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Norm Dynamics: Interdisciplinary Perspectives on Social Norm Emergence, Persistence, and Change

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Abstract

Social norms are the glue that holds society together, yet our knowledge of them remains heavily intellectually siloed. This article provides an interdisciplinary review of the emerging field of norm dynamics by integrating research across the social sciences through a cultural-evolutionary lens. After reviewing key distinctions in theory and method, we discuss research on norm psychology—the neural and cognitive underpinnings of social norm learning and acquisition. We then overview how norms emerge and spread through intergenerational transmission, social networks, and group-level ecological and historical factors. Next, we discuss multilevel factors that lead norms to persist, change, or erode over time. We also consider cultural mismatches that can arise when a changing environment leads once-beneficial norms to become maladaptive. Finally, we discuss potential future research directions and the implications of norm dynamics for theory and policy.

Contents

INTRODUCTION

Few concepts in the social sciences have captured as much interdisciplinary attention as social norms, or the implicit and/or explicit rules that guide and constrain behavior. Social norms create a shared understanding of what is and is not acceptable across all types of human collectives—from groups of friends to organizations to nations. Indeed, adherence to such norms is a foundation of well-functioning communities and the glue that holds society together. At the same time, while some norms are very stable, others can change rapidly. Understanding the emergence, persistence, and change of social norms is crucial for advancing interdisciplinary science and developing policies that can harness the power of social norms for the betterment of society and its members.

In this article, we provide an interdisciplinary review of the emerging field of norm dynamics. Research from anthropology, computer science, economics, evolutionary biology, philosophy, social psychology, sociology, and organizational behavior has grappled with the emergence, persistence, and dynamic change of social norms across different levels of analysis—from the individual to the small group to nations at large. Nevertheless, much of this literature remains in its own

silos and is in sore need of integration. After reviewing key distinctions in theory and method, we discuss a cultural evolutionary framework that forms the basis of our review. Next, we scrutinize research on the emergence of social norms, first discussing norm psychology—the learning and acquisition of social norms and their cognitive, developmental, and neurobiological underpinnings. We then turn to how intergenerational transmission, the structure of social networks, and group-level ecological and historical factors affect the emergence and spread of norms. We then discuss the multilevel factors that affect norm stability and persistence versus norm change and erosion over time. Our review of norm dynamics illustrates cultural mismatches that can occur when norms that have been highly adaptive in one ecological niche become maladaptive when the environment changes. We conclude by discussing future directions that this review invites and the implications of norm dynamics for theory and policy.

KEY DISTINCTIONS

Social norms have a long history and a short past. Some 4,000 years ago, one of the first-identified human codes of formal rules and punishments for behavior, later known as the Code of Hammurabi, was found. The code described 282 regulations put forth by Hammurabi, the king of Mesopotamia from 1792 to 1749 BC. While progressive for its time, the rules, designed to keep social order, were very strict. Robbery of any kind was punishable by death. Slander was punished with a marking on one's brow. A son who struck his father would have his hands cut off. The best-known Hammurabi rules pertained to retaliation, such as "If a man destroys the eye of another man, they shall destroy his eye" and "If one breaks a man's bone, they shall break his bones." One of the earliest records of the mechanisms by which groups enforced social control, the Code of Hammurabi influenced codes of conduct in the surrounding region for well over a millennium. Later, social norms were discussed in many religious texts, including the Bible, the Quran, and the Vedas (Norenzayan et al. 2016), and by numerous ancient philosophers, from Aristotle, Confucius, and Thomasius to Locke, Hume, and beyond (Legros & Cislaghi 2020). Arguably, social norms were not a subject of scientific inquiry until Durkheim's (1895) *The Rules of Sociological Method*, which initiated an explosion of research across disciplines in the twentieth and twenty-first centuries.

While definitions of social norms differ across disciplines, they share a focus on two related phenomena: beliefs about what most people actually do and beliefs about what people should do (Morris et al. 2015). The former are known as descriptive norms (Cialdini & Trost 1998), empirical expectations (Bicchieri 2005), and folkways (which emerge from routines, such as waiting in line). Depending on the discipline, the latter are described as injunctive norms (Cialdini & Trost 1998, Jacobson et al. 2011), normative expectations (Bicchieri 2005, Krupka & Weber 2013), mores (which specify what is moral or unethical), taboos (strict prohibitions on behaviors seen as objectionable), prescriptive norms (which encourage positive behavior) and proscriptive norms (which discourage negative behavior) (Horne & Mollborn 2020). The two main types of social norms can be distinguished from conventions (e.g., brushing one's teeth) and behavioral patterns (e.g., using umbrellas in the rain) (Andrighetto & Vriens 2022, Bicchieri 2005). They are also differentiated from personal norms or normative beliefs that reflect moral values (Bicchieri 2005), which may or may not be influenced by group norms (Spears 2021). The degree to which groups adhere to such norms is referred to as tightness–looseness (Gelfand et al. 2011). A system of norms is referred to as an informal institution (North 1991), and norms can be formally institutionalized by state authorities into laws. Finally, people can incorrectly perceive what others' beliefs are, a phenomenon known as pluralistic ignorance (Miller et al. 2000), and/or they may misrepresent their personal preferences to fit in with peers or avoid criticism from authorities, a phenomenon known

as preference falsification (Kuran 1987). Both phenomena, as discussed below, are implicated in norm persistence and change.

The emergence of norms and their stability and change have been studied using a wide range of methods. In psychology, research tends to rely on laboratory and field studies across the life span and neuroscience methods that peer into the brain. Within economics, empirical research often relies on data from ethnographic sources, archival research, large-scale survey data, and a range of empirical techniques—like instrumental variables or regression discontinuity—to try to distinguish spurious correlations from causal relationships. Increasingly, social norm dynamics have been studied using mathematical and computational approaches. One approach uses game-theoretic methods, which assume that individuals attempt to maximize their payoffs or utility (which may include material and nonmaterial components). In this approach, social norms emerge as a typical or common behavior as a result of social interactions directly affecting individual payoffs, which are then stabilized by forces that reduce the payoffs of deviating behaviors, such as miscoordination costs and/or punishment (Young 2015). Another modeling approach, based on social influence theory, describes changes in individual opinions as resulting from discussions about personal preferences (Flache et al. 2017). This approach is often used to study convergence to a consensus of opinions (i.e., a single norm) or a polarized state (with multiple norms simultaneously present in the population). In both approaches, the transmission of norms can occur between individuals of the same or different generations as a result of imitation and copying. Traditionally, game-theoretic models and social influence models have been developed largely independently. More recently, however, there has been a trend toward unifying these two approaches into more general and realistic models (Calabuig et al. 2017, Gavrilets 2021, Loewenstein & Molnar 2018) that consider additional cognitive processes (e.g., cognitive dissonance, theory of mind, social projections, and logic constraints). All of these methods offer unique and complementary perspectives into the study of norm dynamics.

NORM DYNAMICS: A CULTURAL EVOLUTIONARY FRAMEWORK

Our review of the emergence, persistence, and change of social norms integrates research across the disciplines through a cultural evolutionary framework. Humans have lived in groups throughout our evolutionary history, which has important implications for individual fitness. First, living in groups allows us to learn beneficial behaviors from group members, and indeed, research shows that imitation and imprinting are widespread among humans (Whiten 2021). Second, group living and shared interests create opportunities for individuals to enjoy the benefits of cooperation and mutual aid [Darwin 1871, Kropotkin 2021 (1902)]. Yet, importantly, shared interests do not necessarily remove competition between group members for resources or mating opportunities (Darwin 1871). Cooperation can bring new challenges to be resolved, such as coordination (Fichtel et al. 2011) and free-rider problems [Olson 2012 (1965)]. Moreover, individuals can manipulate group members via tactical deception to increase their own benefits (Byrne & Whiten 1988). Dominance hierarchies, which are present in many social groups, make certain individuals particularly effective at enforcing their preferences on others, which may lead to the evolution of conditionally submissive behavior.

In humans, some of these traits and features are much more exaggerated than in other animals (Richerson et al. 2021) due to numerous factors acting in parallel during the evolution of our species. Historically, harsh and fluctuating ecological conditions—which were characteristic of the Pleistocene environment (Richerson et al. 2021)—put a premium on both cooperation and social learning (Neco & Richerson 2014). In turn, reliance on social learning created conditions for the evolution of active teaching (Fogarty et al. 2011). Moreover, it has been argued that

humans went through a process of self-domestication, which changed some of our morphological and physiological traits as well as our behavior. Self-domestication could have been achieved by partner choice (Hare 2017) or by killing aggressive individuals (Wrangham 2019) or their offspring (Kimbrough et al. 2021). The inferred collective outcomes of these processes were reduced aggression and greater willingness to submit to the wishes of other group members. Indeed, relative to our nearest kin, humans are characterized by a much longer childhood and the involvement of nonparents in socializing children. These features may have further reinforced children's obedience to parents and other adults (Bouchard 2009), and in adulthood, this led to conformity with prestigious individuals and authorities. In addition, the emergence of language opened up a completely new way of influencing not only the behavior of others but also their attitudes and beliefs.

These processes have a number of important multilevel evolutionary consequences. At the micro level, overimitation and norm psychology have emerged. The former is a tendency in both children and adults to copy causally relevant actions of others (and even presumably unnecessary actions) to achieve a given goal (Hoehl et al. 2019, Watson-Jones et al. 2021). The latter is "a suite of genetically evolved cognitive mechanisms that rapidly perceive the local norms of one's social group and acquire them" (Chudek et al. 2013, p. 432). According to this view, a propensity to follow norms is at least partly an innate feature of our psychology, whereas the substantive content of the norms of a given society is largely cultural (Chudek & Henrich 2011). A cultural evolutionary framework also situates these psychological processes within a multilevel framework that details the proximate factors that help clarify *how* norms are transmitted, maintained, and changed as well as the ultimate factors that aim to identify *why* distinct patterns of norms evolve as an adaptation to their distal ecological and historical environments (Mayr 1961). Much like biological evolution, the emergence, rise, decline, and/or erosion of norms occur in systematic ways, dictated by their net benefit relative to other competing norms. Norms that do better tend to become more common, and those that do worse become less common. Furthermore, similar to biological evolution, persistence and change typically occur in a gradual, incremental manner. A cultural evolution framework thus raises the interesting possibility that norms that have been optimized over time may be mismatched to current environmental pressures—what we refer to as *cultural evolutionary mismatches* (Gelfand 2021, Nunn 2022). With this framework in mind, we next review research across the disciplines regarding the key factors that affect social norm emergence, persistence, and change (see **Figure 1** for a visual summary).

