent receives determines its fitness. The strategy of an agent with a greater fitness is more likely to be transmitted to the next generation. If a population of cooperators and defectors interact with each other randomly and transmit their strategies to the next generation, then the population will eventually be entirely made up of defectors. This is because, on average, defectors will have a greater fitness than cooperators at any point in time, and therefore defectors will dominate.

However, many mechanisms have been shown to enable cooperators to survive (see **Table 2**). Many of these mechanisms can be shown to modify the payoff structure of the interaction so that cooperation becomes more beneficial than defection under some circumstances (Taylor & Nowak 2007). One of the most robust mechanisms is assortment (e.g., West et al. 2007)—if cooperators assort themselves with other cooperators, then they have a better chance of survival even if the environment is such that cooperation is difficult to sustain (e.g., the situation is characterized by a

Table 2 Mechanisms for the evolution of cooperation

Type	Summary
Kin selection[a]	Cooperate with a kin member
Direct reciprocity[a]	Cooperate if partner cooperates
Indirect reciprocity[a]	Cooperate with a partner with a good reputation
Network reciprocity[a]	Cooperate within a social network
Attribute-based cooperation[b]	Cooperate if partner shares attribute
Group selection[a]	Cooperate to better adapt to environment or to outcompete out-group
Institution[c]	Cooperate if partner shares institution with the power to reward cooperation or punish noncooperation

Evolutionary mechanisms have been theoretically demonstrated to support the evolution of cooperation when dyadic interactions are characterized by the prisoners' dilemma–type incentive structure.
[a]For discussion and theoretical derivation, see Nowak (2006).
[b]For discussion and theoretical derivation, see Riolo et al. (2001).
[c]For discussion and theoretical derivation, see Sigmund et al. (2010).

prisoner's dilemma). Partner selection (Baumard et al. 2013) is a way of achieving assortment. For instance, kin selection is a partner selection based on genetic relatedness—by cooperating with genetically closely related others, one's genetic information is likely to be transmitted to the next generation (Hamilton 1964). Many others involve reciprocity—reciprocation of cooperation— i.e., one cooperates if one's partner cooperates (direct reciprocity) (e.g., Trivers 1971), has a good reputation of past cooperation (indirect reciprocity) (e.g., Nowak & Sigmund 1998), and is embedded in an interconnected social network (Ohtsuki et al. 2006).

In other cases, reciprocity is not required. In attribute-based cooperation, one cooperates with another who shares the same attribute (e.g., ethnicity, language, religion), which defines a social category. If agents with the same attribute tend to mutually cooperate, then cooperation can survive (e.g., Riolo et al. 2001), although cooperation cannot be sustained if the attribute can be easily faked. A shared culture can act as an attribute that sustains cooperation (Stivala et al. 2016). Group selection is based on the idea that groups with more cooperative members can survive better in a hostile environment or outcompete their out-groups (for a recent systematic statement of this position, see, e.g., Richerson et al. 2016). Institutionalized mechanisms that monitor individuals' actions, reward cooperation, and punish defection (e.g., Sigmund et al. 2010) can also sustain cooperation. Obvious examples are police, court, and other mechanisms of law enforcement (punishment) and conferment of medals, decorations, and other forms of official recognitions of social contribution (reward). As we discuss below, we believe that assortment and partner selection are intimately linked to macro-level cultural dynamics of collectivism.

Iterated Learning

The approaches discussed above have used broad theoretical frameworks to explain global characteristics of macro-level cultural phenomena, such as polarization, spatial clustering, cultural patterning, and the very existence of cooperation among humans, based on micro-level social processes. Although there are exceptions, the models are typically postulated to provide proof that the basic principles are sufficient to explain the observed cultural phenomena. However, they do not usually investigate how the process of transmission itself (rather than the mechanisms for selection or adaptation) affects the evolution of cultural information. In addition, their focus is usually on

the phenomena involved (e.g., polarization) rather than the outcome of that phenomenon on an informational level (e.g., the content and nature of the systems that emerge). The iterated learning framework, which grew primarily out of a desire to better understand language evolution, fills some of these gaps.

The concept of iterated learning emerged in the early 2000s to explain language evolution (Kirby 2001). The central idea conceptualizes cultural transmission as a process in which behavior arises in one individual (or generation) and is then learned by subsequent individuals (or generations), who then similarly provide behavior from which the next individuals (generations) in the chain learn. One of the first applications of iterated learning demonstrated that the process of transmission itself—not just the psychological or cultural fitness landscape—could shape the nature of language evolution (Kirby 2001). For instance, the presence of a linguistic bottleneck (a constraint on the quantity or quality of information flow) in combination with some pressure for expressiveness (or meaning richness) results in compositional languages in which meaning depends in part on the rules for combining words rather than only on the words themselves; either pressure alone does not produce this result (Kirby et al. 2015).

