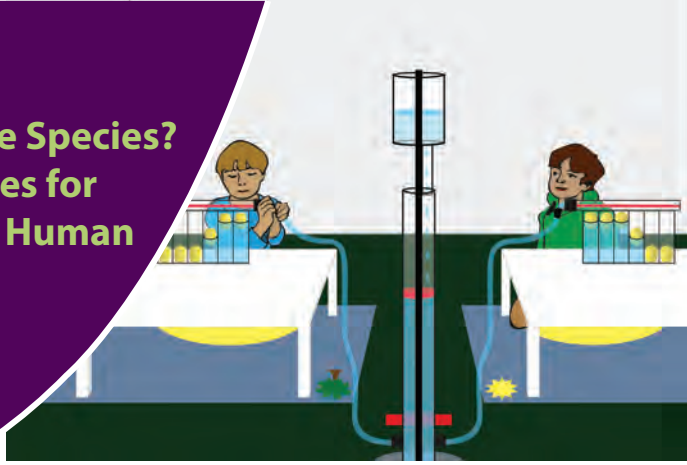
FEATURE ARTICLE

Are Humans a Cooperative Species? Challenges & Opportunities for Teaching the Evolution of Human Prosociality



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Abstract

Evolutionary anthropologists commonly describe humans as a highly cooperative species, based on our evolved socio-cognitive capacities. However, students and the general public may not necessarily share this view about our species. At the same time, fostering our ability to cooperate is considered a key foundation for achieving sustainable development, and students' understanding of the conditions that enable or hinder cooperation is therefore an important learning goal in sustainability education. In this article, we describe a small classroom activity that explored students' and preservice biology teachers' preconceptions about the human capacity to cooperate around shared resources in comparison to the capacity of our closest relative, the chimpanzee. Results indicate that students and teachers had limited knowledge about the evolved human capacity for cooperation around shared resources in small groups, most often viewing chimpanzees as more capable of cooperation and sustainable resource use. Based on the results of this classroom intervention, we highlight important learning opportunities for educators in biology on teaching human evolution and human behavior, particularly as related to current challenges of sustainable development.

Key Words: *behavior; comparative research; cooperation; human evolution.*

○ Introduction

Evolutionary anthropologists commonly describe humans as a highly cooperative species – whether it is in contributing to the group, sharing resources and information, or helping others, humans across cultures seem to care about the well-being of others, about fairness of outcomes, and are willing to enforce norms of cooperation even with a cost to themselves (Henrich et al., 2006; Bowles & Gintis, 2011). There is also wide agreement in the evolutionary and developmental human sciences that our species-typical capacity to cooperate in groups around shared goals and resources runs deep within our hominid evolutionary history (Tomasello, 2009), and that such social tendencies develop early in life (Warneken & Tomasello, 2009).

Importantly for current societal issues, cooperation is also considered a major prerequisite for achieving ecological, social, and economic sustainable development, while our ability to cooperate can be hindered by certain proximate conditions (e.g., Messner et al., 2013; Wilson et al., 2013). Thus, understanding the behaviors and conditions that allow humans to cooperate around the sustainable management of shared resources and other shared goals can be considered a foundation in education for sustainable development, such as for developing cooperation competencies in students (UNESCO, 2017).

However, currently not much is known about whether students, teachers, and everyday citizens have an adequate conceptual understanding of the cooperative abilities in our species and their proximate and ultimate causes. For example, da Silva Porto et al. (2015) investigated Brazilian undergraduate students' conceptions about the causes of human social behavior on a nature-nurture spectrum (i.e., from more evolutionary and genetic causes to more experience-based and cultural causes). The majority of students considered human social behaviors to be mostly influenced by nurture and less by nature. The authors suggest that this may be due to the absence of human behavior as a theme in the biology curriculum of Brazilian high schools. Similarly, in the United States, the theme of human behavior is explicitly excluded from the *Next Generation Science Standards* (NGSS; National Research Council, 2012; NGSS Lead States, 2013), while the evolutionary and biological causes of human behavior are explicitly excluded from the core of U.S. social studies standards (National Council for the Social Studies, 2013).

