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Dirk Messner, Alejandro Guarín, Daniel Haun

The Behavioural Dimensions of International Cooperation

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Duisburg 2013
ISSN 2198-0411

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Abstract

International cooperation to tackle complex common resource problems like climate change is extremely difficult. Although there is broad agreement on the nature of the problem and what is required to solve it, many nations continue to block any meaningful action for solution. This global cooperation crisis is baffling in the light of recent evidence about the surprisingly cooperative disposition of human beings. Research from social and natural sciences points to an unmistakable conclusion: people cooperate all the time, and they enjoy doing so. This picture of human behaviour is at odds with common assumptions about people being narrowly—and exclusively—self-interested, and prompts the question that we address in this paper: why, if we are so good cooperating at interpersonal levels, is international cooperation so hard? We address this question in three steps. First, we review the recent multidisciplinary evidence demonstrating that people cooperate much more than rational-theory models predict, and that this might stem from a natural, evolved, predisposition to cooperate. Second, we argue that there are seven basic mechanisms that determine whether or not cooperation is successful or sustainable: reciprocity, trust, communication, reputation, fairness, enforcement and we-identity. We group these mechanisms in a 'cooperation hexagon' that summarizes the current consensus about what makes cooperation work. Finally, we discuss what these findings mean for global cooperation. We argue that power games are not enough to explain off current international cooperation blockades. A new, comprehensive theory of international cooperation must be compatible with the recent insights about the fundamentally cooperative nature of human behaviour. We suggest that the search for this theory be made in three directions: a) establish how cooperation scales up from interpersonal to lager scales, and how the basic mechanisms of cooperation behave under conditions of unprecedented complexity and rapid change; b) investigate cooperation at the 'meso-level' of global governance—the relatively small group of people who represent nations in international discussions and institutions—a key interface between interpersonal and inter-institutional motivations for cooperation; and c) examine patterns of international cooperation in the light of the cooperation hexagon, to ascertain whether international cooperation blockades are the result of the underprovisioning of the basic mechanisms of cooperation, and how these mechanisms can be used as criteria for designing better institutions for global governance.

Keywords: Global Cooperation, human behaviour, reciprocity, evolution, trust, international relations, climate change, commons, G-20

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The Behavioural Dimensions of International Cooperation

Dirk Messner, Alejandro Guarín, Daniel Haun

1 How Can We Learn to Cooperate in a World of Nine Billion People?

'Great powers' … ultimate aim is to gain a position of dominant power over others, because having dominant power is the best means to ensure one's own survival.'
John J. Mearsheimer (2001: xi)

'I believe we are ready to break free of the selfishness myth and embrace human cooperation as the powerful and potentially positive force that it is.'
Yochai Benkler (2011: 22)

'Humans putting their heads together in shared cooperative activities are thus the originators of human culture.'
Michael Tomasello (2009: 99)

Yochai Benkler poignantly summarized the challenges of cooperation at the beginning of the twenty-first century: 'The world is changing at lightning speed. We are now in a period of our history when we need to learn how to rely on one another more than ever' (Benkler 2011: 22). Avoiding catastrophic climate change that can threaten human civilization as we know it may be the ultimate cooperation challenge that our species has yet faced. Harnessing the power contained in fossil fuels has allowed more people to enjoy material well-being than ever before. Accumulated underground over the course of millions of years, these fuels have been a 'cross-scale subsidy' (Carpenter et al. 2001), a relatively cheap source of energy that enabled rapid industrialization during the last two centuries (Osterhammel 2009). Yet these triumphs have been overshadowed by the unintended consequences of burning fossil fuels. There is now broad scientific agreement that our carbon-intensive economy has changed global climate in noticeable ways and, perhaps more importantly, that if we continue along the same path it is very likely that further climate change will have catastrophic consequences (IPCC 2007). Such change will probably hit the poorest and most vulnerable people in the world the hardest (UNDP 2011; World Bank 2012) and might result in international security threats (WBGU 2007).

There is broad agreement about what should be done. The solution, put simply, is to 'leave as much fossil fuel in the ground as possible, for as long as possible' (Sayre 2010: 85). This deceivingly simple proposition involves a transformation of the global economy under severe time constraints (WBGU 2011). Such a transformation is only possible if nation states cooperate to develop joint rules that protect the

atmospheric commons and incentives that shift the economy towards a low-carbon path (Leggewie and Messner 2012; Messner et al. 2010). And yet, even though the science is clear and the options for collective action are fairly well understood (OECD 2011; WBGU 2011; World Bank 2012), getting countries to agree on action to prevent global climate change has proved very difficult. International climate negotiations failed to reach any substantive progress with regard to a climate change mitigation agreement. Similar difficulties arise when dealing with other global problems—such as global financial markets or cross-border migration—that can only be addressed through international cooperation. Embedded in the promise of an increasingly dense globalized network is a paradox: a spreading consensus on the importance and urgency of global problems, together with the rise of seemingly intractable cooperation blockades. Here we aim to address the simplest of all possible questions: *Why*?

Why is global cooperation hard? The optimistic answer is that we have not figured out the right way to make it work. The current mechanisms and institutions that we have for international cooperation are simply inadequate: they reflect the bipolar world order which emerged after 1945, but are not appropriate to deal with the global interdependencies and commons of the twenty-first century. This is the view of Global Governance theories (Messner and Nuscheler 2006; Nye and Donahue 2000; Rosenau 1992; Zürn 2005), which claim that fundamental reforms are needed to organize, coordinate and enforce rules of the game for the global community (Rittberger 1995).

Recently however, Global Governance theories are on the defence. These ideas were formulated after the end of the Cold War, when some saw a window of opportunity for pushing forward the strengthening of multilateral institutions, international law, and new patterns global cooperation (Commission on Global Governance 1995; Cooper and Antkiewicz 2008; Kennedy, Messner, and Nuscheler 2001; Ostrom et al. 1999). But what if the relative stability and the functioning of the post-World War II global order were forced by the East-West conflict and the shadow of a nuclear threat, and relied on a historically unique configuration that has disappeared since the 1990s? Maybe it is not just that the current mechanisms and institutions for international cooperation are inadequate; perhaps the struggles for power in a multipolar world—in which any shadow of a hegemon is shrinking—will trump any possibility for collective action beyond the lowest common denominator where interests between nations directly converge (Barrett 2005; Bremmer 2012; Mearsheimer 2001). This is the view espoused by the realist school of international politics (Carr 1942; Mearsheimer 2001; Waltz 1979). This school of thought assumes that human behaviour is ultimately driven by self-interest and the maximization of individual benefits (Buchanan and Tollison 1972; Olson 1965). In the realist theories of international relations, this basic assumption about human selfishness is scaled up to the level of nation states: thus national interests and the competition for dominance in an anarchic world become irrefutable propositions. From such a perspective, Thomas Schelling's (2002) hope that humankind could learn to sustainably use the global commons in the basis of international cooperation is highly unrealistic.

The picture of failed global cooperation is at odds with a view that has recently aired in the life sciences: people are not always selfish; in many instances, quite the

opposite appears to be true. A substantial body of evidence from multidisciplinary research from the last twenty years suggests that human beings are in fact astonishingly cooperative. Research in experimental and evolutionary psychology suggests that children, from an early age, are inclined to share, to help, and to work together to accomplish common goals. Importantly, such a cooperative bias appears to have been part of humans' biological history for a long time, and many of the necessary abilities and motivations heritable (Tomasello 2009). In experiments and field observations, behavioural economists and other social scientists have found robust evidence that people share and cooperate much more than a model of human behaviour based on narrow self-interest would predict (Fehr and Schmidt 1999; Kahneman 2011; Ostrom 1990). These findings appear to hold true across many diverse cultural backgrounds (Henrich et al. 2001); they too suggest the existence of a natural human cooperative bias.

However, in theorizing international relations and global governance the insights gained by the behavioural sciences beyond rational choice have been so far largely ignored. This is the gap that, we argue, should be closed. Because, given the high level of cooperation between people, what should come as a surprise is that international cooperation fails. The aim of this paper is to address this apparent contradiction between the obvious underprovision of cooperation at the global scale and the cooperative bias of individual human beings. In what follows we explore this conundrum by addressing three central questions:

First, *are we good or bad at cooperating?* We argue that, contrary to the assumptions of the prevailing model of human behaviour used in economics, political science and theories of international relations, there is rich evidence that cooperation is widespread and comes naturally to humans. We discuss a wealth of experimental and field research that demonstrates that people's cooperative bias manifests itself even during the first few months of childhood, that this bias is shared with our common primate relatives and is thus deeply rooted in our evolutionary history, and that this preference for cooperation appears to emerge regardless of the culture we are born into. Our first goal is to call for a fundamental change in perspective in how we understand human relationships.

Second, *what are the essential mechanisms that enable or prevent cooperation?* We draw from multidisciplinary research on the evolutionary and behavioural bases of human cooperation to show that there is remarkable convergence about the relatively small group of factors on which the success or failure of cooperation depends: reciprocity, trust, communication, reputation, fairness, enforcement and we-identity. We propose a 'cooperation hexagon' to represent the emerging consensus about what makes cooperation work. Our second goal is, then, to take stock of what we know about basic mechanisms of cooperation.