HOW DO SOCIAL NORMS EMERGE?

The process of norm emergence and spread includes a variety of multilevel factors, ranging from individual-level processes involved in norm psychology (e.g., beliefs, expectations, and complex neurobiological and cognitive processes involved in learning, social reasoning, and acquisition) to interpersonal and social network factors that facilitate the spread of norms, to the larger ecological and historical context in which norm emergence is situated.

Individual Level: Norm Psychology

The ability to develop, maintain, and enforce social norms begins with the suite of psychological tools that have evolved over centuries to enable individuals to detect and learn about the web of social expectations in their environments (Chudek et al. 2013, Kelly & Davis 2018, Sripada & Stich 2005). Indeed, research has shown that we become attuned to social norms at a remarkably early age. By age three, children can infer rules from games (Clément et al. 2011) and differentiate conventional norms (those that sustain the social order) from moral norms (those that involve

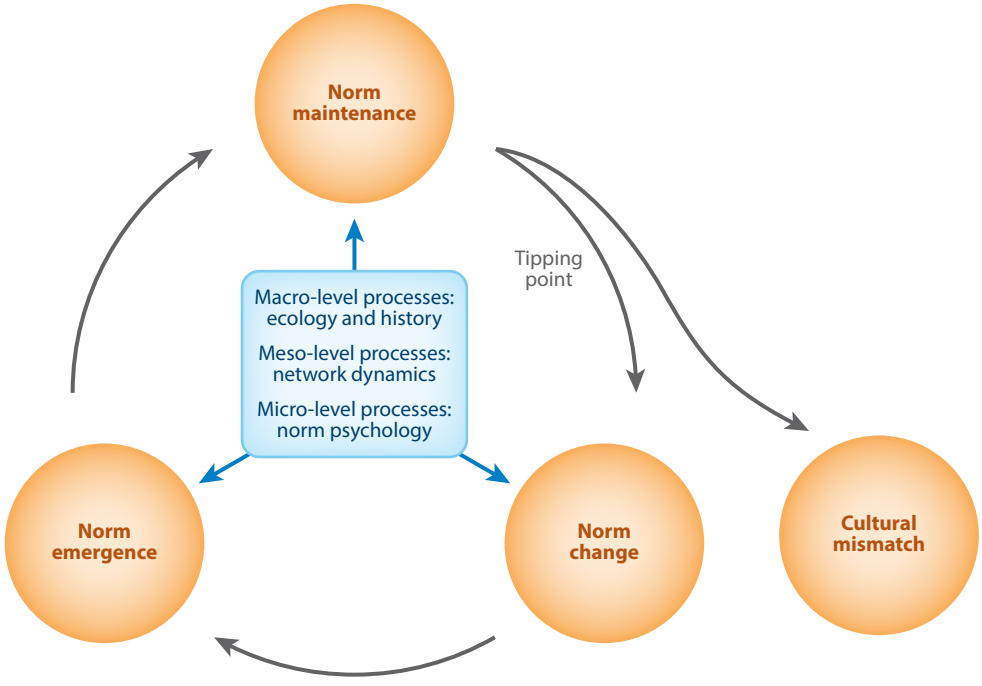

Figure 1

Norm dynamics: emergence, persistence, and change.

issues of well-being, justice, and rights) (Schmidt & Rakoczy 2019). By age five, children recognize that it is considered wrong to ignore a person who is hurt or to laugh at them, while three-year-olds are generally only aware of the latter (Paulus et al. 2020). This suggests there is a developmental step between ages three and five that allows children to make more complex inferences about good or bad behavior. At later ages (i.e., seven-and-a-half to nine years), children engage in costly sharing of norms (House & Tomasello 2018). Globally, although children from different countries appear to learn about social norms at a similar rate, they show increasing between-group variation in line with their culture-specific norms at around ages eight to ten, when they become more sensitive to the norms around them (House et al. 2020).

Other research has elaborated on the specific cognitive mechanisms underlying these developmental milestones. One candidate for such mechanisms is the development of shared intentionality (Tomasello 2018), or the ability to share attention and mental states (e.g., goals and intentions). The development of self-consciousness is also thought to be key in facilitating norm-following behavior—from the developing self-concept at 2 months to selectivity and intersubjectivity at 9 months, identification with others at 14 months, understanding of possession at 21 months, and the ability to make inferences about others' mental states at 60 months (Rochat 2015). Another possible mechanism involved in development is adult guidance. Children infer normative interpretations from adult actions (Schmidt et al. 2011) and gauge rules from the gaze of their caregivers (Kidwell 2005). Indeed, as discussed previously, children overimitate adults, believing unnecessary actions ought to be performed even after learning these actions are irrelevant to the final goal (Kenward 2012), particularly for conventional behaviors (see Watson-Jones et al. 2021 for a review). However, children can also develop social norms around a common game with other children even without adult guidance (Göckeritz et al. 2014).

Research has also documented some of the neurobiological foundations of norm psychology. From an evolutionary perspective, the human brain presumably evolved neural mechanisms supporting the detection of social norms. Using functional magnetic resonance imaging (fMRI), Berthoz et al. (2002) showed that stories about norm violations, relative to normative stories, led to greater brain activation in the medial prefrontal and temporal areas (which represent and interpret others' mental states and intentions) and the lateral orbitofrontal areas (which are involved in responding to the aversive emotional reactions of others, such as anger). Intentional norm violations also evoked different neural activations than unintentional ones, particularly in brain regions involved in cognitive processing of others' mental states, such as the superior and medial frontal cortex, temporal pole, and left inferior parietal cortex, which reflect brain networks involved in mentalizing others. Using electroencephalography (EEG), Mu et al. (2015) found a prominent N400 component (a negative shift in event-related potentials around 400 ms that serves as a potent neural index of the detection of socially incongruent information and processing of anomalous social cues) when individuals were witnessing norm-violation scenarios (e.g., Mary is in a library, she is dancing) relative to the appropriate behavior (e.g., Mary is in a tango lesson, she is dancing) at the central and parietal regions. Neural reactions to norm-violating information are more pronounced in cultures where norms are perceived to be tight (Goto et al. 2022, Mu et al. 2015, Salvador et al. 2020) and there is little residential mobility (Luo et al. 2019). Genetic underpinnings of social norm detection have only recently been explored. According to the norm sensitivity hypothesis, the acquisition of social norms is influenced by reinforcement-mediated social learning (i.e., that which allows individuals to choose behavioral options that maximize anticipated rewards), which is facilitated by the dopamine D4 receptor (DRD4) gene. Consistent with this, Kitayama et al. (2016) found that carriers of the 7R and 2R alleles, relative to noncarriers, were more sensitive to social norms.

Meso Level: Norm Emergence and Spread

At the population level, the emergence and spread of norms is generally driven by the perceived benefits and costs (material or reputational) of corresponding actions and by social influence processes that occur within specific network structures (Constantino et al. 2022, Young 2015). One of the easiest ways for a norm to emerge is when there is a need to coordinate (e.g., on which side of the road to drive) to increase benefits or decrease costs (Hawkins et al. 2019). Norms also emerge spontaneously through interactions with close others. In one experiment (Centola & Baronchelli 2015), participants were assigned positions in a particular network and interacted only with their neighbors. During each dyadic interaction, they were rewarded or penalized based on whether they used the same or different names for a pictured object. Local interactions quickly led local conventions to emerge, and moreover, increased network connectivity caused the spontaneous creation of universally adopted naming conventions (see also Centola 2015). Similar processes have been observed in real life. Danescu-Niculescu-Mizil et al. (2013) used data from two large beer review communities in which users provided ratings and textual reviews of more than 60,000 different types of beer. They illustrated the dynamics of linguistic norms, such as when a norm referring to the smell of a beer as "aroma" emerged and spread but then was replaced by a different norm, namely the use of the word "smell." Most users followed a two-stage lifecycle in their susceptibility to norms: an innovative stage, when they adopted the community's language, and a conservative phase, in which they stopped changing. The spontaneous emergence of social norms from conventions can become normative over time, with participants not only following the norm but also strongly disapproving of norm violators (Przepiorka et al. 2022; see also Eriksson et al. 2015 and Lindström et al. 2018 on the "common is moral" heuristic).

One mechanism through which norms spread is social learning processes. In such processes, individuals copy others, particularly when individual learning is costly or needed information is absent or difficult to obtain (Rendell et al. 2010, Richerson & Boyd 2005). Indeed, as a result of our species' strong reliance on social learning throughout our evolutionary history, copying others has become an important part of our psychology (Richerson et al. 2021) and may even occur outside of our conscious awareness (Kwan et al. 2015). Social learning strategies can be unbiased (random) or based on a variety of criteria, such as copy the majority, copy the most effective behavior, or copy the high-ranked, prestigious, or most successful individuals (Kendal et al. 2018), and the efficiency of any particular social learning strategy largely depends on the specific context and on environmental conditions (Muthukrishna et al. 2016). For example, Weber & Murnighan (2008) showed that even a single unwavering contributor can effectively catalyze the establishment of a cooperative norm, especially if the contributor is of high status. This finding is consistent with mathematical models documenting the effects of prestigious individuals on the evolution of cooperation (Henrich et al. 2015). Interestingly, people sometimes pay more attention to the behavior of lower-ranking than higher-ranking individuals, expecting the former to be more attentive to the group's social norms (Dannals et al. 2020). Even the behavior of outliers in groups can have a strong influence on norm inferences, though this influence decreases as the outlier becomes more extreme (Dannals & Miller 2017). People have been found to copy completely arbitrary norms that do not reflect their preferences, as long as they are perceived to be characteristic of the groups to which they belong (Asch 1956, Pryor et al. 2019). Copying such arbitrary or "silly" norms may have a function: People are better able to learn about important functional norms when they are paired with silly rules, as this gives them more practice in rule enforcement (Köster et al. 2022). More generally, norm learning that uses an adaptive strategy (in which agents can choose between different styles) rather than a fixed strategy (either individual or social learning) results in faster norm emergence (Yu et al. 2016).

