

# **The First General Email: A General Theory of Major Cooperative Evolutionary Transitions**

I am circulating access to a new paper of mine to researchers who are interested in aspects of major evolutionary transitions, including those involving humans. Given your interest in this area, I thought I would forward it to you.

I am also writing to foreshadow the possibility that evolutionary scientists can use their knowledge of evolutionary transitions to make a significant contribution to strategies designed to overcome the existential threats that currently face humanity. But this possibility depends on the development of a reasonably broad consensus on the relevant science.

My paper that has just been published in the journal *Biosystems* outlines a new, general, “all levels” theory of major cooperative evolutionary transitions.

As you are probably aware, previous work on major evolutionary transitions has fallen far short of developing a general theory that satisfies even the most basic requirements for such a project i.e. an adequate theory should at least identify at appropriate levels of abstraction what is common across transitions, identify what is level-specific, and identify what differs across levels to produce trends. In particular, Maynard and Szathmary’s 1995 book on major transitions is little more than a collage of specific models of particular transitions that are loosely cobbled together. Its lack of an over-arching theoretical framework is reflected in its hopeless confusion about what qualifies as a major transition.

Recent reviews by West et al (2015) and by Szathmary (2015) make little progress and share these same limitations. To date, work on an overarching, “all levels” understanding of major cooperative transitions is manifestly ‘theory-lite’. The usefulness of this work is largely limited to serving as a bad example of theory making.

These serious limitations have not been overcome by attempts to posit group selection as a general mechanism that has driven major cooperative transitions. These attempts rely on the supposed power of group selection (including its cultural analogue) to establish costly cooperation that is selected against within groups. Supposedly, this “altruism-establishing” power of group selection arises because the selective disadvantage suffered by group-beneficial cooperation within groups is outweighed by the selective advantage it enjoys at the group level. Can such a mechanism be seriously expected to establish the complex cooperation that emerges in major cooperative transitions? Is this complex cooperation continually being selected against and ‘going out backwards’ within groups and societies? In larger-scale human societies, including modern ones? Really? Some of the almost evangelical proponents of “altruism-establishing” group selection seem to think that the Price Equation combined with lots of hand waving is capable of explaining almost any cooperation.

Recognising these obvious difficulties, some proponents of group solutionism have added an additional mechanism to explain the emergence of complex cooperation in major transitions: they argue that complex cooperation can be established by group selection if it is combined with mechanisms that suppress disruptive selection within groups and societies. They seem to acknowledge that “altruism-establishing” group selection alone is not sufficient to establish complex cooperation. But how do they explain the establishment of the complex cooperation that constitutes these suppression mechanisms? In the absence of high relatedness, they are

left with the absurdly contradictory move of having to rely on what they acknowledge is inadequate by itself to establish complex cooperation: “altruism-establishing” group selection.

How did such an inherently implausible theory as this ever gain traction? Apparently it did because there seemed to be no viable alternative to explain the evolution of complex cooperation in many circumstances. The main alternative candidates were kin selection, reciprocity theory, games theory and their cultural analogues. But these could all be dismissed easily for cooperative transitions in which relatedness was low. This gave proponents of group selection confidence that far outstripped any evidence or theory. In the absence of viable alternatives, it seemed reasonable for them to interpret the existence of complex cooperation as confirmation of the power of group selection. What else could explain it? Everywhere they looked, they saw evidence of the power of “altruism-establishing” group selection.

But as my paper demonstrates, there is a plausible alternative mechanism. This alternative mechanism is central to what I refer to as Management Theory. Significantly, this management mechanism is driven primarily by individual selection. Unlike “altruism-establishing” group selection, it is not continually handicapped by selection against co-operators within groups or societies. Now that Management Theory provides a viable alternative, “altruism-establishing” group selection can once again be relegated back to its proper place amongst attempts to explain the emergence of complex cooperation: i.e. as it was during the ‘60s, it can again be seen as the last refuge of the evolutionary scoundrel.

Management Theory demonstrates that the heavy lifting of complex cooperation is done by management mechanisms, not group selection. For example, Management Theory shows that at the human tribal level, it is done by a cultural analogue of kin selection, and that both gene-based kin selection and its cultural analogue are more usefully and properly understood as management mechanisms.

Management Theory is outlined in my new paper “Towards a general theory of Major Cooperative Evolutionary Transitions”. The paper includes critiques of existing “all levels” theories of cooperative transitions. It is freely available here: <https://doi.org/10.1016/j.biosystems.2020.104237> (BioSystems, online August 2020)

As I hint in the paper, there is another motive behind my attempts to fuel a debate about the architecture that underlies all major cooperative transitions, including future ones. It can be strongly argued that despite their disagreements about mechanisms, all of the competing theories of major transitions are slowly but surely converging on a key insight: the survival of human civilization depends on the emergence of a new global major cooperative transition. Only such a global transition can suppress the destructive competition amongst Nation States and international corporations that is currently endangering human civilization. This competition is driving global warming, other environmental degradation and the threat of nuclear war. As with all other major cooperative transitions, this final global transition would be organized by management that suppresses free riding and supports cooperation, this time on the scale of the planet. Global management would enable the emergence of a cooperative, sustainable and highly evolvable global society.