Third, *what does this knowledge mean for understanding cooperation at an international level?* We argue that taking the behavioural insights about cooperation seriously should prompt a search for a behaviourally-sound theory of international relations. We propose that this search be conducted in three directions: first, if humans have an innate cooperative bias and the basic mechanisms for cooperation apply across time and space, then we must establish whether these mechanisms are relevant for joint problem-solving at any scale, from

small groups to the global arena. Second, global cooperation is done by individual people who represent countries at international institutions or in international negotiation processes—and yet we know very little about cooperation in this meso-dimension of global governance, a point of confluence of individual motivations, collective identities within the groups of international negotiators or within global policy networks, and larger societal interests. Third, seeing the current blockades in international cooperation through the light of the behavioural and evolutionary evidence could provide a much richer picture of international relations. From such a perspective, the global 'cooperation crisis' is not just about intractable power games, but also about the underprovisioning of the basic mechanisms of cooperation. As a consequence, a key role of global governance is to foster the development of these mechanisms.

We structure this paper around these three fundamental questions. In Section 2 we look at the evidence for the cooperative bias of human beings. In Section 3, we examine the key factors that shape cooperation at the interpersonal level, and then in Section 4 discuss the implications of such findings for international cooperation. We end the article by addressing some of the theoretical and practical consequences of using a behavioural approach to studying international cooperation.

2 Are We Good or Bad at Cooperating?

'Be warned that if you wish, as I do, to build a society in which individuals cooperate generously and unselfishly towards a common good, you can expect little help from biological nature. Let us try to teach generosity and altruism, because we are born selfish. Let us understand what our selfish genes are to us, because we may then at least have the chance to upset their designs, something which no other species has ever aspired to do.'
Richard Dawkins (1976: 3)

'Perhaps the most remarkable aspect of evolution is its ability to generate cooperation in a competitive world. Thus, we might add "natural cooperation" as a third fundamental Principle of evolution beside mutation and natural selection.'
Martin Nowak (2006: 1563)

2.1 The Conventional View: We are Bad at Cooperating

The theories that dominate the fields of economics and political science assume that human beings always behave competitively and make rational choices with the only goal of furthering their narrow interests and maximizing their profits and utilities. They do so in isolation from other actors, based on 'complete information about the structure of the situation they are in, including the preferences of other actors, the full range of possible actions, and the probability associated with each

outcome resulting from a combination of actions' (Poteete, Janssen, and Ostrom 2010: 217). From the point of view of such theories the answer to the question posed in the heading of this section is obvious: we are bad at cooperating. We are not naturally prone to cooperate, and when we do so it is either a result of external coercion or a consequence of misjudging the real costs and benefits of a particular decision; cooperation is thus an 'evolutionary mistake' (Lohman 2013: 280). In any case, it is a type of cooperation based on the lowest common denominator, not one which can help to maintain a public resource (or commons) such as the global climate (Milinski et al. 2008).

In what follows we seek to show that there is now overwhelming evidence to seriously discredit such a perspective. However, before we go any further, it is important to clarify what we mean by cooperation. Traditionally a distinction has been made between mutualism—situations in which two or more interested parties collaborate for mutual benefit—and altruism—selfless acts of generosity for which no reward is (apparently) sought or expected (Tomasello 2009). A definition of cooperation such as Melis and Semmann's (2010: 2663)—'behaviours which provide a benefit to another individual (recipient) or are beneficial to both the actor and the recipient'—is broad enough to capture these two dimensions and applies to many of the situations we describe in this paper. Sometimes, however, a narrower perspective is more appropriate. Coakley and Nowak's (2013: 4) definition of cooperation as 'a form of working together in which one individual pays a cost (in terms of fitness, whether genetic or cultural) and another gains a benefit as a result' emphasizes the fact that, strictly speaking, cooperation is a costly endeavour. This clarification is particularly useful when dealing with the problem of public goods governance—such as dealing with climate change—in which free-riding is tempting and cooperation is, by necessity, costly. We would add that, to truly constitute cooperation, these costly actions must show other-regarding preferences. For example, selfish individuals work together every day to coordinate (costly) market transactions, but they will stop at the point when doing so would make them worse-off—the so-called Pareto optimum. In a cooperative context or society, this zero-sum is not enough, and individuals engage in costly relations with the welfare of others in mind. Finally, these definitions focus on behaviour and leave aside the difficult question of motivation. Some forms of cooperation might appear fully unselfish (i.e. altruistic) but they may be motivated by fear of punishment, envy, or even habit. Here we will avoid using the term 'altruism' because of its implications of a particular type of motivation.

Having made this clarification, we can now examine the assumptions of conventional theories more closely. The model of society underpinned by fundamentally uncooperative human behaviour is part of a long intellectual tradition. The point of departure of Hobbes's 1651 *Leviathan* is that the natural (i.e. pre-societal) state of humans is war of all against all. According to Hobbes, social order can only be achieved when a strong authority is able to restrain and discipline the self-regarding behaviour of people. Adam Smith also had a vision of a society made up of self-interested individuals, but the aggregate effect of the individual pursuit of happiness would lead to self-organizing prosperity rather than violent anarchy. This tradition, in which the concept of utility-maximizing individual is linked to the idea of the minimal state has played an important role since the

1960s, both in theory (i.e. the 'Chicago School' of economics) and in practice (e.g. in the form of the 'Washington Consensus').

The concepts (and language) of evolutionary theory such as 'fitness' and 'selection' have been influential in social sciences, and particularly in economics. The rational choice model is founded on the idea that people are egoistical by nature, because otherwise our species would have become extinct. As a result pro-social cooperation runs against people's instinct to cheat and free-ride. Such social Darwinist views of the essential drivers of human behaviour misinterpret the original findings of Darwin's theory of evolution. The social philosopher Herbert Spencer 'invented' the oft-quoted concept of the 'survival of the fittest' in 1864 after reading Charles Darwin's *Origin of Species* (1859). Darwin himself borrowed this terminology from Spencer in the fifth edition of his great work (1869) defining survival of the fittest as a synonym for natural selection. Later 'survival of the fittest' was taken by the social sciences to mean 'strength', 'self-assertion' and the 'displacement of others' (with or without force), but Darwin always understood it to be the ability and extent to which a species can adapt to its surroundings (e.g. despite adverse environmental conditions).

This model of human behaviour that dominates economics and political theory is also the basis for understanding international relations. The realist school, a widely used approach to explaining international relations, assumes that nations engage in a power game to pursue their own interests (Mearsheimer 2001; Waltz 1979). The absence of a global enforcer of laws creates an essentially anarchic system in which the strongest nations are able to pursue their interests at the expense of others. The anarchy of the international system translates into a competitive and conflictive nature of international relations, and structurally limits cooperation and the ability of states to identify common interests. As a result, states can only engage in 'adversarial competition' to defend their sovereignty and their interests (Reinicke 1998: 61). In the context of such theories the idea of global governance is naïve at best (Brzezinski 1997). The only thing stopping one nation from acting solely in its self-interest is the force (or the threat of force) of another nation. Global cooperation is thus an impossible proposition.

In what follows we want to show that cooperation and pro-sociality are part of the basic repertoire of human behaviour. The *Homo economicus* is also a *Homo socialis*. While this insight is probably shared by many, it has been all but ignored by influential social and economic theories, and it is largely absent from theories of the international system. The realization that people are amazingly cooperative in addition to stubborn and self-interested creates a more complex but always truer picture of reality than the family of rational choice theories. It also questions the idea that people's behaviour is reducible to utility-maximization that responds to appropriate punishments and incentives and is therefore easily predictable. Rational choice has enormous strength as a scientific theory: it is based on simple assumptions and identifies precise causal mechanisms. But if this theory accounts only for one part of human behaviour while hiding another that is at least as important, then the strength of the simplicity and clarity of the theory is not compensated by its shortcomings. As Albert Einstein was heard saying, 'everything should be made as simple as possible, but not a bit simpler' (quoted in Benkler 2011: 18).

Our perspective on cooperation is not naïve. We do not deny the existence of self-interest, greed, selfishness, and national interests—but we do question the assumption that human behaviour is reducible to these features. Neither is the outcome of cooperation positive per se. Without cooperation, gangsters, mafias and terrorism organizations cannot succeed; goals and normative targets matter. And yet, without cooperation we cannot solve complex social dilemmas or protect the global commons. If, as we show in Section 2, cooperation is one of the key drivers of human behaviour, then the room of possibility for cooperation is much larger than what conventional theories would predict. If we can successfully decipher the fundamental mechanisms that make cooperation more likely, better or stronger (Section 3), then we can also draw lessons for structuring international cooperation (Section 4).

