



Universiteit
Leiden
The Netherlands

Species literacy: the perception and cultural portrayal of animals

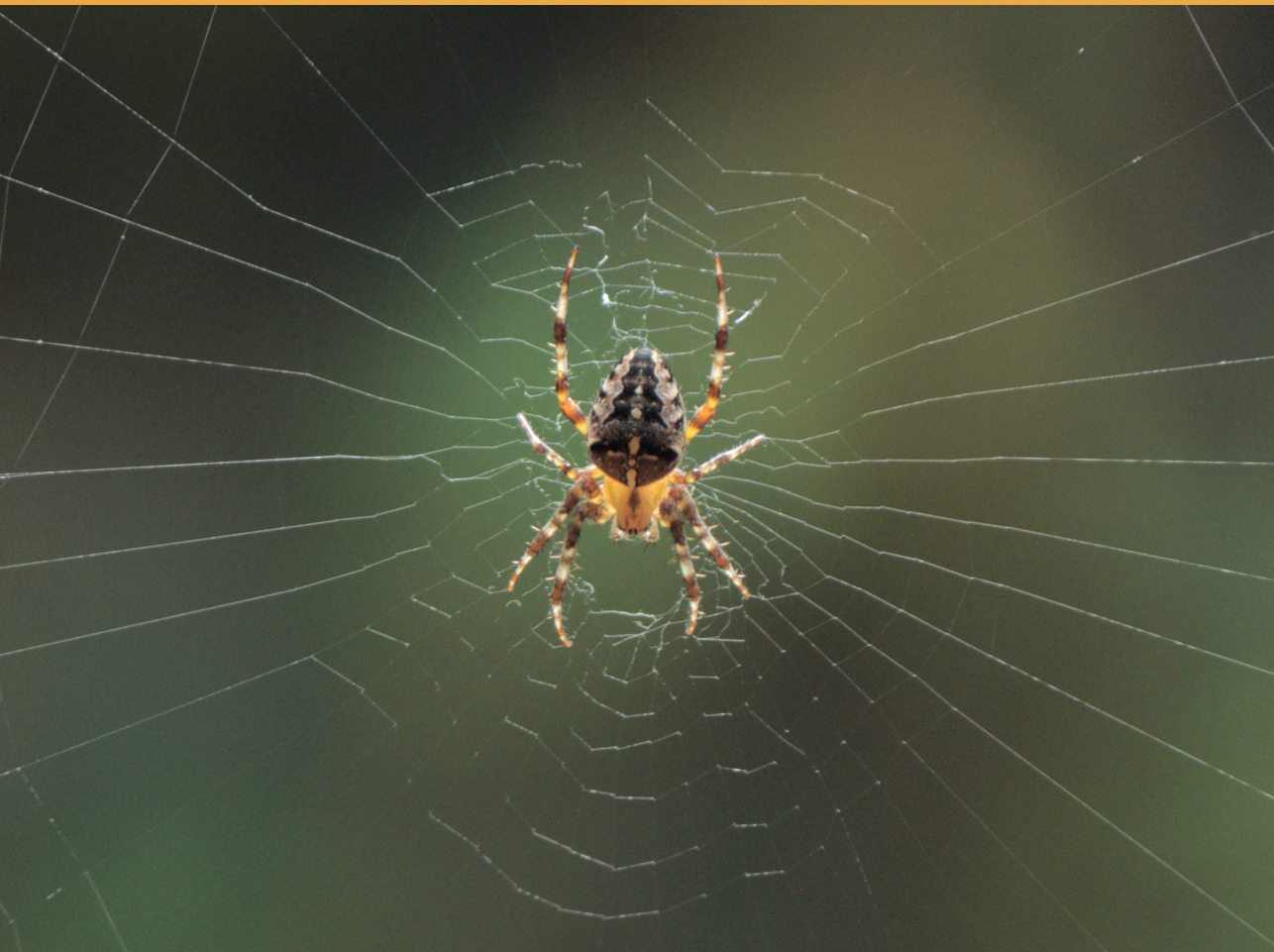
Hooykaas, M.J.D.

Citation

Hooykaas, M. J. D. (2022, June 30). *Species literacy: the perception and cultural portrayal of animals*. Retrieved from <https://hdl.handle.net/1887/3421070>

Version: Not Applicable (or Unknown)
License: [Leiden University Non-exclusive license](#)
Downloaded from: <https://hdl.handle.net/1887/3421070>

Note: To cite this publication please use the final published version (if applicable).



The **cross spider** (Nederlands: **kruisspin**) is usually encountered in late summer and autumn, when the large females are prominent in their orb webs. To show a female his willingness to mate, a male cross spider taps her web rhythmically.

Addendum



REFERENCES

- Admiraal, J. F. (2016). *The tension between nature conservation and economic valuation of ecosystem services* [Leiden University, The Netherlands]. <https://scholarlypublications.universiteitleiden.nl/handle/1887/44588>
- Albert, C., Luque, G. M., & Courchamp, F. (2018). The twenty most charismatic species. *PLoS ONE*, *13*(7), e0199149. <https://doi.org/10.1371/journal.pone.0199149>
- Aldehbiani, A. Y. (2018). Species concept and speciation. *Saudi Journal of Biological Sciences*, *25*(3), 437–440. <https://doi.org/10.1016/j.sjbs.2017.04.013>
- Allen, P. (2013). The elementary child's place in the natural world. *NAMTA Journal*, *38*(1), 147–150.
- Almeida, A., García Fernández, B., & Strecht-Ribeiro, O. (2020). Children's knowledge and contact with native fauna: A comparative study between Portugal and Spain. *Journal of Biological Education*, *54*(1), 17–32. <https://doi.org/10.1080/00219266.2018.1538017>
- Alves, R. R. N., Silva, V. N., Trovão, D. M. B. M., Oliveira, J. V., Mourão, J. S., Dias, T. L. P., Alves, Â. G. C., Lucena, R. F. P., Barboza, R. R. D., Montenegro, P. F. G. P., Vieira, W. L. S., & Souto, W. M. S. (2014). Students' attitudes toward and knowledge about snakes in the semiarid region of Northeastern Brazil. *Journal of Ethnobiology and Ethnomedicine*, *10*(30). <https://doi.org/10.1186/1746-4269-10-30>
- Amer, A. (2006). Reflections on Bloom's revised taxonomy. *Electronic Journal of Research in Educational Psychology*, *4*(1), 213–230.
- Anderson, M. V., & Henderson, A. J. Z. (2005). Pernicious portrayals: The impact of children's attachment to animals of fiction on animals of fact. *Society and Animals*, *13*(4), 297–314. <https://doi.org/10.1163/156853005774653645>
- Apfelbeck, B., Snep, R. P. H., Hauck, T. E., Ferguson, J., Holy, M., Jakoby, C., Scott MacIvor, J., Schär, L., Taylor, M., & Weisser, W. W. (2020). Designing wildlife-inclusive cities that support human-animal co-existence. *Landscape and Urban Planning*, *200*(103817). <https://doi.org/10.1016/j.landurbplan.2020.103817>
- Aubrey, J. S., & Harrison, K. (2004). The gender-role content of children's favorite television programs and its links to their gender-related perceptions. *Media Psychology*, *6*(2), 111–146. https://doi.org/10.1207/s1532785xmep0602_1
- Auster, C. J., & Mansbach, C. S. (2012). The gender marketing of toys: An analysis of color and type of toy on the Disney Store website. *Sex Roles*, *67*(7–8), 375–388. <https://doi.org/10.1007/s11199-012-0177-8>
- Ballovard, J. M., Brischoux, F., & Bonnet, X. (2011). Children prioritize virtual exotic biodiversity over local biodiversity. *PLoS ONE*, *6*(8), e23152. <https://doi.org/10.1371/journal.pone.0023152>
- Balmford, A., Clegg, L., Coulson, T., & Taylor, J. (2002). Why conservationists should heed Pokémon. *Science*, *295*(5564), 2367b. <https://doi.org/10.1126/science.295.5564.2367b>
- Balmford, A., & Cowling, R. M. (2006). Fusion or failure? The future of conservation biology. *Conservation Biology*, *20*(3), 692–695. <https://doi.org/10.1111/j.1523-1739.2006.00434.x>



- Barbas, T. A., Paraskevopoulos, S., & Stamou, A. G. (2009). The effect of nature documentaries on students' environmental sensitivity: A case study. *Learning, Media and Technology*, 34(1), 61–69. <https://doi.org/10.1080/17439880902759943>
- Barker, S., & Slingsby, D. (1998). From nature table to niche: curriculum progression in ecological concepts. *International Journal of Science Education*, 20(4), 479–486. <https://doi.org/10.1080/0950069980200407>
- Barnett, J. T. (2019). Naming, mourning, and the work of earthly coexistence. *Environmental Communication*, 13(3), 287–299. <https://doi.org/10.1080/17524032.2018.1561485>
- Barney, E. C., Mintzes, J. J., & Yen, C.-F. (2005). Assessing knowledge, attitudes, and behavior toward charismatic megafauna: The case of dolphins. *The Journal of Environmental Education*, 36(2), 41–55. <https://doi.org/10.3200/JOEE.36.2.41-55>
- Barrett, M., Belward, A., Bladen, S., Breeze, T., Burgess, N., Butchart, S., Clewlow, H., Cornell, S., Cottam, A., Croft, S., Carlo, G. de, Felice, L. de, Palma, A. De, Deinet, S., Downie, R., Drijver, C., Fischler, B., Freeman, R., Gaffney, O., ... Zwaal, N. (2018). *Living Planet Report - 2018: Aiming higher* (M. Grooten & R. Almond (Eds.)).
- Barrico, L., & Castro, P. (2016). Urban biodiversity and cities' sustainable development. In P. Castro, U. M. Azeiteiro, P. Bacelar-Nicolau, W. L. Filho, & A. M. Azul (Eds.), *Biodiversity and Education for Sustainable Development* (1st ed., pp. 29–42). Springer, Cham. <https://doi.org/10.1007/978-3-319-32318-3>
- Bass, P. F. 3rd, Wilson, J. F., Griffith, C. H., Barnett, D. R., Bass III, P. F., Wilson, J. F., Griffith, C. H., & Barnett, D. R. (2002). Residents' ability to identify patients with poor literacy skills. *Academic Medicine*, 77(10), 1039–1041. <https://doi.org/10.1097/00001888-200210000-00021>
- Batt, S. (2009). Human attitudes towards animals in relation to species similarity to humans: A multivariate approach. *Bioscience Horizons*, 2(2), 180–190. <https://doi.org/10.1093/biohorizons/hzp021>
- Bechlivanis, T. (2019). *Are the new Lacoste logos just recycled greenwashing?* <https://medium.com/@theodore.bechlivanis/are-the-new-lacoste-logos-just-recycled-greenwashing-1038ced91ec3>
- Bergaglio, M. (2017). The contemporary illusion: Population growth and sustainability. *Environment, Development and Sustainability*, 19(5), 2023–2038. <https://doi.org/10.1007/s10668-016-9842-3>
- Berland, J. (2019). *Virtual menageries: Animals as mediators in network cultures* (R. F. Malina & S. Cubitt (Eds.)). MIT Press.
- Bhardwaj, V., & Fairhurst, A. (2010). Fast fashion: Response to changes in the fashion industry. *The International Review of Retail, Distribution and Consumer Research*, 20(1), 165–173. <https://doi.org/10.1080/09593960903498300>
- Bickford, D., Posa, M. R. C., Qie, L., Campos-Arceiz, A., & Kudavidanage, E. P. (2012). Science communication for biodiversity conservation. *Biological Conservation*, 151(1), 74–76. <https://doi.org/10.1016/j.biocon.2011.12.016>
- Bjerke, T., & Østdahl, T. (2004). Animal-related attitudes and activities in an urban

- population. *Anthrozoös*, 17(2), 109–129. <https://doi.org/10.2752/089279304786991783>
- Blakemore, J. E. O. (2003). Children's beliefs about violating gender norms: Boys shouldn't look like girls, and girls shouldn't act like boys. *Sex Roles*, 48(9–10), 411–419. <https://doi.org/10.1023/A:1023574427720>
- Blicharska, M., Smithers, R. J., Mikusiński, G., Rönnbäck, P., Harrison, P. A., Nilsson, M., & Sutherland, W. J. (2019). Biodiversity's contributions to sustainable development. *Nature Sustainability*, 2, 1083–1093. <https://doi.org/10.1038/s41893-019-0417-9>
- Bockmann, F. A., Rodrigues, M. T., Kohlsdorf, T., Cardoso de Pinna, M. C., Mantelatto, F. L. M., Datovo, A., Pombal Jr, J. P., McNamara, J. C., Botelho de Almeida, E. A., Klein, W., Hsiou, A. S., Groppo, M., & Corrêa e Castro, Ricardo Macedo; Amorim, D. de S. (2018). Brazil's government attacks biodiversity. *Science*, 360(6391), 865. <https://doi.org/10.1126/science.aat7540>
- Bonthoux, S., Brun, M., Di Pietro, F., Greulich, S., & Bouché-Pillon, S. (2014). How can wastelands promote biodiversity in cities? A review. *Landscape and Urban Planning*, 132, 79–88. <https://doi.org/10.1016/j.landurbplan.2014.08.010>
- Bornstein, R. F., & D'Agostino, P. R. (1992). Stimulus recognition and the mere exposure effect. *Journal of Personality and Social Psychology*, 63(4), 545–552. <https://doi.org/10.1037/0022-3514.63.4.545>
- Boulton, A. J., Fenwick, G. D., Hancock, P. J., & Harvey, M. S. (2008). Biodiversity, functional roles and ecosystem services of groundwater invertebrates. *Invertebrate Systematics*, 22(2), 103–116. <https://doi.org/10.1071/IS07024>
- Bowen-Jones, E., & Entwistle, A. (2002). Identifying appropriate flagship species: The importance of culture and local contexts. *Oryx*, 36(2), 189–195. <https://doi.org/10.1017/S0030605302000261>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Breuer, G. B., Schlegel, J., Kauf, P., & Rupf, R. (2015). The importance of being colorful and able to fly: Interpretation and implications of children's statements on selected insects and other invertebrates. *International Journal of Science Education*, 37(16), 2664–2687. <https://doi.org/10.1080/09500693.2015.1099171>
- Brundtland, G. H. (1987). Report of the world commission on environment and development: Our common future. In *Brundtland Report*. Oxford University Press.
- Brusca, R. C., Moore, W., & Shuster, S. M. (2016). *Invertebrates* (Third edit). Sinauer Associates, Inc.
- Buijs, A. E., & Elands, B. H. M. (2013). Does expertise matter? An in-depth understanding of people's structure of thoughts on nature and its management implications. *Biological Conservation*, 168, 184–191. <https://doi.org/10.1016/j.biocon.2013.08.020>
- Buijs, A. E., Fischer, A., Rink, D., & Young, J. C. (2008). Looking beyond superficial knowledge gaps: Understanding public representations of biodiversity. *International Journal of Biodiversity Science and Management*, 4(2), 65–80. <https://doi.org/10.3843/Biodiv.4.2>
- Bullock, O. M., Amill, D. C., Shulman, H. C., & Dixon, G. N. (2019). Jargon as a barrier to