> *"Students were less likely to explain human social behavior with reference to evolutionary causes and more likely with reference to developmental and cultural causes."*

In the German context, human behavior is a theme in high school biology curricula, but it is unclear to what degree evolutionary causes of human *social* behavior are explored

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in classrooms, particularly in comparison to the behavior of other species and in terms of implications for sustainable development.

Here, we present results of a classroom intervention that shed further light on German secondary students' and preservice biology teachers' beliefs and causal explanations about the nature of cooperative behavior in humans compared to a nonhuman primate. Based on these results, we highlight important learning opportunities for educators in biology on the themes of human evolution, human behavior, and sustainability.

○ Methods

In order to elicit students' conceptions regarding the nature and causality of human cooperative behavior, a series of studies (Koomen & Herrmann, 2018a, b) was chosen as a focal topic for a brief written assignment in classrooms. The studies investigated and compared behaviors of (1) pairs of six-year-old children and (2) pairs of semi-wild adult chimpanzees when faced with a common-pool-resource problem (Figure 1). The experimental setup was designed to represent conditions of common-pool-resource dilemmas, including a limited renewable resource and shared access to the resource. Such dilemmas – between individual short-term interest to maximize resource use and collective long-term interest to sustain the shared resource – have been referred to as the "tragedy of the commons" since the publication of Garrett Hardin's famous article of that name (Hardin, 1968). Such dilemmas are at the heart of many societal sustainability problems and are studied in ecology and evolutionary biology to understand cooperation dynamics across species (e.g., Rankin et al., 2007; Poteete et al., 2010). In these studies, chimpanzee dyads tended to be less successful in using the resource for as long as possible; tended to share resources less equally, due to dominance-submission behaviors; and tended to perform worse with each trial, in comparison to children.

Besides the relevance to sustainability issues, the study series was chosen because a scientifically adequate prediction and interpretation of results rests upon both ultimate and proximate explanations of cooperative behavior of the two species.

Participant written assignments were conducted in classroom settings with a total of 180 students, spanning high school classes (grades 6–10) across four German schools as well as preservice biology teachers at the University of Leipzig. Classroom interventions were implemented by the authors and by two preservice biology teachers whose results we include here (Herr, 2018; Regner, 2018).

The experiment series was explained to participant groups with the help of a short presentation (5–10 minutes), emphasizing important conditions of the experiments and the common-pool-resource device, and the questions the researchers were interested in. The participants were then given the opportunity to ask a few questions they might have (e.g., regarding other conditions of the experiment they would like clarification on). Common questions concerned the age of the chimpanzees (including relative maturity compared with children), whether children or chimpanzee pairs knew each other before the experiment, or whether children of the same or different sexes were paired together.

Then the assignment sheet was handed out and participants were given 5–10 minutes to answer the following questions:

- Which of the two species do you think was more successful in using the resource sustainably? (Children / Chimpanzees)
- Why do you think this species was more successful?
- Why do you think the other species was less successful?

Participants were given an opportunity for discussion with their neighbors, since the activity was not meant as an assessment tool but as an interesting conversation starter for the theme of human evolution. Consequently, students' answers do not necessarily represent individual conceptions, but may nonetheless reflect a general pattern of variation within and across participant groups. After assignment sheets were collected, answers were discussed in the group and the actual results of the experiment were presented to the group.

Collected assignment sheets were transcribed and analyzed by the two authors using a theory-based thematic analysis followed by an inductive-deductive coding process (Table 1). Explanations included various causal factors ranging from evolutionary to developmental and proximate causes, thus covering important classes of causes explored in behavioral biology (Mayr, 1961; Tinbergen, 1963). Explanations also often included some essentialist statements about the nature of the two species.

