Kinship intensity and the use of mental states in moral judgment across societies

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ABSTRACT

Decades of research conducted in Western, Educated, Industrialized, Rich, & Democratic (WEIRD) societies have led many scholars to conclude that the use of mental states in moral judgment is a human cognitive universal, perhaps an adaptive strategy for selecting optimal social partners from a large pool of candidates. However, recent work from a more diverse array of societies suggests there may be important variation in how much people rely on mental states, with people in some societies judging accidental harms just as harshly as intentional ones. To explain this variation, we develop and test a novel cultural evolutionary theory proposing that the intensity of kin-based institutions will favor less attention to mental states when judging moral violations. First, to better illuminate the historical distribution of the use of intentions in moral judgment, we code and analyze anthropological observations from the Human Area Relations Files. This analysis shows that notions of strict liability—wherein the role for mental states is reduced—were common across diverse societies around the globe. Then, by expanding an existing vignette-based experimental dataset containing observations from 321 people in a diverse sample of 10 societies, we show that the intensity of a society's kin-based institutions can explain a substantial portion of the population-level variation in people's reliance on intentions in three different kinds of moral judgments. Together, these lines of evidence suggest that people's use of mental states has coevolved culturally to fit their local kin-based institutions. We suggest that although reliance on mental states has likely been a feature of moral judgment in human communities over historical and evolutionary time, the relational fluidity and weak kin ties of today's WEIRD societies position these populations' psychology at the extreme end of the global and historical spectrum.

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Every murder, intentional or unintentional, calls for clan vengeance. The closest clansman of the murdered… must in the figurative expression of the Gilyak "raise up the kindred bones" i.e. kill the murderer or at least some person of the male sex of his khal' [clan]. And the wrath of vengeance is so great that not even newborn children are spared.

— Shternberg, Bromwich, and Ward (1933), among the Nivkh (Gilyak) hunter-gatherers of eastern Siberia

1. Introduction

For many readers, the above epigraph portrays a curious and almost counter-intuitive approach to moral judgment. Whether a death comes about through an intentional act of murder or is entirely accidental, the punishment is similarly harsh. This narrow focus on outcomes at the exclusion of intent contrasts with conceptions of culpability and responsibility common in many Western, industrialized societies today. The approach to guilt that many readers are familiar with, which began to develop in Western law during the Middle Ages, focuses primarily on inferences about the mental states of those involved (Berman, 1983; Harper, 2013; Henrich, 2020).

In recent decades, research on moral judgment among populations that are Western, Educated, Industrialized, Rich, and Democratic (WEIRD) has documented subjects' consistent tendency to heavily weight agents' mental states, and particularly their intentions, when assessing the moral permissibility and punishment-worthiness of actions. For example, WEIRD subjects judge *attempted* harms, which involve malicious intent but a neutral outcome, more harshly than *accidental* harms, which involve innocent intent but a negative outcome (Young, Cushman, Hauser, & Saxe, 2007; Young & Saxe, 2008, 2009). Although intent-based moral judgment has a complex developmental trajectory (Cushman, Sheketoff, Wharton, & Carey, 2013), some evidence indicates that even babies incorporate information about intent into their social decisions: given the choice, preverbal infants prefer a puppet who tried but failed to help a third party over a puppet who tried but failed to hinder a third party (Hamlin, 2013). These broad and replicable patterns (Cushman, 2015; Saxe, 2016; Young & Tsoi, 2013) suggest that the great importance of mental states in making moral judgments may be a reliably developing feature of human cognition that emerges with little input from cultural evolution. Considering others' mental states may serve as an adaptive strategy that helps individuals (1) pick the best cooperative partners, (2) avoid uncooperative or dangerous individuals (Chakroff et al., 2016; Young & Tsoi, 2013; Young & Waytz, 2013), (3) select and accurately learn from moral exemplars, or (4) punish and teach most effectively.

However, several recent studies reveal broad variation across societies in the manner and context in which people use mental states during moral judgment. In the largest cross-cultural study to date, Barrett et al. (2016) compared responses to moral-judgment vignettes featuring physical harm, poisoning, theft, and food taboo violations across ten societies. While participants from Los Angeles and rural Ukraine placed substantial weight on intentions in their judgments, pastoralists from Namibia and fisher-horticulturalists from Fiji deemed high- and low-intent harms across most domains to be equally bad, punishment-worthy, and reputation-damaging. Participants from the remaining six societies fell in between these extremes. Barrett et al. (2016) also found substantial variation in the degree to which potentially mitigating factors like self-defense, insanity, and necessity altered the severity of moral judgments. Because taking a mitigating factor into account often requires consideration of a perpetrator's state of mind, this result further indicates population-level variation in the tendency to employ mental-state reasoning during moral judgment. Replicating the noteworthy patterns found in Fiji, McNamara, Willard, Norenzayan, and Henrich (2019) confirmed that indigenous Fijians place more focus on outcomes than intentions when judging moral scenarios, while still

taking intentions into account to some degree, in certain situations (e.g. deeming attempted harms, which involve negative intent but neutral outcome, somewhat "bad"). Related patterns have also been detected in industrialized Asian societies. In contemporary Japan, participants weigh intentions less heavily than in the U.S. when making moral judgments, particularly in certain contexts (Hamilton & Sanders, 1992). Together, these results suggest that while some inclination to consider intentions during moral judgment in at least some situations has been found in all societies studied to date, WEIRD people, with their laser-like focus on mental states, seem to lie at the extreme end of the global distribution.

This curious pattern presents a puzzle: how can we explain the observed cross-cultural variation? Here, we develop and test a cultural evolutionary theory to answer this question, arguing that a substantial part of this variation can be explained by the strength of kin-based institutions, or *kinship intensity*.

We first lay out a theoretical framework to support the hypothesis that reliance on mental states during moral judgments should decrease with kinship intensity. Then, to set the scene for our analysis of cross-cultural experimental data (Barrett et al., 2016), we review the ethnographic evidence for norms that might suppress the use of mental states, specifically focusing on *opacity of mind* and *strict liability*. Contrary to WEIRD intuitions, such mental-state-disregarding norms are widespread. This suggests that, rather than highlighting a few peculiar societies, recent cross-cultural studies of the importance of mental states in moral judgment may be uncovering globally and historically important forms of psychological variation. Next, we provide empirical support for our hypothesis, showing that kinship intensity predicts the use of mental states during moral judgment across a diverse sample of ten societies. In closing, we suggest that although mentalizing has likely been a feature of moral judgment in many communities, the relational fluidity and weak social ties of today's WEIRD societies place this population's psychology at the extreme end of the global and historical spectrum.

2. Theoretical framework

Theory of mind, or the ability to infer others' beliefs, thoughts, goals, and desires, is likely a reliably developing feature of human psychology (Barrett, 2015; Barrett et al., 2013; Henrich, 2016). This does not mean, however, that people everywhere employ theory of mind in the same contexts or with the same frequency; rather, social norms and other cultural technologies may shape, sharpen, and direct its use. Institutions, or packages of culturally-transmitted social norms, exert a potent influence on psychology (Henrich, 2008, 2015; McNamara & Henrich, 2017). Institutions and psychologies culturally coevolve—social norms respond to economic and socioecological circumstances, while minds adapt ontogenetically to the opportunities and incentives created by institutions. Kin-based institutions, which govern practices related to marriage, residence patterns, and mutual familial obligations, are central among these evolving institutions. A growing literature links variations in kin-based institutions to cross-cultural differences in several aspects of psychology (Enke, 2019; Henrich, 2020; Schulz, Bahrami-rad, Beauchamp, & Henrich, 2019). We hypothesize that attention to mental states in moral judgment is one important domain in the psychological package shaped by kin-based institutions.

2.1. The coevolution of kin-based institutions and cultural psychology

Within an evolutionary framework, institutions are packages of social norms that govern many aspects of human life, including patterns of exchange, religious participation, and political systems (Henrich, 2015, 2016). Social norms arise spontaneously via cultural evolution once individuals (1) rely sufficiently heavily on learning from others and (2) are capable of acquiring both 'what to do' in certain contexts

(e.g., share food) and the standards for judging others in those contexts. Institutions rooted in kinship have historically been fundamental in organizing social life across human societies (Chapais, 2010; Fox, 1967; Murdock, 1949). Anchored in various aspects of our evolved psychology, including kin altruism, incest aversion, and pair-bonding, kin-based institutions organize people's social networks, in part by expanding on and either amplifying or suppressing the impacts of genealogical relatedness (McNamara & Henrich, 2017). These institutions structure patterns of marriage, residence, and mutual obligation, directing, for example, who should marry whom (is a first cousin a preferred or tabooed marriage partner?), where newly-wed couples live (with the bride's or groom's relatives?), and who one's natural allies are (if a man's father's brother's son is killed, is he honor-bound to avenge the death?). However, societies vary in how central kinship is to the formation of personal identity and social relationships; we term this *kinship intensity*.

