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An Interview with Michael Tomasello: Cooperation and Human Cognition

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MV Hernández-Lloreda (MVHLL)– The seminar held in Madrid in October 2015, *Cognition and Culture in Evolutionary Context*, was intended to explore culture from both proximate (cognitive) and ultimate (evolutionary) perspectives. So, let's start out by asking some general questions of broad interest and wide implications. Culture means different things to different scholars; this is so across different fields, e.g., biological versus social sciences, as well as across disciplines within the behavioral sciences. Even comparative psychologists themselves have held controversial positions regarding the definition of culture. Some scientists argue that a too narrow definition of culture would deprive us from what can be gained by a comparative approach, so they claim that if human culture is qualitatively different from non-human cultures, then the study of non–human cultural processes could be of no help to unravel the evolutionary origins of human culture. So, what is your current position on this?

Michael Tomasello (MT)– It hits exactly on these different levels you are talking about, proximate and ultimate mechanisms. For example, chimpanzee culture and human culture share some characteristics in terms of behaviors that are maintained across generations by processes of social learning. But, what I've maintained for many years now is that the proximate mechanisms by which that happens are different. And so, there are some differences in the way that children imitate and learn from others compared to chimpanzees. Andy Whiten's research has shown that those differences are not quite as great as once believed but still they are there. Even in Andy Whiten' studies the children tended to be better imitators than the chimps. But, in addition, there are things like teaching. Nobody really has ever shown anything like teaching in apes, whereas human children are exposed to teaching from adults. Adults have as a goal that the children learn, so they persist until the children learn, they make sure the children learn and so that is a different mechanism. Social norms, where children conform to what others are doing, they don't just imitate others for their instrumental benefit, but they see others doing things and they just do them. Like over-imitation, for a young child, if you twirl your finger around in a circle before you press a button, they're quite likely to do the same thing, even though it serves no function, and the chimps are less likely to do it, so this is sometimes called social imitation, meaning that they are imitating not just to reach a goal but to be like a person and to identify with them. So, from my very first writings on chimpanzee versus human culture, I've said I'm happy to call it chimp culture, it's the same thing in a general evolutionary perspective, there's non-genetic transfer of information across generations, but the proximate mechanisms are different.

MVHLL – One of the arguments voiced by scientists who are more inclined to broaden the definition of culture is that we should avoid definitions of culture that rely on high-level cognitive processes like intentions, mental state attribution and the like. We should use, they say, a more functional approach. What do you think about this?

MT – I'm a pluralist, all of the above! We just need to keep our levels separate but, from a functional perspective, there is continuity and then I would say there are differences in the proximate mechanisms and we just need to keep that straight, that's all. And I tend not to work with strict definitions myself. In some places I've actually talked about processes of cultural transmission in the plural, processes, rather than "here's what culture is and then you've got it yes or no". That tends not to be the best kind of question. We say we all know what we are talking about in a general way, and let's look at the different components of that and compare them.

MVHLL – According to your view, then, human culture differs from nonhuman (ape) culture in the processes through which culture is socially transmitted. Could you explain this a bit further?

MT – As I said, imitation can be based on different processes. For example, a sophisticated form of imitation that children engage in when they imitate others is conforming. Conforming means they are copying the other person just to copy them, "he did it in a clever way that will help me, I want to be like him, I identify with him, I'm one of him", so they conform to what the other one is doing and they follow social

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norms, the way one ought to do it and that kind of thing. And then, on the other side, there's the teaching and children conform to the teaching that they have been given from adults. So, I would say, there are some quantitative differences in imitative learning but in addition you have this normative conformity and teaching and those are the things that enable the ratchet effect. The first paragraph of the first article I ever wrote on this cumulative culture is a distinguishing characteristic on this more general level, that it does not seem like other primate species have anything like cumulative culture and experiments since that time have shown that. There are not even candidates from nature that people really seriously propose as cumulative culture. So these different proximate mechanisms also transform the more global processes of culture transmission to enable some more powerful or new processes of transmission where we can get this ratchet effect on cumulative culture which are the kinds of things that Rob Boyd has focused on in his talk in the Seminar as well. We have general functional continuity but with some differences, cumulative culture at the general level and the proximate mechanisms that are generating these differences are the ones that I have just laid out.