- effective science communication: Evidence from metacognition. *Public Understanding of Science*, 28(7), 1–9. <https://doi.org/10.1177/0963662519865687>
- Burgman, M. A. (2016). *Trusting judgements: How to get the best out of experts* (1st ed.). Cambridge University Press.
- Burns, F., Eaton, M. A., Burfield, I. J., Klvanova, A., Silarova, E., Staneva, A., & Gregory, R. D. (2021). Abundance decline in the avifauna of the European Union conceals complex patterns of biodiversity change. *Ecology and Evolution*, 11, 16647–16660. <https://doi.org/10.1002/ece3.8282>
- Burstein, P. (2010). Public opinion, public policy, and democracy. In K. T. Leicht & J. C. Jenkins (Eds.), *Handbook of Politics: State and Society in Global Perspective* (pp. 63–79). Springer. <https://doi.org/10.1007/978-0-387-68930-2>
- Burton, L., & Collins, F. L. (2015). Mediated animal geographies: Symbolism, manipulation and the imaginary in advertising imaginary in advertising. *Social & Cultural Geography*, 16(3), 276–298. <https://doi.org/10.1080/14649365.2014.979863>
- Cardinale, B. J., Duffy, J. E., Gonzalez, A., Hooper, D. U., Perrings, C., Venail, P., Narwani, A., Mace, G. M., Tilman, D., A. Wardle, D., Kinzig, A. P., Daily, G. C., Loreau, M., Grace, J. B., Larigauderie, A., Srivastava, D. S., & Naeem, S. (2012). Biodiversity loss and its impact on humanity. *Nature*, 486(7401), 59–67. <https://doi.org/10.1038/nature11148>
- Carrus, G., Scopelliti, M., Laforteza, R., Colangelo, G., Ferrini, F., Salbitano, F., Agrimi, M., Portoghesi, L., Semenzato, P., & Sanesi, G. (2015). Go greener, feel better? The positive effects of biodiversity on the well-being of individuals visiting urban and peri-urban green areas. *Landscape and Urban Planning*, 134(2015), 221–228. <https://doi.org/10.1016/j.landurbplan.2014.10.022>
- CBD. (2013). *Quick guides to the Aichi Biodiversity Targets* (Issue February). Secretariat of the Convention on Biological Diversity. www.cbd.int/sp
- CBS. (2021). *Bevolkingsteller: Hoeveel mensen wonen er nu in Nederland?* <https://www.cbs.nl/nl-nl/visualisaties/dashboard-bevolking/bevolkingsteller>
- Ceballos, G., Ehrlich, P. R., Barnosky, A. D., García, A., Pringle, R. M., & Palmer, T. M. (2015). Accelerated modern human-induced species losses: Entering the sixth mass extinction. *Sciences Advances*, 1(e1400253). <https://doi.org/10.1126/sciadv.1400253>
- Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the National Academy of Sciences*, 114(30), E6089–E6096. <https://doi.org/10.1073/pnas.1704949114>
- Celis-Diez, J. L., Díaz-Forestier, J., Márquez-García, M., Lazzarino, S., Rozzi, R., & Armesto, J. J. (2016). Biodiversity knowledge loss in children's books and textbooks. *Frontiers in Ecology and the Environment*, 14(8), 408–410. <https://doi.org/10.1002/fee.1324>
- Celis-Diez, J. L., Muñoz, C. E., Abades, S., Marquet, P. A., & Armesto, J. J. (2017). Biocultural homogenization in urban settings: Public knowledge of birds in city parks of Santiago, Chile. *Sustainability*, 9(4), 485. <https://doi.org/10.3390/su9040485>
- Chan, A. A. Y.-H. (2012). Anthropomorphism as a conservation tool. *Biodiversity and*

- Conservation*, 21(7), 1889–1892. <https://doi.org/10.1007/s10531-012-0274-6>
- Chan, K. M. A., Satterfield, T., & Goldstein, J. (2012). Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics*, 74, 8–18. <https://doi.org/10.1016/j.ecolecon.2011.11.011>
- Chapron, G., Kaczensky, P., Linnell, J. D. C., Von Arx, M., Huber, D., Andrén, H., López-Bao, J. V., Adamec, M., Álvares, F., Anders, O., Balečiauskas, L., Balys, V., Bedö, P., Bego, F., Blanco, J. C., Breitenmoser, U., Brøseth, H., Bufka, L., Bunikyte, R., ... Boitani, L. (2014). Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science*, 346(6216), 1517–1519. <https://doi.org/10.1126/science.1257553>
- Chase, M. J., Schlossberg, S., Griffin, C. R., Bouché, P. J. C., Djene, S. W., Elkan, P. W., Ferreira, S., Grossman, F., Kohi, E. M., Landen, K., Omondi, P., Peltier, A., Jeanetta Selier, S. A., & Sutcliffe, R. (2016). Continent-wide survey reveals massive decline in African savannah elephants. *PeerJ*, 4, e2354. <https://doi.org/10.7717/peerj.2354>
- Chawla, L., & Salvadori, I. (2003). Children for cities and cities for children: Learning to know and care about urban ecosystems. In A. R. Berkowitz, C. H. Nilon, & K. S. Hollweg (Eds.), *Understanding Urban Ecosystems: A New Frontier for Science and Education* (pp. 294–314). Springer.
- Cheesman, O. D., & Key, Roger, S. (2007). The extinction of experience: A threat to insect conservation? In A. J. A. Stewart, T. R. New, & O. T. Lewis (Eds.), *Insect conservation biology: Proceedings of the Royal Entomological Society's 23rd Symposium* (pp. 322–348). CAB International. <https://doi.org/10.1079/9781845932541.0383>
- Cheng, J. C.-H., & Monroe, M. C. (2012). Connection to nature: Children's affective attitude toward nature. *Environment and Behavior*, 44(1), 31–49. <https://doi.org/10.1177/0013916510385082>
- Christie, M., Hanley, N., Warren, J., Murphy, K., Wright, R., & Hyde, T. (2006). Valuing the diversity of biodiversity. *Ecological Economics*, 58(2), 304–317. <https://doi.org/10.1016/j.ecolecon.2005.07.034>
- Ćirović, D., Penezić, A., & Krofel, M. (2016). Jackals as cleaners: Ecosystem services provided by a mesocarnivore in human-dominated landscapes. *Biological Conservation*, 199, 51–55. <https://doi.org/10.1016/j.biocon.2016.04.027>
- Clark, N. E., Lovell, R., Wheeler, B. W., Higgins, S. L., Depledge, M. H., & Norris, K. (2014). Biodiversity, cultural pathways, and human health: A framework. *Trends in Ecology and Evolution*, 29(4), 198–204. <https://doi.org/10.1016/j.tree.2014.01.009>
- Clarke, M. (2013). Connecting with nature: Finding out how connected to nature the UK's children are. In *Saving nature – now and in the future*. rspb.org.uk/connectionmeasure
- Clarke, T. A., Reuter, K. E., LaFleur, M., & Schaefer, M. S. (2019). A viral video and pet lemurs on Twitter. *PLoS ONE*, 14(1). <https://doi.org/10.1371/journal.pone.0208577>
- Clucas, B., McHugh, K., & Caro, T. (2008). Flagship species on covers of US conservation and nature magazines. *Biodiversity and Conservation*, 17(6), 1517–1528. <https://doi.org/10.1007/s10531-008-9361-0>
- Coldwell, D. F., & Evans, K. L. (2017). Contrasting effects of visiting urban green- space and



- the countryside on biodiversity knowledge and conservation support. *PLoS ONE*, 12(3), e0174376. <https://doi.org/10.1371/journal.pone.0174376>
- Cole, M., & Stewart, K. (2016). *Our children and other animals: The cultural construction of human-animal relations in childhood*. Routledge. <https://doi.org/10.1080/08927936.2016.1173371>
- Cook, D. T. (2004). *The commodification of childhood: The children's clothing industry and the rise of the child consumer*. Duke University Press. <https://doi.org/10.1515/9780822385431>
- Corbett, S. W., Anderson, B., Nelson, B., Bush, S., Hayes, W. K., & Cardwell, M. D. (2005). Most lay people can correctly identify indigenous venomous snakes. *American Journal of Emergency Medicine*, 23(6), 759–762. <https://doi.org/10.1016/j.ajem.2005.03.008>
- Correia, R. A., Jepson, P. R., Malhado, A. C. M., & Ladle, R. J. (2016). Familiarity breeds content: Assessing bird species popularity with culturomics. *PeerJ*, 4(e1728). <https://doi.org/10.7717/peerj.1728>
- Cosquer, A., Raymond, R., & Prevot-Julliard, A. C. (2012). Observations of everyday biodiversity: A new perspective for conservation? *Ecology and Society*, 17(4). <https://doi.org/10.5751/ES-04955-170402>
- Courchamp, F., Jaric, I., Albert, C., Yves, M., Ripple, W. J., & Chapron, G. (2018). The paradoxical extinction of the most charismatic animals. *PLoS Biology*, 16(4), e2003997. <https://doi.org/10.1371/journal.pbio.2003997>
- Cox, D. T. C., & Gaston, K. J. (2015). Likeability of garden birds: Importance of species knowledge & richness in connecting people to nature. *PLoS ONE*, 10(11), e0141505. <https://doi.org/10.1371/journal.pone.0141505>
- Cox, D. T. C., & Gaston, K. J. (2016). Urban bird feeding: Connecting people with nature. *PLoS ONE*, 11(7), e0158717. <https://doi.org/10.1371/journal.pone.0158717>
- Cox, D. T. C., Hudson, H. L., Shanahan, D. F., Fuller, R. A., & Gaston, K. J. (2017). The rarity of direct experiences of nature in an urban population. *Landscape and Urban Planning*, 160, 79–84. <https://doi.org/10.1016/j.landurbplan.2016.12.006>
- Cracknell, D., White, M. P., Pahl, S., Nichols, W. J., & Depledge, M. H. (2016). Marine biota and psychological well-being. *Environment and Behavior*, 48(10), 1242–1269. <https://doi.org/10.1177/0013916515597512>
- Crewe, L., & Collins, P. (2006). Commodifying children: Fashion, space, and the production of the profitable child. *Environment and Planning A*, 38(1), 7–24. <https://doi.org/10.1068/a35252>
- Curtin, S. (2009). Wildlife tourism: The intangible, psychological benefits of human-wildlife encounters. *Current Issues in Tourism*, 12(5–6), 451–474. <https://doi.org/10.1080/13683500903042857>
- Curtin, S. (2010). What makes for memorable wildlife encounters? Revelations from “serious” wildlife tourists. *Journal of Ecotourism*, 9(2), 149–168. <https://doi.org/10.1080/14724040903071969>
- Cutter-Mackenzie, A., & Smith, R. (2003). Ecological literacy: the ‘missing paradigm’ in environmental education (part one). *Environmental Education Research*, 9(4), 497–524.

- <https://doi.org/10.1080/1350462032000126131>
- Dallimer, M., Irvine, K. N., Skinner, A. M. J., Davies, Z. G., Rouquette, J. R., Maltby, L. L., Warren, P. H., Armsworth, P. R., & Gaston, K. J. (2012). Biodiversity and the feel-good factor: Understanding associations between self-reported human well-being and species richness. *BioScience*, *62*(1), 47–55. <https://doi.org/10.1525/bio.2012.62.1.9>
- Dallimer, M., Tinch, D., Hanley, N., Irvine, K. N., Rouquette, J. R., Warren, P. H., Maltby, L., Gaston, K. J., & Armsworth, P. R. (2013). Quantifying preferences for the natural world using monetary and nonmonetary assessments of value. *Conservation Biology*, *28*(2), 404–413. <https://doi.org/10.1111/cobi.12215>
- Danovaro, R., Gambi, C., Dell'Anno, A., Corinaldesi, C., Fraschetti, S., Vanreusel, A., Vincx, M., & Gooday, A. J. (2008). Exponential decline of deep-sea ecosystem functioning linked to benthic biodiversity loss. *Current Biology*, *18*(1), 1–8. <https://doi.org/10.1016/j.cub.2007.11.056>
- Davey, G. C. L., McDonald, A. S., Hirisave, U., Prabhu, G. G., Iwawaki, S., Jim, C. I., Merkelbach, H., De Jong, P. J., Leung, P. W. L., & C. Reimann, B. (1998). A cross-cultural study of animal fears. *Behaviour Research and Therapy*, *36*(7–8), 735–750. [https://doi.org/10.1016/S0005-7967\(98\)00059-X](https://doi.org/10.1016/S0005-7967(98)00059-X)
- Davies, T., Cowley, A., Bennie, J., Leyshon, C., Inger, R., Carter, H., Robinson, B., Duffy, J., Casalegno, S., Lambert, G., & Gaston, K. (2018). Popular interest in vertebrates does not reflect extinction risk and is associated with bias in conservation investment. *PLoS ONE*, *13*(9), e0203694. <https://doi.org/10.1371/journal.pone.0212101>
- Dayton, P. K., & Sala, E. (2001). Natural History: the sense of wonder, creativity and progress in ecology. *Scientia Marina*, *65*(2), 199–206. <https://doi.org/10.3989/scimar.2001.65s2199>
- De Bruijn, Y., Emmen, R. A. G., & Mesman, J. (2021). Ethnic diversity in children's books in the Netherlands. *Early Childhood Education Journal*, *49*(3), 413–423. <https://doi.org/10.1007/s10643-020-01080-2>
- De Vos, J. M., Joppa, L. N., Gittleman, J. L., Stephens, P. R., & Pimm, S. L. (2014). Estimating the normal background rate of species extinction. *Conservation Biology*, *29*(2), 452–462. <https://doi.org/10.1111/cobi.12380>
- Deinet, S., Ieronymidou, C., McRae, L., Burfield, I. J., Foppen, R. P., Collen, B., & Böhm, M. (2013). Wildlife comeback in Europe: The recovery of selected mammal and bird species. In *Final report to Rewilding Europe by ZSL, BirdLife International and the European Bird Census Council*.
- Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. *California Management Review*, *54*(1), 64–87. <https://doi.org/10.1525/cm.2011.54.1.64>
- DeMello, M. (2012). *Animals and society: An introduction to human-animal studies*. Columbia University Press.
- DeVault, T. L., Rhodes, O. E., & Shivik, J. A. (2003). Scavenging by vertebrates: behavioral, ecological, and evolutionary perspectives on an important energy transfer pathway in terrestrial ecosystems. *Oikos*, *102*(2), 225–234. <https://doi.org/10.1034/j.1600-0706.2003.12378.x>