Since there were qualitative differences in the kinds of explanations given for the two species, partly different categories were

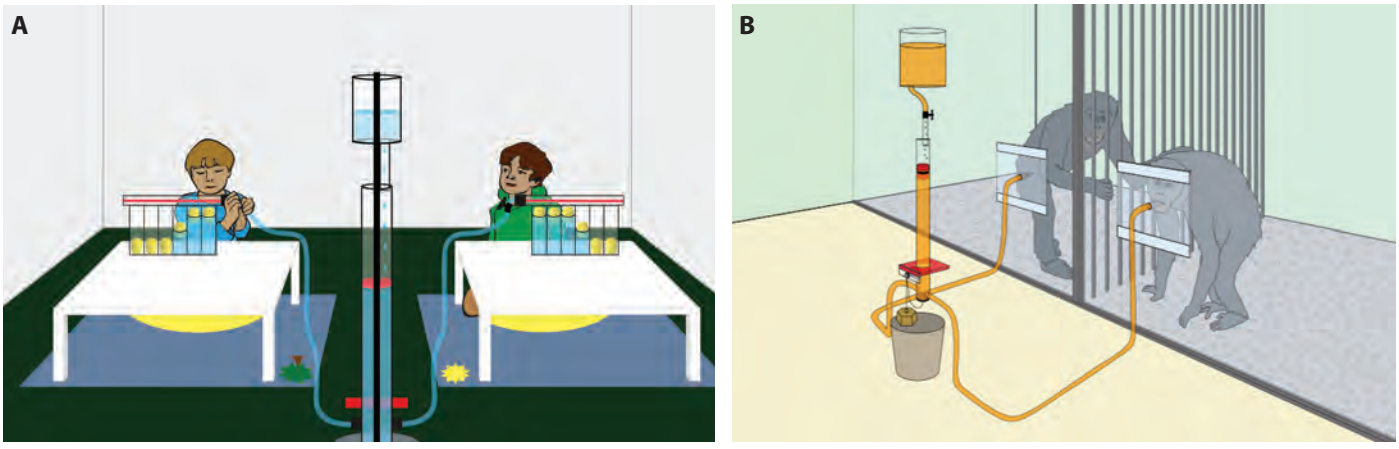

Figure 1. Experimental setup of the experiments with (**A**) children and (**B**) chimpanzees.

Image sources: (A) MPI-EVA Media inspired by Koomen & Herrmann (2018a); (B) Koomen & Herrmann (2018b).

Table 1. Types of causes by causal class that were used to analyze answers in an inductive-deductive approach, with example participant quotes for each code.

Category	Example Quotes
Explanations for why chimpanzees will be more successful	
Cooperative or sustainable by nature	"By nature, chimpanzees are not 'selfish,' meaning they can easily divide scarce resources. They also learned this in the wild (or inherited from their ancestors)."
Intelligence/understanding	"I think the chimpanzees will understand the bigger picture better."
Knowing the partner	"Chimpanzees will be more successful because they come from the same group."
Other (e.g., hierarchy, maturity, experience)	"The chimps are grown-ups." "They live in a hierarchy so the higher-ranking will control it."
Explanations for why children will be more successful	
By cooperative nature	"Cooperation is already more pronounced in *Homo sapiens*."
By understanding	"They can understand the new situation faster."
By education, culture, experience	"They have learned the principle of sharing at home."
By ability to communicate	"Because they can communicate."
Other (e.g., more self-regulation, shyness)	"They can regulate themselves better than the chimps." "They will be shy."

formed for each species. For the chimpanzees, many explanations described essential qualities or mentioned evolutionary causes or survival needs in nature. It was often not clear whether participants referred to the experience or characteristics of the specific individuals participating in the experiments or of the species in general (e.g., "They have to share in nature"). Therefore, we placed any such general and ambiguous explanations into an overall "cooperative by nature" category. Other explanations clustered around the notion that chimpanzees will understand the problem better or the fact that they already know each other.

In regard to human children, explanations referenced some essential qualities of humans and/or children, developmental factors such as age, education, and experience, their ability to understand, and their ability to communicate. For each species, a category of "other explanations" included a range of factors, such as the maturity of chimpanzees, the role of hierarchy, shyness of the children, or factors of the proximate situation of the experiment.