Research has shown that the speed of norm emergence depends both on the structure of networks and on the number and types of possible actions individuals have. Sen & Sen (2010) found that norms emerge faster on ring networks as compared to scale-free networks (i.e., networks that have a few highly connected nodes and many nodes with few connections) if agents only have few actions to choose from. By contrast, norms emerge faster on scale-free networks when agents have a large number of actions to choose from, perhaps because actions chosen by the hubs are followed by others, reducing conflict. Andrighetto et al. (2010a) showed that giving agents the ability to recognize norms (versus merely imitating behavior, that is, acting as social conformers) radically affects norm emergence. In their study, social conformers converged toward norms quickly but not in a stable way (i.e., norms that emerged varied broadly based on the agent's interactions). Meanwhile, norm recognizers converged toward norms in a stable manner because they had the autonomy needed to evaluate the norm and decide whether to act accordingly. Interestingly, when agents have the ability to explicitly discuss social norm violations, they build stronger social norms than they do when using more traditional social learning (e.g., observation) (Agrawal 2021).

Persistent teaching—either through adults (i.e., vertical transmission), through peers (i.e., horizontal transmission), or across generations (i.e., oblique transmission) (Cavalli-Sforza & Feldman 1981)—is also a key mechanism through which norms are spread. Tam et al. (2012) found that parents transmitted norms perceived to be important in their society, which were, in turn, internalized by their children. Gavrilets & Richerson (2022) used evolutionary modeling to show that persistent teaching can lead a group to establish norms that are individually deleterious but beneficial to the group, such as food sharing in small societies. In such societies, moral inculcation takes place systematically and repeatedly from an early age, often through evening stories told by elders and leaders (Smith et al. 2017). Laboratory studies of microcultures with

strangers also show that cultural practices are transmitted across generations through explicit instructions of old-timers and imitation among newcomers (Kashima et al. 2015; see Whiten et al. 2016 for a review). Certain features of normative information make it more likely to be remembered and transmitted, or to be psychologically sticky (Kelly & Davis 2018), including knowledge that is stereotypical (Kashima 2000), threatening (Choi et al. 2022), and/or commonly held (Kashima 2014). Situational conditions also affect the emergence and transmission of norms. Groups that are homogeneous have an easier time establishing norms for cooperation as compared to demographically heterogeneous groups, though this effect can dissipate over time (Chatman & Flynn 2001). Norms also tend to spread more in contexts where there is an aversion to uncertainty. Livi et al. (2015) found that experimentally increasing the need for cognitive closure—an individual difference focused on reducing ambiguity—leads people to transmit already-held norms from previous generations at a greater rate.

Macro Level: Norm Emergence and Spread

Over the past two decades, a great deal of empirical research has documented how distal macro factors affect the emergence and persistence of norms across many generations. We summarize studies that have uncovered evidence of the determinants of norms from historical factors—like ecological conditions experienced thousands of years ago—to the most recent ones, such as events experienced in one's childhood.

Ecological conditions. Malinowski (1918) provided some of the first evidence that differences in ecological environments affect the emergence and spread of norms. Forecasting the role of ecology in norm emergence over a century ago, he found that norms differed across lagoon fishing and open sea fishing among the Trobriand fisherman in ways that appeared functional. While lagoon fishing (which can be conducted with minimal effort) involved relatively loose, flexible norms, open sea fishing (which involved considerable danger and uncertainty) was marked by magical beliefs that were tightly practiced. Building on this work, tightness–looseness (TL) theory suggests that strong norms and harsh punishments evolve in contexts of chronic ecological threat. Across 33 nations, Gelfand et al. (2011) showed that natural disasters, pathogens, density, and a history of conflict (i.e., potential invasions on one's territory over the last 100 years) were related to normative tightness, effects which were replicated across 86 nonindustrial societies (Jackson et al. 2020), the 50 US states (Harrington & Gelfand 2014), the 31 Chinese provinces (Chua et al. 2019), and over time (Choi et al. 2022, Winkler 2021). From an evolutionary perspective, strict norms help groups coordinate under threat, which helps them survive (Roos et al. 2015). Tight and collectivistic norms also evolve in areas where subsistence is based on rice production (which requires a great deal of coordination), whereas loose and individualist norms evolve in areas that cultivate wheat (that requires less coordination) (Talhelm & English 2020). More generally, tight–loose differences are related to a trade-off between order (i.e., discipline and synchrony) and openness (i.e., creativity and tolerance) (Gelfand 2021), with the extreme ends of either continuum being dysfunctional (Harrington et al. 2015).

Accumulating evidence has documented how other features of historical ecological environments have shaped the emergence and spread of norms. Alesina et al. (2013) showed that intensive plow agriculture tended to generate a gender division of labor, with men working in the fields and women working in the home because of the strength required to use the plow, which affects gender norms today. Using ethnographic information from 1,400 ethnic groups and location data for over 7,000 contemporary languages and dialects, the authors found that ancestral plow use is associated with less female labor force participation, fewer female politicians, less female entrepreneurship, and weaker support for female employment. Damann et al. (2023) likewise found that historical

gender inequality, measured by gender difference in linear enamel hypoplasia (lesions on the teeth caused by trauma, malnutrition, or disease evident in remains dating back to 1200 AD), is strongly predictive of contemporary gender norms among those in the same location. Becker (2023) also examined the origins of gender norms related to the control of women, such as veiling and female genital cutting and norms about female sexuality and abortion. Her analysis showed that ethnic groups with a history of pastoralism—which is associated with temporary periods of absence of husbands from wives and creates the potential for infidelity—tended to develop practices aimed at controlling women's sexuality that persist to this day.

Historical events. Major historical events are also important drivers of cultural norms. Nunn & Wantchekon (2011) examined the consequences of Africa's external slave trade, which took 20 million people from the continent over more than five centuries. Many of the enslaved people were captured by those who knew them, including fellow villagers, friends, and even family members. Given that one had to be constantly on guard against being sold into slavery, the authors examined whether norms of distrust evolved and persisted for generations. Using shipping and ethnicity records of over 100,000 individuals, the authors estimated the number of individuals enslaved from each ethnic group on the continent. They found that such measures of enslavement were strongly predictive of contemporary norms of low trust toward neighbors, family, coethnics, non-coethnics, and local government.

In a follow-up study, Teso (2019) studied another important consequence of the slave trade: It led to severe gender imbalance. The trade, which permanently removed large numbers of men from the continent, forced women into roles traditionally held by men, such as employment, political positions, and even warfare (the most well-known example being the female Amazonian army established by Dahomey at the height of the slave trade in the seventeenth century). Today, places more impacted by the trans-Atlantic slave trade tend to have more equal gender norms and higher rates of female labor force participation. Historical gender imbalance has also been shown to be important in other contexts. Grosjean & Khattar (2018) studied the consequence of the early settlement of Australia in the eighteenth and nineteenth centuries, which was disproportionately composed of male convicts. Today, in locations with historically more male-biased sex ratios, women are less likely to participate in the labor force and in high-ranking occupations, and norms support less gender equality. More generally, these studies show that historical gender imbalances that induced women into (or prevented them from entering) new roles shaped beliefs and norms about the natural role of women in society that have persisted long beyond the period of imbalance. An interesting contrast is between the long-term effects of permanent removal of men from a society [resulting in gender imbalance, documented by Teso (2019)] and the temporary absence of husbands from the household documented by Becker (2023). While both feature the absence of men, the nature, temporal scope, and scale of this absence clearly vary and had very different consequences.

Within the United States, Acharya et al. (2016, 2018) documented how historical slavery has affected the racial views of white southerners today. Specifically, in southern counties that had higher numbers of enslaved individuals in 1860, white people today are more likely to express racial resentment, have colder feelings toward Black individuals, and oppose affirmative action. They attribute the effect to the emergence and spread of norms of racism, which arose after abolition in an attempt to maintain control of Black populations. Bazzi et al. (2023) likewise documented the spread of these norms outside of the US South following the "other Great Migration" in the early twentieth century, when millions of white southerners spread throughout the United States. Others have examined how migration itself affected the emergence and spread of norms in the United States. Bazzi et al. (2020) focused on Frederick Jackson Turner's [2008 (1893)] famous frontier

thesis linking historical frontier settlement to norms for rugged individualism. They found that locations that were at the frontier of settlement for longer periods of time during the eighteenth and nineteenth centuries are more individualistic and more economically and politically conservative today. Based on the uniqueness of children's first names, the authors also showed that more individualistic people chose to migrate to the frontier and that, once there, being on the frontier made them even more individualistic (see also Kitayama et al. 2014 for evidence on the voluntary settlement hypothesis).