- Díaz, S., Settele, J., Brondízio, E., Ngo, H. T., Guèze, M., Agard, J., Arneeth, A., Balvanera, P., Brauman, K., Butchart, S., Chan, K., Garibaldi, L. A., Ichii, K., Liu, J., Subramanian, S. M., Midgley, G. F., Miloslavich, P., Molnár, Z., Obura, D., Cynthia, Z. (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. IPBES Secretariat. <https://doi.org/10.5281/zenodo.3553579>
- Dickens, C., Lambert, B. L., Cromwell, T., & Piano, M. R. (2013). Nurse overestimation of patients' health literacy. *Journal of Health Communication, 18*(sup1), 62–69. <https://doi.org/10.1080/10810730.2013.825670>
- Dijkmsa, S. A. M., & Mansveld, W. J. (2013). *Natural capital agenda: Conservation and sustainable use of biodiversity* (pp. 1–12). Government of the Netherlands; Ministry of Economic Affairs and Ministry of Infrastructure and the Environment. <http://en.biodiversiteit.nl/nederlandse-overheid-biodiversiteit/biodiversiteitsbeleid-vanaf-2012>
- Diris, S., & Lambrix, J. (2010). Biodiversity education in and outside the classrooms in Limburg (Belgium). In K. Ulbrich, J. Settele, & F. F. Benedict (Eds.), *Biodiversity in education for sustainable development – reflection on school-research cooperation*. Pensoft Publishers.
- Dirzo, R., Young, H. S., Galetti, M., Ceballos, G., Isaac, N. J. B., & Collen, B. (2014). Defaunation in the Anthropocene. *Science, 345*(6195), 401–406. <https://doi.org/10.1126/science.1251817>
- Divakaran Prathapan, K., Pethiyagoda, R., Bawa, Kamaljit, S., Raven, P. H., & Rajan, P. D. (2018). When the cure kills - CBD limits biodiversity research. *Science, 360*(6396), 1405–1406. <https://doi.org/10.1126/science.aat9844>
- Dixon, S. P., Birchenough, A., Evans, S. M., & Quigley, M. P. (2005). Children's knowledge of birds: How can it be improved and can it be used to conserve wildlife? *Transactions of the Natural History Society of Northumbria, 64*, 121–134.
- Dodd, C. A., Clarke, I., Baron, S., & Houston, V. (2000). "Looking the part": Identity, meaning and culture in clothing purchasing—Theoretical considerations. *Journal of Fashion Marketing and Management, 4*(1), 41–48. <https://doi.org/10.1108/eb022578>
- Douglas, J., & Riphagen, L. (2016). *De kusjeskrokodil [The kisses crocodile]*. De Fontein.
- Dove, J. (2011). Rainforest depiction in children's resources. *Journal of Biological Education, 45*(4), 208–212. <https://doi.org/10.1080/00219266.2010.546696>
- Dreyfus, A., Hebrew, T., & Wals, A. E. J. (1999). Biodiversity as a postmodern theme for environmental education. *Canadian Journal of Environmental Education, 4*(1), 155–176.
- Duffy, J. E., Lefcheck, J. S., Stuart-Smith, R. D., Navarrete, S. A., & Edgar, G. J. (2016). Biodiversity enhances reef fish biomass and resistance to climate change. *Proceedings of the National Academy of Sciences, 113*(22), 6230–6235. <https://doi.org/10.1073/pnas.1524465113>
- Dunn, R. R., Gavin, M. C., Sanchez, M. C., & Solomon, J. N. (2006). The pigeon paradox: Dependence of global conservation on urban nature. *Conservation Biology, 20*(6), 1814–

1816. <https://doi.org/10.1111/j.1523-1739.2006.00533.x>
- Durant, S. M., Mitchell, N., Groom, R., Pettorelli, N., Ipavec, A., Jacobson, A. P., Woodroffe, R., Böhm, M., Hunter, L. T. B., Becker, M. S., Broekhuis, F., Bashir, S., Andresen, L., Aschenborn, O., Beddiah, M., Belbachir, F., Belbachir-Bazi, A., Berbash, A., Brandao de Matos Machado, I., Young-Overton, K. (2017). The global decline of cheetah *Acinonyx jubatus* and what it means for conservation. *Proceedings of the National Academy of Sciences*, *114*(3), 528–533. <https://doi.org/10.1073/pnas.1611122114>
- Duursma, E., Augustyn, M., & Zuckerman, B. (2008). Reading aloud to children: The evidence. *Archives of Disease in Childhood*, *93*(7), 554–557. <https://doi.org/10.1136/adc.2006.106336>
- Elder, J., Coffin, C., & Fariior, M. (1998). *Engaging the public on biodiversity* (Issue August).
- Erwin, P. M., López-Legentil, S., & Schuhmann, P. W. (2010). The pharmaceutical value of marine biodiversity for anti-cancer drug discovery. *Ecological Economics*, *70*(2), 445–451. <https://doi.org/10.1016/j.ecolecon.2010.09.030>
- Eshach, H., & Fried, M. N. (2005). Should science be taught in early childhood? *Journal of Science Education and Technology*, *14*(3), 315–336. <https://doi.org/10.1007/s10956-005-7198-9>
- European Commission. (2013). Attitudes towards biodiversity. In *Report, Flash Eurobarometer 379*. http://ec.europa.eu/commfrontoffice/publicopinion/archives/flash_arch_390_375_en.htm
- European Commission. (2015). *Mid-term review of the EU biodiversity strategy to 2020 EU assessment of progress towards the targets and actions*. http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/mid_term_review_summary.pdf
- Evers, J. (2015a). *Kwalitatief interviewen, kunst én kunde*. Boom Lemma.
- Evers, J. (2015b). *Kwalitatieve analyse: kunst én kunde*. Boom Lemma.
- Falk, J. H. (2005). Free-choice environmental learning: framing the discussion. *Environmental Education Research*, *11*(3), 265–280. <https://doi.org/10.1080/13504620500081129>
- Falk, J. H., & Adelman, L. M. (2003). Investigating the impact of prior knowledge and interest on aquarium visitor learning. *Journal of Research in Science Teaching*, *40*(2), 163–176. <https://doi.org/10.1002/tea.10070>
- Falk, S., Foster, G., Comont, R., Conroy, J., Bostock, H., Salisbury, A., Kilbey, D., Bennett, J., & Smith, B. (2019). Evaluating the ability of citizen scientists to identify bumblebee (*Bombus*) species. *PLoS ONE*, *14*(6), e0218614. <https://doi.org/10.1371/journal.pone.0218614>
- Fančovičová, J., & Prokop, P. (2011). Children's ability to recognise toxic and non-toxic fruits. *Eurasia Journal of Mathematics, Science and Technology Education*, *7*(2), 115–120.
- Feinberg, R. A., Mataro, L., & Burroughs, W. J. (1992). Clothing and social identity. *Clothing and Textiles Research Journal*, *11*(1), 18–23. <https://doi.org/10.1177/0887302X9201100103>
- Feldhamer, G., Whittaker, J., Monty, A., & Weickert, C. (2002). Charismatic mammalian megafauna: public empathy and marketing strategy. *The Journal of Popular Culture*, *36*(1), 160–167. <https://doi.org/10.1111/1540-5931.00037>



- Fernández-Bellon, D., & Kane, A. (2019). Natural history films raise species awareness—A big data approach. *Conservation Letters*, 13(1), e12678. <https://doi.org/10.1111/conl.12678>
- Fiebelkorn, F., & Menzel, S. (2013). Student teachers' understanding of the terminology, distribution, and loss of biodiversity: Perspectives from a biodiversity hotspot and an industrialized country. *Research in Science Education*, 43(4), 1593–1615. <https://doi.org/10.1007/s11165-012-9323-0>
- Fischer, A., & Young, J. C. (2007). Understanding mental constructs of biodiversity: Implications for biodiversity management and conservation. *Biological Conservation*, 136(2), 271–282. <https://doi.org/10.1016/j.biocon.2006.11.024>
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), 219–245. <https://doi.org/10.1177/1077800405284363>
- Fukano, Y., Tanaka, Y., & Soga, M. (2020). Zoos and animated animals increase public interest in and support for threatened animals. *Science of the Total Environment*, 704. <https://doi.org/10.1016/j.scitotenv.2019.135352>
- Fuller, R. A., Irvine, K. N., Devine-Wright, P., Warren, P. H., & Gaston, K. J. (2007). Psychological benefits of greenspace increase with biodiversity. *Biology Letters*, 3(4), 390–394. <https://doi.org/10.1098/rsbl.2007.0149>
- Ganea, P. A., Bloom Pickard, M., & DeLoache, J. S. (2008). Transfer between picture books and the real world by very young children. *Journal of Cognition and Development*, 9(1), 46–66. <https://doi.org/10.1080/15248370701836592>
- Ganea, P. A., Canfield, C. F., Simons-Ghafari, K., & Chou, T. (2014). Do cavies talk? The effect of anthropomorphic picture books on children's knowledge about animals. *Frontiers in Psychology*, 5, 1–9. <https://doi.org/10.3389/fpsyg.2014.00283>
- Ganea, P. A., Ma, L., & DeLoache, J. S. (2011). Young children's learning and transfer of biological information from picture books to real animals. *Child Development*, 82(5), 1421–1433. <https://doi.org/10.1111/j.1467-8624.2011.01612.x>
- Ganzevoort, W., & Born, R. Van Den. (2019). The thrill of discovery: Significant nature experiences among biodiversity citizen scientists. *Ecopsychology*, 11(1), 22–32. <https://doi.org/10.1089/eco.2018.0062>
- Garrard, G. E., Williams, N. S. G., Mata, L., Thomas, J., & Bekessy, S. A. (2018). Biodiversity sensitive urban design. *Conservation Letters*, 11(2), e12411. <https://doi.org/10.1111/conl.12411>
- Gayford, C. (2000). Biodiversity education: A teacher's perspective. *Environmental Education Research*, 6(4), 347–361. <https://doi.org/10.1080/713664696>
- Geerds, M. S. (2016). (Un)Real animals: Anthropomorphism and early learning about animals. *Child Development Perspectives*, 10(1), 10–14. <https://doi.org/10.1111/cdep.12153>
- Geerds, M. S., Van de Walle, G. A., & LoBue, V. (2016). Learning about real animals from anthropomorphic media. *Imagination, Cognition and Personality: Consciousness in Theory, Research, and Clinical Practice*, 36(1), 5–26. <https://doi.org/10.1177/0276236615611798>
- Geerds, M. S., Van De Walle, G., & LoBue, V. (2016). Using animals to teach children biology:

- Exploring the use of biological explanations in children's anthropomorphic storybooks. *Early Education and Development*, 27(8), 1237–1249. <https://doi.org/10.1080/10409289.2016.1174052>
- Genet, S., & Sargent, L. G. (2003). Evaluation of methods and data quality from a volunteer-based amphibian call survey. *Wildlife Society Bulletin*, 31(3), 703–714. <https://doi.org/10.2307/3784590>
- Genovart, M., Tavecchia, G., Enseñat, J. J., & Laiolo, P. (2013). Holding up a mirror to the society: Children recognize exotic species much more than local ones. *Biological Conservation*, 159, 484–489. <https://doi.org/10.1016/j.biocon.2012.10.028>
- Gerbner, G. (1969). Toward “cultural indicators”: The analysis of mass mediated public message systems. *Audio-Visual Communication Review*, 17(2), 137–148. <https://doi.org/10.1007/BF02769102>
- Gerl, T., Randler, C., & Neuhaus, B. J. (2021). Vertebrate species knowledge: an important skill is threatened by extinction. *International Journal of Science Education*, 43(6), 928–948. <https://doi.org/10.1080/09500693.2021.1892232>
- Ghonem-Woets, K. (2009). *Elke dag boekendag! Verslag van een onderzoek naar het voorlezen van prentenboeken in groep 1 en 2 [Everyday book day! Report of a study on the reading of picture books in preschool]*.
- Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2012). Seeking qualitative rigor in inductive research: Notes on the Gioia Methodology. *Organizational Research Methods*, 16(1), 15–31. <https://doi.org/10.1177/1094428112452151>
- Goebster, P. H., Nassauer, J. I., Daniel, T. C., & Fry, G. (2007). The shared landscape: what does aesthetics have to do with ecology? *Landscape Ecology*, 22, 959–972. <https://doi.org/10.1007/s10980-007-9110-x>
- Goodman, J., Knotts, G., & Jackson, J. (2007). Doing dress and the construction of women's gender identity. *Journal of Occupational Science*, 14(2), 100–107. <https://doi.org/10.1080/14427591.2007.9686590>
- Greene, H. W. (2005). Organisms in nature as a central focus for biology. *Trends in Ecology and Evolution*, 20(1), 23–27. <https://doi.org/10.1016/j.tree.2004.11.005>
- Greenhoot, A. F., Beyer, A. M., & Curtis, J. (2014). More than pretty pictures? How illustrations affect parent-child story reading and children's story recall. *Frontiers in Psychology*, 5(738), 1–10. <https://doi.org/10.3389/fpsyg.2014.00738>
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1), 59–82. <https://doi.org/10.1177/1525822X05279903>
- Hailikari, T., Katajavuori, N., & Lindblom-Ylänne, S. (2008). The relevance of prior knowledge in learning and instructional design. *American Journal of Pharmaceutical Education*, 72(5), 113. <https://doi.org/10.5688/aj7205113>
- Hailikari, T., Nevgi, A., & Lindblom-Ylänne, S. (2007). Exploring alternative ways of assessing prior knowledge, its components and their relation to student achievement: A mathematics based case study. *Studies in Educational Evaluation*, 33(3–4), 320–337.