2.2 A Fundamental Change in Perspective: We are Good at Cooperating

The validity of rational choice and other theories that assume a fully uncooperative, profit-maximizing individual has been seriously questioned in recent years. Rather than being universal, competitive behaviour may apply only in specific decision-making settings (Akerlof and Shiller 2009; Kahneman 2003; Messner 1997; Poteete, Janssen, and Ostrom 2010). The assumption of the self-interested individual has long been claimed to be a consequence of the 'natural' forces of evolution, and the pursuit of a biological justification for this social phenomenon has a long history. Surprisingly, while the question of cooperation has typically been seen as belonging to the domain of normative disciplines such as moral philosophy, recently it has found an unlikely champion in evolutionary biology (Margulis and Sagan 2002; Nowak and Highfield 2011). Mathematical modelling has demonstrated that populations of cooperators—i.e. individuals who act pro-socially—are not doomed to become extinct. A population of cooperators is a possible, although not inevitable, outcome of natural selection (Nowak and Sigmund 2007). Furthermore, it may be that populations of cooperators on average fare better than populations of non-cooperators, giving cooperators an evolutionary advantage. Such group selection might have been crucial in selecting for cooperative behaviour in early human populations (see Bowles and Gintis 2011), and it may indeed be necessary for the emergence of complex forms of biological and social organization across species. Cooperation may be a third mechanism of evolution, on par with mutation and selection (Nowak and Highfield 2011). 'A large component of our cooperativeness', write Almenberg and Dreber (2013:145), 'is likely to be biological'.

This evolutionary perspective is consistent with the fundamentally different understanding of human behaviour prompted by recent empirical evidence emerging out of the natural and social sciences. Research from multiple disciplines over the last two decades suggests that cooperation is much more common than previously thought, and that this might stem from a natural human predisposition to cooperate. People routinely cooperate to manage public goods such as fisheries or communal forests. The 'tragedy of the commons'—the overexploitation of a common resource when there is no authority to control its use—theorized by Hardin (1968), is neither typical nor inevitable. Years of field observations and *in*

situ experimental research in a wide range of common resources has shown that users can and do self-organize to manage common resources adequately (for a review see Poteete, Janssen, and Ostrom 2010). Users of resources such as fisheries, public grasslands or forests are obviously self-interested, but they are not blind to the consequences of overexploitation. Under many circumstances, they self-organize and find arrangements that allow them to profit from the common resource while maintaining its integrity in the long run (Acheson and Wilson 1996).

Experimental research has further provided a wealth of evidence about human pro-sociality under controlled conditions (see Cárdenas 2009). Although experiments happen in highly structured and stylized situations which do not necessarily reflect the complexity of real life—and should be thus interpreted cautiously—the breadth and depth of experimental research over the last 20 years provides one powerful indication: people commonly cooperate (at a cost) even when objectively they could be better off without cooperating. For example, in the ultimatum game (Güth, Schmittberger, and Schwarze 1982), a frequently used decision-making experiment involving two people, one of the participants (proposer) is given an amount of money and is asked to offer any portion of it to the other participant (responder). If the responder accepts, the money is split as proposed; but if the offer is rejected both leave the game empty-handed. Two results show up consistently: first, contrary to the assumption of a purely selfish individual, proposers typically make a substantial offer (on average around 50 per cent of their endowment) to the responder. Second, perhaps more surprisingly, offers that are considered too low by the responder (such as, for example, less than 20 per cent of the original sum) tend to be rejected (Camerer 2003; for a review see Bowles and Gintis 2011). In a related experiment, the trust game, the responder can reciprocate and return a portion of the money to the proposer. Here too the results show evidence for pro-social behaviour: responders routinely give back a substantial portion of the money back proposers, often in proportion to the amount of the original offer (Ostrom and Walker 2005). In prisoner's dilemma games—those in which two people have to decide whether to cooperate or to defect, with the best outcome for an individual being to defect—participants routinely decide to cooperate. Such behaviour has been seen in experimental settings (e.g. Clark and Sefton 2001) and in other real-life situations (including a popular TV show; see Oberholzer-Gee, Waldfogel, and White 2010).

Pro-social cooperation is also evident in experiments that investigate people's behaviour in public goods problems. Most of these games are variations of the following basic situation: participants are given an initial endowment of money which they can either keep or contribute (all or part of it) to a common fund. Through several rounds of playing, the more participants contribute to the common fund, the better off the group will be as a whole; the catch, of course, is that this is riskier from an individual standpoint than simply keeping the money. Objectively, each participating individual should act self-interestedly (and assume that the other will do so too) and contribute nothing to the common pool: free-riding would be the most rational strategy. And yet the results of such games are not consistent with an exclusively self-interested behavioural model. Participants typically contribute at least some part of their endowment to the communal fund—although the amount varies greatly depending on the specific circumstances (Ahn,

Ostrom, and Walker 2003; Benkler 2011; Fischbacher and Gächter 2010; Ostrom and Walker 2005).

Recent work on the behavioural and evolutionary foundations of cooperative behaviour suggests that the cooperative behaviours such as the ones described above stem from a natural predisposition to cooperate. For example, a recent study by Rand, Greene, and Nowak (2012) found that, in a range of experimental settings, individuals chose to be cooperative more often when they reached their decisions quickly than when they had more time to think about it; this suggests that their gut reaction was to cooperate. Three types of evidence suggest such a natural bias for cooperation.

First, children often cooperate at a very young age, something that presumably emerges naturally without much adult intervention. Warneken and Tomasello (2006, 2009) have shown that, before a great deal of socialization and even before acquiring language, children are inclined to help others in need (Hepach, Vaish, and Tomasello 2013), to provide helpful information to others (Tomasello, Carpenter, and Liszkowski 2007). Crucially, this helpfulness does not depend on being rewarded; in fact, rewards undermine this type of helpful behaviour (Warneken and Tomasello 2008). During mutualistic interactions, children show a cooperative bias, preferring to cooperate rather than achieve the identical outcome by themselves (Rekers, Haun, and Tomasello 2011). Importantly, children appear to like to cooperate, i.e. they are interested in the social interaction for its own sake, beyond the specific goal at hand (Gräfenhain et al. 2009).

In addition, from early on, children are able to work together to solve problems cooperatively and achieve mutual goals, by assessing other people's intentions, from around their second year (Buttelmann, Carpenter, and Tomasello 2009). From about the same age, children begin to understand the notion of joint commitments, and within a year or so more they are able to recognize the way tasks are supposed to be performed, and what their own part involves (Gräfenhain et al. 2009). The scope of these findings does not imply that children only or always behave cooperatively. Children may be inclined to help when the cost is low, but when something they really want (such as a favourite toy) is at stake, they can be fiercely uncooperative (for review see Rochat 2011). As we grow older, this natural bias for helpfulness is shaped and modulated by socialization. Our interactions become more and more inscribed within the norms and rules of society, and we start to shift from a more selfless form of cooperation to one that is more careful, more influenced by an expectation of what we can receive in return (Tomasello 2009)—what Elinor Ostrom (2005) calls 'appropriate behavior'. Socialization, in sum, builds on a natural predisposition to cooperate—a point obviously at odds with Hobbes's or Hayek's views on human behaviour.

Second, evidence for cooperative behaviour in many other species—and particularly in other primates—suggests that cooperation is well established in our evolutionary lineage. Notwithstanding remaining differences between human and non-human cooperation, recent studies have shown that other great apes possess many of the cognitive prerequisites necessary for human-like collaboration. Three of the four non-human great apes have been shown to cooperate successfully in controlled settings (Hare et al. 2007; Melis, Hare, and Tomasello 2006; Rekers,

Cronin, and Haun, submitted). In particular, chimpanzees have been shown to recognize when they need help in solving a problem and to actively recruit good over bad collaborators (Melis, Hare, and Tomasello 2006).

Recent experiments that compare humans and some closely related species highlight the commonalities—but also some key differences. One such difference is humans' interest in, and understanding of, common goals. Other primates can and do collaborate to achieve common goals, but humans appear to have evolved distinct cognitive abilities to work in groups (Moll and Tomasello 2007). The ability to form joint goals—i.e. perform activities that require partners to know that they are in it together—demands cognitive abilities that appear to be exclusively human (Warneken and Tomasello 2006). Humans are unique among primates for the capacity to form joint goals and cooperate via 'shared intentionality', a mode of action requiring that all parties have an overall comprehension of the whole task—a birds-eye view—and are able to 'see' their own individual role in it (Moll and Tomasello 2007): 'what is common to all of these (…) phenomena is a uniquely human sense of "we"' (Tomasello 2009: 57).

Third, the predisposition to cooperate seems to be independent of culture. Most of what we assume to be universal traits of human psychology and behaviour come from a biased sample. The bulk of experimental research is done by researchers in a small group of countries in Western Europe and North America, and the subjects tend to be university students from these countries. Thus, what we know about human psychology is overwhelmingly based on studies with what Henrich, Heine, and Norenzayan (2010) call WEIRD—Western, Educated, Industrialized, Rich and Democratic—people. Research on cooperation tends to reflect this bias, but more and more evidence from field experiments in non-Western countries points to some important convergences. For example, in a replication of a version of the ultimatum game carried out in 15 small-scale societies (including foragers, hunters and gatherers, and pastoralists), Henrich et al. (2001) found that people in all societies made non-zero offers. There were differences that could be accounted for by the different levels of market integration, but overall, within a very wide range of social and economic organizations, people behaved in a way that was opposed to the predictions of rational-choice theory and consistent with evidence from Western industrialized societies. Similar conclusions have been reached by many other researchers in many other societies, and there is very little indication that differences can be explained by culture alone (for a review see Oosterbeek, Sloof, and van de Kuilen 2004). A similar cross-cultural convergence has been found using other types of experiments, including dictator and public goods games (see Cárdenas and Carpenter 2008; and Cárdenas 2009 for reviews).

