

Supplementary Materials for

Title: EVApeCognition: An 18-Year Database Reveals Domain-Specific Characteristics in Great Ape Cognition

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Supplementary Text
Table S1
Figure S1

Supplementary Text

Table S1. List of 150 studies included in the EVApeCognition Database by the time of publication

study_id	year	reference
albiach2010great	2010	Albiach-Serrano, A., Call, J., & Barth, J. (2010). Great apes track hidden objects after changes in the objects' position and in subject's orientation. <i>American Journal of Primatology</i> , 72(4), 349-359. doi:10.1002/ajp.20790.
albiach2012apes	2012	Albiach-Serrano, A., Bugnyar, T., & Call, J. (2012). Apes (<i>Gorilla gorilla</i> , <i>Pan paniscus</i> , <i>P. troglodytes</i> , <i>Pongo abelii</i>) versus corvids (<i>Corvus corax</i> , <i>C. corone</i>) in a support task: The effect of pattern and functionality. <i>Journal of Comparative Psychology</i> , 126(4), 355-367. doi:10.1037/a0028050.
albiach2014reversed	2014	Albiach-Serrano, A., & Call, J. (2014). A reversed-reward contingency task reveals causal knowledge in chimpanzees (<i>Pan troglodytes</i>). <i>Animal Cognition</i> , 17(5), 1167-1176. doi:10.1007/s10071-014-0749-9.
albiach2015comparing	2015	Albiach-Serrano, A., Sebastián-Enesco, C., Seed, A., Colmenares, F., & Call, J. (2015). Comparing humans and nonhuman great apes in the broken cloth problem: Is their knowledge causal or perceptual? <i>Journal of Experimental Child Psychology</i> , 139, 174-189. doi:10.1016/j.jecp.2015.06.004.
allritz2013food	2013	Allritz, M., Tennie, C., & Call, J. (2013). Food washing and placer mining in captive great apes. <i>Primates</i> , 54(4), 361-370. doi:10.1007/s10329-013-0355-5.
allritz2021chimpanzees	2021	Allritz, M., McEwen, E. S., & Call, J. (2021). Chimpanzees (<i>Pan troglodytes</i>) show subtle signs of uncertainty when choices are more difficult. <i>Cognition</i> , 214. doi:10.1016/j.cognition.2021.104766.
amici2008fission	2008	Amici, F., Aureli, F., & Call, J. (2008). Fission-fusion dynamics, behavioral flexibility, and inhibitory control in primates. <i>Current Biology</i> , 18(18), 1415-1419. doi:10.1016/j.cub.2008.08.020.
amici2010monkeys	2010	Amici, F., Aureli, F., & Call, J. (2010). Monkeys and apes: Are their cognitive skills really so different? <i>American Journal of Physical Anthropology</i> , 143(2), 188-197. doi:10.1002/ajpa.21305.
amici2012aversion	2012	Amici, F., Call, J., & Aureli, F. (2012). Aversion to violation of expectations of food distribution: the role of social tolerance and relative dominance in

		seven primate species. <i>Behaviour</i> , 149(3-4), 345-368. doi:10.1163/156853912X637833.
amici2012modular	2012	Amici, F., Barney, B., Johnson, V. E., Call, J., & Aureli, F. (2012). A modular mind? A test using individual data from seven primate species. <i>PLoS One</i> , 7(12): e51918. doi:10.1371/journal.pone.0051918.
amici2014calculated	2014	Amici, F., Aureli, F., Mundry, R., Sanchez-Amaro, A., Barroso, A. M., Ferretti, J., & Call, J. (2014). Calculated reciprocity? A comparative test with six primate species. <i>Primates</i> , 55(3), 447-457. doi:10.1007/s10329-014-0424-4.
amici2014lack	2014	Amici, F., Visalberghi, E., & Call, J. (2014). Lack of prosociality in great apes, capuchin monkeys and spider monkeys: Convergent evidence from two different food distribution tasks. <i>Proceedings of the Royal Society B: Biological Sciences</i> , 281(1793): 20141699. doi:10.1098/rspb.2014.1699.
amici2014response	2014	Amici, F., Aureli, F., & Call, J. (2014). Response facilitation in the four great apes: Is there a role for empathy? <i>Primates</i> , 55(1), 113-118. doi:10.1007/s10329-013-0375-1.
amici2018social	2018	Amici, F., Call, J., Watzek, J., Brosnan, S., & Aureli, F. (2018). Social inhibition and behavioural flexibility when the context changes: A comparison across six primate species. <i>Scientific Reports</i> , 8: 3067. doi:10.1038/s41598-018-21496-6.
bandini2021individually	2021	Bandini, E., Großmann, J., Funk, M., Albiach-Serrano, A., & Tennie, C. (2021). Naïve orangutans (<i>Pongo abelii</i> and <i>Pongo pygmaeus</i>) individually acquire nut-cracking using hammer tools. <i>American Journal of Primatology</i> , 83(9): e23304. doi:10.1002/ajp.23304.
barth2006tracking	2006	Barth, J., & Call, J. (2006). Tracking the Displacement of Objects: A Series of Tasks With Great Apes (<i>Pan troglodytes</i> , <i>Pan paniscus</i> , <i>Gorilla gorilla</i> , and <i>Pongo pygmaeus</i>) and Young Children (<i>Homo sapiens</i>). <i>Journal of Experimental Psychology: Animal Behavior Processes</i> , 32(3), 239-252. doi:10.1037/0097-7403.32.3.239.
bohn2015communication	2015	Bohn, M., Call, J., & Tomasello, M. (2015). Communication about absent entities in great apes and human infants. <i>Cognition</i> , 145, 63-72. doi:10.1016/j.cognition.2015.08.009.
bohn2016comprehension	2016	Bohn, M., Call, J., & Tomasello, M. (2016). Comprehension of iconic gestures by chimpanzees and human children. <i>Journal of Experimental Child Psychology</i> , 142, 1-17. doi:10.1016/j.jecp.2015.09.001.