The explanatory power of iterated learning as a framework was greatly enhanced by subsequent theoretical work demonstrating that the limiting behavior of the chains could be mathematically characterized under some assumptions. For instance, Griffiths & Kalish (2007) showed that, under certain assumptions, the end point of evolution depends only on the learners' prior expectations and the size of the bottleneck. In general, it is possible to draw deep parallels between iterated learning and models of biological evolution (Suchow et al. 2017).

These theoretical results increase the utility of the iterated learning framework as an explanatory mechanism for understanding the pressures involved in macro-cultural dynamics. Iterated learning designs have demonstrated that the process of transmission smooths out or regularizes linguistic variability, even though individual learners may themselves have weak tendencies to regularize (Smith & Wonnacott 2010); however, this effect depends somewhat on population structure and the capabilities of the learners (Smith et al. 2017). Iterated learning has been used to explore a variety of other phenomena, including how transmission combines with the nature of human memory to create languages with sequential structure (Cornish et al. 2017), how transmission affects the lexicalization of pragmatic inferences (Brochhagen et al. 2016), and how it affects regularities in nonlinguistic domains such as music and rhythm (Ravignani et al. 2017).

One can gain additional insight by analyzing how changing the mathematical assumptions within iterated learning alters the convergence behavior of the overall system. For instance, if one presumes that the learners transmit information not only based on what they have socially learned from others, but also incorporating their goals and the environment in which they live, then the resulting language will reflect world structure rather than priors alone (Perfors & Navarro 2014). If people do not all share the same prior beliefs, then the eventual population distribution of cultural information is disproportionately affected by people with more extreme priors (Navarro et al. 2017). The systematic evaluation of what happens when these mathematical assumptions change—and which assumptions best describe people and our world—opens up many new areas of research.

In addition to iterated learning, Bayesian and other quantitative analyses have been used productively to study linguistic and cultural evolution via quantitative analysis of the extent to which existing systems appear to have been selected for or adapted in some way. For instance, word order universals and near-universals across the worlds' languages may reflect informational pressures during transmission (Futrell et al. 2015, Maurits et al. 2010). In general, many features of human languages appear to have emerged out of the tradeoff between pressures that favor simplicity, like transmission, and pressures that favor complexity, like expressiveness (Christiansen & Chater

2015, Kirby et al. 2015). This tradeoff is evident in different ways in features as diverse as graphical symbol systems (Garrod et al. 2007), word frequency, transmission length, and transmission complexity (Piantadosi et al. 2011), as well as many different kinds of categorization systems (for an overview, see Kemp et al. 2018). This sort of quantitative research is complementary to iterated learning, since it investigates the outcome of the evolutionary process of cultural transmission and selection, while iterated learning focuses on the process itself. Together, they help us to work toward a more complete picture of how macro-level human cultural artefacts like language emerge through micro-level features of human cognition and communication.

Summary

Each of the approaches discussed above brings distinct components to the problem of linking the micro- to the macro-level. The cultural dissemination models provide an understanding of broad transmission and social network dynamics, evolutionary game theory helps to explicate the importance of adaptation in the form of cost and benefit analysis, and the iterated learning framework and associated Bayesian models provide a theoretically grounded method for analyzing how different selective pressures have distinct effects on the product of cultural evolution. Despite the insights provided by each approach, they have yet to be integrated within a comprehensive theoretical and modeling framework.

MACRO-CULTURAL DYNAMICS: IS THERE A GLOBAL TREND FROM COLLECTIVISM TO INDIVIDUALISM?

Through cross-level linkage, micro-level cultural dynamics aggregate to effect macro-level cultural dynamics, i.e., the trajectories of cultural change over time. Although there is a growing literature on cultural change on a variety of psychological constructs, we focus on research surrounding the hypothesis that cultures have been moving from collectivism toward individualism over the past few decades. This focus reflects the centrality of individualism and collectivism in the contemporary world, particularly from the perspective of culture and psychology and of social sciences more generally. The thesis distantly echoes Tönnies's (1963) characterization of cultural change in nineteenth-century Europe from traditional Gemeinschaft (community) to modern Gesellschaft (society). His basic tenets are discernible in the work of Durkheim (1933) and modernization theory (Knöbl 2003) and have been more recently revived by Greenfield (2009).