MVHLL – You have said that teaching is really important, but recently there have been new definitions of teaching according to which several non-human species are claimed to exhibit functional teaching. These species include ants, birds and meerkats. How does this fit?

MT – This is where I would probably start invoking intentions and things like that. What you really need for teaching is for the teacher to do whatever it takes to make sure that the learner learns, and then when the learner has learnt, they quit, and the only one that really fits that definition that I know of is the cats bringing the half dead mice, and it's only that one context, it is just this, it is a quite constrained adaptive specialization so, again the answer to these questions of, "do they do ?" or "don't they do ?" depends on your definition of x. So I don't think it's so productive to get into a definitional battle of what exactly is teaching, but I'll just say that the examples from animals to my knowledge for any given species is typically one specific behavior that for the meerkats and the lions is bringing the half dead prey. The human version is that the adults are motivated to make sure that the children learn a whole range of things, not only skills that they need but even more widespread and universal, teaching them how to behave in public, how to respect your elders, how to behave socially so that you are accepted into the group. I would say that the teaching is much more widespread and much more intentionally structured or flexible. In my talk, one of the things that I focused on was that human culture has not only this transmission dimension, which is the one that biologists and evolutionarily oriented people have focused on, but it also has the coordination dimension, that is, humans create things like social institutions, they create things like conventions, conventional languages, we do things in a conventional way. Norms and institutions are forms of coordination and collaboration, so that is a dimension as well that is focused on more by cultural anthropologists and maybe cultural psychologists, whereas the biologically oriented people are always thinking of genetic information transfer or non-genetic information transfer. They are thinking about the transfer but there is a more cognitive dimension, in the way we collaborate with one another. The way we communicate with one another enables us to build up these social structures like an institution, this is a sort of the pinnacle that seemingly other animal species don't build up as well. Now, whether you want to include that as part of culture is an issue but I would say this coordinative dimension of culture is important as well and it gets passed on, so social institutions persist over generations, so it is not just specific behaviors that go but the institution, independent of the individuals who play the roles in the institutions, gets transmitted as well. So that is another dimension that I think distinguishes human culture: our ability to coordinate with one another. I used the term coordinate to mean things like to collaborate, to solve a problem collaboratively, to communicate and so on. So that is another distinguishing feature, it would be this coordinative dimension in addition to this transmission with special proximate mechanisms leading to cumulative cultural evolution.

MVHLL – Can you explain your view about the relation between genetic and cultural evolution?

MT – Culture is a biological adaptation. I should say, cultural processes are coming from biological adaptations; so, imitation and teaching and all those things are biological adaptations but then, when we start creating these cultural structures, these coordinative structures, like social institutions and things like that, cultural evolution takes on a life of its own, it operates by its own principles and I don't think anybody would attempt to explain cultural historical processes like the French revolution in terms of genes. Of course, the processes that lead to these cultural things are grounded in the mechanisms that evolved for organizational and cultural transmission, but the actual cultural historical events that characterize any human population work by causal laws that are not the laws of evolution, they

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are other kind. And many of the acts that led to the French revolution are intentional acts where people were foreseeing their outcome and attempting to do things. This is grounded in evolution in terms of what kinds of things people want, what kinds of strategies they might have available, but the actual events have their own causal determinants and cultural evolution has its own explanation on its own level.

MVHLL – Understanding the evolutionary origins of culture or culture-like processes means getting to know both the evolutionary history as well as the ecological scenarios that have selected for shared or unique forms of culture. In this context, however, there are several conceptual approaches at hand that have generated heated recurrent debates with important implications. One of these has to do with the relation between phylogeny and ontogeny. Some studies of culture and cognition in which researchers adopt a developmental comparative approach, for example, in studies comparing humans and chimpanzees, some might feel that human children are seen as an improved version of adult chimpanzees and that human adults are seen as a more sophisticated version of human children. And this could recall two past views or ways of thinking about evolution. One is the so-called ladder view (or *scala naturae*), according to which species can be ranked on a ladder with humans at the apex, and the other is the recapitulation principle of Haeckel, according to which ontogeny recapitulates phylogeny with addition of evolutionary novelties at the end of the modern species' ontogeny. Although both views have long been rejected, it sometimes appears that somehow they are revived in some contemporary studies that adopt a developmental-comparative approach. What do you think about this issue, what can the study of the development of, say, a cognitive skill, tell us about its evolutionary origin?