States, institutions, and policies. Another line of inquiry has examined the effect that formal states, governments, and institutions can have on the emergence and spread of norms. For example, Schulz et al. (2019) document the long-term consequences of laws forbidding cousin marriage by the Roman Catholic Church starting in the early Middle Ages. Medieval exposure to the Western Church (but not the Eastern Church, which did not have the same policies) resulted in a breakdown of collectivist norms associated with kinship and extended family, eventually creating WEIRD (Western, educated, industrialized, rich, and democratic) psychology (Henrich et al. 2010). The new norms, in turn, were instrumental in the subsequent economic growth and political development of Western Europe (Enke 2019, Schulz 2022). Several studies have also examined the effects of government institutions on social norms. Studying gender norms and attitudes about female employment, Campa & Serafinelli (2019) found that communist countries tended to promote norms supportive of the employment of women outside of the home and generated more equal attitudes about female workplace participation. Alesina & Fuchs-Schündeln (2007) examined the effects of communism on beliefs about the role of government. They found that even after German reunification, former East Germans continued to remain more supportive than former West Germans of government policies that redistributed income. Di Tella et al. (2007) studied another institutional factor that affects values and beliefs: private property. They found that people who gained titles to land outside of Buenos Aires were more individualistic, materialistic, and supportive of free markets 20 years later compared to those who did not receive such titles.

While state institutions might reinforce societal norms in a self-sustaining manner, evidence of a complementarity between institutions and norms is mixed. Heldring (2021), who studied the long-term impact of the precolonial Nyinga Kingdom in Rwanda, found that a history of living under the state is associated with stronger norms about the importance of obedience to authority. Likewise, Becker et al. (2016) examined the long-term differences between descendants of the Habsburg and Ottoman empires. The former was known for its particularly well-functioning bureaucracy, while the latter was more corrupt. Studying individuals living on both sides of the historical border but in the same countries today, the authors found that those on the Habsburg side have more trust and confidence in judicial and bureaucratic institutions. By contrast, Lowes et al. (2017) found that the precolonial Kuba Kingdom in Central Africa, which had more developed formal institutions, was associated with less rule following today, as measured using a die-rolling task in anonymous conditions. It might be that benefits to intrinsic motivations for good behavior are greater in settings where formal institutions cannot enforce such behavior. Illustrations of this can be found in the theory of Tabellini (2008) and the model of Nowak et al. (2016), which showed that strong norms for retaliation in honor cultures, which serve to restrain uncontrolled aggressive behavior, were more likely to emerge when the state was absent.

In sum, norms emerge and spread through a multilevel process involving micro norm psychology, meso proximal interpersonal and networks factors, and macro historical and ecological factors that cause them to be transmitted and spread. But what causes norms to persist and/or change? We address these questions next.

HOW ARE NORMS SUSTAINED? FACTORS PROMOTING NORM MAINTENANCE

After social norms emerge, a suite of multilevel processes evolve to help sustain them. We next discuss the neural and developmental processes through which individuals come to enforce social norms, followed by research on why and how people punish norm violators. We consider both the external punishment mechanisms (peer, third party, and institutional) and internal punishment mechanisms (internalization) that promote norm stability. We also discuss individual, situational, and cultural moderators of these effects.

The Ontology and Neurobiology of Norm Enforcement

Ample research has studied the ontology of punishment as a key mechanism to sustain social norms. Remarkably, even before infants master formal language, they demonstrate a clear preference for hand puppets that engage in socially normative behavior (e.g., helping other puppets) as compared to puppets that engage in antisocial behavior (Hamlin & Wynn 2011). Indeed, by age three, children actively berate norm-violating puppets (Kanngiesser et al. 2016, Rakoczy et al. 2009, Vaish et al. 2011). Hardecker & Tomasello (2017) show that while both two- and three-year-olds can learn to enforce a behavior, only three-year-olds can generalize norm enforcement to other behaviors that violate the norm. Young children will also disapprove of norm violations that are not ethically charged. For example, after being taught an arbitrary behavior and witnessing a puppet incorrectly imitating it, three-year-olds vigorously protested (Rakoczy et al. 2008). Importantly, children can be quite selective punishers. Schmidt et al. (2012) showed that while three-year-old children actively protested violations of moral norms (i.e., causing harm) equally for ingroup and outgroup individuals, they enforced conventional norms only for ingroup members, illustrating parochialism for these tasks (see also Buttelmann et al. 2013). More generally, by age three, children are promiscuous normativists: They spontaneously infer the presence of social norms even without explicit instruction and enforce them when others break them (Schmidt et al. 2016). By age four, children turn descriptive norms into prescriptive norms (Roberts et al. 2017, 2018; see also Foster-Hanson et al. 2021), and by age six, children are willing to engage in costly third-party punishment for unfair behavior (McAuliffe et al. 2015). Clearly, children learn not only to interpret social norms but also to actively enforce them.

Recent research has identified key neurological mechanisms underlying norm enforcement and norm compliance. De Quervain et al. (2004) showed that costly punishment, relative to symbolic punishment, led to greater activity in the dorsal striatum, which is reflective of anticipated rewards. Punishment decisions also involve neural activation in the emotional regulation and cognitive control networks (i.e., attentional control, conflict processing, and assessment of responsibility) (Koenigs & Tranel 2007). Interestingly, when people think they are being monitored, they react more negatively to norm violations and more strongly in brain areas sensitive to norm violations and/or negative emotions (i.e., in the right insula and anterior cingulate cortex) (Ouyang et al. 2020). Notably, neural patterns underlying first-party direct punishment and third-party punishment vary. Strobel et al. (2011) compared a first-party punishment condition in which participants received unfair offers and were given the opportunity to punish the violators to a third-party punishment condition in which they were watching unfair assignments between two other players and had the choice of punishing the violators at the cost of reducing their own payoff. Reward-related brain areas (e.g., nucleus accumbens) were more strongly activated in the first-person perspective, while cognitive control areas, including the dorsolateral prefrontal cortex and anterior cingulate cortex, showed stronger activation in the third-party perspective. These findings suggest third-party punishment involves less emotional processing, more cognitive control, and

more cognitive–affective conflict when deciding whether to punish defectors (see also Buckholtz & Marois 2012, Krueger & Hoffman 2016).

Given that punishment compels norm compliance, the latter may activate brain regions related to punishment processing. Indeed, Spitzer et al. (2007) found that norm compliance induced greater neural activation in the lateral orbitofrontal cortex and right dorsolateral prefrontal cortex—regions involved in punishment decisions (Buckholtz et al. 2008; see also Ruff et al. 2013). Neuroscience research has also illuminated neural activity when individuals are noncompliant with social norms. For example, Hodgson et al. (2012) found that regions associated with reward processing, including the midbrain, caudate, and orbitofrontal cortex, showed increased activity when participants engaged in a norm violation in a coordination game. In a meta-analysis, Wu et al. (2016) found that neural circuits associated with normative decisions were activated when behaving antinormatively—i.e., showing less activity in the ventral striatum and more activity in the dorsal posterior medial frontal cortex and anterior insula—which may reflect error processing, cognitive inconsistency, and aversive feelings. These, in turn, may serve as signals that propel subsequent conforming behaviors in line with group norms.

Why Do People Punish?

Punishment of norm violators is viewed as a crucial condition for the persistence and stability of social norms. Yet administering punishment is costly and thus puzzling. Research shows, however, that people are willing to pay these costs for multiple reasons. Punishment may bring immediate material benefits by restoring what was lost or deter future misdeeds by the norm violator or observers (Axelrod 1986, Crockett et al. 2014, Cushman 2015). People may punish to remove a cheater's competitive advantage (Gavrilets 2012), to exhibit antisocial punishment (e.g., out of spite), or to achieve their own competitive advantage (Raihani & Bshary 2019). Punishment of norm violators can be internalized as the right thing to do and thus can bring moral satisfaction (Cushman 2015, Gavrilets & Richerson 2017), as discussed more at length below. People also punish because of general conformity ("If others punish, so should I") or adherence to fairness norms ("If others pay the costs of punishment, so should I"); thus, conditional punishment based on an expectation that others will also punish is critical for punishment behavior (Molleman et al. 2019). People can also enforce (unpopular) norms to improve their reputation by showing that they have complied out of genuine conviction and not due to social pressure (Centola et al. 2005). Finally, the costs of punishment can be reduced if punishment is applied by strong/dominant individuals (Axelrod 1986, Perry et al. 2018), by a group of people (Boyd et al. 2010), or by a social institution.

How Do People Punish?

Much attention has been given to the function and forms of punishment that sustain social norms. We review the main types of punishment below.

Peer and third-party punishment. In a classic paper, Axelrod (1986) studied how cooperative norms could be maintained through punishment. In his simulations, individuals differed in their likelihood of cheating (called boldness) and punishing a cheater (called vengefulness). The results show that the cost of punishing a defector could easily prevent the establishment of cooperation. However, if punishers punish not only defectors but also cooperators who do not punish, then the range of conditions under which the cooperative norm is maintained greatly expand. Despite limitations in his model's underlying assumptions and its numerical implementation (Mahmoud et al. 2015), Axelrod's paper has been the focus of much subsequent theoretical and empirical work. For example, Boyd & Richerson (1992) found that the presence of individuals who do not

punish free riders will undermine the stability of cooperative norms unless the costs of punishing others are very small—something rarely true of large groups. However, a cooperative norm can be maintained if one allows for an additional strategy of moralists—those who cooperate, punish noncooperators, and also punish those who do not punish noncooperators. Likewise, while typical evolutionary models find that free riders tend to proliferate in the long run given that people imitate those with high payoffs, Hauert et al. (2007) found that allowing for nonparticipants—individuals who do not join the collective action and cannot be punished but rather rely on some activity whose payoff is independent of the other players' behavior—enables cooperative norms to increase. As they note, "paradoxically, the freedom to withdraw from the common enterprise [to be a nonparticipant] leads to enforcement of social norms. . .[thus,] joint enterprises which are compulsory rather than voluntary are less likely to lead to cooperation" (Hauert et al. 2007, p. 1905).