Reconceptualizing Individualism and Collectivism

In this section, we conceptualize individualism and collectivism as two broad classes of cultural ideas and practices.

Individualism(s). The defining characteristic of individualism is often regarded by many researchers to be the independent self (e.g., Markus & Kitayama 1991, Triandis 1995); however, the notion of the independent self is itself highly multifaceted. Vignoles et al. (2016) identified seven largely orthogonal dimensions of the independent self in what is arguably the most comprehensive cross-cultural investigation of self-concepts to date, encompassing 55 cultural groups from a variety of world regions including Sub-Saharan Africa (see **Table 3**). We use the term individualism to represent a set of cultural ideas and practices consistent in meaning with the conception of the person as an independent being according to Vignoles et al.'s dimensions. In Vignoles et al.'s

Table 3   A variety of individualisms

Dimension	Description
Self–other difference	Defining oneself in terms of differences from others
Self-containment	Experiencing one's own feelings independently of others
Self-direction	Making decisions on one's own
Self-reliance	Relying on oneself
Consistency	Acting consistently across situations
Self-expression	Expressing one's own feelings
Self-interest	Emphasizing one's own interests and accomplishments

Dimensions of individualism based on Vignoles et al. (2016).

study, no culture was high in all these aspects of independent self, casting uncertainty over the hypothesis that a culture changes uniformly in all aspects of individualism.

Collectivism(s) as cultural practices of assortment. Collectivism can be regarded as the cultural practice of partner selection (Baumard et al. 2013), i.e., what type of people are selected as a partner of social interaction with whom one cooperates. Recall that partner selection is a mechanism of assortment that can help sustain cooperation (see **Table 2**). Different collectivisms encourage selection of different types of partners. Kin-, network-, and attribute-based collectivisms are ideas and practices of interacting and cooperating with others of the same kin (i.e., kinsmen should help each other), with one's partner's partner (i.e., my friend's friend is my friend), and with others that share the same attribute such as a race and religion, respectively. Network- and attribute-based partner selection practices closely resemble what Brewer & Chen (2007) called relational and group collectivism, respectively. Relational collectivism emphasizes the maintenance of harmonious interpersonal relationships, whereas group collectivism emphasizes the significance of social category–based membership. The former tends toward a cohesive and tightly knit small group, whereas the latter enables the formation and maintenance of a large-scale collective that shares a social identity and can also act as a basis for in-group–out-group differentiation and competition. Thus, the latter can act as a basis of group selection.

A special subtype of attribute-based collectivism is nation-state-based collectivism. According to Giddens (1990), nation-states are institutions of governance that combine a highly sophisticated system of surveillance with a powerful means of violence (i.e., military, police). In an idealized form, they combine with democracy as a mode of government selection and the rule of law as a mode of social regulation. Among other things, nation-states provide mechanisms of social control that ensure individuals' mutual cooperation under their jurisdiction. Nation-states can use their powers to sanction individuals who violate their regulatory frameworks, and therefore, under this assurance, individuals can maintain an expectation of cooperation from others under state jurisdiction. In this sense, nation-states provide not only social categories whose membership can act as an attribute for attribute-based partner selection, but also a built-in mechanism of social control to maintain cooperation under its jurisdiction. Those under a nation-state's jurisdiction constitute a civil society, and members of a civil society expect to be able to trust their fellow members to cooperate and coordinate their actions under the same social regulatory umbrella. We interpret generalized trust (i.e., people can be generally trusted) as an indication of civil society–based collectivism.

Caveats. The conceptualization of individualism and collectivism does not imply that they are opposite ends of a continuum. Declining collectivism does not imply increasing individualism or vice versa. Therefore, for instance, declining kin-based collectivism (e.g., increasing divorce rate, decreasing household size) does not necessarily lead to increasing individualism (see Grossmann & Varnum 2015). The finding that generalized trust tends to be high in individualist countries (Yamagishi 2017) is a prominent example of the fact that individualism and collectivism are not necessarily polar opposites. When a nation-state's institutions are functioning well (especially their institutions to maintain social order), its citizens' generalized trust increases (Rothstein & Stolle 2008), and this may facilitate greater coordination of their political, economic, and societal activities. These societies have tended to become prosperous, and their wealth appears to have enabled some aspects of individualism [especially self-expressiveness (see Inglehart & Baker 2000)] to flourish. Under these circumstances, some aspects of individualism do not interfere with the sustenance of cooperation because nation-states' impersonal institutions are always there to enforce cooperation and ensure a means of survival. Nonetheless, psychological tensions that may exist between attribute-based collectivism and individualism are well captured by social psychological theories of collective self (e.g., Brewer 1991, Turner 1987).