MT – You have two things here. One is the phylogenetic ladder, and that we all reject, but when you are looking at two closely-related species, you're looking at chimps and bonobos or great apes and humans as one great ape, for example, as all communicating in fairly similar ways, we've looked at their gestures of communication quite a lot and there are some small differences but they're very similar and then humans have language, so we assume that there was some set of ecological conditions that led humans to develop this new way of communicating. Language seems to be more complex than these other forms of communication, this is not a ladder, but it's new, it's derived and it builds on what the other great apes are doing and it does something more complex. So someone who is not steeped in the study of evolution could think of that as "oh! Humans made progress!" Or the apes or whatever but that's obviously not the way we work or anybody else works or thinks about it. Every species is unique by definition, that's what defines the species and you can look at the uniqueness of squirrels in their ability to hide nuts and find them, they can remember more places than humans can. There are all kinds of species that do all kinds of things that humans can't do, but, if you're interested in humans and you want to point out what their unique characteristics are it's going to be in things like cognition, culture and communication, and so it doesn't imply things about better or higher but it's just different. Now, ontogeny is a really deep and interesting question, so, if you want to explain, for example, how humans evolved culture, how they became unique in some way, obviously the centre piece of your explanation is going to be natural selection, but natural selection creates nothing, natural selection is after the fact. It separates viable from non-viable organisms, so, where, what is it separating? Well, that is the other component of evolution which is variation, and heritable variation. And, variation, classically, has been considered to come from genetic variation, which of course it does, ultimately, but more recent evo-devo kind of approaches have made the argument and provided some evidence that the majority of genetic changes that lead to new species and whatnot are differences in ontogenetic timing. They're not huge differences in genetics, genetically-based traits, but the developmental timing of things; and then, you get these cascading effects, so something that emerged at a later point in ontogeny in one species has migrated back to what was an earlier point in ontogeny or vice versa and it has new interactions with other developing systems and you get these large differences based on fairly small genetic changes. And, so, what the evo-devo approach to ontogeny has given us is a way of seeing how it's plausible that you could get huge differences between fairly closely related species without completely new ecological conditions and completely new sets of structural genetic adaptations. You can get a lot of some very big differences from the timing of when things happen in evolution. And, of course, recapitulation has been rejected. But, all the way back to Steven Jay Gould's 1977 book, there are some reasons why some things happen in the same order in phylogeny and ontogeny. Just the simplest one being that some things build on other things, they have pre-requisite skills that have to come first and then these later skills build on and use these others as pre-requisites. Steven Jay Gould's book is written around this kind of curious thing that even though there's no need for recapitulation, evolutionary adaptations can emerge at any point in ontogeny, there still quite often is and that's why the original observation

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does still hold and that's because there is, I don't know what you want to call it, a causal and logical sequence that has to happen, "this has to happen before that", and that would be true in both phylogeny and ontogeny. So, it's just the case that there are some parallels that you can never say ahead of time what those are. I myself would say, for example, that you can't go straight from chimpanzee gestures to human language. You need a middle step of, for example, pointing and pantomiming, which humans do but chimps don't do because this sets kind of a middle step that gets you to language, though you would never see a sequence where you would go from language to chimp-like gestures just because it doesn't make sense causally. So, recapitulation is not a law, it doesn't always hold, it never needs to hold, it's never a sure thing, but you can find parallels sometimes between phylogenetic sequences and ontogenetic sequences and so we have, in some cases, shown empirically ontogenetic sequences and argued that perhaps this reflects the phylogenetic sequence as well. For example, I would say that humans became able to collaborate with one another in unique ways before full-blown culture evolved. That seems sort of reasonable on the surface and it's true for children. Children start collaborating with one another and pursuing goals with other individuals and then only later they do get the idea that I'm in a whole cultural group. It seems like a logical sequence that you need to relate, collaborate with individuals in new ways before you can collaborate with the group in new ways, and we observe it empirically in children that you get that sequence and so, you can use that to make tentative hypotheses about evolutionary sequences.