Anthropologists distinguish between "intensive" and "extensive" kinship systems, tying variation in these institutions to ecological and economic factors. Societies with extensive kinship tend to encourage the formation of broad social networks with unrelated individuals, and often feature exogamy and bilateral descent (Schulz et al., 2019; Walker & Bailey, 2014). Work among mobile hunter-gatherers suggests that extensive kin-based institutions may have culturally evolved to mitigate ecological risk by creating broad, geographically dispersed social networks that can act as social safety nets after local shocks (Wiessner, 1998, 2002). In contrast, in societies with intensive kinship, kin-based institutions tightly control and constrain personal relationships. These societies are often characterized by extended family networks, cousin marriage, polygyny, endogamy, unilineal descent, and an increase in relatedness within kin groups (Schulz et al., 2019; Walker & Bailey, 2014). Scholars have argued that kinship systems often intensified with the scaling up of domesticated food production or with the intensive use of fixed foraging resources, such as coastal fisheries. In this novel context, where control and defense of land parcels and stationary resources became crucial to survival, the ability to mobilize large local communities via intensive kin-based institutions culturally evolved (Bowles & Choi, 2013; Dow, Mitchell, & Reed, 2017; Flannery & Marcus, 2012; Johnson & Earle, 2000). Because there is necessarily a trade-off between the breadth of ties and the density or depth of ties, in the terms used above, societies with intensive kin-based institutions have *high kinship intensity*, while those with extensive kin-based institutions have relatively *lower kinship intensity*.[1]

WEIRD societies evolved extremely low levels of kinship intensity via a different route than mobile hunter-gatherer societies: namely, the dissolution of both extensive and intensive kin-based institutions and the broad weakening of kinship as a central organizing force. Rather than the tightly webbed kin ties of societies with intensive kinship or the broadly dispersed family networks of societies with extensive kinship, WEIRD societies feature weak, isolated nuclear families, a pattern that emerged in medieval Europe (Goody, 1983; Greif, 2006; Todd, 1990). While the precise cause of the weak forms of kinship in Europe remains a matter of debate, a long tradition of anthropologists (Goody, 1983), economists (Greif, 2006), historians (Mitterauer, 2010), and cultural evolutionists (Henrich, 2020; Schulz et al., 2019) have argued that the medieval Church systematically dismantled complex kin-based institutions in Western Europe. Whatever the ultimate cause, most

scholars agree that independent, neolocal, monogamous, nuclear families had stabilized in many regions of Western Europe by around 1500 CE.

Today, trends towards weakening kinship have emerged in some other parts of the industrialized world, such as China and Japan, spurred in part by mid-20th century social and legal reforms (Baker, 1979; Ebrey & Watson, 1986; Hamilton & Sanders, 1992; A. Hashimoto & Traphagan, 2009). However, the shift away from intensive kin-based institutions is relatively recent in these countries, and some scholars suggest that the process of change in social organization is ongoing (Campbell & Lee, 2011; Hamilton & Sanders, 1992; A. Hashimoto & Traphagan, 2009) Together, this suggests that WEIRD societies today lie at the extreme end of the global kinship intensity spectrum.

There is reason to suspect that different kin-based institutions—the first and often the most pervasive institutions that humans encounter during development—shape people's psychology. Different institutions create varying incentives, normative concerns, and social network configurations that push and pull on people's preferences, heuristics, emotions, attentional biases, and other aspects of cognition (Heine, 2016; Hoemann et al., 2019). Providing indirect support for a role for kin-based institutions in molding psychology, a large literature has connected different motivations, emotions, and perceptions to differences in interdependence and network density (Fowler & Christakis, 2010; Gelfand et al., 2011; Kitayama et al., 2017; Kitayama, Ishii, Imada, Takemura, & Ramaswamy, 2006; Kitayama & Park, 2010; Rand, Arbesman, & Christakis, 2011). Psychological variation has been linked to both relational mobility (the porousness or fluidity of one's social network: H. Hashimoto & Yamagishi, 2013; Li, Hamamura, & Adams, 2016; Sato, Yuki, & Norasakkunkit, 2014; Schug, Yuki, & Maddux, 2010; Thomson et al., 2018) and residential mobility (geographical relocation: Lun, Oishi, & Tenney, 2012; Oishi & Talhelm, 2012). Although researchers do not often reference kinship in their discussions of either relational or residential mobility (c.f. Henrich, 2020), the connections seem hard to ignore.

Dovetailing with the work on social networks, two recent papers have directly connected kin-based institutions to aspects of psychology. Schulz et al. (2019) found that individuals from societies with high kinship intensity were less individualistic and more obedient; placed greater value on tradition and stable social relationships; and employed more holistic reasoning (Schulz et al., 2019). In addition, people from populations with high kinship intensity exhibit greater ingroup-oriented prosociality, favoring family members for jobs and expressing a willingness to lie for a friend in court; but less outgroup-oriented prosociality, making fewer anonymous blood donations and cheating more frequently in a behavioral economics game (Schulz et al., 2019). Similarly, Enke (2019) linked intensive kinship to (1) stronger ingroup loyalty and ingroup trust, (2) bigger difference in beliefs about the acceptability of violence against outgroup versus ingroup members, (3) more experience of shame versus guilt, and (4) a greater focus on purity during moral judgment. Here, we suggest that attention to mental states during moral judgment is part of the suite of psychological traits modulated by kinship institutions.

2.2. Why would kinship intensity influence the use of mental states in moral judgment?

We propose three non-mutually exclusive cultural evolutionary hypotheses to justify the prediction that the use of mental states in moral judgment should covary with kinship intensity. First, the benefit-to-cost ratio of considering mental states in the context of partner choice may be lower in societies with intensive kinship. Second, in societies with rigid, kin-based social networks and allegiances, outcome-focused moral judgment norms may culturally evolve as a way to sustain internal harmony. Both of these hypotheses would result in a reduced general tendency to engage in mentalizing during moral judgment in societies with intensive kinship. Finally, intensive kin-

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[1] To clarify, kinship intensity can be conceptualized in relation to the density and redundancy of social network connections. Imagine a society modeled as a network of personal relationships. Some kin-based institutions create networks in which each relationship is embedded within a dense web of shared ties. That is, each pair of interactants shares many mutual partners– there are many redundant pathways reinforcing each relationship. This is high kinship intensity. In contrast, other kin-based institutions create networks in which the average number of shared ties or redundant pathways between pairs is lower, and many pairs lack any at all. This is low kinship intensity.

based institutions may magnify the impact of social distance on mentalizing in moral judgment, leading to greater differences in reliance on mental states when judging outgroup members compared to ingroup members. In the extreme, the mental states of socially distant strangers may not play a role in moral judgment. We will now further elaborate on each of these hypotheses.

2.2.1. Kinship intensity and the costs and benefits of mentalizing for partner choice

In the context of partner choice, kinship intensity may modulate the benefit-to-cost ratio of mentalizing during moral judgment. To understand this, consider an evolutionary model of partner choice in which individuals can access two kinds of information: (1) internal information, which includes the inferred mental states and dispositions of potential partners, and (2) external information, which includes input about local norms, social network ties, situational constraints, and potential partners' obligations and responsibilities. Let us further assume that external information is essentially cost-free in the context of evaluating any particular partner, because it is information that everyone needs to acquire simply to navigate the local social environment. By contrast, inferring and tracking others' mental states comes with a facultative cost, a developmental cost, or both. A facultative cost implies that every time an action needs to be evaluated by considering mental states, individuals must divert some additional cognitive resources (e.g., attention) to the evaluation; a developmental cost implies that individuals could, with some costly effort while growing up, hone a cognitive ability that automatically tracks and integrates inferences about mental states into their evaluation of others' actions at little or no effort per assessment (Buon, Jacob, Loissel, & Dupoux, 2013; Martin, Buon, & Cushman, 2019). Under this model, individuals would only pay the extra cost of tracking mental states if, on average, such inferences paid off in sufficiently better partner choice. If the external input to partner evaluation is by itself sufficiently accurate relative to the boost provided by mental-state inferences, individuals may adaptively conserve their cognitive resources by not deploying theory of mind in the evaluation of certain kinds of actions or for particular categories of people. Instead, they may reallocate these resources to more productive ends (e.g., to acquiring even better external input).

Given this model, kinship intensity will influence the costs and benefits associated with mentalizing in moral judgment and partner choice, which may then help explain the variation observed across societies. In societies with intensive kin-based institutions, many closely monitored social norms regulate social life—these societies are characterized by greater "tightness", indicating the presence of strong norms and low tolerance for deviant behavior (Gelfand et al., 2011; Schulz et al., 2019). These norms often prescribe tightly-specified actions, depending on the context and the relationships of the people involved. Moreover, individuals are enmeshed in dense and enduring social networks on which they depend for economic production, social insurance, and personal safety.[2] In this social world, knowing the social norms, network ties, and personal relationships should be highly predictive of what individuals will do. Trust, for example, is best assessed by knowing the number of shared social ties and interdependencies between you and your potential partner. Even if your partner's internal inclinations tend towards larceny, having a dense and shared social network will likely transform him into a reliable and trustworthy actor. In this intensive kinship context, the available external information (shared norms, a potential partner's network ties, etc.) may be sufficient

for predicting a potential partner's behavior; the added benefits of mental state inference in this context may be minimal and may not outweigh the cognitive costs. This may lead individuals to engage in relatively less mentalizing.

At the other end of the spectrum, in societies with low kinship intensity, social norms are few, poorly monitored, and often in flux. Network connections are widely dispersed, rarely inherited, and often ephemeral. People in such societies tend to be individualistic, independent, self-oriented, and concerned about creativity (Enke, 2019; Schulz et al., 2019). In this social world, knowing the norms and other external information is substantially less informative for predicting people's behavior. Thus, mental-state tracking and inferences usually pay off, providing substantial improvements in partner choice that cover the cognitive costs of integrating mental-state information (Chakroff et al., 2016; Young & Tsoi, 2013; Young & Waytz, 2013). Hence, in societies with weak kinship, mentalizing should be more prevalent in moral judgments and more effective in assessing novel partners for cooperative interactions (Carter & Weber, 2010; Oishi, Schug, Yuki, & Axt, 2015; Yamagishi, Kikuchi, & Kosugi, 1999).