Cultural Changes Around the World

A sizable body of empirical research has documented cross-temporal changes in the population distribution of cultural ideas and practices (for recent reviews, see Hamamura 2017, Varnum & Grossmann 2017). This documentation is made possible in no small part by the availability of large archival records such as government records and digitized books [Google Ngram (Michel et al. 2011)], long-running surveys (e.g., World Value Survey, Monitoring the Future, General Social Survey), and decades of cumulative research in psychology (e.g., meta-analyses of published research). Together, these resources have enabled the use of multiple methods to investigate long-term macro-level cultural dynamics (Kashima 2014).

The United States. There is evidence of increasing individualism in terms of self-expression and self-interest in the United States. Increasing self-expressiveness can be inferred from US parents' greater use of unique first names (Twenge et al. 2010). Increasing levels of self-interest can be inferred from a stronger emphasis on the self's accomplishments and interests, as in higher levels of self-esteem (Twenge & Campbell 2001, Twenge et al. 2017), self-enhancement (Twenge & Campbell 2008), and narcissism (Twenge et al. 2008; but on possible regional and ethnic differences in narcissism, see Twenge & Foster 2010). Although there are other indications of increasing individualism—e.g., increasing frequencies of use of first person singular pronouns (Twenge et al. 2013), individualist words in US Ngram corpora (Greenfield 2013, Grossmann & Varnum 2015, Twenge et al. 2012), and individualist words in popular songs (DeWall et al. 2011)—it is at times difficult to ascertain which aspects of individualism these indications are tapping. Unambiguous evidence of increases in aspects of individualism such as self-reliance or consistency is scarce—in fact, there are some signs of waning self-reliance, as demonstrated by an increasing level of external locus of control, which indicates the extent to which people believe external forces are controlling their lives (Twenge et al. 2004).

Kin-based collectivism is weakening, as demonstrated by value surveys (Hamamura 2012, Santos et al. 2017) and by changes in family practices such as divorce rate, household size, and frequencies of multigeneration households and of people living alone (Grossmann & Varnum 2015, Hamamura 2012). Additionally, several indicators suggest a decline in nation-state-based collectivism in the United States. US citizens' generalized trust and confidence in institutions such

as the government, political system, and judiciary have waned over the past 50 years (Hamamura 2012, Twenge et al. 2014), and US presidents have shown a decreased tendency in their addresses to use the term happy to refer to the nation, as in the phrase happy country (Oishi et al. 2013). Indeed, US citizens' confidence in democracy itself appears to have declined over time (Foa & Mounk 2016), maybe because "in recent years U.S. democracy has become appallingly dysfunctional" (Inglehart 2016, p. 19). The US population seems divided about this cultural change, with an increasing polarization toward both extreme conservativism and extreme liberalism (Twenge et al. 2016).

There are mixed trends in the endorsement of general collectivist values such as honoring obligation or obedience (Hamamura 2012), as well as in the frequency of collectivist words like obliged, obedience, or communal; some of these appear to have decreased (Greenfield 2013, Grossmann & Varnum 2015) whereas one shows a steady state over time (Twenge et al. 2012). Arguably, these concepts may be connected to kin-based and local community–based collectivism.

East Asia. Hamamura (2017) suggested that traditional cultural elements have persisted or become even more prevalent despite some cultural change toward individualism in East Asia. On the one hand, there is an increasing amount of discourse favoring individualism in many respects, with the use of some self–other differentiating, self-directional, and self-expressive words increasing in the Chinese Google Ngram corpus within the past two decades (Xu & Hamamura 2014, Zeng & Greenfield 2015, Zhang & Weng 2018). In addition, Japanese parents increasingly use unique baby names (Ogihara et al. 2015). The endorsement of self-directional values (e.g., independence in child socialization) has increased in Japan (Hamamura 2012, Santos et al. 2017), although it remains stable in China (Santos et al. 2017). On the other hand, the cultural importance of individual rights appears to have declined in Japan (Hamamura 2012), and the use of first person singular pronouns in China shows a complex pattern of ups and downs over time (Hamamura & Xu 2015). Similarly, self-interest, as gauged by positive self-regard, bucks the trend of increasing individualism. Cross-temporal meta-analyses of studies reporting mean levels of self-esteem of their samples reveal a declining trend in both China (Liu & Xin 2015, Xin et al. 2012) and Japan (Oshio et al. 2014). Ogihara and his colleagues (Ogihara 2016, Ogihara et al. 2016) also found declining self-esteem over time in surveys of Japanese students and young adults.