bohn2016role	2016	Bohn, M., Call, J., & Tomasello, M. (2016). The role of past interactions in great apes' communication about absent entities. <i>Journal of Comparative Psychology</i> , 130(4), 351-357. doi:10.1037/com0000042.
bohn2017information	2017	Bohn, M., Allritz, M., Call, J., & Völter, C. J. (2017). Information seeking about tool properties in great apes. <i>Scientific Reports</i> , 7: 10923. doi:10.1038/s41598-017-11400-z.
bohn2019natural	2019	Bohn, M., Call, J., & Tomasello, M. (2019). Natural reference: A phylo- and ontogenetic perspective on the comprehension of iconic gestures and vocalizations. <i>Developmental Science</i> , 22(2): e12757. doi:10.1111/desc.12757.
bohn2020learning	2020	Bohn, M., Kordt, C., Braun, M., Call, J., & Tomasello, M. (2020). Learning novel skills from iconic gestures: A developmental and evolutionary perspective. <i>Psychological Science</i> , 31(7), 873-880.
bourjade2014bonobos	2014	Bourjade, M., Call, J., Pelé, M., Maumy, M., & Dufour, V. (2014). Bonobos and orangutans, but not chimpanzees, flexibly plan for the future in a token-exchange task. <i>Animal Cognition</i> , 17(6), 1329-1340. doi:10.1007/s10071-014-0768-6.
brauer2005all	2005	Bräuer, J., Call, J., & Tomasello, M. (2005). All great ape species follow gaze to distant locations and around barriers. <i>Journal of Comparative Psychology</i> , 119(2), 145-154. doi:10.1037/0735-7036.119.2.145.
brauer2006apes	2006	Bräuer, J., Call, J., & Tomasello, M. (2006). Are apes really inequity averse? <i>Proceedings of the Royal Society of London / Series B</i> , 273(1605), 3123-3128. doi:10.1098/rspb.2006.3693.
brauer2006making	2006	Bräuer, J., Kaminski, J., Riedel, J., Call, J., & Tomasello, M. (2006). Making inferences about the location of hidden food: Social dog - casual ape. <i>Journal of Comparative Psychology</i> , 120(1), 38-47. doi:10.1037/0735-7036.120.1.38.
brauer2007chimpanzees	2007*	Bräuer, J., Call, J., & Tomasello, M. (2007). Chimpanzees Really Know What Others Can See in a Competitive Situation. <i>Animal Cognition</i> , 10(4), 439-448. doi:10.1007/s10071-007-0088-1.
brauer2008chimpanzees	2008	Bräuer, J., Call, J., & Tomasello, M. (2008). Chimpanzees do not take into account what others can hear in a competitive situation. <i>Animal Cognition</i> , 11(1), 175-178. doi:10.1007/s10071-007-0097-0.
brauer2009apes	2009	Bräuer, J., Call, J., & Tomasello, M. (2009). Are apes inequity averse? New data on the token-exchange paradigm. <i>American Journal of</i>