In summary, humans manage to coordinate and cooperate even at a very young age. As soon as they manage to do so, they actively seek out cooperative interactions, apparently, because they enjoy them. Despite some differences, other great apes also succeed in cooperative interactions, indicating a long evolutionary history of cooperative abilities in the human lineage. These abilities and even similar strategies can be found in a large variety of human cultures, providing evidence for human's natural ability and inclination to cooperate. Furthermore, recent findings in evolutionary biology suggests that cooperation is a major driver of human behaviour and that groups and communities with many cooperators and

altruists do better than groups dominated by narrow selfishness. In this new, more refined perspective on human cooperation, coercion might no longer be the only way to make people and nations cooperate. The challenge is to tap into the human inclination to cooperate, which is as much a part of our nature as is self-interest. To propose ways in which this might be done, we will first summarize the necessary prerequisites and basic mechanisms for interpersonal cooperation (Section 3) in order to later explore how much these are present or absent in a global cooperation scenario (Section 4).

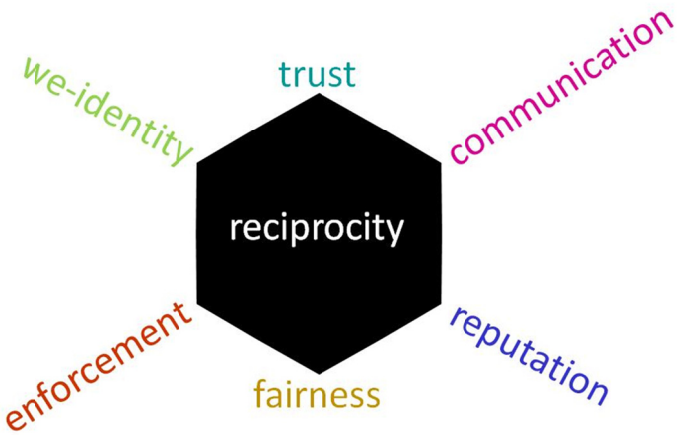
3 What Makes Cooperation Work? The Cooperation Hexagon

'We used to think that cooperation was
hard to sustain and very rare;
now we think that it is much
easier to sustain with a bit of structure,
and therefore more common.'

David Krakauer cited by Benkler (2011: 45)

Accepting that cooperation is as much a part of human nature as selfishness, we naturally turn to the following question: why does cooperation emerge in some situations and not in others? Over the last two decades there has been a remarkable convergence from experiments and field observations, and from disciplines as different as evolutionary biology, social anthropology, and economics, about the basic enablers of cooperation. We propose that, for all the obvious complexity of human behaviour, there are seven fundamental mechanisms that affect whether and how cooperation takes place: reciprocity, trust, communication, reputation, fairness, enforcement and we-identity. We suggest that a 'cooperation hexagon' (Figure 1) can be used to represent the mechanisms repeatedly found across disciplines to explain what makes cooperation work. While the labels and the ordering may be somewhat subjective, what is striking is how consistently these attributes are considered central to cooperation both in the natural and the social sciences literature.

Figure 1: The Cooperation Hexagon



At the centre of the diagram is *reciprocity*, the fundamental prerequisite for cooperation to be sustained in time. Despite our fundamentally pro-social tendencies, we learn early in our cultural development that reciprocity—i.e. not being a sucker—is central to engaging in long-term cooperation. Although all the elements in the cooperation hexagon are important, we contend that four of them are necessary to create conditions conducive to reciprocity: *trust*, *communication* (a key mechanism to develop trust), the ability to determine people's *reputation* as trustworthy partners, and the perception that the interaction is *fair*. In addition to these four mechanisms, we can use *enforcement* (via punishment or reward) as a means to rein in uncooperative partners. And finally, these mechanisms that enable reciprocation are much more likely to emerge within groups that are physically similar or that share a common narrative—in other words, with those with which we share a *we-identity*.

Reciprocity

Reciprocity is the main evolutionary mechanism underlying cooperation (Nowak and Highfield 2011; Nowak and Sigmund 2007), and one of the basic norms taught in all societies (Ostrom 2005). Immanuel Kant's categorical imperative, which is found simultaneously in virtually all non-Western philosophical traditions, reflects the basic principle of reciprocity. That we do something for others when they in turn do something for us (direct reciprocity) does not seem particularly striking. We help those who help us and not those who don't: the strategy of tit-for-tat (Axelrod 1984). What is truly remarkable is how often we do something for others when no reward is apparent or expected. Biologists and evolutionary theorists have used mathematical tools to investigate how stable populations of altruists might have evolved. They have shown that cooperation among individuals is more likely to occur the more closely related genetically they are because it increases the likelihood of cooperative genes to be passed onto the next generation. This notion, referred to as kin selection, was first proposed by Hamilton (1964).

Reciprocity between individuals who are not related genetically presents a more complicated problem. Trivers (1971) suggested that the probability that non-related individuals will behave altruistically towards each other is positively related to the probability that the altruistic act will be reciprocated in another occasion (indirect reciprocity). Such probability is increased when individuals interact repeatedly, live long lives, coexist in small groups, and when the cost of cooperating is relatively small. Indirect reciprocity is one of the key building blocks of cooperation in human societies (Nowak and Highfield 2011). We live in large groups and cannot always rely on direct exchange to be cooperative or to expect help from others. Language, gossip, reputation and other mechanisms of control—particularly the market—allow us to cooperate with others without expecting a direct retribution, knowing that someday the favour will be returned. It is a case of 'I scratch your back and someone else will scratch mine' (Nowak and Highfield 2011:53).

Observations from real-life situations and experiments make it evident that reciprocity is a crucial ingredient of cooperation not only theoretically, but also in practice. Several observations of commons management have found that one of the variables that leads to successful outcomes is the security that contributions

will be returned (Poteete, Janssen, and Ostrom 2010). Many of the economic experiments that we report here have been designed to investigate human behaviour under various contexts of reciprocity. One of the most important results from such experiments is that many people use reciprocity norms even within the short terms of experimental settings (Ostrom 2005: 47). For example, in the ultimatum game, participants routinely make generous offers with the expectation that they will be reciprocated. Importantly, when people make themselves vulnerable by making one-sided displays of cooperativeness, partners tend to reciprocate rather than exploit this behaviour (Bowles and Gintis 2011: 21). Obviously reciprocity is not only about positive interactions. In a context of mistrust and uncooperative behaviour, reciprocity can lead to a downward spiral of anti-cooperation in which even formerly cooperative people stop cooperating (Nowak 2006).

Trust

Multidisciplinary research suggests that establishing trust is a precondition to successful cooperation. Despite its importance, trust is a rather elusive concept (Fehr 2009). Psychologists often refer to trust as belief about the probability of reciprocation (Rousseau et al. 1998: 395). Economists use a narrower definition of trust that is based on people's behaviour in the absence of contractual agreements or external enforcement, such as in the trust game described above. Thus, for Ben-Ner and Putterman (2009), 'how much, if at all, A trusts B is indicated by the degree to which A displays a willingness to engage with B in an interaction that has the potential to benefit both A and B, but that would end up harming A were B to respond in a purely self-regarding fashion. A manifests trust by making himself vulnerable to B's response in the hope or expectation that B will act at least in part with A's interest in mind'.

Trust is closely linked to reciprocity. Building trust is crucial for allowing reciprocity, and reputation is a way of gathering trust in larger groups where personal interaction (and hence direct reciprocity) is less likely. We know from field observations and experiments that the possibilities of cooperation are enhanced when individuals can develop trust and reciprocity, and that the gains from cooperative behaviour 'depend on the willingness of individuals to take risks by placing their trust in others' (Ostrom and Walker 2005: 7).

But how do we know who to trust? In small groups of people with which we interact repeatedly, it is easy to keep track of others' actions and to know whether they are trustworthy or not. In a world full of strangers, we often rely on external clues, particularly on people's faces. Experiments have shown that we make very quick assessments about whether we want to cooperate with people simply by looking at their faces (van't Wout and Sanfey 2008); we are also more prone to cooperating with those who look like us (Sigmund 2009). However, through repeated interaction we are able to gather more information about the behaviour of different individuals, and our preliminary judgment about their trustworthiness based simply on facial traits changes. For example, Chang et al. (2010) found that people make quick judgments about someone's trustworthiness based on how they look, and they use that first impression to decide how to play ultimatum games. After repeated rounds of play, as people gathered more information about others

based on their actual behaviour, they modified these implicit judgments and adjusted their behaviour accordingly.