In the case of collectivism, Hamamura (2012) found mixed trends in Japan. Kin-based collectivist practices have declined in many ways—the rates of divorce and people living alone have increased, and household size has decreased. However, other indicators are less clear. Levels of unconditional respect for parents and the importance of friends (presumably as opposed to family) changed little, but emphasis on family life (as opposed to work) has decreased. This last trend may indicate a strengthening of company-based collectivism rather than a waning of kin-based collectivism, however. The importance given to honoring obligation has also increased. Overall, levels of nation-state-based collectivism within Japan show a complex pattern. Although the number of individuals who agree that their country is important and most people are trustworthy did not change much, a slightly differently worded statement ("Most people would not take advantage of you") shows a trend of greater endorsement over time.

In China, general collectivist discourse also shows mixed trends since the 1980s, when economic reforms began to take shape. On the one hand, the frequencies of collectivist words (Zeng & Greenfield 2015, Zhang & Weng 2018) and first person plural pronouns have decreased (Hamamura & Xu 2015). On the other hand, words and phrases that imply kin-based collectivism (e.g., family, parents) and those that China experts regard as traditionally important (e.g., doctrine of mean, Confucian ethics, filial piety, Chinese New Year) have increased in frequency (Xu & Hamamura 2014, Zhang & Weng 2018). Finally, there are some signs of weakening nation-state-based

collectivism. Words like democracy and patriotism have become less frequent over time (Xu & Hamamura 2014), and interpersonal trust has decreased (Xin & Xin 2017).

Other countries. Inglehart & Baker (2000) showed an increase in self-expression in a majority of the countries they examined from 1980 to 1998 based on the World Value Survey. Santos et al. (2017) found an overall increasing trend in self-direction and self-expression (e.g., the importance of friends over family, independence in child socialization, and self-expression) using the World Value Survey and European Values Survey over a more recent period in the 53 countries that they examined. According to their supplementary materials, statistically significant increases were found in 40% (21 of 53) of those countries. Germans are increasingly using individualist words (Younes & Reips 2018), and research in a Mayan community in Mexico found an increase in skills for managing novel and self-expressive weaving patterns (Maynard et al. 2015). A majority of countries [71%, or 29 of 41 (Santos et al. 2017, supplementary materials)] show a statistically significant decline in kin-based collectivism (based on divorce, household size, and living alone); however, there are exceptions in countries near the Equator in Asia (Bangladesh, Fiji, Malaysia), Africa (Burkina Faso, Cameroon, Malawi, Mali, Morocco, Zambia), and Central America (Costa Rica, Dominican Republic, Haiti) (Santos et al. 2017).

Noteworthy exceptions can also be found in countries of the former Soviet Union, such as Belarus, Estonia, Latvia, Lithuania, and Russia. These countries showed a decline in self-expression in Inglehart & Baker's (2000) analysis and showed no change in Santos et al.'s (2017) work, as did Ukraine. Correspondingly, the frequency of individualist words over the period after the October Revolution (1917) up to the perestroika reforms (1985) showed only a slight, nonsignificant increase, although there was a strong increase from 1986 to 2009 (Skrebyte et al. 2016).

Also intriguing is the finding that there does not appear to be any change in self-interest (self-esteem) in Australia from 1978 to 2014 (Hamamura & Septarini 2017). This trend diverges from the US pattern despite Australia's general cultural similarity to the United States. Hamamura & Septarini (2017) explained this in terms of US vertical versus Australian horizontal individualism; Australia places a strong emphasis on egalitarianism, while the United States emphasizes distinguishing oneself from others in terms of competition, achievement, and power.

Why do cultures change? The socioeconomic environment appears to be a critical driver of cultural change, although the natural environment (e.g., pathogens, natural disasters) may also play some role (Grossmann & Varnum 2015, Santos et al. 2017). Socioeconomic development is high if a country is urbanized and populated by wealthy (high GDP per capita), better educated, and more skilled citizenry (Greenfield 2013). Socioeconomically developed countries, by this standard, tend to be well-established nation-states with democratic institutions, and Grossmann, Varnum, and their colleagues' (Grossmann & Varnum 2015, Santos et al. 2017) work showed that socioeconomic development in this sense tends to increase individualism as measured by self-directiveness and self-expressiveness (see also Bianchi 2016).