		Primates, 71(2), 175-181. doi:10.1002/ajp.20639.
brauer2015apes	2015	Bräuer, J., & Call, J. (2015). Apes produce tools for future use. <i>American Journal of Primatology</i> , 77(3), 254-263. doi:10.1002/ajp.22341.
broihanne2019monkeys	2019	Broihanne, M.-H., Romain, A., Call, J., Thierry, B., Wascher, C. A. F., De Marco, A., Verrier, D., & Dufour, V. (2019). Monkeys (<i>Sapajus apella</i> and <i>Macaca tonkeana</i>) and great apes (<i>Gorilla gorilla</i> , <i>Pongo abelii</i> , <i>Pan paniscus</i> , and <i>Pan troglodytes</i>) play for the highest bid. <i>Journal of Comparative Psychology</i> , 133(3), 301-312. doi:10.1037/com0000153.
bueno2019bargaining	2019	Bueno-Guerra, N., Völter, C. J., de las Heras, A., Colell, M., & Call, J. (2019). Bargaining in chimpanzees (<i>Pan troglodytes</i>): The effect of cost, amount of gift, reciprocity, and communication (advance online). <i>Journal of Comparative Psychology</i> . doi:10.1037/com0000189.
bueno2020effects	2020	Bueno-Guerra, N., Colell, M., & Call, J. (2020). Effects of indirect reputation and type of rearing on food choices in chimpanzees (<i>Pan troglodytes</i>). <i>Behavioral Ecology and Sociobiology</i> , 74: 79. doi:10.1007/s00265-020-02861-w.
buttelmann2008behavioral	2008	Buttelmann, D., Call, J., & Tomasello, M. (2008). Behavioral cues that great apes use to forage for hidden food. <i>Animal Cognition</i> , 11(1), 117-128. doi:10.1007/s10071-007-0095-2.
buttelmann2017great	2017	Buttelmann, D., Buttelmann, F., Carpenter, M., Call, J., & Tomasello, M. (2017). Great apes distinguish true from false beliefs in an interactive helping task. <i>PLoS One</i> , 12(4): e0173793. doi:10.1371/journal.pone.0173793.
cacchione2009gravity	2009	Cacchione, T., Call, J., & Zingg, R. (2009). Gravity and Solidity in Four Great Ape Species (<i>Gorilla gorilla</i> , <i>Pongo pygmaeus</i> , <i>Pan troglodytes</i> , <i>Pan paniscus</i>): Vertical and Horizontal Variations of the Table Task. <i>Journal of Comparative Psychology</i> , 123(2), 168-180. doi:10.1037/a0013580.
cacchione2014apes	2014	Cacchione, T., Hrubesch, C., & Call, J. (2014). Apes' tracking of objects and collections. <i>Swiss Journal of Psychology</i> , 73(1), 47-52. doi:10.1024/1421-0185/a000120.
call2004inferences	2004	Call, J. (2004). Inferences About the Location of Food in the Great Apes (<i>Pan paniscus</i> , <i>Pan troglodytes</i> , <i>Gorilla gorilla</i> , and <i>Pongo pygmaeus</i>). <i>Journal of Comparative Psychology</i> , 118(2), 232-241. doi:10.1037/0735-7036.118.2.232.
dufour2009calculated	2009	Dufour, V., Péle, M., Neumann, M., Thierry, B., & Call, J. (2009). Calculated reciprocity after all:

		computation behind token transfers in orang-utans. <i>Biology Letters</i> , 5(2), 172-175. doi:10.1098/rsbl.2008.0644.
duguid2014coordination	2014	Duguid, S., Wyman, E., Bullinger, A. F., Herfurth-Majstorovic, K., & Tomasello, M. (2014). Coordination strategies of chimpanzees and human children in a Stag Hunt game. <i>Proceedings of the Royal Society B: Biological Sciences</i> , 281(1796): 20141973. doi:10.1098/rspb.2014.1973.
duguid2020strategies	2020	Duguid, S., Wyman, E., Grueneisen, S., & Tomasello, M. (2020). The strategies used by chimpanzees (<i>Pan troglodytes</i>) and children (<i>Homo sapiens</i>) to solve a simple coordination problem. <i>Journal of Comparative Psychology</i> , 134(4), 401-411. doi:10.1037/com0000220.
ebel2019innovative	2019	Ebel, S. J., Schmelz, M., Herrmann, E., & Call, J. (2019). Innovative problem solving in great apes: The role of visual feedback in the floating peanut task. <i>Animal Cognition</i> , 22(5), 791-805. doi:10.1007/s10071-019-01275-0.
ebel2020object	2020	Ebel, S. J., Kopp, K. S., & Liebal, K. (2020). Object preferences in captive Sumatran orang-utans (<i>Pongo abelii</i>). <i>Behavioural Processes</i> , 170: 103993. doi:10.1016/j.beproc.2019.103993.
ebel2021prior	2021	Ebel, S. J., Völter, C. J., & Call, J. (2021). Prior experience mediates the usage of food items as tools in great apes (<i>Pan paniscus</i> , <i>Pan troglodytes</i> , <i>Gorilla gorilla</i> , and <i>Pongo abelii</i>). <i>Journal of Comparative Psychology</i> , 135(1), 64-73.
eckert2017great	2017	Eckert, J., Rakoczy, H., & Call, J. (2017). Are great apes able to reason from multi-item samples to populations of food items? <i>American Journal of Primatology</i> , 79(10): e22693. doi:10.1002/ajp.22693.
engelmann2012five	2012	Engelmann, J. M., Herrmann, E., & Tomasello, M. (2012). Five-year olds, but not chimpanzees, attempt to manage their reputations. <i>PLoS One</i> , 7(10): e48433. doi:10.1371/journal.pone.0048433.
engelmann2017social	2017	Engelmann, J. M., Clift, J. B., Herrmann, E., & Tomasello, M. (2017). Social disappointment explains chimpanzees' behaviour in the inequity aversion task. <i>Proceedings of the Royal Society B: Biological Sciences</i> , 284(1861): 20171502. doi:10.1098/rspb.2017.1502.
forss2016cognitive	2016	Forss, S., Willems, E., Call, J., & van Schaik, C. (2016). Cognitive differences between orang-utan species: a test of the cultural intelligence hypothesis. <i>Scientific Reports</i> , 6, 30516. doi:10.1038/srep30516.