Communication

Although cooperation can emerge even in the quick and anonymous interactions of daily life, it has been well established that communication greatly enhances the chances of more persistent cooperative outcomes. When we communicate we can talk about each other's expectations, we can devise joint strategies and make pledges about our future behaviour. Face-to-face communication is known to be a key element in the collective management of natural resources in small communities throughout the world (Poteete, Janssen, and Ostrom 2010). Field and laboratory experiments using public goods games in diverse settings have confirmed that, when participants are allowed to communicate, cooperation (i.e. contributions to the public good) is significantly enhanced (Ben-Ner and Putterman 2009; Brosig, Weimann, and Yang 2004; Ostrom 2005).

One of the remarkable findings of experimental research is that communication enhances cooperation even when the interaction is anonymous, for example through online chatting systems: there is something innately valuable about exchanging pledges that does not have to do with social shaming or the development of a reputation (Ben-Ner and Putterman 2009; Cárdenas and Jaramillo 2009). But isn't communication just 'cheap talk'? The evidence suggests that the power of communication lies in the fact that we feel bound to stick to the pledges we make, and that this, in turn, creates a self-enforcing cycle of increasing trust between the cooperating partners. Such trust can even overcome initial reluctance to cooperate. In a public goods game, Milinski et al. (2008) found that when participants were given very different initial endowments, contributions to the public good were significantly higher when participants communicated (exchange of pledges) than when they did not.

Why does communication improve the chances of cooperation? Communication is more than exchanging information about strategies or reputations. It is fundamentally about increasing trust (Ostrom 2005) and reducing the uncertainty of entering an agreement with someone else. If we believe that people feel bound to stick to their pledges, and others assume that we will do so to, then communication allows us to cooperate even though we both have our own interests at heart (Brosig, Weimann, and Yang 2004).

Reputation

Humans routinely use facial traits as clues to the trustworthiness of others. The use of such clues is useful in one-off interactions; but in smaller groups, when interactions are more frequent, people rely on history. We seek information about others' past performance to try to guess how they will behave in the future. In evolutionary biology, reputation-building is a key mechanism for indirect reciprocity (Nowak and Sigmund 2005). When cooperative interactions are not of the tit-for-tat kind (that is, direct reciprocity), it is very important that an individual can know in advance if others are trustworthy cooperators or not. A review of dilemma experiments indicates that cooperation levels decrease when the actors

do not know each other, or they cannot exchange information with each other, so there is no chance to build reputation (Ebenhöh and Pahl-Wostl 2008).

Reputation is thus a matter is information flow. Experiments have consistently found that when information sharing is not allowed, cooperation decreases because reputations cannot be built.

Reputation is subjective in the sense that we all perceive others' reputations in our own personal way, which is not available to others. Gossip and other forms of communication serve to synchronize reputations across populations (Nowak and Sigmund 2005) so that everybody knows who is a trustworthy partner. However, reputations are not static: they can be improved or damaged through our behaviour, and we routinely repair bad reputations through forgiveness.

A recent study demonstrated the effect of honour and shame on cooperation. Both, publically honouring players who had contributed large sums to a public good as well as publically shaming players that had contributed very small sums to a public good, increased donations (Jacquet et al. 2011).

Fairness

For cooperation to succeed, it is often not enough that acts are reciprocated; reciprocation should also be perceived as fair. The evidence from the field and from laboratory experiments suggests that fairness is a critical component of cooperation. In a seminal paper, Fehr and Schmidt (1999: 819) provide a simple definition of fairness as 'self-centered inequity aversion'. This definition is useful because it shows that no altruistic motivation is needed for some cooperative outcomes to take place. Using an economic model, Fehr and Schmidt demonstrated that, simply assuming that even a small number of people are averse to inequity is enough to explain a wide range of cooperative (and uncooperative) behaviours in experimental settings. The fraction of 'fair-minded' people is able to sway a group of selfish individuals into cooperation by, for example, resorting to punishment of uncooperative behaviour (Nash at al. 2012).

What is unequal or unfair is subjective. Each individual perceives inequality relative to some group or outcome of reference. Such subjectivity has meant that fairness has been pushed to the margins of economics, as something that does not belong to its domain (Akerlof and Shiller 2009). And yet people in a variety of economic experimental games modulate their behaviour or judge the behaviour of others with regard to fairness concerns: people want to be fair, they want to be perceived as fair, and they expect others to be fair as well (Akerlof and Kranton 2000).

Inequality aversion has been consistently shown to be an important factor in shaping cooperation, not just in humans from an early age (Castelli et al. 2010) but in other social primates (Cronin and Sánchez 2012). For example, in a public goods game, too much inequality of endowments among the players diminished contributions to the public good, and this was attributed to players' perception of fairness (Tavoni et al. 2011). In ultimatum games, offers that are perceived to be too low are frequently rejected because they are perceived as unfair, despite the fact that doing so is costly for the responder (Almenberg and Dreber 2013). Other

experimental and field results suggest that agreement to cooperate may be hampered when the cost and benefits are not fairly distributed (Poteete, Janssen, and Ostrom 2010). For example, in field experiments with fisher communities in Colombia, Cárdenas and Carpenter (2008) found that 'social distance' (i.e. hierarchical relations) and wealth inequalities among the members of the group constrained communication and thus the effectiveness of cooperation.

Enforcement

When trust and reputation are not enough to trigger cooperative behaviour some means of enforcement, such a punishment or reward, is needed. Punishment enhances cooperation in situations where reputation-building is not possible, or when people cannot improve their reputation through cooperating with others, such as in one-off interactions (Fehr and Gächter 2002). People do not just wait patiently (or passively) for a fair cooperating arrangement to take place: they actively punish cheaters who do not play by the rules and therefore harm the principle of reciprocity. What is more, the threat of punishment may be enough to deter free-riders and to create an environment that is conducive to cooperation.

Many experiments in the laboratory and in the field have shown that the possibility to punish cheaters greatly increases the cooperative outcome (for reviews see Bowles and Gintis 2011; and Ostrom and Walker 2005). There is considerable evidence from public goods games that cooperation can be sustained if active punishment is allowed (Fehr and Gächter 2000, 2002). This punishment is costly to the participants, but it shows that 'punishing free-riders is itself a public good, and is no different from contributing to the public good itself' (Bowles and Gintis 2011: 25). How, then, to ensure that people do not free-ride on the costs of punishment? A possible explanation is the idea of 'pool punishment': while most experiments have investigated direct punishment from cooperators to cheaters *after* the public goods game is played, it is also possible that they contribute to a punishing fund *before* they play the game (Sigmund et al. 2010). A police force—something we all contribute to instead of taking punishment into our own hands—is an example of the type of pool punishment institution that emerges both in the real world and in experimental settings.

An important insight from experimental results is that punishment emerges from an intrinsic aversion to cheating rather than an instrumental desire to enhance our own profits. Fehr and Gächter (2002) suggest that punishment is triggered by negative emotions. In a post-experiment survey they found that people who cooperated the most were also those who punished the most, and that they felt angered towards those who cheated. Moreover, people who did not cooperate acknowledged that these negative emotions were to be expected. Such drive to comply with norms and to see to it that others comply appears very early in human development. Research with children as young as 18 month old suggests that we are (1) remarkably quick at learning 'the way things are done' (as, for example, the rules of a game or how a toy should be used) and (2) keen to enforce these set of rules on others (Tomasello 2009). Interestingly, in a series of public goods experiments that allowed for concealment of certain types of behaviour, many subjects chose to pay to hide when they punished others severely, suggesting that

harsh punishment—in addition to free-riding—may lead to a loss of reputation (Rockenbach and Milinski 2011).

While it is true that people engage in costly punishment against cheaters, there is also growing evidence that positive rewards may be just as effective for promoting cooperation. In a series of public goods experiments, Rand et al. (2009) found that contributions to the public fund were equally high when people had the option to either punish uncooperative behaviour or to reward other cooperators. In these interactions—as in most other personal relations that we are involved in during our daily lives—people were not interacting anonymously or sporadically. Thus, 'without the cover of anonymity, it seems probable that people would be less inclined to punish and more likely to reward' (Rand et al. 2009: 1272).

We-identity

When seeking partners for cooperation, it is very important that we guess correctly which individuals are more likely to reciprocate (Durrett and Levin 2005). How to do it? One of the fundamental ways we do this is by looking for those who are somehow similar to us; this is the idea of homophily (Haun and Over, in press). Experimental evidence suggests that we tend to be nice towards people who physically look like us (Sigmund 2009), and we also look for similarity in non-physical traits such as how people act or how they speak (for review see Haun and Over, in press). In large and complex societies, the main source of similarity is cultural: we tend to cooperate better with those who believe in the same things we do, or who adhere to the same norms. Economic experiments have shown that people tend to cooperate more with those who look more like them (Krupp, Debruine, and Barclay 2008) or belong to their in-group, even if that group is defined arbitrarily (Burton-Chellew and West 2012).

The evidence for the importance of similarity also comes from field observations of management of common property resources. The emergence of self-organizing management groups is difficult across ethnic or geographic groups when they are different, arguably because trust is harder to build (Poteete, Janssen, and Ostrom 2010: 44). Furthermore, results of experiments with public goods games suggest that if people who are predisposed to cooperate are allowed to associate with like-minded people, cooperation can be more easily sustained (Page, Putterman, and Unel 2005).