2.2.2. Kinship intensity, mentalizing norms, and community harmony

Outcome-focused norms of moral judgment may culturally evolve in societies characterized by intensive kinship. In particular, these societies may be able to quell internal conflicts and sustain greater harmony by suppressing the use of mental states in moral judgments (Posner, 1980). Consider a community with five different clans in a region in which both economic productivity and physical security increase when the clans all work in harmony. If someone from Clan A kills someone from Clan B, the clans may be able to agree on the facts (what happened?) but not on the perpetrator's mental states. Did the person from Clan A *intend* to murder the person from Clan B and steal his wife? Clan A is positive it was an accident, while Clan B is sure it was purposeful. When settling on the appropriate punishment (e.g., blood payment) for an action, disagreements over inferred intentions or other mental states are a potentially serious source of social conflict. In such a world, there are no impartial third parties, you are either an ally of Clan A or Clan B, and this alliance determines your opinion. How can such a conflict be adjudicated? There are several ways, but one is to suppress reliance on mental states and attend only to observable outcomes.

Of course, purely outcome-based moral judgments (often called "strict liability") can also cause conflict, for example in the case of accidental harm or transgressions in the service of a greater good. However, when strict liability is a social norm—everyone anticipates that others will use outcome-based judgments—dangerous conflicts may be avoided. Anyone who tries to introduce mental states into discussions about culpability breaks a local norm. Consistent with this, ethnographers studying societies with strict liability argue that such outcome-based judgments—devoid of complicated and biased inferences about intentions—help alleviate resentments and heal social wounds caused by harmful acts (Moore, 1972).

By contrast, in societies lacking intensive kinship, individuals are keenly interested in the mental states of others as they search for partners and develop new relationships. Swapping information about others' mental states is a regular part of social discourse. In such social worlds, communal harmony is not greatly endangered by mental-state inferences because these societies are built on fluid network structures. This means that (1) individuals are not ensconced within loyal kin groups ready to defend their honor against all outsiders and (2) relatively impartial adjudicators can often be found to help resolve disagreements about the mental states of the actors involved. Outcome-focused norms of moral judgment may be less likely to culturally evolve in these contexts.

2.2.3. Kinship intensity, mentalizing, and intergroup psychology

Intensive kinship may also influence the use of mentalizing in moral judgments by tightening the ingroup, sharpening the distinction

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[2] N.B. Although these static networks constrain partner choice to a certain extent, individuals nonetheless have some latitude to select their cooperative partners (Nolin, 2010). Of course, some small-scale societies where partner choice has been studied possess relatively extensive kinship systems, so a larger role for partner choice in these places is precisely what we'd expect (Bliege Bird & Power, 2015; Von Rueden, Redhead, O'Gorman, Kaplan, & Gurven, 2019).

between ingroups and outgroups, and solidifying ingroup loyalty. Group membership and intergroup dynamics modulate cognition: in many realms, including morality, how we think about "us" is not the same as how we think about "them" (Cikara & Van Bavel, 2014; Waytz & Young, 2018). Outgroup members can have very different norms and opaque intentions, making it too difficult or costly to try to predict their behavior based on mental states. As a result, people everywhere may be relatively less prone to consider intentions when interacting with socially-distant outgroup members compared to close ingroup members. In support of this idea, there is some evidence that WEIRD people engage in less spontaneous mentalizing when making judgments about outgroup members (Harris & Fiske, 2006, 2009, 2014), although this pattern can reverse when the context is competitive or threatening (Cikara & Van Bavel, 2014; Tsoi & Young, 2018). In addition, WEIRD children use fewer mental-state terms when describing outgroup members compared to ingroup members (Mcloughlin & Over, 2017).

Considering these psychological patterns, intensive kinship may magnify the impact of a target's social distance or outgroup membership on the use of mentalizing in moral judgments. Individuals from societies with more intensive kinship show a greater distinction in how they think about ingroup versus outgroup members across several domains. They show a sharper difference in their trust of family, friends, and people they know versus people from other countries, religions, and strangers; a greater emphasis on loyalty to their community; and a bigger difference in beliefs about the acceptability of violence against outgroup versus ingroup members (Enke, 2019; Schulz et al., 2019). Moreover, the radius of the ingroup may be smaller in societies with intensive kinship relative to those with weak kinship. While clans, kindreds, or tribes may serve as the relevant "ingroup" in populations with intensive kinship, communities with extensive or sparse kin ties may have more expansive ingroups, such as those based on national or religious identity (Brewer & Pierce, 2005). In line with this, people from societies with loose kinship place more emphasis on universal moral values compared to those from societies with intensive kinship– that is, people from loose kinship societies expect others within a much larger social radius to follow the same rules of conduct that they do (Enke, 2019). Thus, given (1) the tendency of people from societies with intensive kinship to avoid interaction with socially distant individuals and (2) the complexity of inferring the mental states of more socially distant individuals, the use of mental states in moral judgments may decline more rapidly with social distance in societies with intensive kinship.

Unfortunately, the available data only allow us to test for a relationship between kinship intensity and the use of mental states in moral judgments. We cannot study the interaction between social distance and kinship intensity or to address some of the other features of the theory just presented. It is worth emphasizing, though, that these three hypotheses—regarding partner choice, community norms, and intergroup psychology—are not mutually exclusive. Fig. 1 depicts the potential relationships between kinship intensity, mentalizing during moral judgment, and social distance. Although we cannot investigate these dynamics in detail, we have provided a fuller account of the theory in order to motivate future empirical work and formal modeling of this evolutionary reasoning.

3. Mental states in moral judgment in the ethnographic record

In the global and historical spectrum, just how prevalent is the tendency to deemphasize mental states during moral judgment? Recent studies have begun to document cross-cultural variation in this tendency (Barrett et al., 2016; McNamara, 2016; McNamara et al., 2019). However, despite careful design and implementation, some researchers may worry that these results reflect participants' misunderstanding or some other experimental issue. To assuage these fears, we show that norms and institutions that suppress mental-state reasoning appear in ethnographies worldwide. In particular, even when they were not
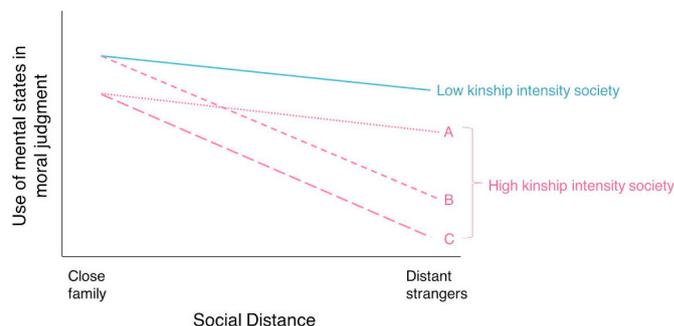
Fig. 1. Visual representation of hypothesized relationships between kinship intensity, mentalizing during moral judgment, and social distance. In societies with low kinship intensity (blue line), people rely heavily on mental states in moral judgment, but this tendency declines as social distance between the judger and the actor increases. Line A represents a scenario in which increasing kinship intensity leads people to generally engage in less mentalizing during moral judgment, and this effect is not dependent on social distance. For example, the benefit-to-cost ratio of mentalizing in the context of partner choice may be lower than in low kinship intensity societies, and/or there may be group-level social norms demanding outcome-based judgments instead of mentalizing. Line B represents a scenario in which increasing kinship intensity magnifies the impact of social distance on mentalizing in moral judgment but does not cause an overall decline in this tendency with respect to close kin. Line C synthesizes the first two possibilities– increasing kinship intensity *both* causes a general decline in mental-state reasoning during moral judgment *and* magnifies the impact of social distance. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

looking for these practices, ethnographers have frequently documented the presence of (1) an *opacity of mind* (the belief that others' minds are fundamentally unknowable), (2) *strict liability* (culpability depends only or largely on outcomes), and (3) *collective guilt* (culpability is shared equally by group members so individual mental states receive little or no weight). Rather than supporting the idea that WEIRD subjects' powerful focus on intentions represents universal *Homo sapiens* psychology, these anthropological accounts instead suggest that attention to mental states in moral judgment has often been suppressed in societies around the world, and may actually have hypertrophied in Western populations over the last millennium (Berman, 1983; Henrich, 2020).

3.1. Opacity of mind

Norms and beliefs about the mind and about the appropriateness of discussing others' mental states may influence the extent to which people deploy mentalizing in certain contexts. Anthropologists working in the Pacific and elsewhere have documented what they term "Opacity of Mind," a cluster of norms and beliefs that, potentially in diverse ways, present others' minds as essentially unknowable or opaque (reviewed in Robbins & Rumsey, 2008). In many societies where Opacity of Mind norms operate, it is considered socially unacceptable to publicly speculate about the internal mental states of others, and anyone who gossips about others' intentions may be sanctioned (Robbins & Rumsey, 2008). Even introspection, thinking about one's *own* mind, is reportedly considered to be suspicious in some groups (Duranti, 2015). This is not to say that people who adhere to Opacity of Mind never engage in belief attribution or are unable to use theory of mind; as mentioned above, current evidence suggests that mentalizing abilities are reliably developing features of human cognition (also, see Supplement 3). Indeed, in his detailed treatment of Opacity of Mind among Samoans, even Duranti (2015) highlights several situations in which intentions come into play.

Nevertheless, anthropologists have documented various ways that Opacity of Mind seems to influence behavior, and perhaps cognition.