○ Results

The majority of participants predicted that chimpanzees would be more successful at cooperating in this experiment (Table 2). Among the explanations for why chimpanzees would be more successful (Table 3), the most dominant conception was a notion that chimpanzees would be more cooperative or sustainable, due to their evolved instinct, need to survive, or need to live and share food in groups and/or to their experience with limited resources in nature. A relatively large number of students explained that chimpanzees would understand the situation better. A range of responses also demonstrated anthropomorphic reasoning, ascribing human-like traits to the chimpanzees, which evolutionary anthropologists would generally agree are more pronounced in humans (and already present in six-year-olds) than in chimpanzees – such as self-regulation, a sense of community, and the ability to negotiate for equal outcomes, to think about the future, to coordinate actions. A few participants accurately predicted that the success of chimp dyads would be due to dominance strategies and unequal resource distribution.

Table 2. Quantitative results of participant predictions about the outcomes of the experiments by participant group.

Participant Group	*n*	Species Predicted to Be More Successful in the Cooperation Task	
		Children (%)	Chimpanzees (%)
Grade 6[a]	17	35	65
Grade 10[b]	103	23	77
Preservice biology teachers	60	20	80
Total (average %)	**180**	**(23)**	**(77)**

[a] Data from Regner (2018).
[b] Includes (n = 76) data points from Herr (2018).

Table 3. Distribution of types of qualitative answers among participants who rated chimpanzees as more successful, with a total of 124 explanations. Note that percentages per participant group do not add up to 100% because several types of answers were sometimes given per participant.

	Types of Explanations for Why Chimpanzees Would Be More Successful: *n* (%)			
	Nature	**Understanding**	**Knowing the Partner**	**Other**
Grade 6 [a]	4 (40)	4 (40)	0	2 (20)
Grade 10 [b]	58 (78)	18 (23)	12 (16)	13 (18)
Preservice biology teachers	32 (80)	4 (10)	0	6 (15)
Total (average %)	94 (76)	26 (21)	12 (10)	21 (17)

[a] Data from Regner (2018).
[b] Includes (n = 76) data points from Herr (2018).

Table 4. Distribution of types of qualitative answers among participants who rated children as more successful, with a total of 40 explanations. Note that percentages per participant group do not add up to 100% because several types of answers were sometimes given per participant.

	Types of Explanations for Why Children Would Be More Successful: *n* (%)				
Participant Group	**Nature**	**Understanding, "Smartness"**	**Education, Experience**	**Ability to Communicate**	**Other**
Grade 6 [a]	0	4 (67)	2 (33)	0	0
Grade 10 [b]	0	15 (65)	5 (22)	6 (26)	3 (13)
Preservice biology teachers	2 (18)	3 (27)	1 (9)	6 (55)	3 (27)
Total (average %)	2 (5)	22 (55)	8 (20)	12 (30)	6 (15)

[a] Data from Regner (2018).
[b] Includes (n = 76) data points from Herr (2018).

Among participants who predicted that children would be the better cooperators in this task, explanations tended toward causes consisting of rational understanding, learning and cultural experience, and ability to communicate (Table 4). We found *two* explanations among preservice biology teachers mentioning a pronounced cooperation in the *Homo* line; thus, these were the only two conceptions from the participant pool that can be considered most in line with scientific conceptions.

There were some stark differences in the distribution of explanations across the age groups, which may have been influenced by the kinds of conditions of the experiment that were illuminated by student questions in each group (such as whether partners knew each other).

Further information about qualitative results and example student quotes can be found in the Supplemental Material with the online version of this article.

○ Discussion

Two results of our classroom intervention are noteworthy: quantitatively, the majority of students considered chimpanzees to be more cooperative than six-year-old children, and qualitatively, there was a difference in the kinds of explanations that were offered for the behaviors of the two species. Results of our investigation comport with results obtained by da Silva Porto et al. (2015), namely that students were less likely to explain human social behavior with reference to evolutionary causes and more likely with reference to developmental and cultural causes.

