Seven Moral Rules Found All Around the World

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Abstract
What is morality? And to what extent does it vary around the world? The theory of 'morality-as cooperation' argues that morality consists of a collection of biological and cultural solutions to the problems of cooperation recurrent in human social life. Morality-as-cooperation draws on the theory of non-zero-sum games to identify distinct problems of cooperation and their solutions, and predicts that specific forms of cooperative behaviour – including helping kin, helping your group, reciprocating, being brave, deferring to superiors, dividing disputed resources, and respecting prior possession – will be considered morally good wherever they arise, in all cultures. In order to test these predictions, we investigate the moral valence of these seven cooperative behaviours in the ethnographic records of 60 societies. We find that the moral valence of these behaviours is uniformly positive, and the majority of these cooperative morals are observed in the majority of cultures, with equal frequency across all regions of the world. We conclude that these seven cooperative behaviours are plausible candidates for universal moral rules, and that morality-as cooperation could provide the unified theory of morality that anthropology has hitherto lacked.

Is it good to cooperate? Testing the theory of morality-as-cooperation in 60 societies

Anthropology has struggled to provide an adequate account of morality. In 1962, the philosopher Abraham Edel complained that "anthropology has not furnished a systematic concept [of morality]", and has avoided "the problem of morality, what it is, what identifying marks are to be sought for it, and how to go about mapping it" (Edel 1962). Four decades later, little had changed. The anthropologist James Laidlaw lamented: "there is no anthropology of ethics…there is no sustained field of enquiry and debate. There is no connected history we can tell ourselves about the study of morality in anthropology, as we do for a range of topics such as kinship, the economy, the state, or the body" (Laidlaw 2002; see also, Laidlaw 2013).

Fortunately, the situation is now beginning to change. In recent years, the study of morality has become the focus of a thriving interdisciplinary endeavour, encompassing research not only in anthropology, but also in evolutionary theory, genetics, biology, animal behaviour, psychology, neuroscience and economics (Haidt 2007; Sinnott-Armstrong 2007; Shackelford and Hansen 2016). A common view in this body of work is that the function of morality is to promote cooperation (Haidt and Kesebir 2010:800; Rai

and Fiske 2011:59; Tomasello and Vaish 2013:231; Greene 2015:40; Curry 2016; Sterelny and Fraser 2016:1). This cooperative account has the potential to provide anthropology with the unified theory of morality it has hitherto lacked. However, previous cooperative accounts have been limited, in two main ways.

First, previous accounts have focussed on a relatively narrow set of cooperative behaviours (typically kin altruism and reciprocal altruism), and omitted others (for example, coordination and conflict resolution), and have thus attempted to explain morality from an unnecessarily restricted base. They have not used the mathematical analysis of cooperation, offered by the theory of non-zero-sum games, to provide a more systematic taxonomy of cooperation, and to thereby furnish a broader, more general theory of morality.

Second, previous empirical work has not established whether the cooperative account of morality applies cross-culturally, or whether there are cultures that provide counter-examples to the theory. In the absence of any agreed upon theory of morality, previous work on cross-cultural moral variation has been patchy and inconsistent; different researchers have used different measures in different places, making the results impossible to combine or compare. In the absence of definitive empirical evidence, opinions have varied wildly, with some claiming that some morals are universal (Brown 1991), and others claiming that there are no such universals (Prinz 2007).

The present paper attempts to overcome these two limitations. First, we use non-zero-sum game theory to provide the cooperative approach to morality with a rigorous, systematic foundation. We show how this approach – which we call 'morality-as-cooperation' – generates a rich, principled explanatory framework that incorporates mores types of cooperation, and thus explains more types of morality, than previous approaches. Here we focus on seven well-established types of cooperation: (1) the allocation of resources to kin (Hamilton 1963); (2) coordination to mutual advantage (Lewis 1969); (3) social exchange (Trivers 1971); and conflict resolution through contests featuring displays of (4) hawkish and (5) dove-ish traits (Maynard Smith and Price 1973); (6) division (Skyrms 1996); and (7) possession (Gintis 2007). And we show how each type of cooperation explains a corresponding type of morality: (1) family values, (2) group loyalty, (3) reciprocity, (4) bravery, (5) respect, (6) fairness and (7) property rights.

Second, in order to resolve uncertainty about the cross-cultural applicability of 'morality-as cooperation', we test the theory's central prediction that each of these specific forms of cooperative behaviour (helping kin, helping your group, reciprocating, being brave, deferring to superiors, dividing disputed resources, and respecting prior possession) will be considered morally good wherever they arise, in all cultures. We do this by investigating the moral valence of these cooperative behaviours in the ethnographic records of 60 societies, and examining their cross-cultural frequency and distribution.