For example, in her work among the Bosavi of Papua New Guinea, Schieffelen reports that caregivers do not make verbal inferences about infants' mental states or expand on (or infer the deeper meaning of) young children's unclear utterances. When children mention their own or others' mental states, adults correct them by stating what is externally evident (e.g., crying rather than sadness: Luhrmann et al., 2011; Schieffelin, 1990, 2008). This suggests that children spontaneously start to infer mental states, even when this behavior is rarely modeled for them, providing further evidence that theory of mind is an evolved psychological capacity. However, it also shows Opacity of Mind norms in action: children are socialized from a young age to deemphasize internal states and focus on real-world outcomes. In a similar vein, Robbins and Rumsey (2008) describe how people living in Opacity of Mind societies make little reference to empathy when discussing their approach to life. A common theme in these societies is the idea that internal or inferred intentions have little causal influence on the world compared to spoken or demonstrated intentions—that is, actions (Robbins & Rumsey, 2008). This view contrasts starkly with the WEIRD conception of the mind as knowable and a causal force behind actions (Luhrmann et al., 2011)— a view common in cognitive science.

Some recent empirical evidence from Fiji supports the idea that Opacity of Mind can modulate the tendency to engage in mentalizing. First, McNamara, Willard, Norenzayan, and Henrich (2018) found that indigenous Fijians have a reduced tendency to predict an agent's behavior based on inferences about their false beliefs in an adult version of the false-belief task, compared to both Indo-Fijians and North Americans (neither of whom adhere to Opacity of Mind norms). In this same study, self-report measures indicate that indigenous Fijians think about others' internal mental states less than do either Indo-Fijians or North Americans, and that this tendency may explain their performance on the false-belief task. These results suggest that Opacity of Mind norms may reduce indigenous Fijians' propensity to engage in mental-state reasoning. Relatedly, recall that Fijians place little focus on intentions when making moral judgments, judging low- and high-intent harms equally harshly (Barrett et al., 2016; McNamara et al., 2019). This effect may not merely be behavioral. Crucially, priming Fijians to think about thoughts shifts their judgments to place more weight on intentions. This suggests that, under normal circumstances, intentions may not be highly salient for Fijians. If they were privately considering intentions but purposefully excluding this information from their explicit judgments, priming thinking about thoughts would probably not influence their performance on this task (McNamara et al., 2019). Together, this line of research suggests that Opacity of Mind modulates cognition, reducing adherents' propensity to engage in mental-state reasoning.

3.2. Strict liability

Cross-culturally, rules about establishing legal or normative liability for crimes represent a second category of norms that may both reflect and influence people's tendency to focus on mental states versus outcomes in the context of moral judgment. These norms relate directly to explicit moral judgments, since they dictate the conditions that must be met in order to hold a person responsible for an action. Norms of liability that place a heavy emphasis on intention should, accordingly, make intentions particularly salient. In contrast, norms of liability that focus on outcomes should make intentions and other mental states less salient during moral judgment.

In the Western legal tradition, mental states play a crucial role in establishing liability and determining appropriate punishments. Consider, for example, the distinction in the U.S. criminal code between homicide (which involves *malice*, the legal term for intention) and manslaughter (which does not involve malice). Both acts produce the same outcome (a death), but while homicide may be punished by life in prison or capital punishment, the sentence for manslaughter tops out at 15 years of incarceration (18 U.S. Code § 1111, 2020). While

punishment for some transgressions (e.g., statutory rape) more heavily weight outcomes, establishing intent is a key feature of many Western court cases. A commonly cited maxim in English criminal law states "*actus non facit reum misi mens sit rea*: an act does not make a man guilty unless his mind is guilty too" (Goldman, 1993, p. 63). These norms extend beyond formal legal proceedings: as noted at the beginning of this paper, many Westerners intuitively feel that intentions play a crucial role in personal responsibility and moral status, a pattern evident in numerous neuropsychological studies (Cushman, 2015; Young & Tsoi, 2013).

In striking contrast to Western conceptions of liability, the ethnographic record indicates that many societies subscribe to some form of "strict" liability. Here, motives, intentions, and other mental states play a diminished role in determining culpability; instead, outcomes are the central– and sometimes only– focus (Moore, 1972; Posner, 1980). In societies where strict liability is common, similarly harsh punishments are levied on both intentional and accidental transgressors. While it is important to note that people in societies with strict-liability norms do sometimes take intentions and motives into account (a fact occasionally neglected in the literature; see Ch. 1 of Goldman, 1993 for discussion), it seems plausible that the presence of these norms could down-regulate people's tendency to think about intentions when making moral judgments.

Thus, norms related to strict liability appear plausibly linked to the use of mental-state reasoning during moral judgments. However, unlike the Opacity of Mind literature, no extensive cross-cultural review exists on strict liability. To begin to fill this gap, we surveyed the ethnographic literature to determine the prevalence of strict liability across diverse societies and geographic regions. In addition, as a first test of our central hypothesis, we used ethnographic data on kinship to examine the relationship between kinship intensity and the presence of strict liability.

We also investigated a second norm of legal liability that may deemphasize mental states: collective guilt. Here, culpability is shared equally by the perpetrator's group members, whose mental states receive little weight. However, while collective guilt may reflect reduced mental-state reasoning, it represents a less clear-cut case than strict liability. Therefore, results for this portion of the ethnographic review, which tell the same story as strict liability, are left to Supplement (S3).

3.2.1. Methods

We reviewed ethnographies from the Standard Cross-Cultural Sample (SCCS) cases present in the electronic Human Relations Area Files (eHRAF, ehrafworldcultures.yale.edu, *n* = 146). Based on a total of 4706 paragraphs of ethnography, we coded each society for the presence or absence of strict liability. Our coding scheme included the following categories: −1 (not enough data), 0 (evidence of absence), 0.5 (intermediate), or 1 (present). Most coded cases focused on punishment for harms that resulted in death. Each society was coded by two independent raters, and all disagreements were adjudicated to create the final data set (for detailed methods, see Supplement S1). Of the full sample of 146 societies, the final data set contains data (a strict liability rating of 0, 0.5, or 1) for 38 societies. Using data from the SCCS, we examined the distribution of societies with strict liability across subsistence styles and regions of the world.

We then tested the relationship between kinship intensity and the presence of strict liability. We followed the methods laid out by Schulz et al. (2019) to create a Kinship Intensity Index, combining SCCS variables related to kin-based institutions: cousin marriage preference, polygamy, co-residence of extended families, lineage organization, and community organization (see S4.1 & S6.1 for details). To analyze the data, we first employed multinomial logistic regression (R package nnet, version 7.3–12). In order to take the missing data into account, all four levels of the dependent variable (−1 = no data; 0 = absent; 0.5 = intermediate; 1 = present) were included in the models. To get more power in this analysis with small sample sizes, we then pooled

Table 1
Societies with strict liability across subsistence style.

Subsistence Style	Strict Liability		
	Present	Intermediate	Absent
Mobile Hunter-Gatherers	1	0	1
Complex Hunter-Gatherers	7	1	3
Horticulturalists	1	4	1
Pastoralists	4	1	0
Intensive Agriculturalists	3	2	5
Other Combinations	0	2	2
Total	*16*	*10*	*12*

Notes: Societies in the SCCS were rated for presence of strict liability based on ethnographic texts from eHRAF. Data on subsistence style comes from eHRAF. The category "Pastoralists" includes societies defined as "Pastoralist" or "Agro-pastoralist" by eHRAF, and the category "Other Combinations" includes the eHRAF classifications "Other Subsistence Combinations" and "Commercial Economy". Societies classified in eHRAF as "Hunter-Gatherers" or "Primarily Hunter-Gatherers" were divided into "Mobile" and "Complex" hunter-gatherers based on 5 SCCS variables: food storage, mobility, local hierarchy, community size, and presence of lineages. See Supplement S5 for more details.

societies coded as "intermediate" (0.05) with "absent" (0), excluded societies with no data, and re-ran the analyses using binomial logistic regression. We controlled for two measures of coder uncertainty in the models (whether the coders disagreed in the first round of coding and whether the coders were uncertain about their final, adjudicated decision). However, due to sample size constraints, we were unable to include other potentially relevant controls, such as subsistence style or levels of jurisdictional hierarchy. See Supplement S4.1 for more details on our approach to this analysis. Analyses were run in R (version 3.5.2).

3.2.2. Results

In this ethnographic sample, societies with strict liability are common and widespread across subsistence modes and regions of the world (Table 1, Fig. 2). Of 38 societies with enough data to code strict liability, 42% (n = 16) clearly have the norms and 26% (n = 10) provide intermediate or less clear evidence. As Fig. 2 and Table 1 illustrate, societies with strict liability occur across disparate regions of the world, from sub-Saharan Africa, to East Asia, to South America, and include hunter-gatherers, horticulturalists, pastoralists, and agriculturalists. Table 2 shows a sample of ethnographic excerpts from some of the societies with strict liability.

We consistently found a positive but imprecisely estimated relationship between kinship intensity and the presence of strict liability in this sample. Multinomial logistic regression suggests that for a 1 standard deviation increase in the Kinship Intensity Index, the relative risk of observing strict liability compared to not observing strict liability is 1.36, but the confidence intervals are wide and include 1 (OR = 1.36, [95%CIs 0.62, 2.98], p = .44). Similarly, using binomial logistic regression, a one standard deviation increase in the Kinship Intensity Index is associated with a 40% increase in the odds of having strict liability, but again, the confidence intervals contain 1 (OR = 1.40, [95%CIs 0.66, 3.2], p = .39). Including controls for coder uncertainty does not substantially alter these results. In addition, results of the multinomial logistic regression suggest that as kinship intensity increases, the likelihood of having missing data for strict liability declines. See Supplement S4.3 for more detailed results.