Future studies may want to investigate the prevalence of different participant conceptions in a more controlled fashion, since our study did not aim to do this and was designed as a classroom activity that encouraged discussion among participants. It would also be interesting to investigate the predictions and explanations about this experiment of students and teachers in the United States and other cultures.

Why Are the Explanations of Chimpanzee & Human Behavior Qualitatively Different?

Research on how people tend to explain human behavior shows that people do not seem to invoke evolutionary or broader historical causes when explaining human behavior. For example, in their framework of the factors that people refer to when explaining human behavior, Böhm and Pfister (2015) consider that *dispositions* "are assumed to mark the end of a causal search, to be particularly satisfactory explanations, and to serve as ultimate explanations that do not raise any further questions."

Of course, in biology, dispositions are hardly considered "ultimate explanations" that end a causal search; if anything, they can mark the *beginning* of a causal search into the deeper evolutionary histories and functions of the behavioral dispositions of living things. When predicting or explaining the differences or similarities between human and animal behavior, such deeper evolutionary causes are required. However, it appears that students (and teachers) need support to reason adequately about evolutionary causes of animal social behavior, and particularly to also include *evolutionary* factors in the explanation of *human* social behavior.

Why Do Students & Teachers Tend to Think That Chimpanzees Are More Cooperative?

One class of factors that might help answer this question is what we have come to call "invisible cooperation" – even though cooperation pervades our everyday lives, it may be taken for granted to such a degree that people do not regard these human characteristics as something that requires an (evolutionary) explanation or as something that distinguishes us from other primates. Furthermore, everyday feats of human cooperation are not what we commonly observe in the media and daily news, which rather emphasize conflict and violence in our societies. Additionally, our current challenges of sustainable development may lead to a cultural conception that the causes of such issues lie in our human nature – after all, we do not commonly hear about chimpanzees polluting their environments or overusing their resources. In fact, however, chimpanzees *have* been observed to overhunt a monkey species to near extinction (Lwanga et al., 2011), and chimpanzees have been observed to show rates of violence and aggression two to three orders of magnitude higher than in human hunter-gatherer groups (Wrangham et al., 2006). Further, economic models of humans may have pervaded cultural conceptions of humans as selfish, profit-maximizing creatures (*Homo economicus*), contributing to the invisibility of everyday human cooperation.

Education may be another plausible cause of these observed patterns. For example, a content analysis of 23 German high school biology textbooks (S. Hanisch & D. Eirdosh, in review) indicates that the role of cooperation in the evolution of our species may be little emphasized, compared to other factors such as large brains and individual intelligence. Furthermore, in sections on behavioral ecology and cooperation, we find that humans are hardly ever mentioned as an example of a cooperative species. Comparative behavioral experiments are also rarely featured as methods used by scientists to explore the origins of human behavior.

Similarly, as we highlighted in the introductory section, in the NGSS, human behavioral sciences are explicitly excluded and are considered to be covered more by the social studies disciplines. At the same time, the themes of relationships in ecosystems and animal group behavior in the NGSS may not be transferred to the understanding of human behavior, while the theme of evolution does not reference the role of cooperation and interdependence (NGSS Lead States, 2013). Conversely, the social studies disciplines may not treat human behavior from a biological perspective, especially in comparison to other species and in regard to exploring the evolutionary causes of human behavior. We argue that this ambiguity regarding where human social behavior is situated (or not situated) in the curriculum may create a kind of conceptual blind spot in students and (biology) teachers when it comes to understanding and explaining human social behavior.

Our conceptions about human nature have a strong influence on our attitudes and behaviors toward ourselves and other humans in social life. For example, a view that humans are predominantly selfish has been shown to lead to less cooperative behavior (Frank et al., 1993). Thus, our finding that a majority of high school students and teachers seem to have a quite negative conception about human nature could be considered a rather alarming phenomenon. Overall, a cultural narrative of humans as selfish or greedy may have influenced participants' intuitive notions about what it means to be human, based on the aspects of human nature that are emphasized in the media, in economics, in biology and other disciplines, and in narratives about the causes of our current sustainability challenges.