MVHLL – How can you tell apart developmental explanations, I mean the effect of culture in the emergence and evolution of these skills?

MT – One thing that people don't realize sometimes is that a lot of developmental questions are not easily answered and the reason they are not easily answered is not in principle, it's ethics. So, if we could randomly assign children to different environments to grow up in, some don't hear any language, some are growing up isolated on an island, we could answer a lot of these questions in a causally reliable way, but obviously, we don't do that, we don't want to do that, and so we have to work with approximations, and one of them, is, of course, cultural differences where it's harder and harder these days because there is so much interpenetration between cultures. But studying cultural differences with groups that are fairly isolated from other groups, or that are fairly isolated from western industrialized cultures and whatnot, making those kinds of comparisons, is one of the best ways that you can get that. If you have all the kids in one culture do one thing and all the kids in another culture do another thing, you have homogeneity within here, and heterogeneity between the groups, ideally, you could relate it causally, at least plausibly, to something in that culture ("in this culture the parents teach the kids one way, in the other parents teach their kids another way"), then you can attribute it to culture. In one of our cross-cultural studies, we did a large battery of tasks with one year olds, we found that. Now, this is important, there's a difference between skills that make culture possible in the first place and cultural skills, and I'll explain so. We tested things like imitation, communication by pointing, basic collaboration in one year old children in three very different cultural contexts, and they emerged at the same age across cultures. This doesn't mean the environment is irrelevant, maybe a child who grew up on a desert island wouldn't develop them, but they are the kinds of things that in all the cultural contexts that humans live in, children are going to develop them at roughly the same age. So, they are universal, I'm not saying innate, I'm saying universal, they are universal across human cultures and, so, if you find things like that, and especially in the case where there are fairly great cultural differences in relevant behaviors, then you can say these things are robust, universal parts of the maturation process. My preferred term is not innate but maturation, because maturation is developmental. So, let me give you one example. I'm saying that children start imitating at more or less the same age across the different cultures that have been studied but in some of those cultures, like in our western cultures, the adults are communicating with their babies and showing their babies how to do things and trying to encourage them to imitate, but it turns out that in cultures where the parents don't do that, they imitate at the same age. Pointing is another one like that, so we communicate and point for our kids quite a bit and in some other cultures they do it much less, and the developmental outcome is the same. So, when you get cultural universals, and even though there are cultural differences in what would seemingly be learning experiences or teaching, or whatever, then that gives you more confidence that this is something that is not culturally created, it's part of the biological endowment and I would argue for things like communication with gestures and pointing and with imitation that these are things that enable you to become a member of a culture. You can't become a member of a culture until you can imitate and communicate at a basic level, and so these are not culturally generated skills, they're skills that are biological, that enable you to become a member of a culture. Then there are more culturally based skills, the way you eat your foods, the kinds of games the children play. All of those are things they learn from their

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culture and those are cases where we see large differences between different cultures and so those are the things that seemingly are created by cultural context. So, we have to use those kinds of general data, we can't do the unethical experiments and whatever but that's the way we try to tease those two factors apart.

MVHLL – There are also more specific questions related to your presentation at the Seminar that we would like to ask you. You claimed that animal, including ape, cultures differ from human culture in that the former are fundamentally individualistic and exploitative whereas the latter is cooperative. In fact you argue that human cooperation differs in fundamental ways from ape cooperation. Could you explain a bit more about it?