greenberg2010chimpanzee	2010	Greenberg, J. R., Hamann, K., Warneken, F., & Tomasello, M. (2010). Chimpanzee helping in collaborative and noncollaborative contexts. <i>Animal Behaviour</i> , 80(5), 873-880. doi:10.1016/j.anbehav.2010.08.008.
grueneisen2017children	2017	Grüneisen, S., Duguid, S., Saur, H., & Tomasello, M. (2017). Children, chimpanzees, and bonobos adjust the visibility of their actions for cooperators and competitors. <i>Scientific Reports</i> , 7: 8504. doi:10.1038/s41598-017-08435-7.
halina2018goal	2018	Halina, M., Liebal, K., & Tomasello, M. (2018). The goal of ape pointing. <i>PLoS One</i> , 13(4): e0195182. doi:10.1371/journal.pone.0195182.
hanus2011chimpanzee	2011	Hanus, D., & Call, J. (2011). Chimpanzee problem-solving: contrasting the use of causal and arbitrary cues. <i>Animal Cognition</i> , 14(6), 871-878. doi:10.1007/s10071-011-0421-6.
hanus2011comparing	2011	Hanus, D., Mendes, N., Tennie, C., & Call, J. (2011). Comparing the performances of apes (<i>Gorilla gorilla</i> , <i>Pan troglodytes</i> , <i>Pongo pygmaeus</i>) and human children (<i>Homo sapiens</i>) in the floating peanut task. <i>PLoS ONE</i> , 6(6): e19555. doi:10.1371/journal.pone.0019555.
haun2006evolutionary	2006	Haun, D. B. M., Call, J., Janzen, G., & Levinson, S. C. (2006). Evolutionary psychology of spatial representations in the Hominidae. <i>Current Biology</i> , 16(17), 1736-1740. doi:10.1016/j.cub.2006.07.049.
haun2009great	2009	Haun, D. B. M., & Call, J. (2009). Great apes' capacities to recognize relational similarity. <i>Cognition</i> , 110(2), 147-159. doi:10.1016/j.cognition.2008.10.012.
haun2011great	2011	Haun, D. B. M., Nawroth, C., & Call, J. (2011). Great apes' risk-taking strategies in a decision making task. <i>PLoS ONE</i> , 6(12): e28801. doi:10.1371/journal.pone.0028801.
heilbronner2008fruit	2008	Heilbronner, S. R., Rosati, A. G., Stevens, J. R., Hare, B., & Hauser, M. D. (2008). A fruit in the hand or two in the bush? Divergent risk preferences in chimpanzees and bonobos. <i>Biology Letters</i> , 4(3), 246-249. doi:10.1098/rsbl.2008.0081.
hepach2020help	2020	Hepach, R., Benziad, L., & Tomasello, M. (2020). Chimpanzees help others with what they want; children help them with what they need. <i>Developmental Science</i> , 23(3): e12922. doi:10.1111/desc.12922.
hepach2021chimpanzees	2021	Hepach, R., Vaish, A., Kano, F., Benziad, L., Albiach-Serrano, A., Call, J., & Tomasello, M. (2021). Chimpanzees' (<i>Pan troglodytes</i>) internal arousal remains elevated if they cannot themselves help a conspecific. <i>Journal of Comparative</i>