More realistic assumptions are being increasingly incorporated into models of punishment and are being tested on real populations. Boyd et al. (2010) note that most existing models and experiments on punishment assume there is an "unconditional and uncoordinated individual action automatically triggered by defection" (p. 617). They build a model in which individuals can signal their intention to punish defectors to others. The punishment is conditional on the number of others willing to punish the defectors. If this number is small (implying that the punishment will not be effective), then individuals avoid paying the cost of punishment (but still pay the cost of signaling the intention to punish free riders). Boyd and colleagues also show that punishment can proliferate when rare under realistically low levels of genetic relatedness among group members, comparable to that in small-scale societies.

Research is also beginning to incorporate psychological factors into models to understand punishment dynamics, including the fact that people care about future payoffs (Szpunar et al. 2014) and have a theory of mind (Tomasello et al. 2005) that allows them to anticipate, to a degree, how others will respond to their actions. Perry et al. (2018) and Gavrilets (2022), for example, built models in which individuals have abilities to predict the reaction of others to punishment and how this reaction affects their own payoffs (also known as foresight models). These abilities allow groups to solve free-rider problems. Interestingly, their models predict a division of labor where more-powerful individuals specialize in punishment while less-powerful individuals contribute to the production of collective goods. Research is also beginning to test model assumptions in the field. Mathew (2017) investigated reasons behind punishment among the Turkana, a Kenyan population where informal peer sanctioning maintains participation in high-risk interethnic warfare. Using vignette experiments, she showed that Turkana participants exhibited punitive sentiments toward second-order free riders, toward those who imposed sanctions irresponsibly, toward those who dispensed the punishment single-handedly without consulting others, and toward members who meted out punishment who were not in a preordained group responsible for punishment. More generally, these experiments show how meta-norms for peer punishment evolve in natural settings.

Research has also begun to focus on the wide variety of ways that people punish in everyday life through informal sanctions, including ostracism, gossip, and direct verbal or physical confrontation. In a longitudinal study assessing responses to norm violations in daily life, Molho et al. (2020) showed that people used direct punishment (e.g., confrontation) when they had more to gain (i.e., when they had more power, valued the offender more, and were personally victimized) and used indirect punishment (e.g., gossip) when the costs of retaliation were large (i.e., when they had less power and violations were severe). Emotions such as anger were associated with the endorsement of more severe punishments, while disgust was associated with indirect punishment. Such emotional reactions can cause deviants to conform to the group norm (Heerdink et al. 2013).

Interestingly, people do not necessarily use direct punishment more as the severity of norm violations increases, perhaps because of concerns of counter-punishment (Balafoutas et al. 2016). On the other hand, third-party punishment does increase as norm violations become more severe (Fehr & Fischbacher 2004) and as the degree of concern third parties have for the welfare of known parties increases (Pedersen et al. 2020; see also FeldmanHall et al. 2014) (see Pedersen et al. 2013, however, for evidence that third-party punishment is far less likely to occur in laboratory experiments among strangers, contexts in which direct punishment is more common).

Institutional punishment. Although punishment can help maintain social norms, it has certain drawbacks. In addition to creating a need to incentivize punishers, it can reduce group members' average payoffs because the total cost of punishing others and being punished by others may exceed the gains from cooperation. Indeed, directing too many group resources toward punishment can reduce the net benefit to the group even if the level of cooperation is increased. Moreover, peer punishment may provoke antisocial punishment or counter-punishment (Herrmann & Thöni 2008). In some cases, an existing social norm of punishing low contributors can lead to overexploitation of the resource, thereby harming collective payoffs (Abbink et al. 2017). Overall, merely offering punishment opportunities does not ensure that punishment will be used for socially beneficial purposes. Accordingly, an alternative mechanism that is widespread in large societies is centralized punishment. Sigmund et al. (2010) considered a situation in which, before a collaborative effort, people could contribute resources to a separate pool to monitor and punish free riders. Such a punishment fund can be viewed as a rudimentary institution to support the common interest. They found that in a competition between peer- and pool-punishers without second-order punishment, peer-punishers win. However, with second-order punishment (i.e., when individuals not punishing defectors are treated as defectors), pool-punishers win. Moreover, pool punishment did not require other-regarding tendencies, preferences for reciprocity and equity, group selection, or prescriptions from higher authorities.

Interestingly, experimental studies show that individuals prefer centralized punishment to a sanction-free environment (Gürerk et al. 2006) or to peer punishment (Traulsen et al. 2012). Fehr & Williams (2018) created a choice between four social institutions: no punishment of free riders, uncoordinated peer punishment, coordinated peer punishment (where participants were informed of the average preference of their peers regarding the level of contribution), and coordinated central punishment (where one group member was elected to enact punishment and all group members shared the total cost equally). The participants could migrate between different institutions at the beginning of each round of the experiment. They found that participants universally rejected uncoordinated peer punishment in favor of coordinated peer punishment or centralized punishment. The two latter social arrangements were equally efficient in terms of the total payoffs. Uncoordinated peer punishment was almost never chosen, which undermines its theoretical and practical relevance.

Several theoretical papers studied how the level of punishment administered by institutions coevolved with the behavior of individuals involved in a collective action to whom the punishment was applied. Isakov & Rand (2012) and Roithmayr et al. (2015) considered a population of groups that each had two types of agents: a ruler (or a state) controlling the punishment institution and commoners (or citizens). The rulers were interested in forcing commoners to behave in a particular way (e.g., to participate in a collective action). Institutions evolved by cultural group selection—that is, the rulers of less successful groups copied the institutions of more successful groups. Harsh institution-inflicted punishment spread across societies, forcing individuals to behave in a way benefiting the rulers. Gavrilets & Shrestha (2021) used a similar model to compare the efficiency of cultural group selection with foresight when rulers were trying to predict and

exploit changes in commoners' behavior in response to changes in punishment level. Selective imitation can be effective only if the one copying and the one being copied share significant similarities. However, foresight—the ability to plan and predict based on future possibilities—does not have these constraints. It allows for creating or adapting institutions and behaviors that are better tailored to specific situations or local conditions. Unlike imitation, which can be restrictive, foresight provides flexibility and customization.

Supernatural punishment. Supernatural punishment refers to the belief that a divine or supernatural entity enforces social norms and punishes norm violators. Research suggests that belief in supernatural punishment can help maintain social norms, as the fear of divine retribution serves as a deterrent against norm violation (Johnson 2015). This form of punishment is considered a cost-effective and efficient means of ensuring social cohesion, as it relies on individuals' internalization of these beliefs. Some studies have indeed linked the belief in supernatural punishment to increased cooperation, especially in large groups, where anonymity can weaken other forms of social control (Lang et al. 2019, Norenzayan 2013); however, this remains a controversial topic (Turchin et al. 2023). Interestingly, although religiosity generally correlates with stronger peer punishment of norm violators, the belief in powerful intervening gods can reduce peer punishment and support for state-sponsored punishment because they are seen as less necessary to ensure cooperation (Laurin et al. 2012). Beliefs in supernatural punishment have been found to evolve particularly in societies with weak or absent formal institutions (Purzycki et al. 2016, Watts et al. 2015) and in contexts of high ecological threat. For example, people desire a punishing (versus loving) god during times of warfare and ecological threat because they are motivated to punish norm violators in such conditions (Jackson et al. 2021; see also Caluori et al. 2020). There may also be a strategic basis for supernatural beliefs, as people and/or leaders may endorse these beliefs to manipulate others into cooperating (Fitouchi & Singh 2022, Johnson & Krüger 2004). In all, supernatural punishment is an evolved cultural tool for social control, given its usefulness in incentivizing cooperation (Fitouchi & Singh 2022).

Norm Internalization

Beyond the role of peer and institutional punishment in sustaining social norms, certain norms become internalized; that is, acting according to a norm becomes an end in and of itself rather than merely a tool for achieving certain goals or avoiding certain undesirable outcomes (e.g., social sanctions) (Andrighetto et al. 2010b, Axelrod 1986, Gintis 2003, Henrich & Ensminger 2014). In this view, incentives to follow such norms come from internally represented rules of behavior rather than from external factors. Indeed, the ability to internalize social norms appears early in child development across societies (House et al. 2020) and has two important effects on human behavior (Cooter 2000). First, for individuals who have strongly internalized a norm, violating it is psychologically painful, even if the direct material benefits of the violation are positive. Moreover, people avoid situations in which they may be tempted to violate norms in order to maintain a positive self-image (Shalvi et al. 2011) and are willing to pay high costs to enact and defend norms that they consider important (Atran & Ginges 2013). Second, individuals who have internalized a norm will tend to criticize or punish norm violators and, subsequently, to view the norms as stronger. In this way, costly norm compliance may be self-reinforcing (Pickup et al. 2022).

Given that following a norm can be very costly, how have norm-following players emerged and survived in a world of rational egoists (Ostrom 2000)? Norm internalization can be viewed as an elaboration of imitation and imprinting found in various species of birds and mammals (Whiten 1992). More generally, norm internalization reduces the costs associated with information gathering, processing, and decision making as well as the costs of monitoring, punishments,

or conditional rewards that would otherwise be necessary to ensure cooperation (Henrich & Ensminger 2014). This argument is supported by an evolutionary model (Gavrilets & Richerson 2017) that shows that the ability to internalize norms evolves under a wide range of conditions, allowing for cooperation to become instinctive. Norm internalization also evolves much more easily and has much larger effects on behavior if groups promote peer punishment of free riders. Typically, intermediate levels of norm internalization are most frequent, but populations can contain relatively small frequencies of over-socialized individuals who are willing to make extreme sacrifices for their groups no matter the material costs as well as under-socialized individuals who are completely immune to social norms. Empirical work shows that people who are highly identified with their groups are more likely to internalize social norms (Pickup et al. 2020), and in turn, this may reinforce their social identity (see Kish Bar-On & Lamm 2023 on the connection between internalization and social identity). Notably, people may reject group norms that they view as detrimental to their group's interests (Packer & Chasteen 2010; see also Ellemers & Jetten 2013, Masson & Fritsche 2019). More generally, the propensity to follow norms may be an innate feature of our psychology, whereas the content of the norms may be determined culturally (Chudek & Henrich 2011, Kelly & Setman 2020; see Heyes 2023 and Westra & Andrews 2022 for alternative views).