MT – In my presentation, I showed a lot of experiments where we found very small but very important differences. One very clear one is in sharing the spoils of the collaboration and the reason I start with that one is because I think that's the major constraining factor with chimps. Chimps are adapted for dividing food, with the dominant getting all he can. So, when they have a collaborative task, for example, when there's the collaborative hunt of monkeys by apes, the one who kills the monkey tries to eat it all, he goes around behind the tree if he can, he keeps it away from others if he can and the others are coming and grabbing, he has to let them have some. Human children of course have some selfish motives, but in general they share and if they've produced it collaboratively, they share fairly, they share equally, and we've shown that in a number of different studies. So, that's a concrete difference that I think had a huge effect on human evolution as we found a way to share the spoils of collaborative effort such that both parties or all the collaborating parties stay incentivized to the future, so… "it seems like a good idea, let's do this again tomorrow". Whereas the apes, you saw in one of the videos I showed, they pull it in together, the dominant takes all the food, and the subordinates say "I'm done, what's in it for me?" So that's one really big difference. We´ve done a study showing that when one individual collaborates with another one in one role, so "I'm playing role A and you're playing role B", human children are learning about role B as they are playing role A, so if they've played role A before, they can go over and play role B without any additional learning. Whereas chimps, when they are playing role A, if they go to role B, they have to start all over, they didn't gain anything from role A. So that suggests that the children are monitoring their partner and really seeing what they are doing and learning from them when they are collaborating in a way that apes aren't. So those are two concrete differences, one more motivational, sharing the spoils, the other a little bit more cognitive, that are empirically demonstrable and that, I think, have very important effects in how humans collaborate with one another in such a way that ultimately ends ups in these more complex cultural things.

MVHLL – You claim that human cooperation relies on uniquely human forms of communicating and teaching. With regards to communication, for example, it has been shown that chimpanzees don't understand the pointing gesture, whereas dogs do, why do we find this difference? What's the role of domestication in the emergence of this kind of cognitive abilities?

MT – Even though this work has been around for a while, I don't think we have a great explanation for the dogs still to this day. With chimps I have a whole story, most of it in a book. From an evolutionary point of view, the question is not why chimps don't understand it, because none of the other animals do either, the only exception is dogs and I'll come back to that. You can go to the zoo and point for any animal you want to and they won't understand the pointing gesture the way the humans do. So, the question is how the humans developed this and I've the whole story about cooperation and this pointing gesture, especially when it's used for informative purposes, and "I'm telling you where the food is", "I'm doing this" (the pointing gesture), it's a cooperative act, when I inform you of something that's useful to you, not me. Human communication does that all the time. If you examine all the things you say in your day, how many of them are actually for the other person's benefit, to tell them something they need to know, it's probably the majority of them. And so, the fact that chimps don't do it is the normal thing, the humans did something special down this cooperative path. Now dogs. The first thing I say when talking about dogs is you have to remember to contextualize this finding and this research; dogs don't do this with other dogs. This is not dog communication, this is dogs with humans, this is a special case, this is interspecies communication, so this is not naturally evolved, I mean, it is in so far as domestication is naturally evolved, it's not independent of humans. So, dogs evolved in the context of human culture and they evolved presumably trusting humans, humans give them food all the time, humans help them with various things and they have a symbiotic relationship, and so they´ve evolved to trust the human pointing and to benefit from it. Some of the more recent species actually take human direction in herding and hunting where humans try to tell them where to go. It is important that in this herding and hunting, a lot of the communication with humans is specific about where humans want them to go, "go over here",

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"go over there", and this task that they are good at, is telling them where to go to find food. That's the main thing we communicate to dogs about, it's a special adaptive system that evolved in this symbiotic relationship. And other domesticated animals have not learned this to the same degree. You hear stories from people who´ve owned horses about this great communication but it's about different things, so, anyway, it's never been demonstrated to quite the same degree. So, dogs are special in many ways and the main one is that dogs have evolved to actually work with humans in things like hunting and herding.

MVHLL – Recently you have proposed an evolutionary sequence from individual intentionality (I) to joint intentionality (you and me) to collective intentionality (we). Could you explain how you came up with this sequence?