3.2.3. Discussion

Although the results suggest that the more intensive a society's kinship, the greater the likelihood of an ethnographer noting strict liability, the size of this relationship was not estimated with precision and fell well below conventional cutoffs. This persistent uncertainty is unsurprising for several reasons. First, the sample sizes are quite small, preventing the inclusion of potentially important covariates such as

subsistence style and jurisdictional hierarchy beyond the local community (often used as a measure of state development). Second, ethnographic data are messy, and there is substantial room for bias in the written ethnographic literature, the availability of relevant ethnography, and the coding process. Third, data were missing from 108 societies, and the "missingness" does not appear to scatter randomly with respect to kinship intensity, which likely introduces bias into the analysis. Given these constraints, we believe that the results of the ethnographic review are best suited to simply providing a suggestion of how these practices may have been historically and globally distributed. In addition, most (75%) of the cases of strict liability uncovered in the review concerned harms that resulted in a death– a particularly severe and final type of transgression. It is possible that moral judgments for less serious harms may be less outcome-focused in some societies; our ethnographic review cannot speak to all moral judgments. We note, however, that Barrett et al.'s (2016) study uncovered tendencies towards strict liability in several societies in response to vignettes featuring harms like theft and battery. This indicates that strict liability can operate for transgressions that do not result in death. Overall, the presence of strict liability in societies from across the globe and the spectrum of subsistence styles suggests that the tendency to deemphasize mental states for at least some types of moral judgments has been widespread.

In light of recent cross-cultural studies on the use of mental states, our review of the ethnographic evidence on Opacity of Mind and strict liability indicates that there may be, and certainly may have been, substantially more variation in the centrality of mental states for moral judgment than existing work in WEIRD populations suggests. While far from conclusive given the amount of missing data, this review suggests that substantial variation may exist, and WEIRD societies likely represent one extreme.

We now turn to testing the hypothesis that this variation can be explained by kinship intensity.

4. Kinship intensity and reliance on mental states in moral judgments

We expanded an existing dataset from Barrett et al. (2016), who investigated moral judgments using vignettes in a diverse sample of ten societies that varied across subsistence mode, geography, ecology, and language (Fig. 3, Table S4). In this study, 322 participants rated the badness, punishment-worthiness, and reputation-damaging effects of different harm scenarios in two studies. In the first, the *Intention vignettes* featured either high-intent harm (e.g. an agent stealing someone's bag) or low-intent harm (e.g. an agent mistaking someone's bag for their own and taking it). These vignettes varied across domain: physical harm (striking someone in the face), theft (taking someone else's bag), poisoning (contaminating the community water source with insecticide), and food taboo violation (eating a locally tabooed food item). In the second study, a set of *Mitigating Factor vignettes* featured either intentional battery or battery that involved a potentially mitigating factor that might soften the severity of moral judgment (e.g. self-defense or necessity). We combined these data on moral judgments with blind-coded ethnographic data on kinship intensity from each field site. We then examined the relationship between kinship intensity and severity of judgment for (1) low- versus high-intent harms and (2) harms that involved a potentially mitigating factor versus those that did not.

Following from the framework laid out in this paper, we hypothesized that the tendency to consider intentions in moral judgments would decline with kinship intensity. That is, we expected the difference in severity of moral judgment for high- versus low-intent harms to shrink as kinship intensity increased. We made no specific predictions about the different vignette domains (theft, poisoning, etc.). However, it is worth noting that we can only expect to see the hypothesized pattern for a given domain if people consider violations in that domain
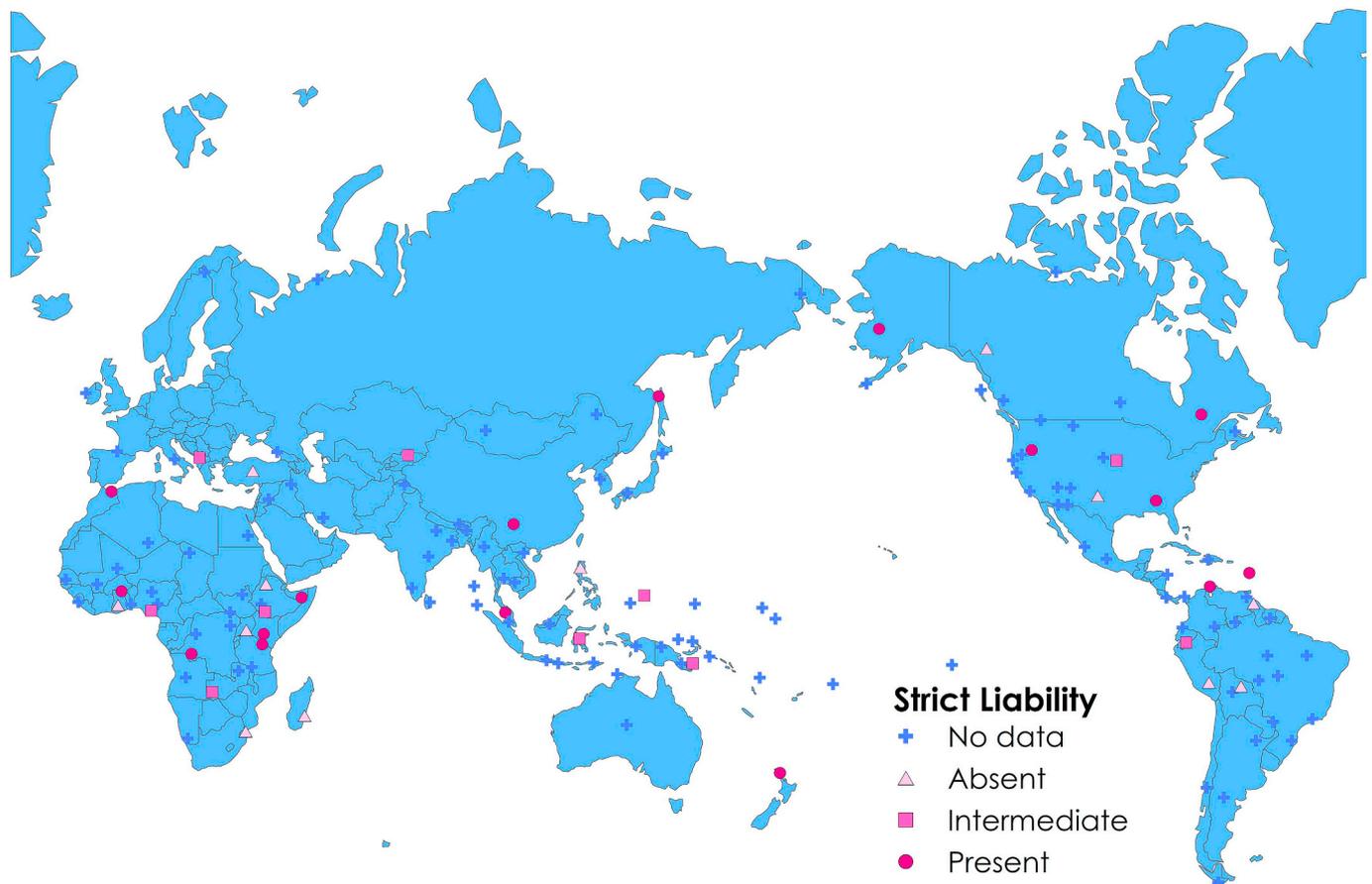
Fig. 2. Strict liability is widespread in the eHRAF Standard Cross-Cultural Sample. In the 38 societies with evidence of absence or presence of strict liability, strict liability is present in 42% (*n* = 16), intermediate in 26% (*n* = 10), and absent in 32% (*n* = 12). Societies with strict liability appear in regions around the world. 108 societies did not have enough relevant data to judge presence or absence of strict liability.

to be important. For example, if a vignette features an action that participants do not see as a meaningful violation, we would expect them to make lenient judgments regardless of the actor's intent.

Furthermore, we reasoned that taking potentially mitigating factors into consideration involves mental state attribution; the participant must think about what the perpetrator intended or believed about the situation (e.g., that they were acting in self-defense, or believed they had no other option). We therefore hypothesized that the effect of mitigating factors on the severity of moral judgment would decline with kinship intensity.

We pre-registered the hypothesis that there would be a negative relationship between kinship intensity and the use of mental states in moral judgment. Note, however, that because this project began as a paper for the first author's graduate coursework, pre-registration occurred after some preliminary data analysis had already been conducted. After pre-registration, the data were re-analyzed using newly blind-coded ethnographic data on kinship intensity.

4.1. Methods

4.1.1. Severity of Moral Judgment Index

Because the three moral judgment measures (badness, punishment-worthiness, and reputational damage) were highly internally consistent (Cronbach's α = 0.81 [95% CIs 0.79, 0.82]), following Barrett et al. (2016), we combined them to create an overall Severity of Moral Judgment Index. A Principal Component Analysis revealed that the first principle component (PC1) explained 72% of the variance in these three variables. The loadings on PC1 were used as weights to generate the Severity of Moral Judgment Index, a weighted sum of judgments about

badness, punishment-worthiness, and reputational damage. A high value indicates harsh moral judgment and a low value indicates a lenient judgment (for details, see S6.3).

4.1.2. Kinship Intensity Index

To create a measure of kinship intensity for each society, we first designed an ethnographic survey about kinship. Following the work of Schulz et al. (2019), the survey questions were based on the *Ethnographic Atlas* and asked about contemporary and traditional kinship practices: domestic organization, post-marital residence, cousin marriage, polygamy, descent pattern, corporate ownership of land, and presence of clans, segmentary lineages, segmented communities, and age sets. Each of these practices relates to kinship intensity. For example, matrilocal, patrilocal, or bilocal post-marital residence encourage intensive kinship by maintaining proximity and close ties between one spouse and his or her kin, whereas neolocal post-marital residence promotes more extensive kinship by placing couples in neighborhoods or communities away from blood relatives, where they are more likely to form extensive ties with unrelated neighbors (Schulz et al., 2019). For more details about each sub-indicator and how it relates to kinship intensity, see S6.1. We then asked an ethnographer from each of Barrett et al.'s (2016) ten field sites to fill out this survey. The ethnographers were blind to the purpose of the study and to the hypotheses.