Morality-as-cooperation: an overview
The theory of morality-as-cooperation argues that morality consists of a collection of biological and cultural solutions to the problems of cooperation recurrent in human social life (Curry 2016). Below we review the general argument, before proceeding to look at specific types of cooperation and the corresponding types of morality that they explain.

Life begins when molecules start making copies of themselves. These 'replicators' are 'selfish' in the technical sense that they promote their own replication (Dawkins 1976/2006). They can promote their

replication at the *expense* of other replicators. These *competitive* interactions have a winner and a loser; one's gain is another's loss; they are zerosum games (Von Neumann and Morgenstern 1944; Maynard Smith 1982). But replicators can also replicate in *concert* with other replicators (Dawkins 1998). These *cooperative* interactions can have two winners; they are win-win situations; they are nonzerosum games. Natural selection for genes that employ such cooperative strategies has driven several 'major transitions' in the evolution of life on Earth, including the formation of cells, chromosomes and multicellular organisms (Maynard Smith and Szathmáry 1995). Natural selection has also favoured genes for cooperation between individuals, in a wide variety of species (Dugatkin 1997), including humans. Humans descend from a long line of social primates; they have spent 50 million years living in social groups (Shultz, Opie, and Atkinson 2011), and two million years making a living as intensely collaborative hunter-gatherers (Tooby and DeVore 1987). This has equipped humans with a range of biological – including psychological –adaptations for cooperation. These adaptations can be seen as natural selection's attempts to solve the problems of cooperation. More recently, improvisational intelligence and cultural transmission (Boyd, Richerson, and Henrich 2011; Pinker 2010) have made it possible for humans to attempt to improve upon natural selection's solutions by inventing evolutionarily-novel solutions – 'tools and rules' – for further bolstering cooperation (Popper 1945; Binmore 1994, 1994; Nagel 1991; Hammerstein 2003). Together, these biological and cultural mechanisms provide the motivation for social, cooperative and altruistic behaviour – leading individuals to value and pursue specific mutually-beneficial outcomes. They also provide the criteria by which individuals recognise, evaluate and police the cooperative behaviour of others. And, according to the theory of morality-as-cooperation, it is precisely these multiple solutions to problems of cooperation – this collection of instincts, intuitions, inventions and institutions – that constitute human morality (Curry 2005, 2016).

Which problems of cooperation do humans face? And how are they solved? Evolutionary biology and game theory tell us that there is not just one problem of cooperation but many, with many different solutions (Nunn and Lewis 2001; Sachs et al. 2004; Robinson and Goforth 2005; Lehmann and Keller 2006). Hence morality-as-cooperation predicts that there will be many different types of morality. Below we review seven well-established types of cooperation: (1) the allocation of resources to kin; (2) coordination to mutual advantage; (3) social exchange; and conflict resolution through contests featuring (4) hawkish displays of dominance and (5) dove-ish displays of submission; (6) division of disputed resources; and (7) recognition of possession.

1. Allocation of resources to kin (Family Values)
Genes that benefit replicas of themselves in other individuals – that is, genetic relatives – will be favoured by natural selection if the cost of helping is outweighed by the benefit to the recipient gene(s) (Dawkins 1979; Hamilton 1964). So, evolutionary theory leads us to expect that under some conditions organisms will possess adaptations for detecting and delivering benefits (or avoiding doing harm) to kin. This theory of kin selection explains many instances of altruism, in many species (Gardner and West 2014), including humans (Kurland and Gaulin 2005; Lieberman, Tooby, and Cosmides 2007). Morality-as-cooperation leads us to expect that this type of cooperative behaviour – caring for offspring, helping family members, and avoiding inbreeding – will be regarded as morally good.

2. Coordination to mutual advantage (Group Loyalty)
Game theory models situations in which individuals are uncertain about how to behave in order to bring about a mutual benefit as coordination problems (Lewis 1969). Humans and other animals use a variety of strategies – such as focal points, traditions, leadership, signalling, badges of membership, and 'theory of mind' – in order to solve these problems (Alvard 2001; McElreath, Boyd, and Richerson 2003; Boos et al. 2011), and form stable coalitions and alliances (Harcourt and de Waal 1992; Balliet, Wu, and De Dreu

2014; Bissonnette et al. 2015). Morality-as-cooperation leads us to expect that this type of cooperative behaviour – forming friendships, participating in collaborative endeavours, favouring your own group, and adopting local conventions – will be regarded as morally good.