MT – Actually, I borrowed the whole notion of shared intentionality from the philosophers of action, but I myself came up with this joint intentionality and shared intentionality, and collective intentionality part and it's because I was looking at young kids and seeing that one-year-olds and two-year-olds don't really have a sense of being in a group or a cultural group, it's about relationships with individuals and it's about collaborating with one partner and not coordinating with a whole group. So, there's a case where, I think, at least partly, the ontogenetic sequence suggested to me that this is a plausible and logical phylogenetic sequence as well. And joint intentionality is about forming a joint goal with another person and monitoring what they're doing and what you're doing and so forth. People have individual relationships, I have friends, I have romantic partners, I have people that I don't like, and whatever. And so this level of dyadic relationships, interpersonal relationships, seems to be the only level the young kids are working on, they walk around in a group but they don't really understand about being in a group, *qua* group. And so then later, they start wondering about, we, and our group and those guys and their group and stuff like that. Chimps already have individual intentionality, so it seems to me a plausible evolutionary hypothesis that that's the starting point and the humans first started by putting their heads together, individuals collaborating in new ways. And so, for example, in the artefactual record you see evidence of collaborative hunting, by at least 400,000 years ago, probably before, but clear, very clear then, with *Homo heidelbergensis*, the common ancestor to Neanderthals and Humans. So you see they are already there, but you don't see evidence of culture, if you define it fairly narrowly. So most of the evolutionary anthropologists, I think, would say that the clearer signs of human culture, uniquely human culture and symbolic things and all that, is going to be modern humans. So the paleoanthropological record is not definitive but it suggests that this collaboration occurred, collaboration which would be just among individuals, before culture as this idea of group mindedness, where it's we as a group vs them as a group. Group identity is strong and people fight over it. So this cultural identity, I would say, is probably a later evolution. It wouldn't make sense for that to be before being able to collaborate and so there's a case where the logical sequence and ontogenetic sequence suggests an evolutionary sequence.

MVHLL – In some of your experiments, you reported that one of the reasons why chimpanzees didn't and couldn't cooperate, behave spitefully or punish others is because they are self-regarding oriented, and behave like rational maximizers. Do you still believe that is correct?

MT – Keith Jensen, one of the co-authors of that study, is quite adamant on all this. I don't fully agree with Keith on this. We have studies of chimpanzees helping, where if it is low cost, they help the other guy, they open doors for them, they fetch objects and whatever. So I do not believe that they are only self-regarding, I do believe that they have some other-regarding concerns. Nevertheless, anyone who has worked with chimpanzees knows how strongly they're motivated by food for themselves, that's the way we have them do experiments. That's what they do when you put food out on the thing: the dominant takes all they want to take. So there's no question that that motivation in them is stronger than in humans, even though humans have it as well, it's stronger in chimps. As for the issue of punishment, I don't think they punish the way humans do, but they do retaliate in a second personal way. They retaliate, "when somebody attacks me, I attack them". But lots of animals do that, that's not unique to great apes. But the real distinguishing characteristic would seem to be third party punishment, and there, I think, that probably emerged with human culture because part of what I'm calling joint intentionality is all about our relationships and whatnot. The second party punishment would seem the natural thing but "when it's all of us and our group, and you're ruining things for the whole group, you're throwing trash all over the place or you're ruining this for everybody, then, even if it doesn't affect me directly, I want to get you to conform to the group". So, I would say that, although chimps do have some other-regarding preferences, the humans' are stronger and humans have some unique ones that have to do with things like third-party

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punishment, which I would say is motivated by wanting the group to function well. A lot of third-party punishment is: "you're doing something that doesn't affect me at the moment but is going to ruin the group functioning in general, then I need to protect the functioning of my group and I engage in third-party punishment", so I'd say that third-party punishment is unique to humans by everything that we know.

MVHLL – Your two-step hypothesis about the evolution of human cooperation takes mutualistic collaboration, the Stag Hunt model, rather than altruistic helping and the prisoner's dilemma model, as the starting point. So, what makes you believe that this is a more realistic scenario and why chimpanzees don't solve that kind of foraging problem the way small hunting-gathering human groups do?