Three blind coders rated each of these variables for kinship intensity, from 0 (low intensity) to 1 (high intensity) according to the scheme presented in Table 3. There was no variation in the presence of age sets in this sample, so we excluded this variable from all analyses. To create a society-level Kinship Intensity Index (KII), we averaged

Table 2
Selected ethnographic examples of strict liability.

Society	Country	Subsistence	Strict Liability	References
Albanians	Albania	Intensive Agriculturalist	*Intermediate* - After an accidental murder...honor was in most places satisfied by a money payment. For example, two men of Krujë were examining a revolver together, not knowing it was loaded, when it went off suddenly and killed one of them. The other was held guilty of murder, but in view of the circumstances escaped with a payment of twenty-five napoleons, the conventional six purses.	Hasluck and Hutton (1954), p.239
Berbers of Morocco	Morocco	Agro-Pastoralist	*Present* - During the hegemony of Abd el Krim, the preceptor of Ajdir once cut off the end of the gland of a child he was circumcising. If it had not been for the intervention of Abd el Krim, who assessed five hundred dollars blood money, the preceptor would surely have been killed, since the child died shortly after the accident.	Coon (1931), p. 130
Eastern Toraja	Indonesia	Horticulturalist	*Intermediate* - If an injury not inflicted on purpose resulted in the death of the injured person, the close relatives might well have demanded the death of the perpetrator, but we know of no cases where this demand was accepted. The imprudent person paid a fine... Of two men who spent the night on an eel-bridge, one cut the other one in the leg because he thought it was an eel. The injured man bled to death, and the perpetrator paid two buffaloes as *gompate* [fine].	Adriani and Kruijt (1950), p. 323
Gikuyu	Kenya	Intensive Agriculturalist	*Present* - Murder and manslaughter were treated in the same way, for the kiama was not chiefly concerned with the motive of the crime or the way in which the crime was committed, but with the fact that one man had taken another man's life.	Kenyatta (1953), p. 227
Goajiro	Colombia	Pastoralist	*Present* - Murder, manslaughter and being the cause of another's death are the most serious crimes. They do not have these actual categories.	Bolinder (1957), p. 100
Igbo	Nigeria	Horticulturalist	*Intermediate* - If it appeared that the homicide had been accidental, the man-slayer might... be allowed to return after twenty-eight days, and on his return would be required to offer sacrifice to Ala [earth deity]. But in some communities there was no difference in the penalty for accidental homicide and murder, owing to the belief that if a man killed another by what we should term an accident he must at some previous time have committed an act abominable to Ala.	Meek and Lugard (1970), p. 210
Ingalik	Alaska	Complex Hunter-Gatherer	*Present* - When one person is killed by another, whether by foresighted intention or in a burst of passion, or even by accident, revenge may be carried out by any capable individual in the relationship of father, son, brother, or either uncle of the deceased.	Osgood (1958), p. 53
Innu	Canada	Complex Hunter-Gatherer	*Present* - A distinction between murder—the premeditated and deliberate killing of a human being—and manslaughter—the killing without prepense—is unknown to these Indians. Even the accidental killing of another person as the result of a quarrel is regarded as homicide.	Lips (1947), p. 470(A)
Kazakh	Kazakhstan	Pastoralist	*Intermediate* - For unpremeditated murder wergeld is not customary, but only a gift of clothing and covering the expenses for burial and memorial services... [In self-defense] if the defender strikes the attacker, even though unintentionally, and it results in death or injury to a part of the body, the person guilty of this pays wergild.	Grodekov and Krader (1889), p. 210
Nivkh	Russia	Complex Hunter-Gatherer	*Present* - [Blood vengeance] is obligatory not only in the case of premeditated murder, but for completely accidental murder as well, even one which is only indirectly connected with one or another person.	Shternberg et al. (1933), p. 150
Northern Paiute	United States	Complex Hunter-Gatherer	*Present* - In the memory of informants no revenge killings took place, and informants stated that the payment of blood money is the most usual type of settlement for murder. Wergild is also demanded in case of accidental homicide and it is more likely to be accepted than in cases of murder.	Whiting (1950), p. 77
Suku	Democratic Republic of Congo	Horticulturalist	*Present* - A homicide must be compensated with the payment of two slaves, regardless of whether it was accidental or premeditated...There is no place, in this system, for arguments over the amount of compensation... nor over such matters as premeditation or accident, for these are legally irrelevant and compromise cannot take place in these terms.	(1) Kopytoff (1961), p.63
Yi	China	Intensive Agriculturalist	*Present* - When Li-ch'ü Ta-i accidently killed the son of Li-ch'ü Pieh-t'u... The clansmen decided that Ta-i would have to pay with his life. Reluctantly, Ta-i accepted the decision and twice attempted suicide without success. It was only after Pieh-t'u's sudden death that no one would press for the forfeit of Ta-i's life.	Lin and Pan (1947), p.107

Fig. 3. Cross-cultural sample from Barrett et al. (2016). The research team conducted moral judgment vignettes in a diverse sample of 10 societies.

across the remaining 9 contemporary kinship measures (a separate Ancestral Kinship Intensity Index was also created to reflect traditional practices; see S6.2). We chose to summarize these variables because in different societies, intensive kinship may culturally evolve via different pathways and thus different combinations of these variables. Kinship Intensity Index scores generated from the three blind coders were highly consistent (Intraclass Correlation Coefficient = 0.95, [95% CIs 0.86, 0.99]).

4.1.3. Data analysis

We employed Linear Mixed Effects Regressions (R package lme4, version 1.1–19) to analyze the results. For the Intention vignettes, we examined each scenario separately (theft, physical harm, poisoning, and food taboo). To do this, we ran a single model that interacted scenario, Kinship Intensity Index, and intention condition on Severity of Moral Judgment Index. For vignette observation v, individual i, in society s:

$$MJ_{vis} = \beta_0 + \beta_1 Scenario_{vis} + \beta_2 Intent_{vis} + \beta_3 KII_s + \beta_4 (Scenario_{vis} \times Intent_{vis}) + \beta_5 (KII_s \times Scenario_{vis}) + \beta_6 (KII_s \times Intent_{vis}) + \beta_7 (Scenario_{vis} \times Intent_{vis} \times KII_s) + \theta_{is} + \omega_{is} + \varphi_s + \varepsilon_{vis}$$

where:

- MJ is the Severity of Moral Judgment Index
- $Scenario$ is a categorical variable indicating the vignette scenario (theft, physical harm, poisoning, or food taboo violation)
- $Intent$ is a dummy indicating whether the vignette featured a high- or low-intent harm
- KII is the Kinship Intensity Index
- θ is a vector of individual covariates (age and sex)
- ω is an individual random intercept
- φ is a society random intercept
- ε is the error term

We report the main output variables of interest below, omitting additional output variables for the sake of simplicity.

Table 3
The Kinship Intensity Survey coding scheme.

Survey Variable	Description	Kinship Intensity	
		Low Intensity	High Intensity
Domestic organization	Prevailing form of domestic or familial organization	Independent nuclear families	Extended family households
Post-marital residence	Prevailing pattern of transfer of residence at marriage	Neolocal	Non-neolocal (e.g. patri-, matrilocal)
Descent pattern	Prevailing mode of familial affiliation	Bilateral	Unilineal (patrilineal, matrilineal)
Cousin marriage	Frequency and acceptability of marriage between cousins	Absent, forbidden	Common, preferred
Polygamy	Frequency and acceptability of marriage between a man and > 1 wife	Absent, forbidden	Common, preferred
Corporate land ownership	Frequency of collective land tenure (e.g. by clans)	Absent	Common
Clans	Presence of clans, phratries, or other large kin groups	Absent	Present
Segmented communities	Residence localized by kinship (e.g. clan barrios)	Absent	Present
Segmentary lineages	Kinship defined by relative position in hierarchical, branching segments	Absent	Present

Notes: An ethnographer from each of the ten field sites filled out the Kinship Intensity Survey, commenting on both contemporary and traditional practices when possible. Ethnographers were blind to the purpose of the study and to the specific hypotheses. Responses were rated for kinship intensity by three blind coders, according to this scheme. Variables were scored continuously where possible, especially when quantitative data was provided (for example, actual rates of cousin marriage). See S6.1 for more details on the coding of the Kinship Intensity Survey.

For the Mitigating Factors vignettes, we interacted the Kinship Intensity Index and mitigating condition on the Severity of Moral Judgment Index. Using the same notation as above:

$$MJ_{vis} = \beta_0 + \beta_1 Mitigating_{vis} + \beta_2 KII_s + \beta_3 (Mitigating_{vis} \times KII_s)$$
$$+ \theta_{is} + \omega_{is} + \varphi_s + \varepsilon_{vis}$$

All models include random intercepts for subjects and societies. All continuous variables were standardized.

Due to missing data on sex, one participant was removed from the analysis, leaving a total of 321 participants in the Intentions sample. Due to the structure of the Mitigating Factors vignette sets, only subjects who completed vignettes featuring self-defense and necessity also completed the control intentional vignette. This constrains our Mitigating Factors analysis to include only 147 subjects from 9 societies (no Mitigating Factors data were collected from Himba participants).