3. Social Exchange (Reciprocity)
In game theory, social dilemmas – prisoners dilemmas, public goods games, tragedies of the commons – arise when the fruits of cooperation are vulnerable to exploitation by 'free riders', who accept the benefit of cooperation without paying the cost (Ostrom and Walker 2002). This problem can be overcome by a strategy of 'conditional cooperation' or 'reciprocal altruism', such as tit-for-tat (Trivers 1971; Axelrod 1984). Evidence for various aspects of conditional cooperation have been found in numerous animal species (Carter 2014), including humans (Cosmides and Tooby 2005; Henrich et al. 2005; Jaeggi and Gurven 2013). Morality-as-cooperation leads us to expect that this type of cooperative behaviour – trusting others, reciprocating favours, seeking revenge, expressing gratitude, and making amends – will be regarded as morally good.

4. & 5. Contests between Hawks (Bravery) and Doves (Respect)
Conflict over resources – food, territory, and mates (Huntingdon and Turner 1987) – presents organisms with an opportunity to cooperate by competing in less mutually-destructive ways (Maynard Smith and Price 1973). There are three ways of achieving this: contests (featuring the display of hawkish and dove-ish traits), division, and possession. Game theory has shown that conflicts can be settled through 'contests', in which individuals display reliable indicators of their "fighting ability", and defer to the stronger party (Maynard Smith and Price 1973; Gintis, Smith, and Bowles 2001). Such contests are widespread in nature (Riechert 1998; Hardy and Briffa 2013), and often form the basis of dominance hierarchies where resources are allocated by 'rank' (Preuschoft and van Schaik 2000). Humans have a similar repertoire of status-related behaviours (Mazur 2005; Sell, Tooby, and Cosmides 2009; Fiddick et al. 2013), and culturally elaborated hierarchies (Boone 1992; Rubin 2000). Morality-as-cooperation leads us to expect that these types of cooperative behaviour – hawkish displays of dominance (the 'heroic virtues' of bravery, fortitude, skill, and wit) and dove-ish displays of submission (the 'monkish virtues' of humility, deference, obedience, and respect) – will be regarded as morally good (Curry 2007).

6. Division (Fairness)
When the contested resource is divisible, game theory models the situation as a 'bargaining problem' (Nash 1950). Here, one solution is to divide the resource in proportion to the relative (bargaining) power of the protagonists (Skyrms 1996). In the case of equally powerful individuals, this results in equal shares (Maynard Smith 1982). Evidence for a 'sense of fairness' comes from non-human primates' adverse reactions to unequal treatment in economic games (Brosnan 2013). With regard to humans, rules such as "I cut, you choose", "meet in the middle", "split the difference", and "take turns", are ancient and widespread means of resolving disputes (Brams and Taylor 1996). And 'equal shares' is a spontaneous and cross-culturally prevalent decision rule in economic games (Henrich et al. 2005) and similar situations (Messick 1993). Morality-as cooperation leads us to expect that this type of cooperative behaviour – dividing disputed resources, reaching a compromise, being fair – will be regarded as morally good.

7. Possession (Property Rights)
Finally, game theory shows that conflicts over resources can be resolved by recognition of prior possession (Maynard Smith 1982; Gintis 2007; Hare, Reeve, and Blossey 2016). The recognition of prior possession is widespread in nature (Strassmann and Queller 2014). Humans also defer to prior possession in vignette studies (Friedman and Neary 2008; DeScioli and Karpoff 2015), experimental games (the 'endowment effect'; Kahneman and Tversky 1979), the law (Rose 1985), and international

relations (Johnson and Toft 2014). Private property, in some form or other, appears to be a cross-cultural universal (Herskovits 1952). Morality-as-cooperation leads us to expect that this type of cooperative behaviour – deferring to prior possession – will be regarded as morally good.

Summary

Thus morality-as-cooperation uses the theory of non-zero-sum games to identify distinct problems of cooperation and their solutions, and thereby generates a deductive framework in which to make sense of morality. The present incarnation of the theory incorporates seven well-established types of cooperation – helping family, helping group, exchange, resolving conflicts through hawkish and dove-ish displays, dividing disputed resources, and respecting prior possession – and uses this framework to explain seven types of morality – obligations to family, group loyalty, reciprocity, bravery, respect, fairness, and property rights.

Morality-as-cooperation's theory-driven approach provides broader and more detailed coverage of the moral domain than previous approaches that are not guided by these theories of cooperation. For example, whereas morality-as-cooperation proposes seven moral domains, Moral Foundations Theory (MFT) proposes only five: Care, Fairness, Ingroup, Authority, and Purity (Haidt and Graham 2007; Graham et al. 2011). MFT's scheme omits several well-established types of cooperation: there is no foundation dedicated to kin altruism, or to reciprocal altruism, or to hawkish displays of dominance such as bravery, or to property rights. 1 And MFT includes two foundations – Care and Purity – that are not related to any specific type of cooperation (and which morality-as-cooperation predicts will not constitute distinct moral domains). 'Care' – like 'altruism' – is a generic term that does not distinguish between forms of prosocial behaviour with different ultimate and proximate roots. And 'purity' – avoiding "people with diseases, parasites [and] waste products" – has no explicated connection to cooperation at all.2 Moreover, whereas morality-as-cooperation can look to advances in game theory to identify new forms of cooperation, and thereby generate new predictions and explanations of moral phenomena, MFT's avowedly *ad hoc* approach (Haidt and Joseph 2011) is unable to make any such predictions.