MT – Well, again, the reason chimps don't is because they don't need to. They are doing fine as they are, and the proposal is that something happened with humans that made the normal ape way of getting food not viable anymore. We have some specific proposals, I think that they are evolutionary fairy tale hypotheses, but, you know, there was an expansion of terrestrial monkeys, like baboons, around the emergence of *Homo*, maybe they started taking all the good fruit, humans' normal feeding ecology was disrupted and so forth. Here is what makes sense to me: everybody knows that, having something like altruism, as a proximate mechanism ("I'm not sacrificing my genes out of existence"), is hard to build. It is only under certain conditions you can build it. And, now, I would say the two conditions where you can build it are: first, kin selection, so altruism is everywhere, under the context of kin selection, ants and bees and everybody else; and the other is mutualism, so "you and I are both benefiting from something and I need you to pursue the goal and you need me", so it's collaborating in an interdependent way, which I have stressed. "We need one another to get this goal, and if you fall in a hole, I'm not going to get anything, so it is in my interest to help you so you'll get out of the hole and we'll go now collaborate and we both benefit". So "my helping of you is in the context of a benefit, a mutual benefit, my own benefit, I need you to benefit". And so, I think, in the human case, kin selection might play some role but this mutualism and altruism in the context of mutualism would be the way to get it started. Now, when other contexts arise, they're not in the context of mutualism but outside that context, all evolution has to do is to extend an already built mechanism to a new context. It doesn't have to build it from scratch. That's a general evolutionary principle that I think is really important in this cooperative domain, that the condition under which some mechanism can be built are one thing, and then the conditions under which they might extend to others are easier, it's a wider number. Now, we can get things like reciprocity of altruistic acts. I don't think it can start from nothing, and yet reciprocity, everybody knows the problem with cheating. But if you got individuals who already are helping their kin or they're already helping their collaborative partners, now you can imagine conditions where that help, that natural tendency to help, is now generalized to another situation, to other individuals under other conditions. So, everybody knows mutualism is not difficult to explain, everybody is benefiting, no problem. And then, if altruism can emerge in the context of mutualism, that's no problem, because I'm still benefiting, "my altruistic act gets me a further benefit in the future". And so, now what we have to explain is only, I put quotation marks around "only", how that mechanism gets extended outside of that context, rather than how does that mechanism gets built. I think that's the big difference. I think that reciprocity is a dead end for starting, for starting from nothing you're just never going to get there with reciprocity. So that's the way that works.

MVHLL – In your account of the ontogenetic and evolutionary origins of human morality there is little evidence of the existence of morality precursors in great apes. How do you see this?

MT – In my book on morality that just came out, I followed tradition and have two components to human morality: one is sympathy, and the other is a sense of fairness. The sense of fairness is this more normative balance: "I consider my own interest equal to yours", "what's the fair thing for all of us". I think, great apes have sympathy, which is quite widespread in mammals, among kin. Individuals are helping their kin and mothers are helping, sacrificing for their offspring all over the place. So, there's lots of sympathy ("oxytocin"), it's less widespread among non-kin, but it's there. And with apes, they help one another, so, I think that's fair, but this notion of fairness and what goes with fairness is a sense of obligation, "that I ought to do it", "this is the right thing to do", that's what I don't think they have. Frans de Waal's experiments do not show that, in my opinion, and I don't think there's any good evidence for either the sense of fairness or the sense of obligation that one ought to be, ought to do certain things. Those, I think, are uniquely human and they come from these, again, interdependent collaborative interactions.

MVHLL – You mention punishment but what about reputation? Do you think it's present in apes?

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MT – We have a study showing that human children will respond to someone watching them by cooperating more, and by doing antisocial things less if they are being watched. And apes do not, the apes don't care if anybody is watching. It is possible that apes care about others watching for things like when they're giving dominance displays or something like that, but it doesn't seem that they care about their cooperative reputation as far as we can tell. Other studies have shown that they decide "this is a good collaborator", "this is a bad collaborator", but the one being judged doesn't say "ah! I know their judging me, therefore, I need to adjust my behaviour so that I get a good judgment!" That's what they're not doing and that's what kids are doing from about age 5.