That said, other aspects of individualism may not show the same trends in all countries. Although wealth has increased in Australia, China, Japan, and the United States, only the United States has shown an increasing trend of self-interest as gauged by positive self-regard. There are other exceptions. Skrebyte et al. (2016) found that economic prosperity was associated with greater frequencies of collectivist ideas in Russia between 1961 and 1994. Broadly speaking, although Hofstede (1980) found a strong correlation between national wealth and individualism, this relationship is nonsignificant in some countries (Kashima & Kashima 2003), hinting at the presence of a factor that may moderate the effect of socioeconomic development on individualism.

In the case of collectivism, there is evidence that socioeconomic development decreases kin-based collectivist practices (Santos et al. 2017). However, this effect is moderated by climate stress. In countries with greater climate stress and more challenging natural environments, socioeconomic development reduces kin-based collectivist practices to a greater extent than in countries with less climate stress. In those countries with poor institutional support, kin-based cooperation may play a significant role in adapting to the natural environmental challenges; however, kin-based support may become less critical as infrastructure improves in these countries. In countries with optimal climate, kin-based collectivism appears to be relatively weak regardless. An interaction between socioeconomic development and climate stress was not observed for individualist values. It is important to note that, currently, strong evidence exists only for declining kin-based collectivism but not for declines in other collectivisms.

Summary

The ongoing global changes—the deepening globalization of market-driven economy and concomitant change in the role of nation-states as an institutional framework—have had a powerful effect on culture. In general, these changes have made many countries more affluent but have also widened the wealth gap both between richer and poorer countries and within many countries. This may be interpreted in terms of an increasing selective pressure in favor of many, but not necessarily all, individualist ideas. One aspect of individualism, positive self-regard, appears to have increased in the United States but not in East Asia or Australia, suggesting the influence of a moderating factor.

In terms of collectivism, kin-based collectivist practices of partner selection, as reflected in a traditional family structure, seem to have declined. There also appears to be a decrease in generalized trust, which we interpret as a nation-state- and civil society–based societal collectivism. Together with a sign of declining confidence in the existing institutional framework in the United States (Twenge et al. 2014) and other countries around the world (Foa & Mounk 2017), this decrease in generalized trust may indicate that the psychological underpinnings for the current nation-state-based system of global governance are waning. One of the factors that may play an important role in this decline is economic inequality: Although an average economic upturn tends to improve generalized trust, economic inequality tends to depress it, at least in the United States (Twenge et al. 2014). If this is also true about other countries, then economic equality may be playing a significant role in the ongoing global cultural change.

CONCLUDING COMMENTS AND FUTURE DIRECTIONS

Research on the social psychology of cultural dynamics has accumulated a great deal of knowledge. At the micro-level, cultural information that is easier to produce, ground, interpret, or remember, and is therefore less costly or more rewarding to process at the cognitive and social levels, is more likely to be culturally transmitted. On average, cultural information is especially likely to be transmitted if it is about agency or sociality, if it is emotive, if it is valid, and if it is generally meaning rich.

Formal and agent-based models have served as the primary investigative tool for linking micro- and macro-cultural dynamics. Such approaches are useful in specifying the mechanisms sufficient to generate broad cultural phenomena such as polarization, spatial clustering, and cultural patterning, as well as to quantitatively evaluate the effects of competing pressures imposed by cognition and communication. Still, a great deal more remains to be done to understand these mechanisms and

pressures, to yield more specific predictions about cultural phenomena of interest, and to combine these distinct approaches and thus leverage the explanatory power of each.

Macro-level cultural changes have been examined in several countries across the world—primarily the United States, with some focus on other regions, especially East Asia. The working hypothesis that modern cultural change proceeds from collectivism to individualism has been tested using increasingly sophisticated and diverse methods, and global trends may indeed be described in broad terms as increasing individualism and declining collectivism on average in those countries where data are available. However, more detailed examinations show exceptions and nuances, suggesting that the idea of a unilinear cultural change from collectivism to individualism is untenable. More generally, it is important to be reminded that a sample of countries included in a study constrains the generalizability of its findings in a multinational investigation of macro-level cultural dynamics.

In considering future research, three main issues stand out. First, there are a number of methodological issues surrounding cultural dynamics research (Kashima 2014, Sun & Ryder 2016), including the question of whether a significance test or an effect size should be a basis for inferring a macro-level cultural change (Trzesniewski & Donnellan 2010, Twenge & Campbell 2010) and statistical issues of autocorrelation and autoregression (Koplenig & Müller-Spitzer 2016).