		Psychology, 135(2), 196-207. doi:10.1037/com0000255.
herrmann2006apes	2006	Herrmann, E., & Tomasello, M. (2006). Apes' and children's understanding of cooperative and competitive motives in a communicative situation. <i>Developmental Science</i> , 9(5), 518-529. doi:10.1111/j.1467-7687.2006.00519.x.
herrmann2019human	2019	Herrmann, E., Haux, L. M., Zeidler, H., & Engelmann, J. M. (2019). Human children but not chimpanzees make irrational decisions driven by social comparison. <i>Proceedings of the Royal Society of London: B, Biological Sciences</i> , 286(1894): 20182228. doi:10.1098/rspb.2018.2228.
hribar2011great	2011	Hribar, A., & Call, J. (2011). Great apes use landmark cues over spatial relations to find hidden food. <i>Animal Cognition</i> , 14(5), 623-635. doi:10.1007/s10071-011-0397-2.
kanngiesser2010bonobos	2010	Kanngiesser, P., & Call, J. (2010). Bonobos, chimpanzees, gorillas, and orang utans use feature and spatial cues in two spatial memory tasks. <i>Animal Cognition</i> , 13(3), 419-430. doi:10.1007/s10071-009-0291-3.
kanngiesser2011limits	2011	Kanngiesser, P., Santos, L. R., Hood, B. M., & Call, J. (2011). The Limits of Endowment Effects in Great Apes (<i>Pan paniscus</i> , <i>Pan troglodytes</i> , <i>Gorilla gorilla</i> , <i>Pongo pygmaeus</i>). <i>Journal of Comparative Psychology</i> , 125(4), 436-445. doi:10.1037/a0024516.
kanngiesser2020children	2020	Kanngiesser, P., Rossano, F., Frickel, R., Tomm, A., & Tomasello, M. (2020). Children, but not great apes, respect ownership. <i>Developmental Science</i> , 23(1): e12842. doi:10.1111/desc.12842.
kano2011visual	2011	Kano, F., Hirata, S., Call, J., & Tomonaga, M. (2011). The visual strategy specific to humans among hominids: A study using the gap–overlap paradigm. <i>Vision Research</i> , 51(23-24), 2348-2355. doi:10.1016/j.visres.2011.09.006.
kano2012face	2012	Kano, F., Call, J., & Tomonaga, M. (2012). Face and eye scanning in gorillas (<i>Gorilla gorilla</i>), orangutans (<i>Pongo abelii</i>), and humans (<i>Homo sapiens</i>): Unique eye-viewing patterns in humans among hominids. <i>Journal of Comparative Psychology</i> , 126(4), 388-398. doi:10.1037/a0029615.
kano2014cross	2014	Kano, F., & Call, J. (2014). Cross-species variation in gaze following and conspecific preference among great apes, human infants and adults. <i>Animal Behaviour</i> , 91, 137-150. doi:10.1016/j.anbehav.2014.03.011.

kano2014great	2014	Kano, F., & Call, J. (2014). Great apes generate goal-based action predictions: An eye-tracking study. <i>Psychological Science</i> , 25(9), 1691-1698. doi:10.1177/0956797614536402.
kano2015social	2015	Kano, F., Hirata, S., & Call, J. (2015). Social attention in the two species of pan: Bonobos make more eye contact than chimpanzees. <i>PLoS One</i> , 10(6): e0129684. doi:10.1371/journal.pone.0129684. OA
kano2016nasal	2016	Kano, F., Hirata, S., Deschner, T., Behringer, V., & Call, J. (2016). Nasal temperature drop in response to a playback of conspecific fights in chimpanzees: A thermo-imaging study. <i>Physiology & Behavior</i> , 155, 83-94. doi:10.1016/j.physbeh.2015.11.029.
kano2018human	2018	Kano, F., Moore, R., Krupenye, C., Hirata, S., Tomonaga, M., & Call, J. (2018). Human ostensive signals do not enhance gaze following in chimpanzees, but do enhance object-oriented attention. <i>Animal Cognition</i> , 21(5), 715-728. doi:10.1007/s10071-018-1205-z.
kano2018primate	2018	Kano, F., Shepherd, S. V., Hirata, S., & Call, J. (2018). Primate social attention: Species differences and effects of individual experience in humans, great apes, and macaques. <i>PLoS One</i> , 13(2): e0193283. doi:10.1371/journal.pone.0193283.
kano2019great	2019	Kano, F., Krupenye, C., Hirata, S., Tomonaga, M., & Call, J. (2019). Great apes use self-experience to anticipate an agent's action in a false-belief test. <i>Proceedings of the National Academy of Sciences</i> , 116(42), 20904-20909. doi:10.1073/pnas.1910095116.
karg2016differing	2016	Karg, K., Schmelz, M., Call, J., & Tomasello, M. (2016). Differing views: Can chimpanzees do Level 2 perspective-taking? <i>Animal Cognition</i> , 19(3), 555-564. doi:10.1007/s10071-016-0956-7. OA
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*the data contains unpublished data (see details below)

Unpublished data

Some trials from brauer2007chimpanzees were not published in the original publication. The trials follow the same methodology as those presented in brauer2008chimpanzees (competitive theory of mind task where a subordinate needs to infer the decision of a competitive partner based on noise cues). See more details in Brauer et al., 2007 and 2008.

Annotated yaml including all timestamped events and email correspondence entries throughout the standardization process.

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study_id: sanchez2017chimpanzees
scraper_name: Lizbeth Mujica
scraper_comments: "
year: 2017
reference: 'Sanchez-Amaro, A., Duguid, S., Call, J., & Tomasello, M. (2017). Chimpanzees,
bonobos and children successfully coordinate in conflict situations. Proceedings
of the Royal Society B: Biological Sciences, 284(1856): 20170259. doi:10.1098/rspb.2017.0259.'
abstract: Social animals need to coordinate with others to reap the benefits of group living
even when individuals' interests are misaligned. We compare how chimpanzees, bonobos
and children coordinate their actions with a conspecific in a Snowdrift game, which
provides a model for understanding how organisms coordinate and make decisions under
conflict. In study 1, we presented pairs of chimpanzees, bonobos and children with
an unequal reward distribution. In the critical condition, the preferred reward
could only be obtained by waiting for the partner to act, with the risk that if
no one acted, both would lose the rewards. Apes and children successfully coordinated
to obtain the rewards. Children used a 'both-partner-pull' strategy and communicated
during the task, while some apes relied on an 'only-one-partner-pulls' strategy
to solve the task, although there were also signs of strategic behaviour as they
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waited for their partner to pull when that strategy led to the preferred reward. In study 2, we presented pairs of chimpanzees and bonobos with the same set-up as in study 1 with the addition of a non-social option that provided them with a secure reward. In this situation, apes had to actively decide between the unequal distribution and the alternative. In this set-up, apes maximized their rewards by taking their partners' potential actions into account. In conclusion, children and apes showed clear instances of strategic decision-making to maximize their own rewards while maintaining successful coordination.