MVHLL – What's the role of language in the evolution of human cooperation?

MT – The role of communication is crucial. Language, specifically, is a little bit later for me. This unique form of cooperative communication was critical to the development of human-like collaboration, because, to coordinate our collaboration, the best way to do that is by various kinds of communication, where we plan our goal and plan how we're going to do it and everything. Communication was key in forming joint goals and planning the roles that we play. So, uniquely human cooperative communication through pointing and pantomiming goes with the first step, goes with the joint intentionality. Language is a conventional form of communication that differs between cultures, so it's created by each community, each culture on its own creates its own conventional set of communicable conventions, conventional language. So that goes with culture, that's step 2. Language is critical for cultural interaction, where I have to meet somebody I've never met before and I have common ground with them, and I can communicate with them, even though I have never met them. This kind of idiosyncratic gesturing can go so far, but it can't do everything language can, if you don't have a lot of common ground with other people. So, uniquely human cooperative communication plays a crucial role in the evolution of collaboration, and then, language plays a crucial role in the formation of cultural groups and all the things that go with cultural things.

MVHLL – What do you think about other forms of human communication such as music, for example?

MT – We did one little study, as you know, and I'd never thought about the evolutionary function of music, but Sebastian Kirschner, a graduate student, looked at the role of music in small scale cultures, and it's utterly unlike in the modern world, so you have to get rid of this notion of putting on your earphones and doing it privately. In more small scale cultures, it's always social, it's always communal and it's a way of getting people on the same wavelength. So, the major sociocultural context for music are celebrations, funerals, making war, and it's a way of getting people in the same mood. If you dance together, we know that moving in synchrony makes people feel solidarity, that's the way soldiers march in unison, because it makes them feel like one unit. So, when you hear music and you dance together, it makes you feel like a unit and it makes you feel solidarity with one another. And, I think it makes all the sense in the world that this is the evolutionary context for music. It's communication, not in this individual, me to you sense, but in the group sense, that we're communing, we're really communing and, obviously, it ended up doing different things but that was its original function. So, again, it's all about cooperation and culture.

MVHLL – According to evolutionary psychologists, modern humans now live in large groups but they are cognitively adapted for living in smaller groups. So what's your view about this, which direction do you think human evolution is taking?

MT – I guess I'd just say that our adaptations for these smaller homogeneous groups, the way that hunter-gatherers live today, although they are different but something more like that, and once you start with agriculture, 10,000 years ago, you get all these different people in the same place, you know, things have changed. And the question is whether we can make it work, whether we can make our adaptations for small group cultural interactions work in this larger mixed context. And that's what we see every day, it is most of the major conflicts in the world and the strife is between people who see themselves as in-group out-group, in-group out-group evolved in a context where it functioned just fine, we're hunter-gatherer groups. We see these guys from a distance, we don't trust them, we don't like them, fine, we avoid them. Every once in a while we have a conflict with them but having these people live together and having to operate together is a new situation, it's worked so far, but we'll see. We get collective action problems with the environment and all that, on the level of the world, and we have to see if we can work out these public goods and collective action problems like with the environment, before it kills us all.

MVHLL – I would like to end by asking you a more personal question. How did you become interested in this type of research in the first place?

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MT – I became fascinated with animals and children at about the same time, during my undergraduate studies, and I thought they were both just so interesting because it's this mix, they are so like us but they are so different. So, a child is a human, but then they say this crazy thing, and you say, "where's that coming from?". And chimps are so like us, they have the same emotions, they use tools, they solve problems, but then they do some crazy things… so, it's the combination of being so similar to us and being, yet, at the same time, so different. I think, that's just inherently fascinating, and as I was exposed to it during my studies I just grabbed bite immediately. I can't tell you how many BBC television programs and series are made on chimpanzees, whatever, it's naturally interesting to people, and I've been lucky enough to be at institutions where I could study it, and that's a little just natural interest and then a lot of luck. I think, that's the main thing.

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