Learning Opportunities for Evolution & Sustainability Education

Our findings demonstrate that students need support to construct a scientifically adequate understanding of human social behaviors and their evolutionary, cultural, and developmental origins. Here, we offer suggestions for U.S. biology teachers regarding how they might provide students this support, particularly within the topics and core ideas of the NGSS.

(1) Disciplinary Core Idea LS2.D: Social Interactions and Group Behavior (NGSS Lead States, 2013) provides students an opportunity to compare human and other animal social behaviors, their functions and evolutionary origins, toward a critical understanding of the claims that humans are a highly cooperative species and that cooperative social behavior pervades our lives. The classroom intervention presented here, and similar cross-species cooperation experiments, can offer productive teaching tools around this set of core ideas.

(2) Link the topics of natural selection and evolution with the core idea of Social Interactions and Group Behavior in order to provide students with the opportunity to explore the conditions that favor the natural selection of group behavior. In a unit on human evolution, emphasize the role of cooperation and prosociality in the evolution of our species' behavior and cognition (e.g., cooperative hunting, cooperative foraging, resource sharing, moral cognition, teaching and social learning; e.g., Burkart et al., 2009; Hayes & Sanford, 2014).

(3) Link the themes of cooperation and group behavior to the NGSS theme of Human Sustainability and to themes in social studies. The social dilemma of the "tragedy of the commons," inherent in the experimental design of this lesson, is a central model that highlights the challenges of cooperation toward sustainable development. From natural resource use and climate change to cooperative learning and peer groups at school, cooperation dilemmas pervade the many challenges that students will experience within their lifetimes. The lesson presented here can serve as an introductory activity for students to explore this challenge and the conditions and behaviors required to overcome it (Wilson et al., 2013; Atkins et al., 2019).

To support educators in these directions, we have begun to advance a range of open-education resources that integrate the themes of human evolution, behavior, and sustainability (http://teaching-materials.globalesd.org).

○ Conclusions

Our results suggest that insights into the nature of human social behavior and its evolution that have been gained in recent decades have not been sufficiently translated into educational practice and/or cultural knowledge, at least among the German populations of students and biology teachers investigated in this study. This gap in understanding could have deleterious effects on how students perceive and act in social situations throughout their lives, and on how

effectively they may act toward collaboratively solving sustainability problems on local to global scales.

Overall, the behavioral sciences offer a wide range of cross-species, developmental, and cross-cultural experiments and observations that can serve as engaging content that allows students to construct more accurate and helpful narratives about the capacity and conditions for humans to cooperate around sustainable resource use and many other shared goals. We invite readers to implement the lesson presented in this article in their classrooms toward these ends.

○ Supplemental Material

The following resources are available with the online version of this article:

- "Chimpanzees or Children – Who Is Better at Sharing Resources?" Information and materials.
- "Are Humans a Cooperative Species? Challenges and Opportunities for Teaching the Evolution of Human Prosociality." Twenty-two data tables from our study.

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References

Atkins, P.W.B., Wilson, D.S. & Hayes, S.C. (2019). *Prosocial. Using Evolutionary Science to Build Productive, Equitable, and Collaborative Groups.* Oakland, CA: Context Press.

Böhm, G. & Pfister, H.R. (2015). How people explain their own and others' behavior: a theory of lay causal explanations. *Frontiers in Psychology,* February 18, article 139.

Bowles, S. & Gintis, H. (2011). *A Cooperative Species: Human Reciprocity and Its Evolution.* Princeton, NJ: Princeton University Press.