Data analyses and visualizations were produced in R (version 3.5.2). Data files and code are available on OSF.

4.2. Results

For three of the four vignette scenarios, Table 4 and Fig. 4 reveal a significant negative interaction between kinship intensity and intentionality on the severity of moral judgments (given as standardized β coefficient [95%CI], p-value): theft (β = −0.53 [−0.68, −0.38], p < .001), physical harm (ß = −0.30 [−0.45, −0.15], p < .001), and poisoning (ß = −0.22 [−0.35, −0.094], p < .001). For food taboo violations, the coefficient on the interaction term is negative but much smaller than the other coefficients, and the confidence interval includes zero (β = −0.11 [−0.26, 0.052], p = .19). When pooling across all four scenarios, the interaction between kinship intensity and intent on the severity of moral judgments remains negative and significant (β = −0.30 [−0.39, −0.22], p < .001, Table S5, Column 2).

The coefficient on this interaction term represents the change in slope between the KII and the Severity of Moral Judgment Index when comparing high-intent vignettes to low-intent vignettes. For example, moving one standard deviation on the Kinship Intensity Index scale is associated with about one-third of a standard deviation increase in the Severity of Moral Judgment Index for low-intent vignettes involving physical harm (ß = 0.33 [−0.01, 0.68], p = .055, Table 4, Column 2). To visualize this, see the positively-sloped blue line in Fig. 4, Panel 2. In contrast, for high-intent physical harm vignettes, there is essentially no change in the severity of moral judgment across kinship intensities (ß = 0.037 [CIs −0.31, 0.39], p = .81; see the flat red line in Fig. 4, Panel 2).

As illustrated in Fig. 4, the negative interaction between kinship intensity and intentionality means that there is a larger difference in severity of judgment for high- versus low- intent harms in societies with low kinship intensity compared to high kinship intensity. At one extreme, in societies with the lowest kinship intensity, Los Angeles and Storozhnitsa, participants substantially adjusted their judgments depending on whether a harm was low- or high-intent (1.35 and 1.80 standard deviation difference in the severity of judgment, respectively, across all vignettes). At the other extreme, in the societies with the highest kinship intensity in the sample, Yasawa, Fiji and Sursurunga, participants judged high- and low-intent harms similarly harshly (0.078 and 0.85 standard deviation difference in the severity of judgment, respectively, across all vignettes).

The relationship between kinship intensity and the use of intentions during moral judgment holds up to several robustness checks, including controlling for measures of ecological risk (S6.4, S7.2), using ancestral kinship intensity as the main predictor (S7.3), and examining each moral judgment (badness, punishment, and reputation) separately (S7.4).

Paralleling the above, our analysis of the data on mitigating factors further confirms this relationship. Fig. 5 and Table S8 reveal a significant, negative interaction between KII and mitigating condition on the severity of moral judgment (ß = −0.28 [−0.39, −0.17], p < .001). Similar to above, this interaction represents the change in slope between the KII and the Severity of Moral Judgment Index when comparing vignettes without a mitigating factor to those with a mitigating factor.

4.3. Discussion of experimental analysis

The results of this analysis provide support for the hypothesis that reliance on mental states during moral judgment declines as kinship intensity increases. The analysis of low- versus high-intent vignettes suggest that people in societies with low kinship intensity tend to heavily weight intentions when making moral judgments, while those in societies with high kinship intensity place less weight on mental states. This result holds for vignettes involving theft, physical harm, and poisoning, and when pooling across all four scenarios.

Initially, the food taboo result seems in line with work in cognitive neuroscience, which has shown that WEIRD subjects consider intentions less when judging purity violations compared to harms (Chakroff

Table 4

Kinship intensity, intentionality, & severity of moral judgment.

	Severity of Judgment Index			
	Theft (1)	Physical Harm (2)	Poisoning (3)	Food Taboo (4)
Contemporary KII	0.37* (0.024, 0.72)	0.33 (−0.010, 0.68)	0.13 (−0.21, 0.47)	0.39* (0.040, 0.74)
High Intent	0.94*** (0.77, 1.1)	0.81*** (0.64, 0.97)	0.60*** (0.45, 0.74)	0.26** (0.077, 0.43)
KII x High Intent	**−0.53***** (**−0.68, −0.38**)	**−0.30***** (**−0.45, −0.15**)	**−0.22***** (**−0.35, −0.094**)	**−0.11** (**−0.26, 0.052**)
Age	0.028 (−0.023, 0.079)	0.028 (−0.023, 0.079)	0.028 (−0.023, 0.079)	0.028 (−0.023, 0.079)
Sex	−0.068 (−0.16, 0.029)	−0.068 (−0.16, 0.029)	−0.068 (−0.16, 0.029)	−0.068 (−0.16, 0.029)
Random Effects				
Subject Standard Dev.	0.26	0.26	0.26	0.26
Society Standard Dev.	0.42	0.42	0.42	0.42
N per vignette	321	320	321	317
AIC	2987.5	2987.5	2987.5	2987.5
Log Likelihood	−1457.7	−1457.7	−1457.7	−1457.7

Notes: LMER estimates with 95% confidence intervals. To produce the results shown here, we ran a single model that interacted vignette scenario, Kinship Intensity Index, and intention condition on Severity of Moral Judgment Index. The full sample included in the model contains 1279 observations; the *N* listed in each column of this table gives the number of observations per vignette. Additional output variables have been omitted for simplicity; the R code for the full results is available on OSF. *Contemporary Kinship Intensity Index* combines measures of current kinship practices: domestic organization, post-marital residence, cousin marriage, polygamy, descent pattern, corporate ownership of land, and presence of clans, segmentary lineages, and segmented communities. *High Intent* indicates whether the vignette features a high intent harm (compared to a low intent, i.e. accidental, harm). The Severity of Judgment Index combines measures of badness, punishment-worthiness, and reputation-damaging effects of harms. *Age* and *Sex* are individual-level covariates. All continuous variables have been standardized.

*** p < .001.
** p < .01.
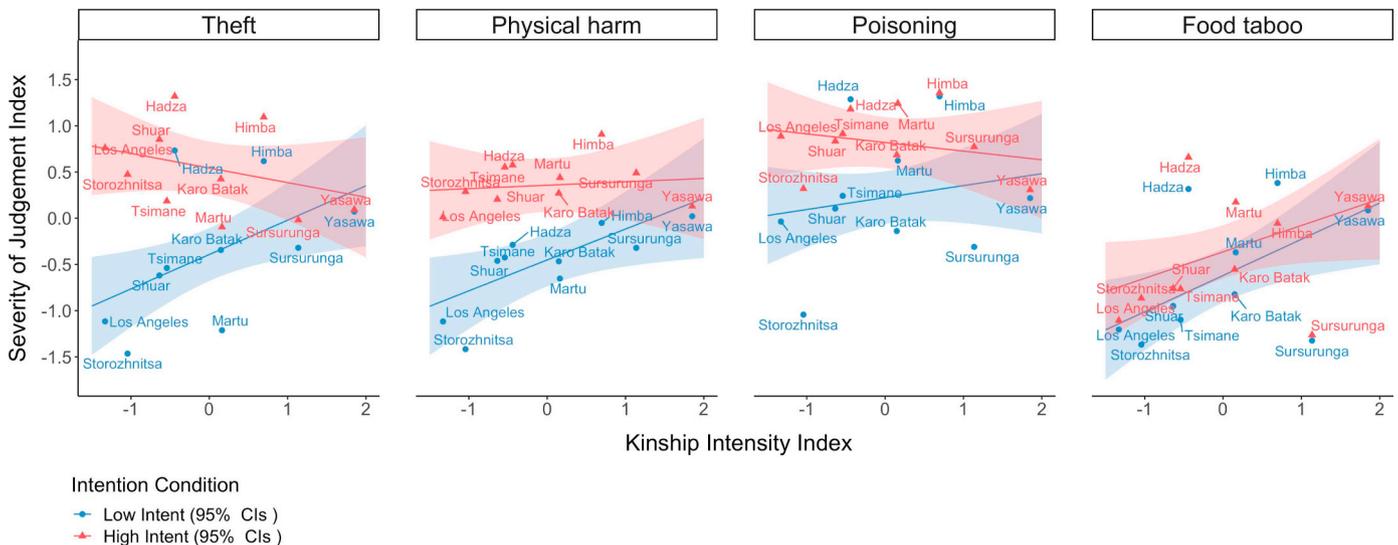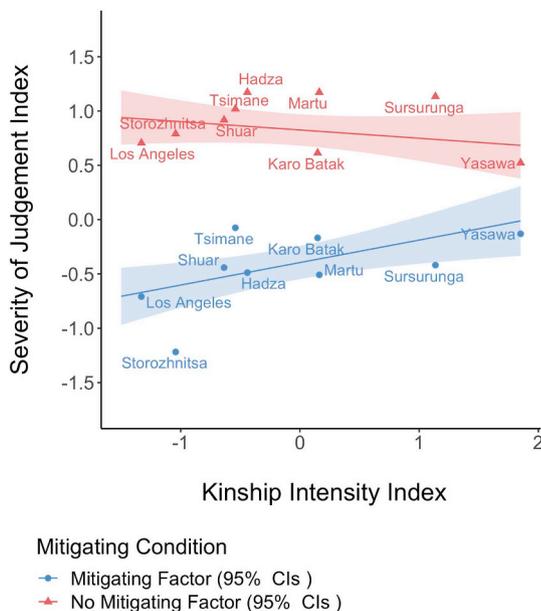* p < .05.

Fig. 4. Reliance on intention in moral judgment decreases with kinship intensity across three vignette scenarios. The regression lines show fitted values and 95% confidence intervals produced by Linear Mixed Effects Regression models predicting Severity of Moral Judgment Index from the interaction between Kinship Intensity Index and intentionality condition in four vignette scenarios: theft, physical harm, poisoning, and food taboo violation. The Severity of Judgment Index combines measures of badness, punishment-worthiness, and reputation-damaging effects of harms. The models include random intercepts for subjects and societies and individual-level covariates (sex & age). All continuous variables have been standardized. Labeled points show the average Severity of Judgment Index in each society for high and low intent harms.