Individual, Situational, and Cultural Differences in Norm Maintenance

A wide range of moderators affect norm compliance and punishment of norm violators (Gelfand et al. 2017, Gross & Vostroknutov 2022). Kimbrough & Vostroknutov (2018) found reliable individual differences in the propensity to comply with social norms, even at a cost to oneself, which generalizes across social contexts. Rule followers, in turn, can help promote norm abidance even in groups of rule violators (Gross & De Dreu 2021). Generally speaking, people are highly sensitive to others' behavior and can be classified as conditional cooperators—that is, willing to cooperate only when others do (Bicchieri 2005, Fehr & Schurtenberger 2018). Moreover, people tend to follow the norms of those who have higher social proximity (e.g., with whom they share common traits and identities) (Bicchieri et al. 2022) and dynamically switch between norms depending on the audience (Hackel et al. 2020). For example, biculturals follow American or Chinese norms when interacting in these respective groups, particularly in uncertain situations in which norms can provide closure (Chao et al. 2010). Diversity *within* groups makes it difficult to establish and maintain cooperative norms, though this effect can dissipate over time (Chatman & Flynn 2001). Situational conditions also affect norm reinforcement. When people's goals have been thwarted, they comply more with norms endorsed in their network (Leander et al. 2020). Contexts that activate *felt accountability*—those with a high degree of monitoring and where reputation is at stake—affect the willingness to comply with social norms. Yamagishi et al. (2008) found that norm compliance was drastically reduced in anonymous situations in which individuals could not be evaluated. Lindström & Olsson (2015) also found that humans are prone to copying and transmitting others' behaviors if threatened by punishment. However, when punishment is weak, it needs to be coupled with norm information to induce prosocial behavior (Bicchieri et al. 2021) or it will be ineffective. Importantly, some people are more motivated to follow norms, such as people who are concerned with exclusion (Ellemers & Jetten 2013). Likewise, lower-power individuals feel more constrained by social norms (Galinsky et al. 2008) and also tend to be punished more strongly for norm violations (Bowles & Gelfand 2010, Egan et al. 2022, Winter & Zhang 2018), including by members of their own group who are seeking respectability in the eyes of others (Jefferson 2023).

There is wide cross-cultural variation in norm compliance and maintenance. In tight cultures, people act more in accordance with norms than with their personal values (Dimant et al. 2023,

Elster & Gelfand 2021; see also Savani et al. 2015), which may promote pluralistic ignorance (i.e., misperceptions of others' actual values) (Hashimoto & Yamagishi 2015). The types of punishments that are perceived to be appropriate, or meta-norms, vary across cultures (Eriksson et al. 2021). Endorsement of physical confrontation and social ostracism are negatively correlated with looseness and individualism and positively correlated with power distance, while the opposite pattern is generally found for gossip. Punishment of norm violators through third parties is more common in contexts with low mobility and high strength of ties (Roos et al. 2014). Ironically, Aycinena et al. (2022) found that in countries with very strict norms, people are more likely to lie to the maximum extent, perhaps because they do not differentiate between small and large violations. Other research shows that reactions to norm violators vary across cultures. Norm violators are seen as higher in power and status (Van Kleef et al. 2011), due to signals that they are able to act according to their own volition (Wanders et al. 2021), yet these effects are particularly pronounced in contexts in which norms are loose and individualistic (Stamkou et al. 2019). Other research has examined when punishment spreads beyond initial norm violators—a phenomenon known as vicarious retribution (Lickel et al. 2006). In an fRMI study in China, Han et al. (2020) showed that when people witnessed one of their group members being harmed, they were more likely to punish both the perpetrator and even their group members, as mediated by increased levels of endogenous oxytocin and medial prefrontal activity, illustrating how sensitivity to ingroup pain can motivate punishment of outgroups during intergroup conflict.

HOW DO SOCIAL NORMS CHANGE?

While a great deal of attention has been paid to the persistence and stability of social norms, research has only recently studied the conditions that foster changes in social norms, despite such strong evolutionary pressures for their persistence. In this section, we review the major factors that propel social norm change.

Social Network Dynamics

Being central and salient in social networks can pave the way for norm change. Paluck & Shepherd (2012) showed that shifts in the public behavior of highly connected, influential actors were able to change peers' perceptions of school collective norms. On the other hand, trendsetters who initiate norm change may be on the fringe of social groups, because they are less central and it is less risky for them to bear the cost of nonconformity compared to highly embedded actors (Bicchieri & Funcke 2018). Indeed, people willing to abandon norms are often less identified with their groups (Gomila & Paluck 2020), more open to taking risks, and less inclined to adhere to conformity (Andreoni et al. 2021). This raises interesting questions about the specific network and/or cultural conditions under which high- or low-embedded actors can promote norm change (see Bicchieri & Funcke 2018, Centola 2021, Constantino et al. 2022).

New norms can also emerge from the spread of information about the costs and benefits of old behaviors or about the attitudes and beliefs of peers in one's network (see Miller & Prentice 2016, Rhodes et al. 2020). For example, informing homeowners about their neighbors' attitudes toward energy saving can reduce energy consumption (Jachimowicz et al. 2018; see also Bhanot 2021, Eisner et al. 2021, Goldstein et al. 2008, Hallsworth et al. 2016 for other examples). Likewise, attunement to macro societal trends, or *dynamic norms*, sets the stage for the adoption of new norms. In particular, people are more likely to engage in a nontypical behavior if they learn it is trending in the general population (Mortensen et al. 2019), in part because dynamic norms lead to the belief that personal change is possible (i.e., an increase in self-efficacy), important to others (i.e., injunctive norms), and/or compatible with one's social identity. More generally,

dynamic norms lead people to believe that barriers to change are less significant than once expected (Sparkman & Walton 2019). Relatedly, giving individuals information about what people actually believe about a specific topic in contexts in which there is strong pluralistic ignorance can change behavior. Bursztyn et al. (2020b) found that while the majority of young married men in Saudi Arabia supported women working outside of the home, they vastly underestimated the level of support for such practices by other men, even in their own neighborhoods. Correcting these perceptions increased women's participation in the labor force months later (see also Gauri et al. 2019).

Media

Numerous studies have shown the causal effects of media on norm change. An early study by Paluck (2009) showed that radio soap operas featuring positive messages about intergroup relations were able to change perceptions of social norms and behaviors related to intermarriage, dissent, cooperation, and empathy, even though the program did not change personal values. Similarly, Blair et al. (2021) showed that radio messages delivered by trusted authorities led to more willingness to accept former Boko Haram fighters in Nigeria and to increased perceptions that neighbors would too. In another context, La Ferrara et al. (2012) estimated the effect of media on fertility norms in Brazil. Exploiting the staggered rollout of Brazilian soap operas, or *novelas*, which tend to feature smaller families, they showed that the *novelas* had important effects on norms about desired family size and led to reduced fertility rates.

On the other hand, the media can also erode social norms. For example, access to radio sermons by Catholic Priest Charles ("Father") Coughlin resulted in the spread of anti-Semitic and xenophobic views, which increased support for the Nazi Party during World War II (Wang 2021). Likewise, DellaVigna & Kaplan (2007) also found that the rollout of the conservative Fox News television channel in 1996 changed individuals' values enough to increase the Republican vote share by an average 0.4–0.7 percentage points in the 1996 and 2000 presidential elections. Fox News opinion programs were also found to affect behavior surrounding the COVID-19 pandemic: Viewing of *Hannity* and *Tucker Carlson Tonight* corresponded with fewer pandemic precautions taken and more deaths (Bursztyn et al. 2023b). Perhaps the most dramatic illustration of this phenomenon comes from the 1994 Rwandan genocide, where more than 800,000 individuals, primarily Tutsis, were murdered in a matter of months. Yanagizawa-Drott's (2014) empirical analysis showed that access to the radio, and to the anti-Tutsi hate propaganda that was aired, moved the society from one normative equilibrium characterized by peace to another characterized by mass killing. The radio programs not only directly encouraged individuals to kill Tutsis but also had the indirect effect of making killings more common, which changed norms about the murders and further increased their frequency.

Other studies have shown that media exposure to particularly influential individuals can also affect social norms. Assouad (2020) found that, within Turkey, exposure to propaganda by the country's first president, Mustafa Kemal Atatürk, from 1923 to 1938 resulted in the diffusion of a new national identity, as measured by the frequency of pure Turkish names given to children. Relatedly, in a series of experiments, Bursztyn et al. (2020a) showed that Donald Trump's rise in popularity increased individuals' willingness to publicly express xenophobic views, in part due to reduced stigma for expressing such opinions. More generally, once people begin to observe norm violations, they may imitate such behavior, contributing to norm erosion (Bicchieri et al. 2022). To be sure, norms may also influence the choices people make to attend to specific media and disregard other sources that convey alternative messages—resulting in a self-reinforcing cycle and in the echo chambers that are evolving today.

Institutions

Institutional decisions can also shift perceptions of social norms. Cantoni et al. (2017) analyzed the consequences of a major textbook reform rolled out in China from 2004 to 2010 with the explicit intention of shaping youths' ideology. As a result of the new curriculum, views on political participation and democracy in China grew more negative, and trust in government officials and skepticism toward free markets increased. Similarly, Tankard & Paluck (2017) found that US Supreme Court decisions can lead individuals to update their perceptions of social norms, even if their personal attitudes are not always affected; these effects may be contingent on whether people infer that institutions are representative of public opinion, as is more often the case in democracies (see also Ofosu et al. 2019).