- <https://doi.org/10.1016/j.stueduc.2007.07.007>
- Hanski, I. (2005). Landscape fragmentation, biodiversity loss and the societal response. The long term consequences of our use of natural resources may be surprising and unpleasant. *EMBO Reports*, 6(5), 388–392. <https://doi.org/10.1038/sj.embor.7400398>
- Harlin, R., & Morgan, H. (2009). Review of research: Gender, racial and ethnic misrepresentation in children's books: A comparative look. *Childhood Education*, 85(3), 187–190. <https://doi.org/10.1080/00094056.2009.10521389>
- Hättenschwiler, S., & Gasser, P. (2005). Soil animals alter plant litter diversity effects on decomposition. *Proceedings of the National Academy of Sciences of the United States of America*, 102(5), 1519–1524. <https://doi.org/10.1073/pnas.0404977102>
- Heath, P., Houston-Price, C., & Kennedy, O. B. (2014). Let's look at leeks! Picture books increase toddlers' willingness to look at, taste and consume unfamiliar vegetables. *Frontiers in Psychology*, 5(191), 1–11. <https://doi.org/10.3389/fpsyg.2014.00191>
- Heathcote, G. (2021). Animals of Instagram: Taxonomic bias in science communication online. *Journal of Science Communication*, 20(4), 1–19. <https://doi.org/10.22323/2.20040210>
- Hedblom, M., Heyman, E., Antonsson, H., & Gunnarsson, B. (2014). Bird song diversity influences young people's appreciation of urban landscapes. *Urban Forestry and Urban Greening*, 13(3), 469–474. <https://doi.org/10.1016/j.ufug.2014.04.002>
- Herzog, H. A., & Galvin, S. L. (1992). Animals, archetypes, and popular culture: Tales from the tabloid press. *Anthrozoös*, 5(2), 77–92. <https://doi.org/10.2752/089279392787011494>
- Herzon, I., & Mikk, M. (2007). Farmers' perceptions of biodiversity and their willingness to enhance it through agri-environment schemes: A comparative study from Estonia and Finland. *Journal for Nature Conservation*, 15(1), 10–25. <https://doi.org/10.1016/j.jnc.2006.08.001>
- Hill, K. (2021). Animal-themed tattoo narratives: insights into ontological perspectives. *Anthrozoös*, 34(4), 579–596. <https://doi.org/10.1080/08927936.2021.1914441>
- Hinds, J., & Sparks, P. (2008). Engaging with the natural environment: The role of affective connection and identity. *Journal of Environmental Psychology*, 28(2), 109–120. <https://doi.org/10.1016/j.jenvp.2007.11.001>
- Home, R., Keller, C., Nagel, P., Bauer, N., & Hunziker, M. (2009). Selection criteria for flagship species by conservation organizations. *Environmental Conservation*, 36(2), 139–148. <https://doi.org/10.1017/S0376892909990051>
- Hooykaas, M. J. D., Aten, C., Hemelaar, E. M., Albers, C. J., Schilthuizen, M., & Smeets, I. (2021). Children's species literacy as estimated and desired by biodiversity communicators: A mismatch with the actual level. *BioRxiv*, 1–15. <https://doi.org/10.1101/2021.11.10.466733>
- Hooykaas, M. J. D., Schilthuizen, M., Aten, C., Hemelaar, E. M., Albers, C. J., & Smeets, I. (2019). Identification skills in biodiversity professionals and laypeople: A gap in species literacy. *Biological Conservation*, 238, 108202. <https://doi.org/10.1016/j.biocon.2019.108202>
- Horwitz, P., Lindsay, M., & O'Connor, M. (2001). Biodiversity, endemism, sense of place, and public health: Inter-relationships for Australian Inland aquatic systems. *Ecosystem Health*, 7(4), 253–265. <https://doi.org/10.1046/j.1526-0992.2001.01044.x>

- Hosany, S., Prayag, G., Martin, D., & Lee, W. Y. (2013). Theory and strategies of anthropomorphic brand characters from Peter Rabbit, Mickey Mouse, and Ronald McDonald, to Hello Kitty. *Journal of Marketing Management*, 29(1–2), 48–68. <https://doi.org/10.1080/0267257X.2013.764346>
- Houkema, T. (2010). *De staart van meneer Kat [The tail of mister Cat]*. Gottmer.
- Hsiao, C.-Y., & Shih, P.-Y. (2016). Exploring the effectiveness of picture books for teaching young children the concepts of environmental protection. *International Research in Geographical and Environmental Education*, 25(1), 36–49. <https://doi.org/10.1080/10382046.2015.1106203>
- Huxham, M., Welsh, A., Berry, A., & Templeton, S. (2006). Factors influencing primary school children's knowledge of wildlife. *Journal of Biological Education*, 41(1), 9–12. <https://doi.org/10.1080/00219266.2006.9656050>
- Irvine, K. N., Fuller, R. A., Devine-wright, P., Tratalos, J., Payne, S. R., Warren, P. H., Lomas, K. J., & Gaston, K. J. (2010). Ecological and psychological value of urban green space. In M. Jenks & C. Jones (Eds.), *Dimensions of the Sustainable City* (Vol. 2, pp. 215–237). Springer. https://doi.org/10.1007/978-1-4020-8647-2_10
- IUCN. (2021). *Number of animal species (kingdom: Animalia) in each IUCN Red List Category by class*. <https://www.iucnredlist.org/statistics>
- Jansen, J., Steuten, C. D. M., Renes, R. J., Aarts, N., & Lam, T. J. G. M. (2010). Debunking the myth of the hard-to-reach farmer: Effective communication on udder health. *Journal of Dairy Science*, 93(3), 1296–1306. <https://doi.org/10.3168/jds.2009-2794>
- Jarić, I., Correia, R. A., Roberts, D. L., Gessner, J., Meinard, Y., & Courchamp, F. (2019). On the overlap between scientific and societal taxonomic attentions — Insights for conservation. *Science of the Total Environment*, 648, 772–778. <https://doi.org/10.1016/j.scitotenv.2018.08.198>
- Jensen, E., & Laurie, C. (2016). *Doing real research: A practical guide to social research* (J. Seaman (Ed.); 1st ed.). SAGE Publishing.
- Junge, X., Jacot, K. A., Bosshard, A., & Lindemann-Matthies, P. (2009). Swiss people's attitudes towards field margins for biodiversity conservation. *Journal for Nature Conservation*, 17(3), 150–159. <https://doi.org/10.1016/j.jnc.2008.12.004>
- Justice, L. M., Meier, J., & Walpole, S. (2005). Learning new words from storybooks: An efficacy study with at-risk kindergartners. *Language, Speech, and Hearing Services in Schools*, 36, 17–32. [https://doi.org/10.1044/0161-1461\(2005/003\)](https://doi.org/10.1044/0161-1461(2005/003))
- Kahn, P. H. (2002). Children's affiliations with nature: Structure, development, and the problem of environmental generational amnesia. In P. H. Kahn Jr. & S. R. Kellert (Eds.), *Children and nature: Psychological, sociocultural, and evolutionary investigations* (pp. 93–116). MIT Press.
- Kai, Z., Woan, T. S., Jie, L., Goodale, E., Kitajima, K., Bagchi, R., & Harrison, R. D. (2014). Shifting baselines on a tropical forest frontier: Extirpations drive declines in local ecological knowledge. *PLoS ONE*, 9(1), e86598. <https://doi.org/10.1371/journal.pone.0086598>
- Kaikati, A.M., & Kaikati, J.G. (2004). Stealth marketing: How to reach consumers surreptitiously.



- California Management Review*, 46(4), 6–22. <https://doi.org/10.2307/41166272>
- Kalof, L., Zammit-Lucia, J., Bell, J., & Granter, G. (2015). Fostering kinship with animals: Animal portraiture in humane education. *Environmental Education Research*, 22(2), 203–228. <https://doi.org/10.1080/13504622.2014.999226>
- Kelemen, D., Emmons, N. A., Seston Schillaci, R., & Ganea, P. A. (2014). Young children can be taught basic natural selection using a picture-storybook intervention. *Psychological Science*, 25(4), 893–902. <https://doi.org/10.1177/0956797613516009>
- Kellert, S. R. (1985). Attitudes toward animals: Age-related development among children. *The Journal of Environmental Education*, 16(3), 29–39. <https://doi.org/10.1080/00958964.1985.9942709>
- Kellert, S. R. (1993). Values and perceptions of invertebrates. *Conservation Biology*, 7(4), 845–855. <https://doi.org/10.1046/j.1523-1739.1993.740845.x>
- Kellert, S. R. (2002). Experiencing nature: Affective, cognitive, and evaluative development in children. In P. H. Kahn Jr. & S. R. Kellert (Eds.), *Children and nature: Psychological, Sociocultural, and Evolutionary Investigations* (pp. 117–151). MIT Press.
- Kellert, S. R., & Berry, J. K. (1987). Attitudes, knowledge, and behaviors toward wildlife as affected by gender. *Wildlife Society Bulletin*, 15(3), 363–371. <https://doi.org/10.2307/3782542>
- Kellert, S. R., & Wilson, E. O. (Eds.). (1993). *The biophilia hypothesis*. Island Press.
- Kelly, P. A., & Haidet, P. (2007). Physician overestimation of patient literacy: A potential source of health care disparities. *Patient Education and Counseling*, 66(1), 119–122. <https://doi.org/10.1016/j.pec.2006.10.007>
- Keniger, L. E., Gaston, K. J., Irvine, K. N., & Fuller, R. A. (2013). What are the benefits of interacting with nature? *International Journal of Environmental Research and Public Health*, 10(3), 913–935. <https://doi.org/10.3390/ijerph10030913>
- Kentie, R., Senner, N. R., Hooijmeijer, J. C. E. W., Márquez-Ferrando, R., Figuerola, J., Masero, J. A., Verhoeven, M. A., & Piersma, T. (2016). Estimating the size of the Dutch breeding population of continental black-tailed godwits from 2007–2015 using resighting data from spring staging sites. *Ardea*, 104(3), 213–225. <https://doi.org/10.5253/arde.v104i3.a7>
- Kesebir, S., & Kesebir, P. (2017). A growing disconnection from nature is evident in cultural products. *Perspectives on Psychological Science*, 12(2), 258–269. <https://doi.org/10.1177/1745691616662473>
- Kim, J. Y., Do, Y., Im, R.-Y., Kim, G.-Y., & Joo, G.-J. (2014). Use of large web-based data to identify public interest and trends related to endangered species. *Biodiversity Conservation*, 23, 2961–2984. <https://doi.org/10.1007/s10531-014-0757-8>
- Kimbell, A. R., Schuhmann, A., & Brown, H. (2009). More kids in the woods: Reconnecting Americans with nature. *Journal of Forestry*, 107(7), 373–377.
- Kubiattko, M., & Prokop, P. (2007). Pupils' misconceptions about mammals. *Journal of Baltic Science Education*, 6(1), 5–15.
- Langers, F. (2018). *Recreatie in groenblauwe gebieden; Actualisatie van CLO-indicator 1258*

- (Bezoek aan groenblauwe gebieden) op basis van data van het continu vrijetijdsonderzoek uit 2015 (Vol. 1258). <https://doi.org/10.18174/463400>
- Larragueta, M., & Ceballos-Viro, I. (2018). What kind of book? Selecting picture books for vocabulary acquisition. *The Reading Teacher*, 72(1), 81–87. <https://doi.org/10.1002/trtr.1681>
- Larsen, N. E., Lee, K., & Ganea, P. A. (2017). Do storybooks with anthropomorphized animal characters promote prosocial behaviors in young children? *Developmental Science*, 21(3), e12590. <https://doi.org/10.1111/desc.12590>
- Lash, S. J., & Polyson, J. A. (1988). Reassessment of gender perception in projected animal content. *Perceptual and Motor Skills*, 67(2), 547–553. <https://doi.org/10.2466/pms.1988.67.2.547>
- Leather, S. R., & Quicke, D. J. L. (2009). Where would Darwin have been without taxonomy? *Journal of Biological Education*, 43(2), 51–52. <https://doi.org/10.1080/00219266.2009.9656151>
- Lepczyk, C. A., Mertig, A. G., & Liu, J. (2004). Landowners and cat predation across rural-to-urban landscapes. *Biological Conservation*, 115(2), 191–201. [https://doi.org/10.1016/S0006-3207\(03\)00107-1](https://doi.org/10.1016/S0006-3207(03)00107-1)
- Lerman, S. B., & Warren, P. S. (2011). The conservation value of residential yards: Linking birds and people. *Ecological Applications*, 21(4), 1327–1339. <https://doi.org/10.1890/10-0423.1>
- Lerner, J. E., & Kalof, L. (1999). The animal text: Message and meaning in television advertisements. *Sociological Quarterly*, 40(4), 565–586. <https://www.jstor.org/stable/4121254>
- Lewinsohn, T. M., Attayde, J. L., Fonseca, C. R., Ganade, G., Jorge, L. R., Kollmann, J., Overbeck, G. E., Prado, P. I., Pillar, V. D., Popp, D., da Rocha, P. L. B., Silva, W. R., Spiekermann, A., & Weisser, W. W. (2014). Ecological literacy and beyond: Problem-based learning for future professionals. *Ambio*, 44(2), 154–162. <https://doi.org/10.1007/s13280-014-0539-2>
- Lindemann-Matthies, P. (2002). The influence of an educational program on children's perception of biodiversity. *The Journal of Environmental Education*, 33(2), 22–31. <https://doi.org/10.1080/00958960209600805>
- Lindemann-Matthies, P., & Bose, E. (2008). How many species are there? Public understanding and awareness of biodiversity in Switzerland. *Human Ecology*, 36(5), 731–742. <https://doi.org/10.1007/s10745-008-9194-1>
- Lindemann-Matthies, P., Junge, X., & Matthies, D. (2010). The influence of plant diversity on people's perception and aesthetic appreciation of grassland vegetation. *Biological Conservation*, 143(1), 195–202. <https://doi.org/10.1016/j.biocon.2009.10.003>
- Lindemann-Matthies, P. (2005). 'Loveable' mammals and 'lifeless' plants: How children's interest in common local organisms can be enhanced through observation of nature. *International Journal of Science Education*, 27(6), 655–677. <https://doi.org/10.1080/09500690500038116>
- Lindemann-Matthies, P. (2006). Investigating nature on the way to school: Responses to