Second, there need to be greater efforts to bring micro-level and micro–macro linkage research to bear on the study of macro-cultural dynamics like individualism and collectivism. Existing efforts in this regard include Imada & Yussen's (2012) work on collectivism and Nowak et al.'s (2016) work on culture of honor. Future research can be oriented toward further cross-fertilizations of different levels of analysis.

Third, of particular importance in the contemporary world are investigations about the mechanisms of cultural change. As we face the global challenges of the twenty-first century, e.g., climate change and intergroup conflict, there is an increasing need for humanity to be able to harness our own culture so as to better adapt to the changing natural and human-made environments (Kashima 2016b) and to recognize the role of culture in these processes (Bain et al. 2016). If cultural information in our common ground tends to perpetuate itself, and socially transformative information that challenges the cultural status quo is harder to transmit (Connor et al. 2016), then greater efforts need to be directed toward a better understanding of the mechanisms of the transmission, retention, and adoption of transformative cultural information. Of particular interest is information about the types of cultural change that people expect or desire (Bain et al. 2013) and consideration of the psychological consequences of these types of change (Fernando et al. 2018). Behavior change is a critically important subject for translational cultural dynamics research in the future (Wilson et al. 2014).

SUMMARY POINTS

1. Culture consists of socially transmittable information in a population that can potentially influence the thoughts, emotions, and actions of individuals. The combination of genetic and cultural information enables the human population to construct its niche to adapt to both natural and human-made environments, including built, economic, social, and psychological ones. The critical feature of the cultural dynamics perspective is population thinking: The fundamental questions are how novel cultural information enters into a population, how cultural information is transmitted and retained, and how cultural information is selected in or out of the population.

2. Although culture is often treated as if it is stable over time, researchers have begun to study its dynamics. The study of micro-level cultural dynamics examines the processes and mechanisms by which cultural information is subjectively and intersubjectively produced, grounded, interpreted, and committed to memory in the individual mind and body, but also deposited into cultural artefacts (i.e., human-made objects in the world, including stories and images). The study of macro-level cultural dynamics investigates the trajectory of cultural change, namely, changes in the distribution of cultural information within a population over time. There exist dynamic interrelationships between the two levels such that micro-level cultural dynamics generate emergent macro-level processes, while macro-level cultural dynamics influence micro-level cultural dynamics.

3. One of the most critical questions in micro-level cultural dynamics concerns cultural transmission: What types of cultural information are transmitted and retained in a population? Certain kinds of information are more likely to be transmitted and retained than other kinds. These kinds include information about agency and sociality—what can affect things in the world and how others socially relate to each other. Pragmatically or socially validated information, along with emotive information, is also more likely to be transmitted and retained. However, these general tendencies are modulated by the context of cultural transmission. Cultural information consistent with the common ground is more likely to be transmitted than information inconsistent with the common ground when social connectivity is emphasized in the context; pragmatically relevant information is more likely to be transmitted when task performance is emphasized. These tendencies likely help the senders and receivers of cultural information to adapt to the local niche, which interfaces with the broader, external natural and human-made environments.

4. Micro–macro linkage dynamics are often researched using formal models and computer simulations. In psychology, models of cultural dissemination, evolution of co-operation, and iterative learning have often been used to shed light on general cultural phenomena, such as polarization, spatial clustering, and cultural patterning. Each of these models brings complementary strengths—communication and social network dynamics, adaptation through cost–benefit processes, and rich cognitive models and experimental paradigms, respectively. However, they have yet to be integrated into a unified theoretical framework or brought to bear on the micro–macro linkages that relate to critical research questions in culture and psychology, such as individualism and collectivism.

5. Studies have begun to investigate macro-level cultural dynamics using a variety of research methods and on a number of cultural issues. One of the most active research foci has been an examination of the hypothesis that world cultures have changed from collectivism to individualism. In this research area, individualism*s* and collectivism*s* are reconceptualized as two classes of diverse cultural ideas and practices. Individualisms imply different conceptions of the person as independent being, such as self-direction, self-expression, and self-interest; collectivisms describe different cultural ideas and practices for partner selection.

6. We suggest that the trajectory of cultural change appears to differ across countries and regions depending on which aspects of individualisms and collectivisms are examined. There is consistent evidence for increasing individualism, particularly self-expression, in several countries around the world, and socioeconomic development (e.g., high income,

high education) is often correlated with this trend; however, there are some exceptions to this rule in former Soviet Union countries. Although there is evidence of increasing self-interest (especially as measured in terms of positive self-regard) in the United States, evidence is weak or nonexistent for East Asia or even Australia. Conversely, there is consistent evidence of declining kin-based collectivism and nation-state-based collectivism in many parts of the world; however, little research exists about cultural trajectories in race-based or religion-based collectivism around the world. It is nonetheless important to be reminded that not only the sample of participants in a country, but also the sample of countries included in a study critically constrains the generalizability of the study's findings.