The understanding possessed by evolutionary scientists of major cooperative transitions and how they can be organised puts us in a unique position. But with this unique position comes unique responsibilities. The key responsibility of evolutionary science is to ensure that humanity understands what needs to be done to enable a global cooperative transition that can overcome these existential threats. For the first time in human history, there now exists a body of scientific knowledge that can inform humanity about how we need to organise ourselves socially if humanity is to survive and thrive into the future. More detail on this final global major cooperative transition is provided in earlier publications of mine, including my paper on the emergence of a global entity which is freely accessible here:

<https://doi.org/10.1016/j.biosystems.2014.05.006> (The Direction of Evolution: The rise of cooperative organization. BioSystems, 123: 27-36. 2014)

In the coming months I will contact you again in order to explore the possibility that you might want to participate in a campaign undertaken by evolutionary scientists directed at promoting the emergence of this global cooperative transition.

Feel free to forward this email to anyone who you think might be interested about major cooperative transitions theory or its practical implications for humanity.

John Stewart

<http://www.evolutionarymanifesto.com/about.html>

11 September 2020

## **A different version of the email focusing on kin selection**

I circulated a different version of this email to evolutionary scientists whose work focused particularly on kin selection. This 'kin selection' version of the email omitted the critique of existing general theories of major cooperative evolutionary transitions. Instead it sketched the case for considering that kin selection mechanisms involved in producing major cooperative transitions are in fact a special case of a more general management-based mechanism. Following the sketching of this case, the email then goes on as did the original version to foreshadow further contact about a possible campaign about the emergence of a global cooperative transition. Here are the relevant parts of this different version of the first general email:

### **Is kin selection a special case of a wider phenomenon?**

I am circulating access to a new paper of mine that develops a general theory of the major cooperative transitions. The paper begins by critiquing existing approaches, including the view that 'altruism-establishing' group selection has played a significant role in driving these major transitions. The paper then goes on to outline a new general theory of transitions which I refer to as Management Theory. An important component of Management Theory is the recognition that kin selection is a special case of a wider phenomenon. The paper argues that in cases where kin selection is significant in establishing major cooperative transitions, it can be understood more usefully and appropriately as an instance of what Management Theory refers to as Distributed Lower-Level Management. When this form of management

operates, a group is organized cooperatively not by an external manager or centralized controller, but by a controller that is distributed across the members of the group.

Because of your interest in the role of kin selection in the evolution of cooperation, I am sending you a link to the paper.

I will first briefly sketch here some of the key elements of this reframing of kin selection. This will enable you to see easily whether the paper interests you sufficiently to consider it in depth.

In order to build a mental model of this re-framing, it is first useful to break up any existing pre-conceptions about kin selection by recognising that a similar mechanism operates at the cultural level. At the cultural level, cultural predispositions rather than genetic predispositions operate. It is evident that in appropriate circumstances, a cultural predisposition that predisposes individuals to provide cooperative benefits to others that carry the predisposition can enhance its own success. The key point here is that 'relatedness' is not an essential or relevant feature of this mechanism when it is generalised to the cultural level. At the cultural level, cultural predispositions can be reproduced across a group of unrelated individuals by processes of enculturation. And these shared cultural predispositions have a similar capacity to that possessed by shared genetic predispositions to enable beneficial cooperation to emerge and persist within a group.

The second key step in building this mental model is to recognise this: consider a cluster of cultural predispositions that are reproduced across the members of a group. In appropriate circumstances, such a cluster has the same capacity to coordinate the group and to organize complex cooperation as does a centralized controller or governor of the group. Such a cluster of predispositions can predispose the members of the group that contain it to identify and punish free-riders and to re-deploy the resources of the group to support and 'fund' beneficial cooperation. Importantly, the distributed cultural predispositions will capture the benefits produced by this, aligning its interests with those of the group it manages. Just like a centralized governor, it can appropriate for itself the benefits of any beneficial cooperation that it organizes.

It is for these reasons that Management Theory re-frames the mechanism that underlies kin selection as a management mechanism, at least in circumstances where the mechanism organises a group cooperatively to produce a major cooperative transition (but it recognises that this reframing is not necessarily useful in all other circumstances where kin selection operates).

Finally, it is worth exploring whether this 'substrate-independent' understanding of the mechanism that underlies kin selection can provide any new insights into circumstances where traditional kin selection is operative. This new understanding suggests that this mechanism can operate effectively in gene-based organisms even where the only genes they share are the cluster of genes that comprise the distributed lower-level manager. It can operate where the individuals that are interacting are completely unrelated and do not share other genes by descent. In this way, the reframing of kin selection also encompasses at a higher level of abstraction the processes that give rise to the 'green beard' effect. But more significantly, arguably it can also explain the fact that in certain eusocial hymenoptera that have successfully completed a major cooperative transition, the requirement for high

relatedness within colonies appears to have been relaxed, without jeopardizing the success of the transition (thereby enhancing evolvability by 'unfreezing' the remainder of the genome, compared with a clone or quasi-clone).

My paper titled 'Towards a general theory of the Major Cooperative Evolutionary Transitions' is freely available here: <https://doi.org/10.1016/j.biosystems.2020.104237> (BioSystems, online August 2020)

As I hint in the paper, there is another motive behind my attempts to fuel a debate about the architecture that underlies all major cooperative transitions, including future ones ...

... and so on, as for the first version of the email.

John Stewart

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21 September 2020