keywords: coordination, conflict, Snowdrift, chimpanzees, bonobos, children

any_data_provided: true

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internal_reviewer_name: Alex Sanchez

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corr_author: false

experiments:

- experiment_no: 1

data_provided: partial

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grouping: dyads

dropouts_no: null

dropout_names: null

group_id: wkprc_bonobo, wkprc_chimpanzee_a

group_id_excluded: leipzig_children

data_collection_date_provided: true

data_collection_date_source: dataset

data_collection_date: 2014 - 2015

data_collection_date_comments: "

age_source: calculated

age_source_comments: ''

- experiment_no: 2

data_provided: true

reason_no_data: null

reason_no_data_cat: null

grouping: dyads

dropouts_no: null

dropout_names: null
group_id: wkprc_bonobo, wkprc_chimpanzee_a
group_id_excluded: null
data_collection_date_provided: true
data_collection_date_source: dataset
data_collection_date: 2015 - 2016
data_collection_date_comments: "
age_source: calculated
age_source_comments: ''
domains:
- domain_no: 1
 general_domain: competition_and_cooperation
 specific_domain: collaboration
cognitive_domain:
 social: true
 physical: false
events:
- phase: standardization
 name: Carin Molenaar
 date: 2022-04-01
 comment: initial standardization
- phase: internal review
 name: Alex Sanchez
 date: 2022-11-22
 comment: glossary ready to be filled
- phase: standardization
 name: Akzira Abuova
 date: 2024-01-11
 comment: condition/condition_code needs to be renamed; otherwise glossary ready
 for author approval
- phase: standardization
 name: Carin Molenaar
 date: 2024-01-16
 comment: redundant columns removed. discrepancy between glossary and glossary_ongoing
 columns in experiment 2 resolved
- phase: standardization
 name: Carin Molenaar
 date: 2024-01-19
 comment: added age of participants and added focal to participant
- phase: standardization
 name: Akzira Abuova
 date: 2024-10-28
 comment: the data is complete and can go to the final folder
author_list:
- requested: true
 requested_date: 2024-10-28
 received: true
 received_date: null
emails:
- email_sent_on: null
 email_sent_by: null

email_sent_by_email: null
email_sent_to: null
email_sent_to_email: null
email_type: null
email_comments: null

Annotated yaml only including relevant public metadata information for publication
study_id: sanchez2017chimpanzees

year: 2017

reference: 'Sanchez-Amaro, A., Duguid, S., Call, J., & Tomasello, M. (2017). Chimpanzees, bonobos and children successfully coordinate in conflict situations. Proceedings of the Royal Society B: Biological Sciences, 284(1856): 20170259. Doi:10.1098/rspb.2017.0259.'

abstract: Social animals need to coordinate with others to reap the benefits of group living even when individuals' interests are misaligned. We compare how chimpanzees, bonobos and children coordinate their actions with a conspecific in a Snowdrift game, which provides a model for understanding how organisms coordinate and make decisions under conflict. In study 1, we presented pairs of chimpanzees, bonobos and children with an unequal reward distribution. In the critical condition, the preferred reward could only be obtained by waiting for the partner to act, with the risk that if no one acted, both would lose the rewards. Apes and children successfully coordinated to obtain the rewards. Children used a 'both-partner-pull' strategy and communicated during the task, while some apes relied on an 'only-one-partner-pulls' strategy to solve the task, although there were also signs of strategic behaviour as they waited for their partner to pull when that strategy led to the preferred reward. In study 2, we presented pairs of chimpanzees and bonobos with the same set-up as in study 1 with the addition of a non-social option that provided them with a secure reward. In this situation, apes had to actively decide between the unequal distribution and the alternative. In this set-up, apes maximized their rewards by taking their partners' potential actions into account. In conclusion, children and apes showed clear instances of strategic decision-making to maximize their own rewards while maintaining successful coordination.