FUTURE ISSUES

1. One of the fundamental questions in the current perspective is what a population is. From a pragmatic viewpoint for a specific research project, it may be possible to select an appropriate level of human groupings, varying in inclusiveness from a relatively small community through nation-states and regions of the world. The objective of the inquiry may determine the relevant population. However, the concept of population as something that can be treated as a largely isolated and self-contained human grouping may be untenable in the globalized world where most human groups exchange goods, services, and information at an unprecedented speed and scale. Should we then treat the whole of humanity as a population in cultural dynamics research? If all human groupings need to be treated as statistically non-independent, then the result is a contemporary version of Galton's problem: How should the statistical dependencies among human populations be treated?

2. Future research needs to address some of the inherent methodological questions about cultural dynamics research, i.e., time. Most of the cultural dynamics research is concerned with change and stability in mean levels of the psychological construct at stake. However, it is unclear what amount of change can be called a cultural change. Is the statistical significance of a correlation between mean and time a good guide, or should we use effect size? If the latter, what level of effect size is necessary? Can a cultural change be defined in terms of variance, skewness, or any other characteristics of a distribution? This definition may be not only possible, but also necessary, as in the case of income inequality, which is a good example of a characteristic of income distribution that is not its mean. Other examples include the degree of polarization or multimodality of a distribution. Finally, there is a critical question of temporal autocorrelation and other forms of cross-temporal dependencies of time series data. These issues need to be examined and evaluated in the context of cultural dynamics research.

3. Of the three fundamental processes of cultural dynamics, two—cultural transmission and selective retention—have been the focus of much of the research. The third process—how novel cultural information enters a population—has been investigated largely in terms of importation, and particularly in terms of how a receiving population responds to the imported information. Little is known about the process of exporting cultural information despite prominent examples, such as extremist groups exporting cultural

information to encourage terrorist activities. Invention—indigenous generation of novel cultural information in a population—should be further investigated given the significance of this process.

4. In terms of the micro-level dynamics of cultural transmission, imitation and instruction have been investigated largely in developmental psychology, whereas collaborative horizontal transmission has been explored in social psychology. A further integration and cross-fertilization between these areas of investigation would be a fruitful future direction. One pressing issue is the transmission and retention of novel or counternormative cultural information. That is, if there is a tendency to transmit and retain cultural information that is consistent with the prevalent cultural ideas and practices, how can the transmission and retention of transformative cultural information be facilitated? Another issue is the effect of cultural transmission on social structuration, that is, how the process of transmitting and sharing cultural information may structure the relationship between the sender and receiver of the information in relation to other social entities.

5. How micro-level processes give rise to macro-level dynamics is a perennial social science question of micro–macro linkage. To answer this question, first, further improvements of theories and models are needed. Different mechanisms and strengths highlighted by diverse theoretical approaches may be brought together to improve models and the methods of model validation. Second, modeling efforts may be further directed toward some substantive theoretical issues, such as the transmission of socially transformative cultural information and macro-level trajectories in individualisms and collectivisms.

6. Research on macro-level cultural dynamics can be further extended beyond individualism and collectivism and could also include diverse countries and cultural groups. Although the literature is growing in both depth and breadth, its growth can be further facilitated by bringing in broader insights from social scientific disciplines other than psychology, such as anthropology, sociology, political science, and economics. Changing levels of nation-state- and civil society–based collectivism may be of particular importance in the wake of deepening globalization and gathering populism in many economically advantaged countries. It is important to be reminded that the sample of countries included in a study constrains its findings.

7. Many of the global challenges to humanity in the twenty-first century are human made and therefore self-inflicted. Climate change is an example: Human niche construction after the Industrial Revolution using fossil fuels and engaging in other greenhouse gas emitting activities (e.g., methane-generating agriculture) caused runaway greenhouse effects and ocean acidification. Meeting these challenges requires technological as well as behavioral adjustments to the contemporary human niche construction activity, and therefore cultural change will have to be part of a blueprint for humanity. How can we effect a cultural change and steer the trajectory of macro-level cultural dynamics? This is probably the most important direction for future research.

DISCLOSURE STATEMENT

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