- an educational programme by teachers and their pupils. *International Journal of Science Education*, 28(8), 895–918. <https://doi.org/10.1080/10670560500438396>
- Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. Atlantic Books.
- Lucassen, J., Singh, A., Heijnen, E., & Slot-Heijs, J. (2020). *Buitenspelen 2020; Een verkenning van het beleid in Nederland en Europa*.
- Luck, G. W., Davidson, P., Boxall, D., & Smallbone, L. (2011). Relations between urban bird and plant communities and human well-being and connection to nature. *Conservation Biology*, 25(4), 816–826. <https://doi.org/10.1111/j.1523-1739.2011.01685.x>
- MacAbasco-O'Connell, A., & Fry-Bowers, E. K. (2011). Knowledge and perceptions of health literacy among nursing professionals. *Journal of Health Communication*, 16(sup3), 295–307. <https://doi.org/10.1080/10810730.2011.604389>
- Macdonald, E. A., Burnham, D., Hinks, A. E., Dickman, A. J., Malhi, Y., & Macdonald, D. W. (2015). Conservation inequality and the charismatic cat: *Felis felis*. *Global Ecology and Conservation*, 3, 851–866. <https://doi.org/10.1016/j.gecco.2015.04.006>
- Mace, G. M., Norris, K., & Fitter, A. H. (2012). Biodiversity and ecosystem services: A multilayered relationship. *Trends in Ecology and Evolution*, 27(1), 19–25. <https://doi.org/10.1016/j.tree.2011.08.006>
- Macfarlane, R. (2015). The word-hoard: Robert Macfarlane on rewilding our language of landscape. *The Guardian*. <https://www.theguardian.com/books/2015/feb/27/robert-macfarlane-word-hoard-rewilding-landscape>
- Macfarlane, R. (2016). *Landmarks*. Penguin Books.
- Macfarlane, R. (2017, September 30). Badger or Bulbasaur - have children lost touch with nature? *The Guardian*. https://www.theguardian.com/books/2017/sep/30/robert-macfarlane-lost-words-children-nature?CMP=share_btn_link
- Magntorn, O., & Helldén, G. (2005). Student-teachers' ability to read nature: Reflections on their own learning in ecology. *International Journal of Science Education*, 27(March 2015), 1229–1254. <https://doi.org/10.1080/09500690500102706>
- Magntorn, O., & Helldén, G. (2006). Reading nature-experienced teachers' reflections on a teaching sequence in ecology: Implications for future teacher training. *Nordic Studies in Science Education*, 5, 67–81.
- Malone, K. (2007). The bubble-wrap generation: Children growing up in walled gardens. *Environmental Education Research*, 13(4), 513–527. <https://doi.org/10.1080/13504620701581612>
- Mankin, P. C., Warner, R. E., & Anderson, W. L. (1999). Public wildlife and Illinois public: Attitudes of perceptions. *Wildlife Society Bulletin*, 27(2), 465–472.
- Marriott, S. (2002). Red intooth and claw? Images of nature in modern picture books. *Children's Literature in Education*, 33(3), 175–183. <https://doi.org/10.1023/A:1019677931406>
- Martín-López, B., Montes, C., & Benayas, J. (2007). The non-economic motives behind the willingness to pay for biodiversity conservation. *Biological Conservation*, 139(1–2), 67–82. <https://doi.org/10.1016/j.biocon.2007.06.005>

- McCabe, S., & Nekaris, K. A. I. (2018). The impact of subtle anthropomorphism on gender differences in learning conservation ecology in Indonesian school children. *Applied Environmental Education and Communication*, 18(1), 13–24. <https://doi.org/10.1080/1533015X.2018.1427011>
- Mccallum, M. L., & Bury, G. W. (2013). Google search patterns suggest declining interest in the environment. *Biodiversity Conservation*, 22, 1355–1367. <https://doi.org/10.1007/s10531-013-0476-6>
- McClure, C. J. W., Westrip, J. R. S., Johnson, J. A., Schulwitz, S. E., Virani, M. Z., Davies, R., Symes, A., Wheatley, H., Thorstrom, R., Amar, A., Buij, R., Jones, V. R., Williams, N. P., Buechley, E. R., & Butchart, S. H. M. (2018). State of the world's raptors: Distributions, threats, and conservation recommendations. *Biological Conservation*, 227, 390–402. <https://doi.org/10.1016/j.biocon.2018.08.012>
- McCrinkle, C. M. E., & Odendaal, J. S. J. (1994). Animals in books used for preschool children. *Anthrozoös*, 7(2), 135–146. <https://doi.org/10.2752/089279394787001998>
- McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica*, 22(3), 276–282.
- McKinney, M. L. (2006). Urbanization as a major cause of biotic homogenization. *Biological Conservation*, 127(3), 247–260. <https://doi.org/10.1016/j.biocon.2005.09.005>
- McKinney, M. L. (2008). Effects of urbanization on species richness: A review of plants and animals. *Urban Ecosystems*, 11(2), 161–176. <https://doi.org/10.1007/s11252-007-0045-4>
- Miller, J. R. (2005). Biodiversity conservation and the extinction of experience. *Trends in Ecology and Evolution*, 20(8), 430–434. <https://doi.org/10.1016/j.tree.2005.05.013>
- Milstein, T. (2011). Nature identification: The power of pointing and naming. *Environmental Communication*, 5(1), 3–24. <https://doi.org/10.1080/17524032.2010.535836>
- Ministry of Economic Affairs. (2014a). *Convention on biological diversity: Fifth national report of the Kingdom of the Netherlands*.
- Ministry of Economic Affairs. (2014b). *The natural way forward: Government vision 2014*.
- Mohneke, M., Erguvan, F., & Schlüter, K. (2016). Explorative study about knowledge of species in the field of early years education. *The Journal of Emergent Science*, 11, 11–22.
- Mooney, C. (2010). Do scientists understand the public? In *American Academy of Arts & Sciences*.
- Mooney, H., Larigauderie, A., Cesario, M., Elmquist, T., Hoegh-Guldberg, O., Lavorel, S., Mace, G. M., Palmer, M., Scholes, R., & Yahara, T. (2009). Biodiversity, climate change, and ecosystem services. *Current Opinion in Environmental Sustainability*, 1(1), 46–54. <https://doi.org/10.1016/j.cosust.2009.07.006>
- Moreno-Tarín, S., Pina, T., & Domínguez, M. (2021). Worlds apart, drawn together: Bears, penguins and biodiversity in climate change cartoons. *Public Understanding of Science*, 30(4), 384–399. <https://doi.org/10.1177/09636625211992508>
- Morris, J., & Macfarlane, R. (2017). *Lost words*. Penguin Books.
- Mortimer, J. A. J., Greene, T. C., & Mortimer, S. P. (2019). Assessing bird vocalisation identification accuracy using a computer-based quiz. *New Zealand Journal of Zoology*,



- 46(3), 201–224. <https://doi.org/10.1080/03014223.2018.1536068>
- Moss, A., Jensen, E., & Gusset, M. (2014). *A global evaluation of biodiversity literacy in zoo and aquarium visitors* (pp. 1–37). World Association of Zoos and Aquariums (WAZA) Executive Office. https://www.researchgate.net/publication/266444881_A_Global_Evaluation_of_Biodiversity_Literacy_in_Zoo_and_Aquarium_Visitors
- Moss, A., Jensen, E., & Gusset, M. (2017). Probing the link between biodiversity-related knowledge and self-reported proconservation behavior in a global survey of zoo visitors. *Conservation Letters*, 10(1), 33–40. <https://doi.org/10.1111/conl.12233>
- Muratet, A., Pellegrini, P., Dufour, A.-B., Arrif, T., & Chiron, F. (2015). Perception and knowledge of plant diversity among urban park users. *Landscape and Urban Planning*, 137, 95–106. <https://doi.org/10.1016/j.landurbplan.2015.01.003>
- Murnen, S. K., Greenfield, C., Younger, A., & Boyd, H. (2016). Boys act and girls appear: A content analysis of gender stereotypes associated with characters in children’s popular culture. *Sex Roles*, 74(1–2), 78–91. <https://doi.org/10.1007/s11199-015-0558-x>
- Nassauer, J. I. (1995). Messy ecosystems, orderly frames. *Landscape Journal*, 14(2), 161–170. <https://doi.org/10.3368/lj.14.2.161>
- Nates Jimenez, J., & Lindemann-Matthies, P. (2015a). Public knowledge and perception of toads and frogs in three areas of subtropical Southeast China. *Society & Animals*, 23(2), 166–192. <https://doi.org/10.1163/15685306-12341368>
- Nates Jimenez, J., & Lindemann-Matthies, P. (2015b). Public knowledge of, and attitudes to, frogs in Colombia. *Anthrozoös*, 28(2), 319–332. <https://doi.org/10.1080/08927936.2015.11435405>
- National Research Council. (1999). *Perspectives on biodiversity: Valuing its role in an everchanging world*. The National Academy Press. <https://doi.org/10.17226/9589>
- National Research Council. (2000). *How people learn: Brain, mind, experience, and school* (J. D. Bransford, A. L. Brown, R. R. Cocking, M. S. Donovan, & J. W. Pellegrino (Eds.)). The National Academy Press. <https://doi.org/10.17226/9853>
- National Research Council. (2007). *Taking science to school: Learning and teaching science in grades K-8* (R. A. Duschl, H. A. Schweingruber, & A. W. Shouse (Eds.)). The National Academies Press. <https://doi.org/10.17226/11625>
- National Research Council. (2009). *Learning science in informal environments: People, places, and pursuits* (P. Bell, B. Lewenstein, A. W. Shouse, & M. A. Feder (Eds.)). The National Academies Press. <https://doi.org/10.17226/12190>
- Navarro-Perez, M., & Tidball, K. G. (2012). Challenges of biodiversity education: A review of education strategies for biodiversity education. *International Electronic Journal of Environmental Education*, 2(1), 12–30.
- Nemésio, A., Seixas, D. P., & Vasconcelos, H. L. (2013). The public perception of animal diversity: What do postage stamps tell us? *Frontiers in Ecology and the Environment*, 11(1), 9–10. <https://doi.org/10.1890/13.WB.001>
- Niesenbaum, R. A. (2019). The integration of conservation, biodiversity, and sustainability. *Sustainability (Switzerland)*, 11(17). <https://doi.org/10.3390/su11174676>

- Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. *Nature Reviews Earth & Environment*, 1(4), 189–200. <https://doi.org/10.1038/s43017-020-0039-9>
- Nilon, C. H., Aronson, M. F. J., Cilliers, S. S., Dobbs, C., Frazee, L. J., Goddard, M. A., O'Neill, K. M., Roberts, D., Stander, E. K., Werner, P., Winter, M., & Yocom, K. P. (2017). Planning for the future of urban biodiversity: A global review of city-scale initiatives. *BioScience*, 67(4), 332–342. <https://doi.org/10.1093/biosci/bix012>
- Novacek, M. J. (2008). Engaging the public in technology policy. *PNAS*, 105(suppl. 1), 11571–11578. <https://doi.org/10.1073/pnas.0802599105>
- Nyhus, P. J., Sumianto, & Tilson, R. (2003). Wildlife knowledge among migrants in southern Sumatra, Indonesia: Implications for conservation. *Environmental Conservation*, 30(2), 192–199. <https://doi.org/10.1017/S0376892903000183>
- O'Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: A synthesis of recommendations. *Academic Medicine*, 89(9), 1245–1251. <https://doi.org/10.1097/ACM.0000000000000388>
- Ohl, M., Lohrmann, V., Breitzkreuz, L., Kirsche, L., & Krause, S. (2014). The soul-sucking wasp by popular acclaim – Museum visitor participation in biodiversity discovery and taxonomy. *PLoS ONE*, 9(4), e95068. <https://doi.org/10.1371/journal.pone.0095068>
- Olive, A. (2014). Urban awareness and attitudes toward conservation: A first look at Canada's cities. *Applied Geography*, 54, 160–168. <https://doi.org/10.1016/j.apgeog.2014.08.002>
- Orr, D. W. (2005). Ecological Literacy. In J. Pretty (Ed.), *Sustainable Agriculture* (pp. 21–29). James & James.
- Oswald, L. J. (1995). Heroes and victims: The stereotyping of animal characters in children's realistic animal fiction. *Children's Literature in Education*, 26(2), 135–149.
- Owens, S. (2000). 'Engaging the public': Information and deliberation in environmental policy. *Environment and Planning A*, 32(7), 1141–1148. <https://doi.org/10.1068/a3330>
- Paas, F., Renkl, A., & Sweller, J. (2003). Cognitive load theory and instructional design: Recent developments. *Educational Psychologist*, 38(1), 1–4. https://doi.org/10.1207/S15326985EP3801_1
- Pacoureau, N., Rigby, C. L., Kyne, P. M., Sherley, R. B., Winker, H., Carlson, J. K., Fordham, S. V., Barreto, R., Fernando, D., Francis, M. P., Jabado, R. W., Herman, K. B., Liu, K. M., Marshall, A. D., Pollom, R. A., Romanov, E. V., Simpfendorfer, C. A., Yin, J. S., Kindsvater, H. K., & Dulvy, N. K. (2021). Half a century of global decline in oceanic sharks and rays. *Nature*, 589, 567–571. <https://doi.org/10.1038/s41586-020-03173-9>
- Page, B. I., & Shapiro, R. Y. (1983). Effects of public opinion on policy. *The American Political Science Review*, 77(1), 175–190. <https://doi.org/10.2307/1956018>
- Palmberg, I., Berg, I., Jeronen, E., Kärkkäinen, S., Norrgård-Sillanpää, P., Persson, C., Vilkonis, R., & Yli-Panula, E. (2015). Nordic-Baltic student teachers' identification of and interest in plant and animal species: The importance of species identification and biodiversity for sustainable development. *Journal of Science Teacher Education*, 26(6), 549–571. <https://doi.org/10.1007/s10972-015-9438-z>