Thus, by using the logic of game theory, morality-as-cooperation is able to state the cooperative thesis with greater precision, and explain and predict a broader array of moral phenomena, than previous cooperative accounts of morality. And it is to those predictions that we now turn.

Is cooperation considered morally good, in all cultures?

As we have seen, the theory of morality-as-cooperation predicts that specific forms of cooperative behaviour – helping kin, helping one's group, reciprocating costs and benefits, displaying 'hawkish' and dove-ish traits, dividing disputed resources, and respecting prior possession – will be regarded as morally good. Conversely, the theory predicts that the corresponding forms of uncooperative behaviour – neglecting kin, betraying one's group, free-riding, cowardice, disrespect, unfairness and theft – will be regarded as morally bad. Moreover, morality-as-cooperation predicts that, to the extent these problems of cooperation are universal features of human social life, these cooperative behaviours will be considered morally good in all moral systems, in all cultures – there will be no cultures in which any of these types of cooperative behaviour are considered morally bad.3 These seven moral values will be universal.

Previous empirical work on morality in diverse cultures – comparative anthropology and questionnaire-based research – provides some support for these predictions (see Table S1).

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Helping kin
A survey of the ethnographic records of 'Pleistocene-appropriate foragers' found that kin altruism was 'socially favoured' in 10/10 societies (Boehm 2008). In addition, a survey of family values involving student samples from 30 countries (Georgas and et al. 2006; Byrne and van de Vijver 2014; Graham et al. 2011) and responses to items in the World Values Survey, conducted in over 65 societies (Inglehart and Baker 2000), indicate that 'helping kin' is widely considered to be morally good.

Helping your group
A review of the Standard Cross Cultural Sample reveals that: loyalty to the local community is 'moderate' to 'especially high' in 77 / 83 cultures for which there is data; loyalty to the wider society is 'moderate' to 'especially high' in 60 / 84 cultures (Ross 1983; Murdock and White 2006, V778-779); and loyalty within ethnic groups is 'middle' to 'high' in 45 / 86 cultures (Lang 1998; Murdock and White 2006, V1771). In addition, responses to the Ingroup items in the Moral Foundations Questionnaire from 'Eastern' and 'Western' internet samples (Graham et al. 2011), and responses to items from the Schwartz Basic Values Survey, from student samples in 20 countries (Schwartz 1992), indicate that 'helping your group' is widely considered to be morally good.

Positive and negative reciprocity
There is evidence that 'cheating' is considered morally deviant in 5/10 foraging societies (Boehm 2008). Taking revenge is prescribed in 48 / 80 cultures for which there is data (Murdock and White 2006, V704), and kin group vengeance is considered legitimate in 90 (and a moral imperative in 38) out of 168 societies for which there is data (Ericksen and Horton 1992; Murdock and White 2006, V2008). In addition, endorsement of the norms of positive and negative reciprocity in student samples (Eisenberger et al. 2004), in Britain and Italy (Perugini et al. 2003), and responses to some items in the Values in Action Inventory of Strengths in 54 countries (Park, Peterson, and Seligman 2006; Peterson and Seligman 2004) and Schwartz's Values Scale (Schwartz 1992), indicate that 'reciprocating costs and benefits' is widely considered to be morally good.

Hawkish traits
Toughness (encompassing Fortitude, Aggression, and Competitiveness) are among the traits widely inculcated in children in a majority of cultures (Barry III et al. 1976; Murdock and White 2006, V294-305, 322-325). In addition, a series of investigations into the concept of honour, among students in the US and Turkey (Cross et al. 2014) indicate that various hawkish traits are considered to be morally good.

Dove-ish traits
Obedience is also among the traits widely inculcated in children in a majority of cultures (Barry III et al. 1976; Murdock and White 2006, V294-305, 322-325). In addition, responses to the Authority items in the Moral Foundations Questionnaire (Graham et al. 2011), and to items from the Schwartz Basic Values Survey (Schwartz 1992) indicate that 'respecting superiors' is widely considered to be morally good.

Dividing disputed resources
Responses to items in the Merit Principle Scale in student samples (Davey et al. 1999) indicate that 'dividing disputed resources' is considered to be morally good.