Fig. 5. Effect of mitigating factors on severity of moral judgment declines with kinship intensity. The regression lines show fitted values and 95% confidence intervals produced by Linear Mixed Effects Regression predicting Severity of Moral Judgment from the interaction between Kinship Intensity Index and mitigating condition. The Severity of Judgment Index combines measures of badness, punishment-worthiness, and reputation-damaging effects of harms. The model includes random intercepts for subjects and societies and individual-level covariates (sex & age). All continuous variables have been standardized. Labeled points show the average effect of mitigating factors in each society.

et al., 2016; Dungan & Young, 2019; Young & Saxe, 2011). For example, innocent intentions do not tend to mitigate harsh judgments of purity violations such as incest or the breaking of a food taboo; these judgments focus more on the bad outcome (Young & Saxe, 2011). Here, however, breaking a food taboo is generally judged quite *leniently* in societies with low kinship intensity, and analyses suggest that the severity of judgments increases with kinship intensity across both

intention conditions (ß = 0.33, [−0.028, 0.68], p = .07).[3] Interestingly, this finding is consistent with recent work in economics showing that kinship intensity predicts the moral relevance of purity. Using data from the Moral Foundations Questionnaire, Enke (2019) found that when deciding whether an act is right or wrong, people from societies with intensive kinship are more likely to consider whether the act violated purity standards than are people from societies with loose kin ties. The result for food taboos may be partially driven by this effect. However, it is also possible that the breaking of a food taboo was not a highly salient purity violation in our lower-kinship-intensity samples. If people did not think that breaking a food taboo constituted an important violation, then their judgments would be lenient regardless of the actor's intent.

Similarly, the relatively weaker interaction between kinship intensity and intent condition on the severity of judgments for the poisoning scenario may reflect the particularly wide-reaching effects of the poisoning scenario– many people in the community were sickened by the contaminated water supply. As shown in Fig. 4, people in many societies appear to have shifted towards relatively more outcome-focused judgments of this poisoning scenario, levying harsher judgments on low-intent actors than in the other scenarios.

Our analysis of the mitigating factor data offers further support for the kinship intensity hypothesis. The results suggest that people in societies with more intensive kinship have a lesser tendency to take mitigating factors into account when making moral judgments. Because considering a mitigating factor involves mentalizing (e.g., thinking about whether the perpetrator believed they had no other option), this finding further indicates that reliance on mental states in moral judgment declines with kinship intensity.

5. General discussion

We have argued that some of the variation in the use of mental states in moral judgment can be explained as a psychological calibration to the social incentives, informational constraints, and cognitive

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[3] Note that this coefficient is more precisely estimated and reaches statistical significance when society random intercepts are excluded from the model.

demands of kin-based institutions, which we have assessed using our construct of kinship intensity. Our examination of ethnographic accounts of norms that diminish the importance of mental states reveals that these are likely common across the ethnographic record, while our analysis of data on moral judgments of hypothetical violations from a diverse sample of ten societies indicates that kinship intensity is associated with a reduced tendency to rely on intentions in moral judgment. Together, these lines of ethnographic and psychological inquiry provide evidence that (i) the heavy reliance of contemporary, WEIRD populations on intentions is likely neither globally nor historically representative, and (ii) kinship intensity may explain some of the population-level variation in the use of mental-state reasoning in moral judgment.

Although we use data from an experimental manipulation to assess people's reliance on mental states in moral judgments, our main empirical results for kinship intensity are correlational; accordingly, based on the current data, we cannot draw decisive causal inferences about the relationship between kinship intensity and the use of mental states in moral judgment. In addition, our sample size is small, especially given that our main predictor of interest varies at the society level. Nonetheless, against the background of a cohesive cultural evolutionary theory and much evidence from other aspects of psychology (Enke, 2019; Schulz et al., 2019), the results point to a promising avenue for further investigation.

Of course, demonstrating further that kinship intensity predicts intentionality in the eHRAF ethnographic sample would have bolstered our hypothesis; however, despite large effects in the expected directions, we lacked the statistical power in our small sample to substantiate these relationships with conventional levels of confidence.

Nonetheless, we note that several ethnographers have pointed to kin networks and relational mobility when seeking to understand the frequency of strict liability in small-scale societies. For example, Moore (1972) suggests that, in an interdependent community where ties cannot easily be broken, strict liability may be a means to assuage resentment or ameliorate social relationships harmed by a damaging act. This idea echoes the theory presented earlier, that reliance on intentions in moral judgment may be deemphasized in societies with intensive kinship and low relational mobility as a means to avoid conflict and maintain harmony.

One limitation of our work is that kinship intensity may be correlated with other society-level variables that may instead be driving the empirical patterns we observe. Short of finding a natural experiment, the only way to address this issue is to systematically pose and test theoretically well-grounded hypotheses. In the Supplement, we take a small step in this direction by showing that measures of ecological risk cannot account for our results. Rural-urban differences present another potential confound. Given that many features of life may vary between rural and urban settings, some of which have been tied to psychological variation (Komiya, Oishi, & Lee, 2016; Milgram, 1970; Yamagishi, Hashimoto, Li, & Schug, 2012), it is possible that differences in urbanization could influence the use of mental states in moral judgment. We note, however, that nearly the entire sample of societies in Barrett et al.'s (2016) study is rural, including mostly small villages and camps. Removing the one urban site, Los Angeles, from the analysis has little impact on the results (Supplement S7.6). For example, pooling across all Intention vignettes, the significant, negative interaction between KII and intention condition on severity of moral judgment barely changes when Los Angeles is excluded ($\beta = -0.30 \, [-0.40, -0.21], p < .001$) compared to when it is included ($\beta = -0.30 \, [-0.39, -0.22], p < .001$). Though Los Angeles represents only a single urban site, this consistency suggests that rural-urban differences cannot account for the observed patterns in moral judgment, at least in this sample.

Alternatively, given that formal schooling has been linked to the early development of theory of mind (Kuntoro, Saraswati, Peterson, & Slaughter, 2013; Vinden, 1999, 2002; Wang, Devine, Wong, & Hughes, 2016), it is not implausible that schooling could influence the use of

intentions in moral judgment. However, while schooling may independently influence this aspect of psychology, we think that it is unlikely to underlie our results for three reasons. First, prior work investigating the impact of kinship intensity on other features of psychology has held schooling constant– sometimes comparing undergraduates from around the world– yet has still found large effects of kinship intensity (Enke, 2019; Schulz et al., 2019). Second, specifically with regard to research on the use of mental states in moral judgments, vignette studies comparing the well-educated populations in Japan and the U.S. reveal noteworthy differences (Hamilton & Sanders, 1992). Formal schooling cannot explain these patterns. Finally, while we have not integrated formal schooling data into our analysis, the broad patterns across the sample of societies suggest that this will not matter. Anchoring one end of our kinship intensity distribution, the Yasawans and Sursurunga on average spend longer in school (modes of 9 and 6 years, respectively) and give less attention to intent than either the Hadza or Himba, both of whom have lower kinship intensity and rarely attend more than 2–3 years of school.

Our results suggest fertile ground for future research into the cultural evolution of intentionality in moral judgment. Beyond further testing of the causal link between kinship intensity and reliance on intentions, future work should examine the cultural evolutionary mechanisms that we have hypothesized to explain this relationship in Section 2.2: (1) the costs and benefits of partner choice, (2) the maintenance of community harmony, and (3) making inferences about the mental states of more socially distant individuals (intergroup psychology). In addition, as the sample of societies with data on mentalizing in moral judgment grows, ongoing work should examine which dimensions of kinship intensity have the largest impact (e.g., cousin marriage or clans?). Future studies should also exploit regional variation in kinship intensity within individual countries such as Italy (Alesina & Giuliano, 2014; Schulz et al., 2019) and the United States. Although patterns of kinship intensity in the US cannot be cleanly linked to urbanization (Lee & Cassidy, 2019), it is possible that kin-based institutions may be more intensive in parts of the rural US. Future work should examine whether these regional differences are associated with variation in the use of mental states in moral judgment. Moreover, studies should investigate whether the tendency to integrate information about mental states into moral judgment varies depending on the *type* of mental state in question (e.g. jealousy versus goodwill). Finally, future work should examine the factors beyond kinship intensity that may contribute to variation in reliance on mental states in moral judgment, and in particular, formal schooling.

More broadly, this research lays a path for investigation into the cultural evolution of diverse conceptions of the mind. Ethnographic work suggests that there is substantial variation in how people in different societies conceive of the mind (Luhrmann et al., 2011). Here, we have built a cultural evolutionary framework for understanding a small sliver of this diversity. Moving forward, to make sense of how and why conceptions of the mind– and related psychologies– vary cross-culturally, we must carefully consider how culturally evolving beliefs, norms, and institutions direct, hone, and mold these features.

Data availability

The data associated with this research are available at: https://osf.io/65krf/?view_only=0ee63a2f9c6541c3b3ab4c4fe2663a13.

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Declaration of Competing Interest

We declare no conflicts of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.evolhumbehav.2020.07.002.

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