In addition to being a factor that we use to identify potential collaborators, similarity is something that we actively build. Language and communication are essential to this task. Through language we learn and build joint narratives that reinforce our sense of belonging. We actively use narratives—whether around religions, political parties, nation states or football teams—to expand our common ground and to actively *be* more like those in the group (Akerlof and Shiller 2009; Kennedy, Messner, and Nuscheler 2001; Scharpf 1999; Tomasello 2010). The communicative process is thus crucial for creating new arenas of commonality and to enhance belonging and acceptance in them.

The existence of a we-identity allows us to perform acts of generosity and kindness with others within a group, but at the same time to inflict great damage on those who belong to other groups. Humans can cooperate very effectively, in

other words, with very evil objectives in mind, 'but such deeds are not usually done to those inside "the group"' (Tomasello 2009: 99). And yet, even within the in-group, cooperation is not a static given. Within the group there is always defection and competition, so there is always a very dynamic process of cooperation, cheating, punishment and rewards (Nowak and Sigmund 2007).

To summarize, whether cooperation works or not seems to depend on a handful of factors that appear again and again. Reciprocity is the most important of these mechanisms in the sense that it makes long-term cooperation possible. Next to reciprocity, communication, trust, reputation, and fairness seem to form the backbone of stable cooperative interactions: take one away and cooperation fizzles. Punishment (or its opposite, reward) can and often does nudge people to behave in a cooperative way, or at least to follow the rules of the game. Finally, all of these mechanisms emerge more easily, and are much more likely to persist, when the cooperators belong to a group and share common physical traits, languages, stories or ideas—a we-identity in short.

4 What Does This Mean for International Cooperation?

'The cultures of human beings are based not only on exploitation, but on fundamentally cooperative processes as well. … indeed all of humans: most impressive cognitive achievements – from complex technologies and mathematical symbols to intricate social institutions – are not the product of individuals acting alone, but of individuals interacting … (based on) shared intentionalities.'
Michael Tomasello (2009: xv-xvi)

'The scientific study of cooperation has a central role to play in achieving that cooperation.'
Simon A. Levin (2009: 16)

Until now we have talked about the capabilities of human beings to cooperate and about cooperation at the interpersonal level or between small groups of people. We have shown that there is consensus among different scientific disciplines that cooperation is widespread, and that a handful of recurrent basic mechanisms make cooperation possible. Our next step is to find out what is the significance of these insights for cooperation at very large scales. How, in other words, does our knowledge about human cooperation help us to understand the challenges of global governance and international cooperation? If people are fundamentally good at cooperating, this should prompt a new set of theories of international relations whose assumptions go well beyond the notions of power and self-interest. Such a change in perspective could reshape our understanding of historic patterns of social change, challenge received ideas about the nature of the current international 'cooperation crisis', and point in the direction of new lines of empirical research. Such a change could also help us identify the institutional, normative and cognitive innovations that are necessary to favour global cooperation in the twenty-first century.

Our review of the evidence about human cooperation should make apparent the limits of current theories which perceive the interplay between people, organizations and states to be exclusively the power games of what Amartya Sen called 'rational fools' (Sen 1977). As we have shown, humans do not only optimize their own self-interests, they are also able to cooperate and enjoy doing so: the scope for cooperation at all levels of human organization—including international relations—is therefore larger than it is assumed. For example, (neo-)realist John Mearsheimer (2001) contends that 'a peaceful rise of China is impossible' because power rivalries between old (Western) and new powers lead inevitably to conflicts. In light of the cooperation theories discussed here, this apparent certainty would seem to be more of a hasty conclusion. Power, dominance and self-interest are obviously significant, but evidently nations have cooperated successfully in many ways over the last two centuries, for example in the creation of international law, the establishment of international organizations (including the United Nations Charter) and in the development of institutions for sharing knowledge.

We do not currently have this new behaviourally-sound theory of international cooperation. What we would like to do in what follows is to outline three of the directions that could lead to a more robust and more comprehensive theory of international relations that contemplates both people's ability to compete and their desire and ability to cooperate. We elaborate on each within the subheadings of this section.

First, we need to establish how cooperative behaviour 'trickles up' from simple interpersonal relations to larger and more complex forms. We suggest that cooperation can be seen as the mother of civilization, in the sense that our evolved cooperative abilities provide the building blocks that have allowed us to cooperate in ever larger and more complex ways. Our hypothesis is that these building blocks—the mechanisms of the cooperation hexagon—have scale-free properties that allow them to function in societies of increasing size. Cooperation, however, is not always an inevitable outcome; these mechanisms need to be re-established, reworked, or even reinvented when new contexts emerge. This change in perspective would allow us to see history in a new light, and, from historical evidence, to learn how people have built cooperation in times of upheaval and change.

Second, we need to use the findings from the behavioural sciences to gain a better understanding of the meso-dimension of global cooperation. Large scale cooperation can be an emergent property of small-scale interactions, but in some cases—such as concrete negotiation processes and global policy networks—it has to be deliberate. The most common way of carrying out this type of high level decision-making is through relatively small groups of people that represent nations in international fora, processes, networks and regimes. We refer to this group, of which very little is known, as the meso-level of global governance. Our hypothesis is that the mechanisms of the cooperation hexagon should operate in these groups as well—but with the particularity that they represent a point of contact of interpersonal and inter-institutional dynamics.

Third, we must shed new light on the current 'cooperation crisis', in a world of tectonic power shifts between Western countries and emerging powers (Gu,

Humphrey, and Messner 2008) through the lens of the cooperation hexagon. If people are fundamentally able to cooperate, why are there currently so many areas in which international cooperation seems impossible? Our hypothesis is that many of the current cooperation blockades in international cooperation can be explained not merely as power games, but as the underprovisioning of the basic mechanisms for cooperation. We suggest that such a view can help us draw useful lessons about successful cooperation strategies within the international system and help us to design better institutions for international cooperation.

4.1 A Change in Perspective: is Cooperation the Mother of Human Civilization?

Heraclitus is credited with saying that 'war is the father of all things'. While war has undoubtedly played an important role in the constitution and stabilization of many forms of social organization (Waltz 2001), it is also possible to interpret human history as a long process of intense cooperation. From life in small bands of hunters and gatherers, the invention of agriculture and cities, the industrial revolution, and the development of the modern welfare state to the point of a global architecture of international organizations, the history of humankind has been characterized by ever increasing and accelerating complexity, which is based on cooperation between people (Fogel 1999; Osterhammel 2009). One of the most astonishing aspects of this increasing social size and complexity is that it happened relatively quickly: it has been only ten thousand years since the dawn of the Neolithic revolution—too little time for these changes to be accounted for by biological innovations in our species. Our cultural evolution, in other words, has rapidly outpaced our biological one. How can ever larger and more complex forms of social organization emerge from the same biological make up of our hunter gatherer ancestors?

Our fundamental ability to cooperate might hold the key. One of the motors of human cultural evolution is cultural learning, i.e. the ratcheting-up of knowledge by building on what previous generations have learned (Tomasello 1999). Thus all relevant human inventions such as language, mathematics, science, cities, states and all other complex social structures are collective cultural products, which are in turn the result of cooperation (Nowak and Highfield 2011). From very early in our evolutionary history, humans relied on the fundamental ability and predisposition to cooperate in order to develop social norms, commonly shared rules of behaviour and solution strategies for interdependence problems, which cannot be solved individually. The cultural development of humankind may therefore be based on the cognitive abilities 'that enable individuals of the species *Homo sapiens* to, in a sense, pool their cognitive resources, that is, to create and participate in collective cultural activities and products' (Tomasello and Rakoczy 2003: 122). In this sense, cooperation can be said to be the mother of human civilization.

It is important to know that human history has not been about a gradual or predictable progression towards greater complexity based on cooperative learning processes. Instead, history has been shaped by a series of radical transformations such as the invention of agriculture during the Neolithic revolution, the development of writing and the first nation states in Mesopotamia, and the

Industrial revolution of the early nineteenth century (Fogel 1999). What can we learn from this new reading of history through the lens of cooperation? Such a perspective could provide clues about the origin of these transformative moments in the level and complexity of cooperation. It could also serve as a guide to understanding whether people and organizations are able to overcome new cooperation challenges. Could it be that the new context of a dense and accelerated globalization which is approaching the limits of the earth system is overtaxing people's ability to cooperate? Do our cognitive limits impose restrictions on our ability to cooperate in large groups (Dunbar 2009) or for goals that seem too distant (Kahneman 2011)? Is there a threshold of size or complexity after which the basic mechanisms of cooperation start to break down? These are empirical questions for which we have no good answers.