- Palombo, M. R. (2021). Thinking about the biodiversity loss in this changing world. *Geosciences*, 11(9), 370. <https://doi.org/10.3390/geosciences11090370>
- Papworth, S. K., Rist, J., Coad, L., & Milner-Gulland, E. J. (2009). Evidence for shifting baseline syndrome in conservation. *Conservation Letters*, 2, 93–100. <https://doi.org/10.1111/j.1755-263X.2009.00049.x>
- Parris, K. M., Amati, M., Bekessy, S. A., Dagenais, D., Fryd, O., Hahs, A. K., Hes, D., Imberger, S. J., Livesley, S. J., Marshall, A. J., Rhodes, J. R., Threlfall, C. G., Tingley, R., van der Ree, R., Walsh, C. J., Wilkerson, M. L., & Williams, N. S. G. (2018). The seven lamps of planning for biodiversity in the city. *Cities*, 83, 44–53. <https://doi.org/10.1016/j.cities.2018.06.007>
- Patrick, P., Byrne, J., Tunnicliffe, S. D., Asunta, T., Carvalho, G. S., Havu-Nuutinen, S., Sigurjónsdóttir, H., Óskarsdóttir, G., & Tracana, R. B. (2013). Students (ages 6, 10, and 15 years) in six countries knowledge of animals. *Nordic Studies in Science Education*, 9(1), 18–32. <https://doi.org/10.5617/nordina.624>
- Pauly, D. (1995). Anecdotes and the shifting baseline syndrome of fisheries. *Trends in Ecology and Evolution*, 10(10), 430. [https://doi.org/10.1016/S0169-5347\(00\)89171-5](https://doi.org/10.1016/S0169-5347(00)89171-5)
- Pearson, E., Dorrian, J., & Litchfield, C. (2011). Harnessing visual media in environmental education: Increasing knowledge of orangutan conservation issues and facilitating sustainable behaviour through video presentations. *Environmental Education Research*, 17(6), 751–767. <https://doi.org/10.1080/13504622.2011.624586>
- Penn, J., Penn, H., & Hu, W. (2018). Public knowledge of monarchs and support for butterfly conservation. *Sustainability*, 10(807). <https://doi.org/10.3390/su10030807>
- Pergams, O. R. W., & Zaradic, P. A. (2006). Is love of nature in the US becoming love of electronic media? 16-year downtrend in national park visits explained by watching movies, playing video games, internet use, and oil prices. *Journal of Environmental Management*, 80(4), 387–393. <https://doi.org/10.1016/j.jenvman.2006.02.001>
- Pergams, O. R. W., & Zaradic, P. A. (2008). Evidence for a fundamental and pervasive shift away from nature-based recreation. *Proceedings of the National Academy of Sciences of the United States of America*, 105(7), 2295–2300. <https://doi.org/10.1073/pnas.0709893105>
- Perrenet, J. C. (2010). Levels of thinking in computer science: Development in bachelor students' conceptualization of algorithm. *Education and Information Technologies*, 15(2), 87–107. <https://doi.org/10.1007/s10639-009-9098-8>
- Peterson, M. N., Chesonis, T., Stevenson, K. T., & Bondell, H. D. (2017). Evaluating relationships between hunting and biodiversity knowledge among children. *Wildlife Society Bulletin*, 41(3), 530–536. <https://doi.org/10.1002/wsb.792>
- Peterson, M. N., Sternberg, M., Lopez, A., & Liu, J. (2008). Ocelot awareness among Latinos on the Texas and Tamaulipas border. *Human Dimensions of Wildlife: An International Journal*, 13(5), 339–347. <https://doi.org/10.1080/10871200802227414>
- Pett, T. J., Shwartz, A., Irvine, K. N., Dallimer, M., & Davies, Z. G. (2016). Unpacking the people-biodiversity paradox: A conceptual framework. *BioScience*, 66(7), 576–583. <https://doi.org/10.1093/biosci/biw036>
- Pfister, M. (2008). *Niels wil nog niet slapen [Bertie at bedtime]*. De Vier Windstreken.

- Pilgrim, S. E., Cullen, L. C., Smith, D. J., & Pretty, J. (2008). Ecological knowledge is lost in wealthier communities and countries. *Environmental Science and Technology*, 42(4), 1004–1009. <https://doi.org/10.1021/es070837v>
- Pilgrim, S. E., Smith, D. J., & Pretty, J. (2007). A cross-regional assessment of the factors affecting ecoliteracy: Implications for policy and practice. *Ecological Applications*, 17(6), 1742–1751. <https://doi.org/10.1890/06-1358.1>
- Pimm, S. L., Jenkins, C. N., Abell, R., Brooks, T. M., Gittleman, J. L., Joppa, L. N., Raven, P. H., Roberts, C. M., & Sexton, J. O. (2014). The biodiversity of species and their rates of extinction, distribution, and protection. *Science*, 344(6187), 1246752. <https://doi.org/10.1126/science.1246752>
- Platt, J. R. (2013). Film fakery: Does Shark Week harm conservation efforts? *Scientific American*. <https://blogs.scientificamerican.com/extinction-countdown/film-fakery-does-shark-week-harm-conservation-efforts/>
- Plous, S. (1993). Psychological mechanisms in the human use of animals. *Journal of Social Issues*, 49(1), 11–52. <https://doi.org/10.1111/j.1540-4560.1993.tb00907.x>
- Potter, W. J. (2014). A critical analysis of cultivation theory. *Journal of Communication*, 64(6), 1015–1036. <https://doi.org/10.1111/jcom.12128>
- Poulsen, D., Kintsch, E., Kintsch, W., & Premack, D. (1979). Children's comprehension and memory for stories. *Journal of Experimental Child Psychology*, 28(3), 379–403. [https://doi.org/10.1016/0022-0965\(79\)90070-5](https://doi.org/10.1016/0022-0965(79)90070-5)
- Prévot-Julliard, A. C., Julliard, R., & Clayton, S. (2015). Historical evidence for nature disconnection in a 70-year time series of Disney animated films. *Public Understanding of Science*, 24(6), 672–680. <https://doi.org/10.1177/0963662513519042>
- Prokop, P., Kubiátko, M., & Fančovičová, J. (2007). Why do cocks crow? Children's concepts about birds. *Research in Science Education*, 37(4), 393–405. <https://doi.org/10.1007/s11165-006-9031-8>
- Prokop, P., Kubiátko, M., & Fančovičová, J. (2008). Slovakian pupils' knowledge of, and attitudes toward, birds. *Anthrozoös*, 21(3), 221–235. <https://doi.org/10.2752/175303708X332035>
- Prokop, P., Medina-Jerez, W., Coleman, J., Fancovicová, J., Ōzel, M., & Fedor, P. (2016). Tolerance of frogs among high school students: Influences of disgust and culture. *Eurasia Journal of Mathematics, Science and Technology Education*, 12(6), 1499–1505. <https://doi.org/10.12973/eurasia.2016.1241a>
- Prokop, P., & Rodák, R. (2009). Ability of Slovakian pupils to identify birds. *Eurasia Journal of Mathematics, Science and Technology Education*, 5(2), 127–133. <https://www.ejmste.com/article/ability-of-slovakian-pupils-to-identify-birds-4145>
- Prokop, P., Usak, M., & Erdogan, M. (2011). Good predators in bad stories: Cross-cultural comparison of children's attitudes towards wolves. *Journal of Baltic Science Education*, 10(4), 229–242. <http://oaji.net/articles/2014/987-1410547670.pdf>
- Prokop, P., Usak, M., Erdogan, M., Fancovicova, J., & Bahar, M. (2011). Slovakian and Turkish students' fear, disgust and perceived danger of invertebrates. *Hacettepe University The Journal of Education*, 40, 344–352. http://www.efdergi.hacettepe.edu.tr/shw_artcl-419.html



- Pyle, R. M. (2003). Nature matrix: Reconnecting people and nature. *Oryx*, 37(2), 206–214. <https://doi.org/10.1017/S0030605303000383>
- Pyle, R. M. (2011). *The Thunder Tree: Lessons from an urban wildland*. Oregon State University Press.
- Qiu, L., Lindberg, S., & Nielsen, A. B. (2013). Is biodiversity attractive? - On-site perception of recreational and biodiversity values in urban green space. *Landscape and Urban Planning*, 119, 136–146. <https://doi.org/10.1016/j.landurbplan.2013.07.007>
- Randler, C. (2008a). Pupils' factual knowledge about vertebrate species. *Journal of Baltic Science Education*, 7(1), 48–54. <http://oaji.net/articles/2014/987-1404289078.pdf>
- Randler, C. (2008b). Teaching species identification - A prerequisite for learning biodiversity and understanding ecology. *Eurasia Journal of Mathematics, Science and Technology Education*, 4(3), 223–231. <https://doi.org/10.12973/ejmste/75344>
- Randler, C. (2010). Animal related activities as determinants of species knowledge. *Eurasia Journal of Mathematics, Science and Technology Education*, 6(4), 237–243. <https://doi.org/10.12973/ejmste/75244>
- Randler, C., & Bogner, F. (2006). Cognitive achievements in identification skills. *Journal of Biological Education*, 40(4), 161–165. <https://doi.org/10.1080/00219266.2006.9656038>
- Randler, C., Höllwarth, A., & Schaal, S. (2007). Urban park visitors and their knowledge of animal species. *Anthrozoös*, 20(1), 65–74. <https://doi.org/10.2752/089279307780216696>
- Randler, C., Ilg, A., & Kern, J. (2005). Cognitive and emotional evaluation of an amphibian conservation program for elementary school students. *The Journal of Environmental Education*, 37(1), 43–52. <https://doi.org/10.3200/JOEE.37.1.43-52>
- Randler, C., & Wieland, L. (2010). Knowledge about common vertebrate species in German kindergarten pupils. *Journal of Baltic Science Education*, 9(2), 135–141. <http://oaji.net/articles/2014/987-1405171515.pdf>
- Read, D., & Smith, H. M. (1982). Teaching through visual wordless literacy picture books. *The Reading Teacher*, 35(8), 928–933. <http://www.jstor.org/stable/20198128>
- Reid, W. V., Mooney, H. A., Cropper, A., Capistrano, D., Carpenter, S. R., Chopra, K., Dasgupta, P., Dietz, T., Duraiappah, A. K., Hassan, R., Kaspersen, R., Leemans, R., May, R. M., McMichael, P. P., Samper, C., Scholes, R., Watson, R. T., Zakri, A. H., Shidong, Z., ... Zurek, M. B. (2005). Ecosystems and human well-being: Synthesis. In *Ecosystems* (Vol. 5). <http://www.millenniumassessment.org/documents/document.356.aspx.pdf>
- Reiss, M. J., & Beaney, N. J. (1992). The use of living organisms in secondary school science. *J.Biol.Ed.*, 26(1), 63–66. <https://doi.org/10.1080/00219266.1992.9655245>
- Remmele, M., & Lindemann-Matthies, P. (2018). Like father, like son? On the relationship between parents' and children's familiarity with species and sources of knowledge about plants and animals. *Eurasia Journal of Mathematics, Science and Technology Education*, 14(10), em1581. <https://doi.org/10.29333/ejmste/92287>
- Ribeiro, Carolina, dos S., Koopmans, M. P., & Haringhuizen, G. B. (2018). Threats to timely sharing of pathogen sequence data. *Science*, 362(6413), 404–406. <https://doi.org/10.1126/science.aau5229>

- Riggio, J., Jacobson, A., Dollar, L., Bauer, H., Becker, M., Dickman, A., Funston, P., Groom, R., Henschel, P., de longh, H., Lichtenfeld, L., & Pimm, S. (2013). The size of savannah Africa: A lion's (*Panthera leo*) view. *Biodiversity and Conservation*, 22(1), 17–35. <https://doi.org/10.1007/s10531-012-0381-4>
- Rivas, J. A., & Owens, R. Y. (1999). Teaching conservation effectively: A lesson from life-history strategies. *Conservation Biology*, 13(2), 453–454. <https://doi.org/10.1046/j.1523-1739.1999.013002453.x>
- Roberge, J. M. (2014). Using data from online social networks in conservation science: Which species engage people the most on Twitter? *Biodiversity and Conservation*, 23(3), 715–726. <https://doi.org/10.1007/s10531-014-0629-2>
- Roll, U., Mittermeier, J. C., Diaz, G. I., Novosolov, M., Feldman, A., Itescu, Y., Meiri, S., & Grenyer, R. (2016). Using Wikipedia page views to explore the cultural importance of global reptiles. *Biological Conservation*, 204, 42–50. <https://doi.org/10.1016/j.biocon.2016.03.037>
- Root-Bernstein, M., Douglas, L., Smith, A., & Veríssimo, D. (2013). Anthropomorphized species as tools for conservation: Utility beyond prosocial, intelligent and suffering species. *Biodiversity and Conservation*, 22, 1577–1589. <https://doi.org/10.1007/s10531-013-0494-4>
- Roth, C. E. (1992). *Environmental literacy: Its roots, evolution and directions in the 1990s*.
- Roy, A., & Chattopadhyay, S. P. (2010). Stealth marketing as a strategy. *Business Horizons*, 53(1), 69–79. <https://doi.org/10.1016/j.bushor.2009.09.004>
- Rozzi, R. (2013). Biocultural ethics: From biocultural homogenization toward biocultural conservation. In R. Rozzi, S. T. A. Pickett, C. Palmer, J. J. Armesto, & J. B. Callicott (Eds.), *Linking Ecology and Ethics for a Changing World: Values, Philosophy, and Action* (1st ed., pp. 9–32). Springer Netherlands. https://doi.org/10.1007/978-94-007-7470-4_2
- Sánchez-Bayo, F., & Wyckhuys, K. A. G. (2019). Worldwide decline of the entomofauna: A review of its drivers. *Biological Conservation*, 232, 8–27. <https://doi.org/10.1016/j.biocon.2019.01.020>
- Sandifer, P. A., Sutton-Grier, A. E., & Ward, B. P. (2015). Exploring connections among nature, biodiversity, ecosystem services, and human health and well-being: Opportunities to enhance health and biodiversity conservation. *Ecosystem Services*, 12, 1–15. <https://doi.org/10.1016/j.ecoser.2014.12.007>
- Sarkar, S. (2002). Defining “biodiversity”; Assessing biodiversity. *The Monist*, 85(1), 131–155. <https://www.jstor.org/stable/27903761>
- Scheufele, D. A. (2018). Beyond the choir? The need to understand multiple publics for science. *Environmental Communication*, 12(8), 1123–1126. <https://doi.org/10.1080/17524032.2018.1521543>
- Schilthuizen, M. (2018). *Darwin comes to town: How the urban jungle drives evolution*. Picador.
- Schlegel, J., Breuer, G., & Rupf, R. (2016). Local insects as flagship species to promote nature conservation? A survey among primary school children on their attitudes toward