Keywords: coordination, conflict, Snowdrift, chimpanzees, bonobos, children

any_data_provided: true

authors:

- author_no: 1
name: Alejandro Sanchez-Amaro
- author_no: 2
name: Shona Duguid
- author_no: 3
name: Josep Call
- author_no: 4
name: Michael Tomasello

experiments:

- experiment_no: 1
data_provided: partial
grouping: dyads
dropouts_no: null
dropout_names: null
group_id: wkprc_bonobo, wkprc_chimpanzee_a
group_id_excluded: 20eipzig_children

```

data_collection_date_provided: true
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age_source_comments: ‘ ‘
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  grouping: dyads
  dropouts_no: null
  dropout_names: null
  group_id: wkprc_bonobo, wkprc_chimpanzee_a
  group_id_excluded: null
  data_collection_date_provided: true
  data_collection_date_source: dataset
  data_collection_date: 2015 – 2016
  data_collection_date_comments: ‘ ‘
  age_source: calculated
  age_source_comments: ‘ ‘
domains:
- domain_no: 1
  general_domain: competition_and_cooperation
  specific_domain: collaboration
cognitive_domain:
  social: true
  physical: false

```

Example of data standardization script

```

import json
import os
with open('config.json', 'r') as f:
    data = json.load(f)
pathway_gen = os.path.abspath(data["python_files"])
pathway_temp = os.path.abspath(data["publications"])
pathway = os.path.join(pathway_temp, "sanchez2017chimpanzees")
original_data_pathway = os.path.join(pathway, "original_data")
complete_path_1 = os.path.join(original_data_pathway, "Sanchez_2017_Dataset_Study1a.csv")
complete_path_2 = os.path.join(original_data_pathway, "Sanchez_2017_Dataset_Study 2.csv")
out_pathway = os.path.join(pathway, "standardized_data")
if not os.path.exists(out_pathway):
    os.makedirs(out_pathway)

import pandas as pd
import numpy as np
import pyreadstat
#open original data files
df1 = pd.read_csv(complete_path_1)
df1['experiment_name']="1a"

```

```

df2 = pd.read_csv(complete_path_2)
df2['experiment_name']="2"

data_frames=[ df1, df2] ##temporarily combine data frames to facilitate data standardization
for index, x in enumerate(data_frames):
    x.columns = map(str.lower, x.columns) ##remove capitalization
    x=x.applymap(lambda s: s.lower() if type(s) == str else s) ##remove capitalization
    x['study_id']="sanchez2017chimpanzees" ##include study_id variable
    x = x.rename(columns={"sex_dyad": "dyad_sex",
        "dyad": "dyad_original", ##rename original dyad column to prevent confusion with standardized
column
        "subject left": "ape", ##initial standardization protocol update subject columns to ape/later updated to
participant to include other species when relevant
        "subject right": "ape_2"})
    x['role']='focal_participant_left' ##clarify roles of participants
    x['role_2']='focal_participant_right'
    x['ape'] = x['ape'].str.rstrip() ##remove extra spaces after names in both participant columns
    x['ape_2'] = x['ape_2'].str.rstrip()
    data_frames[index]=x
new_df=data_frames[0]
fulldf = pd.concat(data_frames, ignore_index=True, sort=False)

for x,y in zip(df_name['wrong'],df_name['right']): ##correct common misspellings of participant names
    fulldf['ape'].replace(x, y, inplace=True)
    fulldf['ape_2'].replace(x, y, inplace=True)

fulldf['dyad']=fulldf.ape.str.cat(fulldf.ape_2, sep='_') ##create standardized dyad column

##add standardized participant information (i.e., sex/species) from WKPRC ape list
comp_path_ape_info = os.path.join(pathway_gen, "apes_includeindatabase.csv")
apedf= pd.read_csv(comp_path_ape_info)
fulldf= fulldf.merge(apedf,left_on='ape', right_on='name', how='left')

comp_path_ape_info_2 = os.path.join(pathway_gen, "apes_includeindatabase_2.csv")
apedf_2 = pd.read_csv(comp_path_ape_info_2)
fulldf= fulldf.merge(apedf_2,left_on='ape_2', right_on='name_2', how='left')

fulldf.columns =fulldf.columns.str.replace(' ', '_') ##replace spaces in variable names with underscore

##update values in variables for clarity by creating temporary columns to allow for easy comparison to
ensure updates were made as intended before renaming updated columns for standardized file
code_list=["position_1_reward_in_social_original", "position_5_rewards_in_social_original"]
for index, x in enumerate(code_list):
    fulldf[x] = fulldf[x].astype(str)
    temp=[]
    for entry in fulldf[x]:
        if entry == 'in':
            entry = "roped_interior_side"
        elif entry == 'out':
            entry = "free_exterior_side"