Possession
Recognition of private property is present in 70 / 84 cultures for which there is data (Murdock and White 2006, V704; Whyte 2005). In addition, punitive attitudes to 'theft' in six cultures (Newman 1976),

and responses to items in the World Values Survey (reported in Weeden and Kurzban 2013) indicate that 'respecting property' is widely considered to be morally good.

However, these heterogenous studies were not designed to, and indeed do not, test fully morality-as-cooperation's specific predictions. Comparative anthropology has not systematically assessed the moral valence of all seven forms of cooperative behaviour; moral values relating to hawkish and dove-ish traits in the adult population, and dividing disputed resources, are conspicuously absent from the literature. And no previous questionnaire research has evaluated all seven types of cooperative behaviour posited by the theory; existing scales typically measure something other than moral valence (for example, they ask whether a person or a society possesses a particular trait, rather than whether the trait is moral); and the disparate samples are typically university students, or people in Western Educated Industrialised Rich Democratic (W.E.I.R.D.) societies (Henrich, Heine, and Norenzayan 2010), or people with access to the internet, which limits their external validity and generalizability to 'humanity' at large.

Thus, as Machery and Mallon (2010:35) put it: "we do not know whether moral norms are present in every culture…because…researchers have simply not shown that, in numerous cultures, there are norms that fit some rich characterization of moral norms". And this uncertainty is reflected in the diversity of opinions about the universality or otherwise of moral values – opinions which range from one extreme to the other.

At one end of the spectrum, it has been argued that morality is universal. A classic statement of this position was provided by the philosopher David Hume, who argued that moral judgements depend on an "internal sense or feeling, which nature has made universal in the whole species", and that as a result certain qualities – such as "truth, justice, courage, temperance, constancy, dignity of mind… friendship, sympathy, mutual attachment, and fidelity" – are "the most universal, established principles of morals", "esteemed universally, since the foundation of the world", "in all nations and all ages" (Hume 1777). More recently, the anthropologist Donald Brown has claimed that moral notions of reciprocity, generosity, empathy, etiquette, hospitality, sexual modesty and property are universals, present in every society (Brown 1991).4

At the other end of the spectrum, it has been argued that morality is not universal, but varies dramatically. The philosopher John Locke, for example, argued that: "He that will carefully peruse the history of mankind, and look abroad into the several tribes of men…will be able to satisfy himself, that there is scarce that principle of morality to be named, or rule of virtue to be thought on…which is not, somewhere or other, slighted and condemned by the general fashion of whole societies of men" (Locke 1690). More recently, the American Anthropological Association has argued that: "Ideas of right and wrong, good and evil, are found in all societies, though they differ in their expression among different peoples. What is held to be a human right in one society may be regarded as anti-social by another people, or by the same people in a different period of their history" (Board 1947). And the philosopher Jesse Prinz concluded that "it is difficult to find examples of moral universals. The rules by which people abide vary across cultural boundaries…If there are substantive universal moral rules or moral domains, they have yet to be identified…Moral rules show amazing variation across cultures…" (Prinz 2007).

Thus it remains unclear whether morality-as-cooperation's predictions hold across all cultural groups. And so, in order to provide a robust test of these predictions, in a way that overcomes the limitations of previous research and resolves lingering uncertainty over cross-cultural variation in moral values, we surveyed the moral valence of the seven cooperative behaviours in a single, homogenous, coherent source of high-quality ethnographic data, collected from a sample of 60 societies specifically chosen to

provide as representative a sample of humanity as possible – a sample that provides the best chance of identifying potential counter-examples to the theory.

In addition to reporting the moral valence of these cooperative behaviours, we also report their cross-societal frequency and distribution. After all, it is possible that even if morality-as-cooperation's predictions regarding the moral valence of cooperative behaviours are supported, these behaviours and their corresponding moral values may still turn out to be rare, present in relatively few societies, or in only some regions but not others.

Methods

In order to test the prediction that the seven cooperative behaviours would be regarded as morally good, and to establish the cross-cultural prevalence of the moral values that result, we undertook a content analysis of the ethnographic record of 60 societies, using the holocultural method (Otterbein 1969; Ember and Ember 2009).

We began by assembling ethnographic descriptions of morality from the digital version of the Human Relations Area Files (eHRAF) – an archive of thousands of original, full-text ethnographies from hundreds of societies of varying complexity, from simple hunter-gatherer bands to kingdoms and modern states. For this study we focussed on the 60 societies that constitute the Probability Sample Files (PSF), a stratified random sample of well-attested human societies, drawn from the six cultural regions of the globe (Africa, Circum-Mediterannean, East Asia, Insular Pacific, North America, South America) (Lagacé 1979). This sample of societies was constructed to minimise the effects of 'Galton's Problem' – the non-independence between cross-cultural data points (Naroll 1967; Mace et al. 1994; Atkinson and Whitehouse 2011). The ethnographic coverage of these 60 societies conforms to rigorous ethnographic criteria, including the requirements that at least 1,200 pages of reliable, well-rounded cultural data are available for each society, and that one or more professionally-trained ethnographers stayed in that society for more than a year and had a working knowledge of the native language(s) (HRAF 1967). For the specific geographic location of these 60 societies, see Figure 1.