The question also remains, exactly how and why the basic building blocks of interpersonal cooperation (i.e. those identified in the hexagon discussed above) come together to build larger and more complex cooperative institutions. It is possible that the basic mechanisms of cooperation (reciprocity, communication, trust, reputation, fairness, enforcement and we-identity) operate regardless of the size of the group that we live in. If these mechanisms were 'scale-free', then we could rely on them without having to invent new mechanisms in order to live in larger or more complex societies (Pagel 2012: 348). While the existence of scale-free mechanisms alone cannot explain large societies, it can make them possible. Often large-scale complexity that appears to be ordered and purposeful (such as markets) is driven by simple local rules (Pagel 2012). For example, a simple social norm such as 'do to others as they do to you' (what is otherwise referred to as 'tit-for-tat') is able to create apparent order out of random interaction. Extensive modeling has shown that cooperative populations can and do emerge out of interactions between individuals which are governed by minimal rules (Nowak and Sigmund 2007). These insights are very significant for the possibilities of international cooperation. While we cannot derive the ideal architecture of complex global governance systems from these simple elements, if the mechanisms of cooperation are the basic building blocks of more complex forms of cooperation, then they constitute essential design criteria for the development of international organizations and the structuring of international processes. Only institutional designs firmly anchored in the basic mechanisms of cooperation can create and expand cooperation spaces.

However, as Nowak and other evolutionary biologists have noted, the simple rules of cooperation do not always lead to stable or persistent cooperative outcomes. As populations change (for example through migration or mutation) other configurations are possible. The development of cooperation is thus not a linear process, which leads to increasing cooperation or to evolutionarily stable situations. The empirical evidence, the reality of conflicts, cooperation blockades of cooperation or even war, show that while cooperation structures develop and expand, they can also successively erode and even collapse in cycles (Nowak and Highfield 2011: 35). While we have reasons to suggest that some properties of cooperation operate regardless of time or scale, it is also the case that context matters: some institutional and historical contexts promote cooperation while others inhibit it (Ostrom 2005). The mechanisms of the cooperation hexagon

emerge and stabilize themselves differently in small groups than in nation states, and differently in highly competitive environments than in charitable institutions. Thus they need to be re-established over and over in light of changing historical and/or institutional contexts. Where do we stand now in global governance arenas with regard to these cycles of cooperation? How can the current situation of the international system be described using the insights of the cooperation hexagon and what consequences could result for initiatives to favour cooperation? We address these questions below.

4.2 The Meso-dimension of Global Cooperation from a Behavioural Perspective

The wonderful, seemingly choreographed operation of large, complex systems such as markets can be misleading. As we noted above, intricate cooperative organization with the semblance of purposeful direction can emerge spontaneously from random interactions between individuals following simple rules. However, some of the particular challenges that we need to address in a global society of nine billion people do require a very sophisticated system of deliberate decision-making and coordination at local, national and international levels. The space for international cooperation is structured by the combination of widely different governance formations and polycentric networks.

Global cooperation is therefore a pretty complex affair. But it is also, inevitably, something that is carried out by a relatively small group of individuals who speak on behalf of others. We refer to this level of interaction as the meso-dimension. We understand the meso-dimension to be international regimes, negotiating processes and policy networks in which public bodies and increasingly more private individuals work together. How is interaction between these individuals governed, and how is it different from that of other individuals making decisions at local or national levels? Our claim is that the behavioural perspectives discussed in this paper could offer crucial insights towards a better understanding of the meso-dimension of international cooperation. International Regime theory (Rittberger 1995; Zürn 2005) focuses on examining the relations between institutional designs and particular sets of problems. From a behavioural perspective, the question regarding the meso-dimension is how a concrete group of people—staff of multilateral organizations, foreign missions, civil society organizations and the like—work at a unique point of confluence of several scales. They cooperate at the interpersonal level, as members of a small group of experts, and as representatives of the interests of millions or even billions of people.

To understand this particular dynamic from the perspective of our cooperation hexagon it is crucial to understand what Poteete, Jannsen, and Ostrom (2010: 228) call the 'microsituational context'. First, the members of these groups interact as people. Do they know each other personally? Do they trust each other? Do they have similar information at their disposal? These are all relevant questions for dynamics at the meso-dimension of global governance. But, apart from their own personal interactions, these individuals also represent different interests which they bring to bear in their decisions. These are the (presumed or real) interests of the countries or civil societies to whom they are accountable, the interests, points

of view and feelings of obligation which arise within the groups of experts themselves, as well as their individual preferences and mental maps as experts.

Within these internationalized spheres of activity, there are presumably many individuals who attempt to orientate themselves towards common global interests. However, the effects of this interest and motivation on the actions and decisions of the players are unknown. At the same time the decisions of the individuals (for example in trade or climate negotiations) are shaped by microsituational conditions with their specific procedures, rules and heuristics, and moreover embedded in a broader institutional and political context. The meso-level of international cooperation is thus the direct point of confluence of interpersonal and inter-institutional dimensions. Hence, the problem of cooperation at the meso-scale is not about scale but about different drivers of cooperation. How does cooperation work at this point of intersection? This is a rarely examined area for which we have little direct evidence. Empirically understanding the meso-level will require the combination of qualitative and quantitative methods, including participant observation, discourse analysis, game theory and experimental approaches. As we discuss below, the cooperation hexagon may provide a useful framework for further research.

4.3 The Blocked Multipolarity from the Perspective of the Cooperation Hexagon

Up to this point we have shown that there is a remarkable consensus about human predisposition to cooperate, and have suggested that there are plausible mechanisms by which this natural (individual) tendency might be important for understanding complex social organization and meso-level decision-making. If the hypothesis outlined here are right, then a behaviourally-sound theory of global governance would offer a radical alternative to the realist world-view. In this section, we suggest that, in addition to power, dominance and self-interest, the current obstacles for international cooperation are related to an underprovisioning of the basic elements of the cooperation hexagon. Here we suggest that some of the key difficulties of global governance stem from a period of transition in which reciprocity, trust, communication, reputation, enforcement, we-identity and fairness need to be re-negotiated, re-established, or even reinvented.

In the different theories of International Relations, current blockades in world politics are interpreted as power games resulting from the transition from a G 7/8 to a G20 world (Bremmer 2012; Gu, Humphrey, and Messner 2008; Kennedy 1982; Mearsheimer 2001). Economic, political and military power resources are being redistributed among emerging powers and OECD countries—many of which find themselves in a state of relative decline. Western privileges in the international system are being questioned and the dominance of Western countries, which has lasted for over 200 years, is being eroded. The escalating power struggle between nation states is making international cooperation more difficult with the result that the G20 constellation is turning out to be a G0 world in which all countries involved are fighting to expand, stabilize or defend their own power resources (Bremmer 2012), neglecting collective action activities to manage the global commons. From a classical (neo)realistic perspective, initiatives to improve the situation of 'the West'

are easily described: strengthen your own power, fence in emerging powers and defend dominance (Mearsheimer 2001).

The existence of these power games cannot be denied, but viewed through the eyes of the cooperation hexagon the perspective of the various cooperation blockades and possible ways of overcoming them is altered. The basic mechanisms of cooperative relations between the Western countries have intensified successively since World War II. Investment in them has been massive. They have been routinized and stabilized in mutual regulations and institutions. After the disaster of World War II, the people of Western Europe, North America and Japan created a dense network of cooperation, including the establishment of institutions such as the EU and the OECD, despite many opposing interests and power asymmetries. The resultant cooperation culture helped to embed potential conflict potential and develop common interests. Viewed overall, these dense patterns of collaboration developed on the basis of the strong fundamental mechanisms of cooperation. Outside the North Atlantic, other institutions of international cooperation such as ASEAN (Association of Southeast Asian Nations), NEPAD (New Partnership for Africa's Development) or Mercosur (Southern Common Market) have different histories and configurations of actors. However, building them has also required time to build up trust, communication, and other basic elements of cooperation—especially when former enemies decide to cooperate for peace, as in the case of ASEAN (Acharya 2009).

The cooperation blockades in the multipolar power constellation and within the G20—an important forum of the current world order in transition—are not only attributable to power struggles. Our contention is that these basic mechanisms of cooperation are rebuilt, re-developed and reinvented in this new constellation of players. Without these fundamentals of cooperation, the joint solving of problems can only succeed if interests happen to coincide—something impossible in the case of protecting global commons. Our answer to those who see only power conflicts and blockades is that these forces appear unrestrained in this phase of tectonic power shifts because they have not (yet) been embedded and defused by the structures of the cooperation hexagon, i.e. by functional cooperation spaces. Thus, the idea of a 'clash of civilizations' which threatens the standing of the (cooperative) West is replaced by a recognition that we might simply need time and effort to set up the mechanisms that enable cooperation to flourish.

If this hypothesis is correct, then a perspective of the current global cooperation crisis from the point of view of the cooperation hexagon would yield important insights. A cursory examination, presented below, suggests that this is indeed the case.

Reciprocity. The denser the interactions between humans and organizations, the more likely that people will show cooperative behaviour in advance without expecting something directly in return. Reciprocity therefore develops with time through repeated interaction. Reciprocity relations of this kind have grown between the OECD countries over almost seven decades since the end of World War II. It is likely that old and new powers in the G20 will have to first build up interactions to enable self-strengthening reciprocity to develop before they can engage in certain types of cooperation.

Trust. Trust facilitates cooperation and lowers the transaction costs of interaction between the players. Some of the obstacles for cooperation within the G20 could be attributable to persistent mistrust. Emerging countries assume that power-retaining strategies lie behind the political initiatives of the G7/8 countries. The dichotomies between the G77 (an informal alliance of developing countries) and the G7/8 have by no means disappeared, and continue to dominate the build-up phase of the G20. Whereas the G7/8 understood itself to be a union based on democratic values, the G20 requires democratic, semi-authoritarian and authoritarian countries to work together. The trust potential within the old transatlantic community has also shrunk, as it has within the old G77. Trust is therefore likely to be a scarce commodity in the new power constellation.