```

```

temp.append(entry)
fulldf = fulldf.assign(temp_col=temp)
fulldf=fulldf.rename(columns={'temp_col': x+'_codes'})
fulldf
=fulldf.rename(columns={"position_1_reward_in_social_original_codes":"position_1_reward_in_social",
                        "position_5_rewards_in_social_original_codes":"position_5_rewards_in_social"})

##update column names to reflect updated standardization protocol that updated subject/ape to participant
fulldf.rename(columns={"subject_left_pull_latency": "participant_left_pull_latency",
                        "subject_right_pull_latency": "participant_right_pull_latency"}, inplace=True)
##update values in variable columns for clarity
replace_list_1 = ['participant_left_pull_latency', 'participant_right_pull_latency',
                  'pull_latency_participant_right', 'pull_latency_participant_left']
for x in replace_list_1:
    fulldf[x].replace('np', 'no_pull', inplace=True, regex=True)

##calculate and enter participant ages using date of data collection and participant birth dates as noted by
the WKPRC participant list
comp_path_birth_dates = os.path.join(pathway_gen, "apes_age_calculations.csv")
ape_dob = pd.read_csv(comp_path_birth_dates)
fulldf= fulldf.merge(ape_dob, left_on='participant', right_on='name', how='left')

comp_path_birth_dates_2 = os.path.join(pathway_gen, "apes_age_calculations_2.csv")
ape_dob_2 = pd.read_csv(comp_path_birth_dates_2)
fulldf= fulldf.merge(ape_dob_2, left_on='participant_2', right_on='name_2', how='left')

two_participant_lists = [['dodc', 'dob', 'age_in_years'],
                          ['dodc_2', 'dob_2', 'age_in_years_2']]
for x,y,k in two_participant_lists:
    fulldf[x] = fulldf['year'].astype(str) + '-' + fulldf['month'].astype(str) + '-' + fulldf['day'].astype(str)
    fulldf[x] = pd.to_datetime(fulldf[x])
    fulldf[y] = pd.to_datetime(fulldf[y])
    fulldf[k] = (fulldf[x] - fulldf[y]).dt.days//365

##organize data frame in order of standardization protocol in preparation for exporting standardized file
fulldf=fulldf[['study_id', 'experiment_name', 'year', 'month', 'day',
               'participant', 'age_in_years', 'sex', 'role',
               'participant_2', 'age_in_years_2', 'sex_2', 'role_2', 'species', 'dyad', 'dyad_sex',
               'phase', 'session', 'trial',
               'condition', 'pull',
               'focal_participant_left_pull_latency', 'focal_participant_right_pull_latency',
               'get_4', 'get_1',
               'minimum_latency_to_pull', 'pull_binomial',
               'food_in_non_social', 'position_5_rewards_in_social',
               'position_1_reward_in_social',
               'choice_focal_participant_right', 'choice_focal_participant_left',
               'latency_open_door_right',
               'latency_open_door_left',
               'pull_latency_focal_participant_right', 'pull_latency_focal_participant_left',
               'get_focal_participant_right', 'get_focal_participant_left' ]]

```

```

##split experiments into two files and export both standardized data file and corresponding empty
glossary
exp1 = fulldf[fulldf['experiment_name'] == '1a']
exp2 = fulldf[fulldf['experiment_name'] == '2']

experiments = [[exp1, 'sanchez2017chimpanzees_exp1a'],
               [ exp2, 'sanchez2017chimpanzees_exp2']]

for x,y in experiments:
    x = x.dropna(axis=1, how='all')## drop empty rows/columns
    comp_out_path_stand = os.path.join(out_pathway, y+'_standardized.csv')
    x.to_csv(comp_out_path_stand, encoding='utf-8-sig', index=False)
    ##glossaries
    names = x.columns.tolist()
    df = pd.DataFrame(names)
    df = df.rename(columns={0: "column_name"})
    df["description"] = ""
    studyID_glossary=df[["column_name", "description"]]

    comp_out_path_glossary = os.path.join(out_pathway, y+'_glossary.csv')
    studyID_glossary.to_csv(comp_out_path_glossary, encoding='utf-8-sig', index=False)

```

Additional visualization

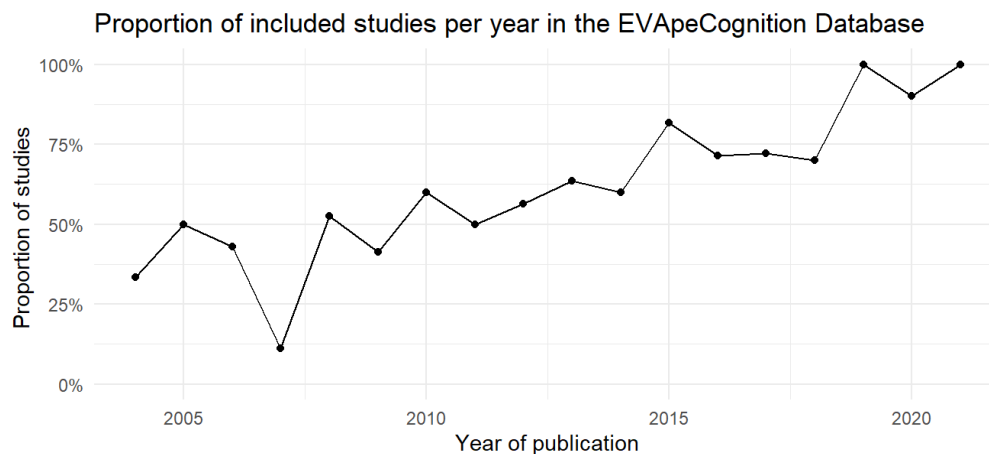


Figure S1: Proportion of studies recovered for the EVApeCognition Database per year of publication.