Relevant ethnographic material was identified and collected from eHRAF in two phases. In the first phase, we extracted paragraph-level ethnographic materials indexed by professional anthropologists for the eHRAF as *Ethics* or *Norms*. The extraction of materials indexed 5 as *Ethics* resulted in 2,519 paragraphs from 400 documents across the 60 societies sampled. The extraction of materials indexed as *Norms* resulted in 1,605 paragraphs from 263 discrete documents across 58 of the societies sampled. We then conducted a second phase of data collection in order to exhaust all relevant material in the ethnographic archive. In this phase, the entire archive was searched using a combination of relevant indexical headings (for example, 'Mutual Aid') and keyword combinations (Krippendorff 2012; Altheide 1987). (For the full search syntax, see Table S2). This phase identified 1,737 paragraphs from 355 discrete documents across the 60 societies. When duplicate paragraphs were removed (that is, 2,401 paragraphs identified in more than one phase) we were left with a total of 3,460 paragraphs, containing 606,556 words, from 603 unique sources, published over a period spanning 300 years.6

We then operationalised the seven types of cooperative behaviour under investigation and constructed a codebook that specified how to identify and code them in the ethnographic source material (shown in Table 1). For kinship and mutualism, we looked for cases in which family or group were helped or given special treatment. Reciprocity included both positive and negative (revenge) forms. Because hawkish displays of prowess encompass several different behaviours – strength, bravery, generosity – we

decided to focus on one particular example, bravery. For dove-ish displays, we focussed on respect for, and allegiance to, elders and chiefs. For division, we looked specifically for instances in which dividing a resource resolved or forestalled a conflict (and not merely cases in which resources were 'shared'). And finally, we looked for cases where objects or resources were controlled by their possessor.

Having identified instances of the cooperative behaviours of interest, the next task was to determine whether they were presented in a morally valenced way, and if so whether the valence was positive or negative. Thus the code book instructed coders to record whether the behaviour was described as good, right, moral, ethical, or virtuous, or as an obligation, duty, or moral norm, and so on. It could also be indicated by morally valenced words. For example, the mere mention of 'family *loyalty*', or 'property *rights*' would suffice to indicate the presence of a positive moral valence.

The coding procedure involved making 24,200 (3,460x7) coding decisions – that is, deciding whether or not each of the 3460 paragraphs indicated that any of the seven cooperative behaviours had a positive or negative moral valence. Raters 1 & 2 (a 7 uthors OSC and DAM) independently coded the full set of 3,460 paragraphs, and then conferred to resolve ambiguities and discrepancies. This resulted in a total of 1,426 paragraphs that contained material germane to one or more moral domain. A hypothesis-blind independent coder (Rater 3) then coded each of these 1,426 paragraphs before discussing coding discrepancies with Raters 1 & 2. Of the 1,426x7=9,982 initial coding decisions compared between the two sets of codes, there were 8,704 decisions in agreement and 1,278 decisions on which the raters disagreed – thus there was 'moderate' agreement between the two initial sets of ratings overall (κ = .58, p<.005) (Cohen 1968, 1960; Landis and Koch 1977). By type of cooperation, the degree of agreement between the two sets of ratings were: 'helping kin' (κ = 0.52; 'moderate'); 'helping your group' (κ = 0.47; 'moderate'); 'reciprocity' (κ = 0.66; 'good'); 'bravery' (κ = 0.65; 'good'); 'respect for superiors' (κ = 0.56; 'moderate'); 'dividing disputed resources' (κ = 0.14; 'poor'); 'property' (κ = 0.75; 'good').[8] Raters 1, 2 & 3 met to discuss and analyse discrepancies using the resolution method (Ember and Ember 2009). On closer inspection it was discovered that the poor level of agreement with regard to 'dividing disputed resources' was the result of Rater 3 including cases of generic 'sharing'.[9] These and other rating discrepancies were reviewed and resolved until complete agreement was reached (κ = 1).

In the final analysis, of the 3,460 paragraphs reviewed, 761 contained information about the moral valence of one or more of the seven cooperative behaviours. This gave rise to 962 observations of moral valence in total.