- invertebrates. *Anthrozoös*, 28(2), 229–245. <https://doi.org/10.1080/08927936.2015.11435399>
- Schlegel, J., & Rupf, R. (2010). Attitudes towards potential animal flagship species in nature conservation: A survey among students of different educational institutions. *Journal for Nature Conservation*, 18(4), 278–290. <https://doi.org/10.1016/j.jnc.2009.12.002>
- Schuetz, J., Soykan, C. U., Distler, T., & Langham, G. (2015). Searching for backyard birds in virtual worlds: Internet queries mirror real species distributions. *Biodiversity and Conservation*, 24, 1147–1154. <https://doi.org/10.1007/s10531-014-0847-7>
- Schultz, M., Tyrrell, T. D., & Ebenhard, T. (2016). *The 2030 agenda and ecosystems - A discussion paper on the links between the Aichi Biodiversity Targets and the Sustainable Development Goals*. SwedBio at Stockholm Resilience Centre.
- Schutte, M. (2010). *Inschatten van het algebraniveau in het voortgezet onderwijs door docenten*. Eindhoven University of Technology.
- Scott, G. W., & Boyd, M. (2014). A potential value of familiarity and experience: Can informal fieldwork have a lasting impact upon literacy? *Education 3-13*, 42(5), 517–527. <https://doi.org/10.1080/03004279.2012.731418>
- Scott, G. W., Boyd, M., Scott, L., & Colquhoun, D. (2015). Barriers to biological fieldwork: What really prevents teaching out of doors? *Journal of Biological Education*, 49(2), 165–178. <https://doi.org/10.1080/00219266.2014.914556>
- Scott, G. W., Goulder, R., Wheeler, P., Scott, L. J., Tobin, M. L., & Marsham, S. (2012). The value of fieldwork in life and environmental sciences in the context of higher education: A case study in learning about biodiversity. *Journal of Science Education and Technology*, 21(1), 11–21. <https://doi.org/10.1007/s10956-010-9276-x>
- Seibold, S., Gossner, M. M., Simons, N. K., Blüthgen, N., Müller, J., Ambarlı, D., Ammer, C., Bauhus, J., Fischer, M., Habel, J. C., Linsenmair, K. E., Nauss, T., Penone, C., Prati, D., Schall, P., Schulze, E. D., Vogt, J., Wöllauer, S., & Weisser, W. W. (2019). Arthropod decline in grasslands and forests is associated with landscape-level drivers. *Nature*, 574(7780), 671–674. <https://doi.org/10.1038/s41586-019-1684-3>
- Sénéchal, M., LeFevre, J. A., Hudson, E., & Lawson, E. P. (1996). Knowledge of storybooks as a predictor of young children's vocabulary. *Journal of Educational Psychology*, 88(3), 520–536. <https://doi.org/10.1037/0022-0663.88.3.520>
- Senzaki, M., Yamaura, Y., Shoji, Y., Kubo, T., & Nakamura, F. (2017). Citizens promote the conservation of flagship species more than ecosystem services in wetland restoration. *Biological Conservation*, 214, 1–5. <https://doi.org/10.1016/j.biocon.2017.07.025>
- Shiple, N. J., & Bixler, R. D. (2017). Beautiful bugs, bothersome bugs, and FUN bugs: Examining human interactions with insects and other arthropods. *Anthrozoös*, 30(3), 357–372. <https://doi.org/10.1080/08927936.2017.1335083>
- Shwartz, A., Turbé, A., Simon, L., & Julliard, R. (2014). Enhancing urban biodiversity and its influence on city-dwellers: An experiment. *Biological Conservation*, 171, 82–90. <https://doi.org/10.1016/j.biocon.2014.01.009>
- Silk, M. J., Crowley, S. L., Woodhead, A. J., & Nuno, A. (2018). Considering connections

- between Hollywood and biodiversity conservation. *Conservation Biology*, 32(3), 597–606. <https://doi.org/10.1111/cobi.13030>
- Small, E. (2016). The value of cartoons for biodiversity conservation. *Biodiversity*, 17(3), 106–114. <https://doi.org/10.1080/14888386.2016.1203818>
- Smith, R. J., Veríssimo, D., Isaac, N. J. B., & Jones, K. E. (2012). Identifying Cinderella species: Uncovering mammals with conservation flagship appeal. *Conservation Letters*, 5(3), 205–212. <https://doi.org/10.1111/j.1755-263X.2012.00229.x>
- Soga, M., & Gaston, K. J. (2016). Extinction of experience: The loss of human-nature interactions. *Frontiers in Ecology and the Environment*, 14(2), 94–101. <https://doi.org/10.1002/fee.1225>
- Soga, M., & Gaston, K. J. (2018). Shifting baseline syndrome: causes, consequences, and implications. *Frontiers in Ecology and the Environment*, 16(4), 222–230. <https://doi.org/10.1002/fee.1794>
- Soga, M., Gaston, K. J., Koyanagi, T. F., Kurisu, K., & Hanaki, K. (2016). Urban residents' perceptions of neighbourhood nature: Does the extinction of experience matter? *Biological Conservation*, 203, 143–150. <https://doi.org/10.1016/j.biocon.2016.09.020>
- Soga, M., Gaston, K. J., Yamaura, Y., Kurisu, K., & Hanaki, K. (2016). Both direct and vicarious experiences of nature affect children's willingness to conserve biodiversity. *International Journal of Environmental Research and Public Health*, 13(6), 529. <https://doi.org/10.3390/ijerph13060529>
- Soga, M., Yamanoi, T., Tsuchiya, K., Koyanagi, T. F., & Kanai, T. (2018). What are the drivers of and barriers to children's direct experiences of nature? *Landscape and Urban Planning*, 180, 114–120. <https://doi.org/10.1016/j.landurbplan.2018.08.015>
- Solbes-Canales, I., Valverde-Montesino, S., & Herranz-Hernández, P. (2020). Socialization of gender stereotypes related to attributes and professions among young Spanish school-aged children. *Frontiers in Psychology*, 11, 609. <https://doi.org/10.3389/fpsyg.2020.00609>
- Somaweera, R., Somaweera, N., & Shine, R. (2010). Frogs under friendly fire: How accurately can the general public recognize invasive species? *Biological Conservation*, 143(6), 1477–1484. <https://doi.org/10.1016/j.biocon.2010.03.027>
- Sorsa, M. A., Kiiikkala, I., & Åstedt-Kurki, P. (2015). Bracketing as a skill in conducting unstructured qualitative interviews. *Nurse Researcher*, 22(4), 8–12. <https://doi.org/10.7748/nr.22.4.8.e1317>
- Sousa, E., Quintino, V., Teixeira, J., & Rodrigues, A. M. (2017). A portrait of biodiversity in children's trade books. *Society & Animals*, 25(3), 257–279. <https://doi.org/10.1163/15685306-12341447>
- Southon, G. E., Jorgensen, A., Dunnett, N., Hoyle, H., & Evans, K. L. (2017). Biodiverse perennial meadows have aesthetic value and increase residents' perceptions of site quality in urban green-space. *Landscape and Urban Planning*, 158, 105–118. <https://doi.org/10.1016/j.landurbplan.2016.08.003>
- Spalding, M., Burke, L., Wood, S. A., Ashpole, J., Hutchison, J., & Zu Ermgassen, P. (2017). Mapping the global value and distribution of coral reef tourism. *Marine Policy*, 82, 104–



113. <https://doi.org/10.1016/j.marpol.2017.05.014>
- Squires, C. (2007). Book marketing and the booker prize. In N. Matthews & N. Moody (Eds.), *Judging a Book by Its Cover: Fans, Publishers, Designers, and the Marketing of Fiction* (pp. 85–97). Ashgate.
- Staats, H., & Hartig, T. (2004). Alone or with a friend: A social context for psychological restoration and environmental preferences. *Journal of Environmental Psychology*, 24(2), 199–211. <https://doi.org/10.1016/j.jenvp.2003.12.005>
- Stagg, B. C., & Donkin, M. E. (2015). Mnemonics are an effective tool for adult beginners learning plant identification. *Journal of Biological Education*, 50(1), 24–40. <https://doi.org/10.1080/00219266.2014.1000360>
- Standish, R. J., Hobbs, R. J., & Miller, J. R. (2013). Improving city life: Options for ecological restoration in urban landscapes and how these might influence interactions between people and nature. *Landscape Ecology*, 28(6), 1213–1221. <https://doi.org/10.1007/s10980-012-9752-1>
- Stibbe, A. (2012). *Animals erased: Discourse, ecology and reconnection with the natural world*. Wesleyan University Press.
- Stibbe, A. (2014). Ecolinguistics and erasure: Restoring the natural world to consciousness. In C. Hart & P. Cap (Eds.), *Contemporary critical discourse studies. Contemporary Studies in Linguistics*. (pp. 583–602). Bloomsbury Academic. <http://www.bloomsbury.com/uk/contemporary-critical-discourse-studies-9781441160775/>
- Storm, K. (2012). *Hoe schat de wiskundedocent het begripsniveau van zijn leerlingen?* Eindhoven University of Technology, the Netherlands.
- Streiner, David, L., Norman, G. R., & Cairney, J. (2015). *Health measurement scales: A practical guide to their development and use* (Fifth). Oxford University Press.
- Strommen, E. (1995). Lions and tigers and bears, oh my! Children's conceptions of forests and their inhabitants. *Journal of Research in Science Teaching*, 32(7), 683–698. <https://doi.org/10.1002/tea.3660320704>
- Strouse, G. A., Nyhout, A., & Ganea, P. A. (2018). The role of book features in young children's transfer of information from picture books to real-world contexts. *Frontiers in Psychology*, 9, 50. <https://doi.org/10.3389/fpsyg.2018.00050>
- Sweller, J., Merrienboer, J. G. van, & Paas, F. G. W. C. (1998). Cognitive architecture and instructional design. *Educational Psychology Review*, 10(3), 251–296.
- Tate, J., & Pelton, M. R. (1980). Human-bear interactions in Great Smoky Mountains National Park. *Bears: Their Biology and Management*, 5(February), 312–321. <https://doi.org/10.2307/3872556>
- Tetlock, P. E., & Gardner, D. (2015). *Supervoorspellers: Goed voorspellen is een manier van denken – en iedereen kan het leren. (Superforecasting)*. Business Contact.
- Thompson, C. W., Aspinall, P., & Montarzino, A. (2008). The childhood factor adult visits to green places and the significance of childhood experience. *Environment and Behavior*, 40(1), 111–143. <https://doi.org/10.1177/0013916507300119>
- Thompson, R. A., & Zampoanga, B. L. (2003). Prior knowledge and its relevance to student

- achievement in introduction to psychology. *Teaching of Psychology*, 30(2), 96–101. https://doi.org/10.1207/S15328023TOP3002_02
- Torkar, G. (2016). Young Slovenian learners' knowledge about animal diversity on different continents. *International Journal of Biology Education*, 5(1), 1–11. <https://doi.org/10.20876/ijobed.07914>
- Trepanier-Street, M. L., & Romatowski, J. A. (1999). The influence of children's literature on gender role perceptions: A reexamination. *Early Childhood Education Journal*, 26(3), 155–159. <https://doi.org/10.1023/A:1022977317864>
- Troudet, J., Grandcolas, P., Blin, A., Vignes-Lebbe, R., & Legendre, F. (2017). Taxonomic bias in biodiversity data and societal preferences. *Scientific Reports*, 7, 9132. <https://doi.org/10.1038/s41598-017-09084-6>
- Tull, D. (1994). Elementary students' responses to questions about plant identification: Response strategies in children. *Science Education*, 78(4), 323–343. <https://doi.org/10.1002/sce.3730780402>
- Tunncliffe, S. D., & Reiss, M. J. (1999). Building a model of the environment: How do children see animals? *Journal of Biological Education*, 33(3), 142–148. <https://doi.org/10.1080/00219266.1999.9655654>
- Turner-Erfort, G. (1997). Public awareness and perceptions of biodiversity. *Transactions of the Illinois State Academy of Science*, 90(3–4), 113–121.
- Turner, W. R., Nakamura, T., & Dinetti, M. (2004). Global urbanization and the separation of humans from nature. *BioScience*, 54(6), 585–590. [https://doi.org/10.1641/0006-3568\(2004\)054\[0585:GUATSO\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2004)054[0585:GUATSO]2.0.CO;2)
- UEBT. (2018). *UEBT biodiversity barometer 2018*. <http://www.biodiversitybarometer.org/>
- UNESCO. (2012). *Education for sustainable development: Good practices in addressing biodiversity*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000220307>
- United Nations. (1992). *Convention on biological diversity*. <http://www.cbd.int/doc/legal/cbd-en.pdf>
- United Nations. (2014). *World urbanization prospects: The 2014 Revision, highlights (ST/ESA/SER.A/352)*. <http://esa.un.org/unpd/wup/Highlights/WUP2014-Highlights.pdf>
- United Nations. (2019). *The sustainable development goals report* (L. Jensen (Ed.)). United Nations Publications. <https://unstats.un.org/sdgs/report/2019/>
- United Nations. (2012). *The future we want: Outcome document of the United Nations Conference on sustainable development*. 1–72. <https://sustainabledevelopment.un.org/futurewewant.htmls/733FutureWeWant.pdf>
- Van den Boorn, C. (2007). *Boomhut of chatroom? Een onderzoek naar de natuurinteresse van Nederlandse kinderen in 2006 en 20 jaar eerder* [Vrije Universiteit Amsterdam]. <https://edepot.wur.nl/62201>
- Van den Eijnden, J. (2015). *Wie stoeit met het boek? Verschillen in de leesopvoeding van vaders en moeders* [Who frolics with the book? Differences in the reading education of fathers and mothers]. <https://www.lezen.nl/publicatie/wie-stoeit-met-het-boek/>
- Van den Heuvel-Panhuizen, M., Van den Boogaard, S., & Doig, B. (2009). Picture books