Although it is natural to expect that laws and institutions will shape norms in intended ways, recent evidence has emerged suggesting that just as often as not, institutional innovations backfire. An early example is the constitutionally mandated gender quotas implemented in India in the 1990s, which randomly reserved one-third of all seats in Indian village councils for women. Beaman et al. (2009) found that villages that took on a female leader due to the quota exhibited self-reported views about women's participation in politics that were less favorable. In contrast to this conscious backlash effect, subconscious stereotypes against women participating in politics, as measured by the Implicit Association Test, improved. The quota increased the aspirations of girls and their parents, particularly after a second set of elections (Beaman et al. 2012). There are also numerous examples from the United States of backlash. Considering several landmark changes to US law in the second half of the twentieth century, Wheaton (2022) found that values moved in the opposite direction from what was intended for every law change. Similarly, Fouka (2020) found evidence of backlash in the US states that banned the German language in schools after World War I: German immigrants became more likely to marry coethnics, more likely to give their children German first names, and less likely to volunteer for military service in World War II. To date, we still do not have a clear understanding of when institutions generate the norm changes they intended and when the changes generate backlash instead. Possible differentiating factors may include the extent to which people have trust in institutions and believe the change to be fair, think that both normative and descriptive norms for the change are in alignment (see Bicchieri & Dimant 2022), and/or feel that the change threatens personal and/or collective identity, among others.

Ecological and Cultural Factors

Norms also change as ecological and cultural pressures change. Using linguistic data on books indexed by Google, Greenfield (2013) showed that individualism rose in the United States over the last 200 years with increasing urbanization. Individualism also increases as family size and pathogen prevalence decrease (Grossmann & Varnum 2015), though later work suggests that socioeconomic development is a more robust predictor of changes in individualism (Santos et al. 2017; see also Inglehart 2018). Choi et al. (2022) found that decreasing threat in the United States was related to decreasing tightness and collectivism (see also Varnum & Grossmann 2017 on how declining pathogen threats were related to reductions in gender inequality in the United States over six decades).

Lived Experiences

While research has shown that macro- and meso-level forces can shape norms, there is also evidence that very micro-level factors, like an individual's own lived experiences, can also be important. Clingingsmith et al. (2009) examined the effects of participating in the Hajj—an annual

Muslim pilgrimage to Mecca—on values, beliefs, and norms. Exploiting the fact that, in Pakistan, travel visas that allow participation are limited and allocated randomly by lottery, the authors compared successful and unsuccessful applicants. They found that this life experience increased religiosity and feelings of unity with fellow Muslims while decreasing perceived differences or inequalities between groups within Islam. It also increased normative beliefs about gender equality and female empowerment. Pakistani participants met other Muslims with more liberal gender attitudes, and their views became more liberal as a result. Other lived experiences have also been shown to affect norm change. For example, Depetris-Chauvin et al. (2020) find that soccer can bring about greater group identity and solidarity. Looking at populations within Africa, the authors compared people's self-reported attitudes before and after international professional soccer matches in which their national team won or lost. They found that victories increased a sense of national identity and decreased ethnic identity. Mousa (2020) found that mixing Christians and Muslims on Iraqi soccer teams led to more positive attitudes and behaviors within the context of the sport, but not in nonsoccer contexts. Similarly, Lowe (2021) found that within India, participation in cricket matches increased cross-caste cohesion and reduced intergroup differences for men on the same team but had the opposite effects for men competing against each other on different teams. More generally, the evidence about the importance of individual life experiences illustrates that norm changes are not fully determined by macro historical, ancestral, social, institutional, or ecological forces, and that individual decisions at the micro level can also have important effects.

Nonlinear Tipping Points

Researchers have increasingly examined the factors that produce rapid changes in social norms, or tipping points. In an experimental study of norm change, Centola et al. (2018) had groups of participants establish norms, after which confederates entered the groups to promote a different norm. The researchers found that when the number of confederates was approximately 25% of the group, the opinion of the majority tipped to that of the minority. Andreoni et al. (2021) found that the shift toward a new norm can be delayed because individuals tend to exaggerate the costs associated with deviating from the original norm. The study also highlighted that the process of moving away from an old norm is more efficient in smaller communities and in settings in which individuals receive prompt feedback on others' behaviors. Cultural factors affect the rate of norm change. Tight groups—which have strong coordination pressures due to collective threat—have more cultural inertia than loose groups (Gelfand 2021). Indeed, De et al. (2018) showed with evolutionary models that when agents primarily played a coordination game, wherein one only gets a payoff if playing the same action as the agent one is interacting with, change was much slower than when they were playing games wherein their payoff was less dependent on others' actions. Yet once a tipping point is reached, change goes much faster in tight cultures (De et al. 2018, Muthukrishna & Schaller 2020). Identity also matters for tipping. When group identities are inconsistent and/or threatened by the adoption of new norms, they can undermine tipping substantially (Efferson et al. 2020, Ehret et al. 2022).

To date, the mechanisms that produce tipping points, however, remain a black box (Andrighetto & Vriens 2022). There are a number of processes that could lead to a quick and drastic change. For example, there may be no qualitative changes in the underlying social dynamics; rather, the underlying process may be continuous but characterized by an acceleration during a short period of time. Indeed, the spread of innovations often shows an S-shaped curve (Rogers 1962). In the early stages, the spread is slow, as only a few people adopt the innovation. Next, there is a rapid increase as more people gradually catch on. Finally, the spread slows down again as almost everyone has adopted the innovation. This rapid middle phase can give the impression that a tipping

point has been crossed as a result of a sudden shift. However, this situation does not fit the typical understanding of tipping-point dynamics, as the change is not sudden but rather part of a gradual process. Other processes do involve qualitative changes in the underlying dynamics due to a transition from one stable state (known as an equilibrium or, more generally, attractor) to another. In one scenario, the shift from one norm to another is driven by certain forces—e.g., large random changes in the frequency of norm followers (Young 1998). These forces push the population across a boundary separating two states, leading to a transition. In another case, a locally stable state loses stability as a result of changes in some factors controlling the dynamics (Gavrilets 2020), causing the system to move to a different stable state. For example, shifts in environmental or epidemiological conditions can make previously uncommon behaviors beneficial, or individuals may discover that many in their community share their personal discontent with the existing norm, making them more courageous in advocating for change. Theoretical research shows that these types of transitions can happen only in a relatively narrow range of conditions, which depend on the material costs and benefits of different behaviors and on differences in individuals' motivation, beliefs, and attitudes, among other factors (Gavrilets 2020). Future research should focus on delineating the precise conditions and mechanisms that produce tipping points in particular systems.

WHEN NORMS DO NOT ALIGN WITH THEIR ENVIRONMENT: CULTURAL EVOLUTIONARY MISMATCHES

A consequence of the fact that norms evolve incrementally and are shaped by historical environments is that the norms present in a society are not always optimized for the current environment. Instead, norms evolve as a result of a long history of evolutionary forces that were beneficial in past environments. We refer to this imprecision as cultural or norm mismatch (Gelfand 2021, Nunn 2022), which reflects the fact that this dynamic follows a similar logic as evolutionary mismatch, a well-understood process in evolutionary biology.

While this line of inquiry is in its infancy, some studies have provided evidence of mismatch. Atkin (2016) showed that when Indians migrated to a different Indian state that had a new set of food prices, they continued to consume food from their state of origin due to their norms and preferences. These scarcer foods tended to be more expensive, which resulted in less food purchased and fewer calories consumed. Indeed, the most affected migrants consumed 7% fewer calories than if they had adopted the local food preferences. This result is particularly striking, given that child stunting and malnutrition are chronic issues in India. Another example of mismatch can be seen in norms about modern medicine. There are many recent examples of modern medicine being historically inappropriately implemented, with such detrimental episodes leading to persistently lower levels of trust in medical science. Studies have shown that medical distrust arose due to coercive French colonial medical campaigns in Africa (Lowes & Montero 2021), leper colonies in Colombia (Ramos-Toro 2023), the Tuskegee study in the United States (Alsan & Wanamaker 2018), and, most recently, the CIA's fake vaccination campaign in Pakistan, which was used in an attempt to capture Osama bin Laden (Martinez-Bravo & Stegmann 2022). In each case, a norm of medical distrust emerged from a historical environment in which distrust of modern medicine was beneficial. Today, such norms are harmful, as they have been shown to lower vaccination rates in Africa and to reduce life-extending preventative doctor visits among Black men in the United States.

Comparison of people's perceptions of the beliefs and values of others to those others' actual self-reported values indicates that the two tend to be systematically different, suggesting a mismatch between perceived norms (and resulting behavior) and others' actual beliefs. Systematic misperception of gender norms was documented first in Saudi Arabia (Bursztyn et al. 2020b) and

then more widely across the globe (Bursztyn et al. 2023a). Such misperceptions are found in a wide range of domains and across many societies (Bursztyn & Yang 2022). Mismatch is possible not only across time (i.e., traits that are beneficial during one period are not in another) but also across space (i.e., traits that are beneficial in one setting are not in another). One way in which this can occur is if an individual from one socioeconomic background, with its own set of norms, is placed in another. The norms one brings with them may be mismatched to the new environment. Stephens et al. (2012) provide evidence that first-generation students are inculcated with interdependent norms, only to encounter much more independent norms when they go to college. Similarly, Heller et al. (2017) argue that children in inner-city Chicago are raised with norms related to a culture of honor—norms that are mismatched in their public high schools. Norms of retribution may be beneficial on the streets but not in the classroom.