Results
In 961 out of 962 observations (99.9%), cooperative behaviour had a positive moral valence. The results for each type of cooperative behaviour are given in Table 2. The one exception to the rule – among the Chuuk, "To steal openly from others is admirable in that it shows a person's dominance and demonstrates that he is not intimidated by the aggressive powers of others." (Caughey 1977) – appears to be a case in which one form of cooperation (respect for property) has been trumped by another (respect for a hawkish trait, although not explicitly bravery).[10]

Most of these positively-morally-valenced cooperative behaviours were observed in most societies (see Table 3 and Figure 2). The average number of behaviours observed per society was: mean=4.4, sd=1.5, median=5, mode=5.5 (minimum=1, maximum=7). A repeat-measures GLM (with Bonferroni-correction for multiple comparisons) revealed that: there were significantly more societies in which 'property' was observed than 'bravery', 'respect' and 'fairness' (*p*s≤.001); and there were significantly fewer societies in which 'fairness' was observed than all other types of moral behaviour (*p*s<.001). All other differences

were non-significant. There were no societies in which any of the seven cooperative behaviours had a negative moral valence. (The 'exception' reported above was itself an exception – seven other paragraphs attested to the positive moral valence of property among the Chuuk).

When aggregated by cultural region, all seven positively-morally-valenced cooperative behaviours were observed in all six regions – with the sole exception of 'dividing disputed resources' in Central America (for which there were no data). Crucially, the positively-m 11 oral-valenced cooperative behaviours were observed with equal frequency in all regions: one-way ANOVAs revealed no significant difference between regions ($0.5 ≤ F$s $≤ 1.28$, $.78 ≥ p$s $≥ .29$).

Discussion
A survey of 60 diverse societies found that the moral valence of seven cooperative behaviours was uniformly positive. In every society for which there were data, these seven cooperative behaviours were considered morally good. There were no counter-examples, that is societies in which these behaviours were considered morally bad. The survey also found that these cooperative morals were widespread – with most appearing in most societies – and that they were observed with equal frequency across all cultural regions.

As such, these results provide strong support for the theory of morality-as-cooperation, and no support for the more extreme versions of moral relativism. In short, Hume was right, and Locke was wrong. When you 'look abroad into the several tribes of men' there are some widely held morals that are not elsewhere 'slighted or condemned', and they include precisely those morals predicted by morality-as-cooperation. As Hume put it: "history informs us of nothing new or strange in this particular" (Hume 1748/1907). By way of illustration, "[t]he moral values reinforced during traditional Amhara adolescence…[include]…the importance of loyalty to kin" (Levine 1965), and "[f]louting kinship obligation is regarded as a shameful deviation, indicating an evil character" (Messing and Bender 1985). In Korea, there exists an "egalitarian community ethic [which includes the values of] mutual assistance and cooperation among neighbors [and] strong in-group solidarity" (Brandt 1971). "Reciprocity is observed in every stage of Garo life [and] has a very high place in the Garo social structure of values" (Majumdar 1978). "Those who cling to warrior virtues are still highly respected" among the Maasai; "the uncompromising ideal of supreme warriorhood [involves] ascetic commitment to self-sacrifice…in the heat of battle, as a supreme display of courageous loyalty." (Spencer 1988). The Bemba exhibit "a deep sense of respect for elders' authority" (Maxwell 1983). The Kapauku "idea of justice" is called "uta-uta, half-half…[the meaning of which] comes very close to what we call equity" (Pospisil 1958). And "[r]espect for the property of others is the keystone of all interpersonal relations" among the Tarahumara (Fried 1951). As such, and in the absence of any counter-examples, these seven forms of cooperative behaviour remain plausible candidates for universal moral rules.

When interpreting these results, two considerations should be kept in mind. First, the ethnographic source material analysed here was not originally collected in order to test morality-as-cooperation's hypotheses, and hence the moral valence of cooperative behaviour was recorded somewhat serendipitously (if at all). As such, it is likely that our results are an underestimate of the cross-cultural prevalence of these moral values – absence of evidence is not evidence of absence. Indeed, there was a positive correlation between observed moral values and the total number of paragraphs describing that society in the HRAF archive ($r=0.43$, $p=.001$). This suggests that much of the variation in observed morals per society can be attributed to variation in the ethnographic coverage of that society; and had there

been more information on a given society, we would likely have observed more of the seven moral values more frequently.

Second, methodological details to do with the categorisation and coding of the moral domains, may have introduced some artefacts into the data that partly explain why some morals were observed more frequently than others, and why some were relatively rare. Some coding categories focus on one of several possible solutions to a problem; and the more solutions there are, the lower we should expect the frequency of any one of them to be. For example, as noted above, hawkishness can be displayed not only by bravery but also by other costly signals such as generosity (and other conspicuous displays of wealth), which may partly explain why 'bravery' was relatively rare. And some coding categories were broader than others, capturing a wider variety of behaviours, which may have skewed the apparent frequency of a moral value. For example, there are many ways to 'help kin', but only one way to 'divide resources to forestall a dispute' – this may partly explain why 'family values' were very common, and 'fairness' was relatively rare. Similarly, although 'property rights' were present in nearly all societies, there appeared to be considerable variation in who (males, females, children, chiefs) could own what (land, moveable property, each other), and had we attempted to code for these smaller more specific categories, the frequency of any given trait would have been lower.