Communication. Without intense communication, misunderstandings, mistrust and stereotypes dominate. Relationships of mutual obligations, as well as an understanding of the interests and guiding principles of others, can hardly be built up. Intense communication relationships increase the chances of the emergence of cooperation relationships. Communication relationships in the G20 and also between G20 societies are still pretty thin compared to, for example, the communication relationships which have been expanding between EU societies over the last seven decades.

Reputation. Trust and reciprocity are closely connected to the reputation of the players who have to : a reputation for cooperation. The lack of trust in the G20 suggested above and the thin communication structures may result in chronic reputation problems within this new power constellation. All involved have to regain a reputation as trustworthy, cooperation-oriented players who not only have an eye towards their own interests but also towards finding solutions in the common interest or to preserve the global commons.

Fairness. Fairness is of enormous importance in international cooperation. The grapple for a fair distribution of the burden stands at the centre of the climate negotiations. Developing countries complain about a structural fairness deficit in the international system established during the last 200 years, which has been dominated by Western societies. These issues of fairness play a major role regarding the distribution of seats in the control bodies of the IMF and World Bank, the setting of topics in the WTO processes, in the discussion about access to genetic resources, and the negotiations about 'shared but differentiated responsibilities' for climate change. Whether these are objective or perceived fairness gaps is of no consequence initially. Lasting cooperation relations and solutions to protect global commons can hardly be established without a common understanding of fairness.

Enforcement. Cooperation can fall apart if those who refuse to cooperate are not punished or if those who do are not encouraged by special awards. There is little to suggest that international agreements on the protection of the climate, oceans, other ecosystems or even the stability of the global financial markets would function without sanction mechanisms which already exist in the international system. Although the WTO has an arbitration court mechanism and sanction option, the G20 has yet to reach a single agreement which is bound by sanctions. Both, emerging economies and the USA too, have refused up to now to give up part of

their sovereignty. No functional international regimes can be created without a global agreement on the significance of sanction mechanisms for the protection of global commons.

We-identies and joint narratives. Cooperation in large, complex groups and communities is bound to fail if there is no common ground about the main challenges, their possible solutions, and the basic principles of collective work. The examples of successful international cooperation suggest a key role for a powerful narrative that creates a common identity: the European Union as a 'peace project', the great post-World War II transatlantic coalition to contain the 'threat of communism', or G77 as an alliance of underprivileged countries in a Western-driven global economy. Inventing a common, shared narrative for global cooperation in a G20 context is no triviality, because it involves nothing less than (a) finding solutions to global problems and the protection of global commons beyond the restrictions of nation states (political structuring in a global society); (b) the transition from a world order dominated by a Western power to one of multiple regional powers; and (c) the invention of a global growth and welfare concept for a population that will soon reach nine billion within the limits of the earth system.

The G20 cannot therefore simply take over already established narratives from the old G8 world (as with the transition of the socialist states towards a market economy). It must develop a new, cognitively convincing and normatively sustainable narrative for the structuring of global processes which takes into account both power shifts and the functional limits of the earth system. The development of common notions of this kind needs time for nurturing (Weber and Johnson 2011). The changes that have to be processed in this narrative are enormous. They are only comparable with the radical changes from agrarian societies to complex industrialized societies which resulted in completely altered energy systems, economic structures, time regimes, human rights concepts and political systems. The international system with its almost 200 nation states and nearly nine billion inhabitants, all of whom have still to learn how to overcome global interdependence problems, protect and utilize global commons, accept responsibility for the further development of the earth system and create a post-Western world order, find themselves in the midst of a 'great transformation' (WBGU 2011).

From this point of view, therefore, institutional, normative and cognitive innovations have to be developed in order to improve the foundations for cooperation in a multipolar world order. Instead of more power and countervailing power, more should be invested in the basic mechanisms of the cooperation hexagon. A view of the current global cooperation blockades through the prism of the cooperation hexagon shows a complicated construction site on which the basic mechanisms of cooperation have to be built and developed successively. In view of the complexity of the task, the existence of cooperation blockades and weak cooperation dynamics are perhaps less surprising than the absence of large-scale conflicts (which the realist perspective would lead us to expect). The problems of the G20 are not cooperation defectors or those who fundamentally refuse to cooperate. There is a shortage of the essential basics of cooperation which have to be created on a completely new playing field by a radically changed constellation of players.

5 Conclusions

We have argued that the evidence of a human cooperative bias should prompt us to profoundly rethink current theories of international cooperation. If we accept that the space for cooperation is larger than dominant theories allow, then we need to reconsider the assumption that national self-interests and competitive struggles will inevitably derail efforts for effective global cooperation. There is competition, and there is self-interest, no doubt. But cooperation is also happening around us all the time; any theory about human institutions that knowingly ignores this fact is simply inadequate.

Our call for a behaviourally sound theory of international relations has been based on three key premises. First, we have argued that there is overwhelming evidence to show that cooperation plays a much more important role in human behaviour than is predicted by rational choice and related theories. New frontiers in theoretical biology make the case that cooperation, rather than an evolutionary anomaly, is instead a driver of complex forms of organismic and social organization. Cooperation has been part of the behavioural repertoire of primates long before our species evolved in Africa. Not only do some of our extant primate relatives exhibit certain obviously pro-social traits, but human children are keen to cooperate before they have learned the norms of culture. Moreover, this human cooperative bias appears to hold true across cultures.

Second, cooperation appears to be governed by a relatively small set of basic mechanisms (what we call the cooperation hexagon). These have been shown repeatedly to affect the outcome of human interactions and to determine whether cooperation persists in time or not. First among these seven mechanisms is *reciprocity*—in other words the very strong aversion that we have to being cheated. Reciprocity is better established when there is *trust*, when we can *communicate* to share information, when we can use *reputation* to assess trustworthiness, and when we perceive the interaction as being *fair*. It is very difficult for cooperation to emerge or to persist if these five elements are not in place. Frequently the use (or threat of) punishment can be an effective mechanism to keep free-riders at bay and maintain cooperation in larger groups. Finally, cooperation is sustained through the glue of a *we-identity*. People who share common physical and intellectual characteristics, interests, ideas or narratives are brought together to cooperate with each other much more easily than those who do not.

Third, acknowledging the pervasiveness of cooperative behaviour between people and the basic mechanisms that make it possible prompts us to call for a fundamental reformulation of current theories of international cooperation. Although we do not claim to have such a theory, we argue that the evidence for human cooperative bias opens up a number of research avenues. We propose to begin this exploration in three different areas:

1. Cooperation is an important part of people's behavioural repertoire and history shows that cooperation has been a key enabler of society's increasing size and complexity. This suggests that the same basic mechanisms of cooperation operate at different scales and in different contexts, but that they have to be re-established and reworked. To

understand the relationship between interpersonal and global cooperation we need to establish the scaling properties of the cooperation hexagon, as well as how these mechanisms perform in times of crisis and transformation.

2. Our society has devised a number of institutions and instances to deal with the day to day of international cooperation: this includes formal organizations such as the UN, and informal networks of knowledge exchange. Ultimately, then, global cooperation is performed by the relatively few people who interact in these fora—what we call the meso-dimension of international cooperation. We hypothesize that the elements of the cooperation hexagon must operate among these groups, but with an important difference: these people are interacting not only as individuals, but also as representatives of other groups or even whole societies. It is crucial that we better understand how cooperation works at this interface between interpersonal and inter-institutional interests.
3. Current blockades in international cooperation—most prominently, the failure to move forward to avoid further climate change—are attributed to power plays and the narrow pursuit of national interests in the international arena. Taking into account the behavioural dimension provides an alternative perspective: what is baffling is why, given our bias for cooperation, we have not succeeded at coping with these global challenges. We hypothesize, seen through the lens of the cooperative hexagon, the current crises in international cooperation can be plausibly attributed to an underprovisioning of the basic mechanisms of cooperation: a lack of reciprocity, trust, communication and reputation in international relations, as well as the perception that the burden sharing is not fair, the absence of credible effective punishing mechanisms, and the lack of a global we-identity.

Taking the recent insights about human cooperation seriously should, at the very minimum, produce a shift in how we see international relations. The importance of a change of perspective should not be underestimated. How we frame situations can have real consequences for how we behave (Weber and Johnson 2011). The basic assumption of the impossibility of cooperation in a time of global power shifts can become a self-realizing prophecy if it is internalized as the guiding principle of the actions by certain players and institutions. In the same way, a perspective that looks at the challenges of international cooperation from the starting principle that people can and do cooperate could improve the chances of global cooperation. Moreover, scientific creativity and social fantasy are necessary to chart the spaces of future cooperation. This creativity cannot be expected of theorists who reduce human societies to utilities, payoffs, optimal strategies, self-interest, national interests, rational economic people, and a priori efficient markets. ‘The limits of my language’, as Ludwig Wittgenstein wrote, ‘mean the limits of my world’ (1922: 74).

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