Burkart, J.M., Hrdy, S.B. & van Schaik, C.P. (2009). Cooperative breeding and human cognitive evolution. *Evolutionary Anthropology, 18,* 175–186.

da Silva Porto, F.C., Paiva, P.C., Waizbort, R.F. & da Luz, M.R.M.P. (2015). Brazilian undergraduate students' conceptions on the origins of human social behavior: implications for teaching evolution. *Evolution: Education and Outreach, 8,* 16.

Frank, R.H., Gilovich, T. & Regan, D.T. (1993). Does studying economics inhibit cooperation? *Journal of Economic Perspectives, 7,* 159–171.

Hardin, G. (1968). The tragedy of the commons. *Science, 162,* 1243–1248.

Hayes, S.C. & Sanford, B.T. (2014). Cooperation came first: evolution and human cognition. *Journal of the Experimental Analysis of Behavior, 101,* 112–129.

Henrich, J., McElreath, R., Barr, A., Ensminger, J., Barrett, C., Bolyanatz, A., et al. (2006). Costly punishment across human societies. *Science, 312,* 1767–1770.

Herr, A. (2018). Schülervorstellungen zu Kooperation und nachhaltiger Ressourcennutzung bei Schimpansen und Menschen. State examination thesis, University of Leipzig, Institute of Biology.

Koomen, R. & Herrmann, E. (2018a). An investigation of children's strategies for overcoming the tragedy of the commons. *Nature Human Behaviour, 2,* 348–355.

Koomen, R. & Herrmann, E. (2018b). Chimpanzees overcome the tragedy of the commons with dominance. *Scientific Reports, 8,* 10389.

Lwanga, J.S., Struhsaker, T.T., Struhsaker, P.J., Butynski, T.M. & Mitani, J.C. (2011). Primate population dynamics over 32.9 years at Ngogo, Kibale National Park, Uganda. *American Journal of Primatology, 73,* 997–1011.

Mayr, E. (1961). Cause and effect in biology. *Science, 134,* 1501–1506.

Messner, D., Guarín, A. & Haun, D.B.M. (2013). *The Behavioural Dimensions of International Cooperation.* Duisburg, Germany. http://www.gcr21.org/en/publications/research-papers/gcrp-1/.

National Council for the Social Studies (2013). *The College, Career, and Civic Life (C3) Framework for Social Studies State Standards: Guidance for Enhancing the Rigor of K–12 Civics, Economics, Geography, and History.* Silver Spring, MD: NCSS.

National Research Council (2012). *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas.* Washington, DC: National Academies Press.

NGSS Lead States (2013). *Next Generation Science Standards: For States, by States.* Washington, DC: National Academies Press.

Poteete, A.R., Janssen, M.A. & Ostrom, E. (2010). *Working together: collective action, the commons, and multiple methods in practice.* Princeton, NJ: Princeton University Press.

Rankin, D.J., Bargum, K. & Kokko, H. (2007). The tragedy of the commons in evolutionary biology. *Trends in Ecology & Evolution, 22,* 643–651.

Regner, M. (2018). Schülervorstellungen zu Kooperation und nachhaltiger Ressourcennutzung bei Schimpansen und Menschen. State examination thesis, Institute of Biology, University of Leipzig.

Tinbergen, N. (1963). On aims and methods of ethology. *Zeitschrift für Tierpsychologie, 20,* 410–433.

Tomasello, M. (2009). *Why We Cooperate.* Cambridge, MA: MIT Press.

UNESCO (2017). Education for Sustainable Development Goals Learning Objectives. https://www.unesco.de/sites/default/files/2018-08/unesco_education_for_sustainable_development_goals.pdf.

Warneken, F. & Tomasello, M. (2009). Varieties of altruism in children and chimpanzees. *Trends in Cognitive Sciences, 13,* 397–402.

Wilson, D.S., Ostrom, E. & Cox, M.E. (2013). Generalizing the core design principles for the efficacy of groups. *Journal of Economic Behavior and Organization, 90,* S21–S32.

Wrangham, R.W., Wilson, M.L. & Muller, M.N. (2006). Comparative rates of violence in chimpanzees and humans. *Primates, 47,* 14–26.

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