And of course, the present study has its limits. First, the study investigated the moral valence of only seven cooperative behaviours – it did not investigate the moral valence or prevalence of the other cooperative traits encompassed by morality-as-cooperation (such as forgiveness, or generosity). And it remains to be seen whether the theory can be extended to provide cooperative explanations of other moral phenomena, including those encountered in this ethnographic review – industry and laziness, truth-telling and honesty, chastity and fidelity, hospitality and gossip, the virtues expected of a leader, some forms of purity, and the behaviour expected by gods, spirits and ancestors.

Second, the present study employed a sample of 60 cultures in order to minimise 'Galton's Problem' of the non-independence of cross-cultural data points. Hence this review cannot exclude the possibility that there are other societies – beyond these 60 – that have moral values that provide counter-examples that refute the theory. Nor does the selected sample of 60 cultures completely solve the problem of non-independence of cross-cultural data points (Ember and Otterbein 1991).

Third, the nature of the source material meant that we were able to code only for the (binary) presence or absence of the cooperative moral; we were not able to measure within- or between society variation in how strongly these various moral values were held or endorsed, or how conflict between these different moral values was resolved. As such, we were not able to test morality-as-cooperation's further prediction that, far from being identical, moral systems will vary as a function of variation in the value of different types of cooperation under different conditions – in other words, to the extent that individuals (or societies) face different cooperative problems, and benefit from different solutions, they will prioritise different moral values (Curry 2016). Consistent with this view, our impression of the source material was that, even if all societies shared the same moral values, they varied in how they prioritised or ranked them. In some societies, family appeared to trump group, in other societies it was the other way around. In some societies there was an overwhelming obligation to seek revenge, in other societies this was trumped by the desire to maintain group solidarity. And of course our study found that moral obligations to members of one's family, one's group, and to senior members of one's hierarchy were relatively frequent; but (positive) reciprocity and fairness were relatively rare. Morality-as-cooperation would predict that this was partly because, in our sample of societies, cooperative interactions with kin and group and high-status individuals occurred more frequently (or conferred greater benefits) than

cooperative interactions with anonymous, mobile strangers of equal status. But further 12 research will be needed to test this conjecture.

In order to overcome these limitations, future work should aim to investigate the moral valence of a wider range of cooperative behaviours, in more societies, using more sophisticated methods. Theorists should mine the game theory literature to look for further accounts of cooperation that could perhaps explain further aspects of morality, and they should investigate whether the cooperative approach can be extended to as yet under-theorised aspects of morality such as sexual, religious and political ethics (McKay and Whitehouse 2014; Curry et al. in preparation; Asao and Buss under review). Ethnographers should employ new statistical techniques, including multiple imputation and two-stage instrumental variables regression, that now make it possible to overcome Galton's problem at the analysis stage (Eff and Dow 2009; Brown and Eff 2010) and thereby potentially test morality-as-cooperation against eHRAF's full sample of approximately 200 ethnographically-attested cultures. And psychologists, anthropologists 13 and historians should also investigate the relationship between particular moral values and the corresponding individual- and societal-level indicators of cooperation – such as family size and dispersal, group size, mobility, subsistence strategy, reliance on trade, frequency of warfare, degree of inequality, political structure, age structure, resource base, and territory size (Turchin et al. 2015; Turchin et al. 2012; Gelfand et al. 2011). These predictions could be further tested by gathering new data on the full range of moral values, using survey and questionnaire methods, from representative cross-cultural samples (Curry, Jones Chesters, and Van Lissa under review). Such work would help to move the debate on from arguing about *whether or not* morality varies, to explaining precisely *how and why* it varies, and thereby steer a middle way between the extremes of unbending moral absolutism and anything-goes moral relativism, and towards a more theoretically-nuanced, and empirically tractable, view of moral variation (for one such example, see: Wong 2006).

Conclusion
We have shown how morality-as-cooperation, through the use of game theory, exhibits a theoretical precision and explanatory scope that supersedes that of previous cooperative accounts of morality. And we have shown how one of the theory's central predictions – that cooperation is always and everywhere considered moral – is supported by an extensive cross-cultural survey of moral values. As such, we have removed two major obstacles to the theory's wider adoption. Thus, we recommend morality-as-cooperation to the field, and encourage fellow anthropologists to join us in testing its many further implications.