The extent to which we expect to observe norm mismatch depends on how quickly norms change. This aspect of norms has been studied extensively within the theory of norm tightness (Gelfand et al. 2011). We expect that societies with tighter norms, which have low tolerance for deviant behavior, will have less flexible and more persistent norms (De et al. 2017). Similarly, societies that value traditional ways of thinking and doing are expected to have more persistent norms and more mismatch. Giuliano & Nunn (2021) studied how a society's environment changes over multiple generations. Looking at paleoclimatic data from 500 to 1900 AD, they find that, conditional on environmental factors, the more these conditions stay consistent across generations, the more society tends to adhere to tradition and the more persistent cultural traits tend to be. This pattern is predicted by standard models of cultural evolution. Relatedly, although tight cultures tend to adopt new norms more slowly than loose cultures, they may be able to respond more quickly to rising ecological threat, given that they coordinate faster and enforce social norms better (Gelfand et al. 2021, Szekely et al. 2021). Indeed, in a study of 57 societies prior to the development of COVID-19 vaccinations, loose societies took much longer to cooperate and had five times as many cases and nearly nine times as many deaths from COVID-19 as tight societies, controlling for a variety of factors (Gelfand 2021). This suggests that loose cultures may experience cultural evolutionary mismatches during times of changing threat, particularly when the threat is abstract and easy to ignore (compared to, for example, warfare). While evidence of the determinants of tightness and tradition is still emerging, existing findings point to the possibility that the effects of shorter-term shocks (e.g., those that occur within a lifetime) might be very different from longer-term change (i.e., differences in the frequency of shocks between generations). In an uncertain world rocked by climate change, global inequality, and health crises, the need to understand the factors that influence cultural mismatches is particularly pressing.

DISCUSSION

Though social norms have existed across millennia, the science behind them only took off in the last few decades. This interdisciplinary effort, which spans the social and computational sciences, has made clear that the emergence, persistence, and change of social norms is truly a multilevel phenomenon, afforded and constrained by a suite of factors—including neurobiological and psychological processes undergirding norm psychology, the structure of social networks and lived experiences, and macro ecological, historical, cultural, and institutional forces. Moreover, because norms can evolve as a result of a long history of evolutionary forces that were beneficial in those environments, norms may be mismatched to their current environments. By integrating work from multiple disciplines that rely on different theoretical and methodological traditions to study norm dynamics, we can achieve a richer and more comprehensive study of norm dynamics that no single discipline can provide. Here, we discuss some of the most critical gaps that await investigation.

Integrating Distal and Proximal Factors in Norm Dynamics

The wealth of research generated on social norm dynamics offers exciting opportunities to integrate these insights into a unifying theoretical framework. On the one hand, research examines the proximal processes through which norms are transmitted, maintained, and changed—the *how* of norm dynamics. Other traditions focus on broader ultimate explanations, or the why of norm dynamics (Mayr 1961)—that is, *why* distinct patterns of norms evolved as adaptations to their distal ecological and historical environments. To date, these traditions are largely distinct, and there is a dearth of research integrating proximal and ultimate factors that affect norm emergence, persistence, and change. For example, there is a black box about what factors mediate the influence of distal historical and ecological factors on norm persistence and stability. In some contexts, norms may be transmitted across generations and become sticky and internalized. Yet these distal factors may also affect the emergence of endogenously preferred punishment systems and institutions that were originally adaptive under past conditions and reinforce such equilibria over long periods. Relatedly, there is a need to understand the dynamics between informal social norms and external factors like laws, institutions, and policies over time: When are they self-reinforcing or self-defeating? Likewise, the role of neurobiological and genetic factors in mediating cultural persistence and change remains poorly understood.

Indeed, because multiple norms exist in any system, we need to move away from studies examining a single norm to understand how ultimate and proximal factors collectively affect the dynamics of norms that vary in norm fitness—i.e., in cognitive salience, motivational and communicable force, and material payoffs—as they compete with and win over other norms over time (see Kelly & Davis 2018). Arguably, in the past, harmful, suboptimal, or maladaptive norms were more likely to be weeded out, since warfare and other forms of intergroup competition were more common. In today's world, intergroup competitive forces may be weaker, raising interesting questions about the dynamics of norm persistence and change. More generally, more research is needed to better understand *norm systems* and to delineate whether processes of emergence, persistence, and change depend on different types of norms and their interrelationships (e.g., injunctive/normative, descriptive/empirical, moral). For example, recent research has begun to examine how norm dynamics are affected when injunctive and descriptive norms are incongruent (Bicchieri et al. 2021) and when people perceive high variance in normative behavior (Dimant et al. 2023).

Research on norm dynamics has generally been done in face-to-face contexts, begging the question of how the emergence, persistence, and change of social norms vary in online environments in which information (and misinformation) is readily available and how these processes affect offline norms. Accordingly, there is an urgent need for social and computational scientists to work to understand the evolution of norm dynamics online (Acerbi 2019, Brady & Crockett 2023, Brady et al. 2021, Heitmayer & Schimmelpfennig 2023). Relatedly, the area of artificial intelligence and social norms is just emerging. Key questions regarding how to incorporate knowledge of norm dynamics into training AI to follow and enforce social norms when working with humans in a variety of contexts (e.g., medicine, the military, manufacturing) will loom large in future research.

Moving Beyond WEIRD Samples

Our review illustrates that much of the research on norms comes from WEIRD samples, with some exceptions from cultural economics and cross-cultural psychology. A key imperative is to examine whether processes of norm emergence, persistence, and change are universal (etic) or culture specific (emic). Since much of the research on norm psychology is drawn from Western

samples, critical questions remain unaddressed: Are the developmental and neurobiological bases of norms acquisition similar or different across the globe? How are the emergence, spread, and persistence of social norms influenced by existing cultural norms and values? What social learning strategies are preferred in different cultural groups? Likewise, the enforcement of norms through punishment is an important mechanism that sustains norms, yet we know very little about preferences for different punishment institutions and their role in norm maintenance across the globe. Moreover, understanding how cultural factors affect the success of norm change efforts around the world is of critical importance. Should norm change focus on injunctive norms, descriptive norms, or personal attitudes, and in what contexts (cf. Dimant et al. 2023, Jacobson et al. 2011, White & Simpson 2013)? How do mismatches between the values embedded in norm interventions and local values and norms affect backlash (Thomas & Markus 2023)? There may also be cultural variation in pluralistic ignorance and preference falsification that are directly related to the success or failure of norm interventions in different countries. More generally, research needs to broaden and deepen the global scope of norm research.

Breaking Down Academic Silos

While research on social norm emergence, persistence, and change is thriving across disciplines, much of it remains in academic silos. This may be because definitions of social norms, research questions, and methodologies prioritized tend to be discipline specific. While this may make it difficult to integrate research that takes very different approaches, as our review has shown, such intellectual diversity is a great strength for the study of norm dynamics, which is ultimately multilevel and complex. As Karl Popper [2014 (1963)] stated, "we are not students of some subject matter, but students of problems. And problems may cut right across the borders of any subject matter or discipline" (p. 88). Future research will benefit from deliberately cross-fertilizing learnings to generate radical new insights, in part because each discipline has strengths and blind spots with respect to norm dynamics. The use of experiments in psychology, for example, can address causality but often ignores proximal (social networks) and distal ecological and historical pressures. Likewise, game-theoretic modeling is causal at the population level and can identify structural factors that affect norm dynamics but tends to ignore psychology and is rarely empirically validated. Future research needs to integrate psychological variables and belief dynamics, such as internalized norms and theory of mind, into models of human behavior (Galesic et al. 2021, Loewenstein & Molnar 2018). Indeed, exciting new mathematical frameworks are beginning to integrate material, social, and cognitive aspects of behavior and belief dynamics, combining insights from different disciplines (Gavrilets 2021, Gavrilets & Richerson 2022). Such models integrate both material and social-psychological factors in the utility function and consider changes in personal norms and second-order beliefs about the actions and beliefs of others (see Andrighetto & Vriens 2022). In turn, findings from these models should be validated and extended with research from disciplines using field and laboratory methods, ethnography, and historical methods. More generally, an interdisciplinary approach to norm dynamics is indispensable to map out the ultimate and proximate functions of norms and their multilevel consequences.

Integrating Academic Research and Policy

To date, research on norm dynamics also remains siloed in academic disciplines and has little impact on public policy. Social norms are at the heart of many of the world's most pressing issues. Academic research is needed to help practitioners and policy makers cultivate norms of civility on- and offline, tackle climate change, reduce poverty, and help integrate refugees around the world, among many other topics. The new movement of norm nudges, which provide social information

about what others do or approve/disapprove of to change behavior (because people want to imitate influential others, coordinate, or be accepted by a credible reference group; Bicchieri & Dimant 2022, Miller & Prentice 2016), would benefit from academic–practitioner partnerships.

In addition, academics and practitioners have an opportunity to explore the implications of norm mismatch for policy. The most obvious implication is that when norms are mismatched, as in the case of harmful or maladaptive norms, governments may want to quicken the transition from norms that emerged in the previous environment to those that are optimal in the current setting. This is the perspective taken by the international community regarding practices such as female genital cutting. For some practices, it may be relatively clear that norms are mismatched with the modern world and likely harmful; for others, such as efforts to lower fertility (Ashraf et al. 2014) or to eliminate traditional marriage transfers (Lowes & Nunn 2018), the mismatch is less clear. There are many examples of development policy causing damage by changing norms under the presumption that a society's norms are mismatched. One of the most well-studied examples is the Bali Irrigation Project implemented by the Asian Development Bank in 1979. The project legally forced individuals to abandon traditional planting practices intimately connected to the Hindu-based belief system *Agama Tirtha*. This caused harm, since the practices, unbeknownst to developers, were effective at reducing the pest population in the region (Lansing 1991). Thus, while policy has the potential to do good by reducing mismatch when it exists, it also has the potential to create harm by changing norms and practices when mismatch is not present.

In conclusion, a central focus of this review has been on the dynamics of norms, namely, their emergence, persistence, and change. Understanding the dynamics of norms, especially given the global challenges we face, has never been more important. It is becoming increasingly clear that norms are a key factor in determining views on policies related to economic inequality, human rights, personal freedoms, gender equality, and environmental management. Our ability to understand norm dynamics and harness these insights will have important implications for the success of the human species.

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