- stimulate the learning of mathematics. *Australian Journal of Early Childhood*, 34(2), 30–39. <https://doi.org/10.1177/183693910903400305>
- Van Weelie, D., & Wals, A. (2002). Making biodiversity meaningful through environmental education. *International Journal of Science Education*, 24(11), 1143–1156. <https://doi.org/10.1080/09500690210134839>
- Vaske, J. J., Jacobs, M. H., & Sijtsma, M. T. J. (2011). Wildlife value orientations and demographics in The Netherlands. *European Journal of Wildlife Research*, 57, 1179–1187. <https://doi.org/10.1007/s10344-011-0531-0>
- Vázquez-Plass, E. ., & Wunderle, J. M. (2010). Differences in knowledge about birds and their conservation between rural and urban residents of Puerto Rico. *Journal of Caribbean Ornithology*, 23(2), 93–100. <https://www.jco.birdscaribbean.org/index.php/jco/article/view/334>
- Venhuizen, G. J., Hut, R., Albers, C., Stoof, C. R., & Smeets, I. (2019). Flooded by jargon: How the interpretation of water-related terms differs between hydrology experts and the general audience. *Hydrology and Earth System Sciences*, 23(1), 393–403. <https://doi.org/10.5194/hess-23-393-2019>
- Verboom, J., Kralingen, R. van, & Meier, U. (2004). *Teenagers and biodiversity - worlds apart? - An essay on young people's views on nature and the role it will play in their future*. <https://edepot.wur.nl/41890>
- Vincenot, E. C., Collazo, A. M., Wallmo, K., & Koyama, L. (2015). Public awareness and perceptual factors in the conservation of elusive species: The case of the endangered Ryukyu flying fox. *Global Ecology and Conservation*, 3, 526–540. <https://doi.org/10.1016/j.gecco.2015.02.005>
- Vining, J., Merrick, M. S., & Price, E. A. (2008). The distinction between humans and nature: Human perceptions of connectedness to nature and elements of the natural and unnatural. *Human Ecology*, 15(1), 1–11. <https://www.jstor.org/stable/24707479>
- Vrla, S., Whitley, C. T., & Kalof, L. (2020). Inside the yellow rectangle: An analysis of nonhuman animal representations on National Geographic Kids magazine covers. *Anthrozoös*, 33(4), 497–509. <https://doi.org/10.1080/08927936.2020.1771056>
- Wals, A. E. J. (1994). Nobody planted it, it just grew! Young adolescents' perceptions and experiences of nature in the context of urban environmental education. *Children's Environments Quarterly*, 11(3), 1–27. <https://doi.org/10.2307/41515260>
- Wals, A. E. J., & Weelie, D. Van. (1997). Environmental education and the learning of ill-defined concepts: The case of biodiversity. *Southern African Journal of Environmental Education*, 17, 4–11. <https://www.ajol.info/index.php/sajee/article/view/137440>
- Watanabe, M. E. (2015). The Nagoya Protocol on access and benefit sharing. *BioScience*, 65(6), 543–550. <https://doi.org/10.1093/biosci/biv056>
- Waxman, S. R., Herrmann, P., Woodring, J., & Medin, D. L. (2014). Humans (really) are animals: Picture-book reading influences 5-year-old urban children's construal of the relation between humans and non-human animals. *Frontiers in Psychology*, 5, 172. <https://doi.org/10.3389/fpsyg.2014.00172>

- Weilbacher, M. (1993). The renaissance of the naturalist. *Journal of Environmental Education*, 25(1), 4–7. <https://doi.org/10.1080/00958964.1993.9941937>
- Wenny, D. G., DeVault, T. L., Johnson, M. D., Kelly, D., Sekercioglu, C. H., Tomback, D. F., & Whelan, C. J. (2011). Perspectives in ornithology: The need to quantify ecosystem services provided by birds. *The Auk*, 128(1), 1–14. <https://doi.org/10.1525/auk.2011.10248>
- White, P. C. L., Bennett, A. C., & Hayes, E. J. V. (2001). The use of willingness-to-pay approaches in mammal conservation. *Mammal Review*, 31(2), 151–167. <https://doi.org/10.1046/j.1365-2907.2001.00083.x>
- White, P. C. L., Gregory, K. W., Lindley, P. J., & Richards, G. (1997). Economic values of threatened mammals in Britain: A case study of the otter *Lutra lutra* and the water vole *Arvicola terrestris*. *Biological Conservation*, 82(3), 345–354. [https://doi.org/10.1016/S0006-3207\(97\)00036-0](https://doi.org/10.1016/S0006-3207(97)00036-0)
- White, R. L., Eberstein, K., & Scott, D. M. (2018). Birds in the playground: Evaluating the effectiveness of an urban environmental education project in enhancing school children’s awareness, knowledge and attitudes towards local wildlife. *PLoS ONE*, 13(3), e0193993. <https://doi.org/10.1371/journal.pone.0193993>
- Williams, J. A., Podeschi, C., Palmer, N., Schwadel, P., & Meyler, D. (2012). The human-environment dialog in award-winning children’s picture books. *Sociological Inquiry*, 82(1), 145–159. <https://doi.org/10.1111/j.1475-682X.2011.00399.x>
- Wilson, C., & Tisdell, C. (2005). Knowledge of birds and willingness to support their conservation: An Australian case study. *Bird Conservation International*, 15(3), 225–235. <https://doi.org/10.1017/S0959270905000419>
- Winfree, R., Reilly, J. R., Bartomeus, I., Cariveau, D. P., Williams, N. M., & Gibbs, J. (2018). Species turnover promotes the importance of bee diversity for crop pollination at regional scales. *Science*, 359(6377), 791–793. <https://doi.org/10.1126/science.aao2117>
- Wissman, K. K. (2019). Reading radiantly: Embracing the power of picturebooks to cultivate the social imagination. *Bookbird: A Journal of International Children’s Literature*, 57(1), 14–25. <https://doi.org/https://doi.org/10.1353/bkb.2019.0002>
- Worldometers.info. (2019). *Countries in the world by population (2019)*. <https://www.worldometers.info/world-population/population-by-country/>
- Worldometers.info. (2021a). *Netherlands Population*. <https://www.worldometers.info/world-population/netherlands-population/>
- Worldometers.info. (2021b). *World population milestones*. <https://www.worldometers.info/world-population/>
- Wratten, S. D., & Hodge, S. (1999). The use and value of prior knowledge assessments in ecology curriculum design. *Journal of Biological Education*, 33(4), 201–203. <https://doi.org/10.1080/00219266.1999.9655666>
- Wu, J. (2010). Urban sustainability: An inevitable goal of landscape research. *Landscape Ecology*, 25(1), 1–4. <https://doi.org/10.1007/s10980-009-9444-7>
- WWF. (2020). *Living Planet Report 2020: Bending the curve of biodiversity loss* (R. E. A. Almond, M. Grooten, & T. Petersen (Eds.)).



- Yli-Panula, E., & Matikainen, E. (2014). Students and student teachers' ability to name animals in ecosystems: A perspective of animal knowledge and biodiversity. *Journal of Baltic Science Education*, 13(4), 559–572. <https://doi.org/10.33225/jbse/14.13.559>
- Yong, D. L., Fam, S. D., & Lum, S. (2011). Reel conservation: Can big screen animations save tropical biodiversity? *Tropical Conservation Science*, 4(3), 244–253. <https://doi.org/10.1177/194008291100400302>
- Young, H. S., McCauley, D. J., Galetti, M., & Dirzo, R. (2016). Patterns, causes, and consequences of Anthropocene defaunation. *Annual Review of Ecology, Evolution, and Systematics*, 47(1), 333–358. <https://doi.org/10.1146/annurev-ecolsys-112414-054142>
- Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology*, 9(2), 1–27. <https://doi.org/10.1037/h0025848>

Appendix 2.1

Guidelines used to score the answers provided during the species identification test. A more elaborate overview of the guidelines can be found in the Online Supplementary Materials (S_Ch2_Scoring_Guide).

Type of answer	Example	Score
Correct answer:		
correct (everyday/partial) name	e.g. 'fox' (instead of 'red fox')	1
Correct answer in a different language	e.g. 'rotfuchs' (instead of 'red fox')	1
Multiple correct answers	e.g. 'fox, Vulpes vulpes'	1
Correct specification	e.g. 'mammal - fox' or 'fox, mammal'	1
Spelling mistakes	e.g. 'red ffox'; e.g. 'foks'	1
Correct answer with a sign of doubt	e.g. 'fox?'	1
Correct name of female or male of the species	e.g. 'vixen'	1
'Neutral additions' to a correct answer	e.g. 'nice fox'; e.g. 'Eurasian fox'; e.g. 'hungry fox'; e.g. 'forest fox'; e.g. 'small fox'	1
Incorrect answer	e.g. 'don't know'; e.g. 'dog' (when 'fox' is asked for)	0
Both correct and incorrect answer	e.g. 'fox, wolf'	0
'Group/broad thinking'	e.g. 'a fox like animal'	0
Negative answer	e.g. 'not a fox'	0
Unclear/incorrect specification	e.g. 'fox or mammal'; e.g. 'fox - rodent'	0
Name of an animal character from cartoons or fables without the correct species name	e.g. 'Reynard'	0
Additions that turn a correct answer into an incorrect answer	e.g. 'snow fox'	0



Appendix 3.1

Identification and in-depth knowledge rates among laypeople and professionals.

Species	% Identification			% In-depth knowledge			% In-depth knowledge when correctly identified		
	Lay	Profs	All	Lay	Profs	All	Lay	Profs	All
Origin									
American bison	87.9	93.5	89.4	77.0	85.3	79.3	84.0	88.6	85.3
Cardinal tetra	47.3	65.8	52.2	42.0	50.9	44.4	50.0	60.8	53.7
Jaguar	40.1	59.5	45.3	29.0	49.9	34.6	54.4	74.6	61.4
White-handed gibbon	69.8	87.8	74.7	49.0	58.4	51.5	52.4	61.1	55.1
Fire salamander	49.1	69.0	54.4	33.6	61.1	40.9	53.2	82.0	63.0
American alligator	32.7	45.8	36.3	40.4	49.5	43.0	87.0	87.6	87.4
European badger	78.7	92.2	82.3	81.7	91.8	84.5	94.2	96.9	95.0
Eurasian bullfinch	40.5	62.5	46.4	71.7	81.7	74.4	92.6	95.5	93.6
Emu	69.2	72.6	70.1	54.9	64.9	57.5	60.1	72.3	63.5
Capybara	91.3	97.3	92.9	63.9	80.1	68.2	66.8	81.6	70.9
Black-footed penguin	76.6	78.8	77.1	27.1	57.5	35.2	27.6	61.9	37.1
Common wombat	90.1	95.3	91.5	76.6	88.0	79.6	81.4	90.6	83.9
Secretarybird	67.6	84.1	72.0	58.3	72.2	62.0	65.9	79.6	70.2
Cougar	73.6	87.9	77.4	57.1	76.0	62.1	68.7	82.4	72.8
Red-bellied piranha	82.1	91.2	84.5	76.4	83.0	78.2	82.6	87.8	84.1
Habitat									
Meerkat	98.5	99.3	98.8	96.4	99.3	97.2	96.9	99.5	97.6
Chamois	46.3	62.1	50.4	82.5	85.5	83.3	90.5	94.0	91.6
Goldcrest	53.2	75.3	59.2	32.5	53.9	38.3	41.9	63.7	49.4
Okapi	93.0	97.0	94.1	25.4	50.2	32.1	26.2	51.1	33.1
Fallow deer	78.4	83.4	79.7	68.1	80.0	71.3	74.9	87.0	78.2
Common crossbill	47.1	67.5	52.6	37.1	55.5	42.1	51.0	70.4	57.9
Black-tailed prairie dog	28.5	49.4	34.2	20.7	38.1	25.4	61.4	73.1	66.0
Eurasian red squirrel	87.8	93.6	89.4	97.5	98.7	97.9	98.9	99.2	99.0
Bearded reedling	35.4	62.6	42.9	38.5	60.3	44.3	64.0	81.0	70.6
Naked mole-rat	92.1	96.8	93.4	44.0	66.5	50.0	45.4	67.8	51.6
Southern ground hornbill	47.2	66.7	52.7	26.2	41.5	30.4	34.6	52.8	40.9
Malayan tapir	84.0	91.9	86.1	73.0	84.3	76.1	77.6	86.4	80.1
Black-tailed godwit	62.9	78.1	67.0	93.5	97.0	94.5	96.6	99.0	97.3
Fennec fox	37.8	66.9	45.7	43.0	72.4	51.1	80.3	93.6	85.7
Polar bear	99.7	100.0	99.8	99.9	100.0	99.9	99.9	100.0	99.9

Species	% Identification			% In-depth knowledge			% In-depth knowledge when correctly identified		
	Lay	Profs	All	Lay	Profs	All	Lay	Profs	All
Diet									
Common kingfisher	89.6	96.9	91.4	72.2	91.3	77.2	80.3	94.2	84.2
European goldfinch	49.1	73.0	55.3	44.5	66.2	50.2	67.1	82.4	72.5
Eurasian otter	67.9	86.8	72.8	64.3	85.0	69.6	90.0	96.6	92.0
Peregrine falcon	47.1	66.9	52.3	21.3	45.6	27.7	33.4	60.8	42.7
European green woodpecker	58.5	79.2	63.9	14.8	30.0	18.8	17.4	34.9	23.1
European mole	99.1	99.6	99.2	86.0	91.5	87.3	86.3	91.6	87.6
Bearded vulture	40.7	63.1	46.6	6.9	24.5	11.5	13.0	36.5	21.3
Barn swallow	62.4	81.8	67.4	69.3	84.2	73.1	85.1	93.5	87.7
Common eider	47.4	69.0	53.0	21.6	40.7	26.6	25.3	48.2	33.1
Koala	98.8	99.6	99.0	75.5	83.5	77.5	76.0	83.5	77.9
Coconut lorikeet	55.2	71.2	59.4	14.4	34.0	19.5	21.6	45.7	29.2
Marine iguana	48.2	65.2	52.7	29.1	51.5	35.0	54.9	73.7	60.9
Wolf	88.7	96.1	90.6	53.8	70.3	58.1	56.7	71.6	60.8
Gelada	8.4	27.2	13.3	5.6	19.7	9.2	49.6	65.0	57.9
Giant panda	99.8	100.0	99.8	97.6	98.7	97.9	97.7	98.7	98.0
Behavior									
White stork	93.7	97.0	94.5	87.2	94.3	89.0	90.2	95.4	91.6
Roe deer	70.4	77.5	72.1	34.6	58.7	40.9	39.0	65.1	46.4
Red deer	86.5	93.2	88.2	81.3	89.7	83.4	84.5	91.8	86.4
European robin	96.2	98.5	96.8	78.9	88.7	81.4	79.9	89.3	82.3
Leopard seal	30.1	51.8	35.9	18.5	37.9	23.6	42.2	61.7	49.5
Long-tailed tit	72.9	82.4	75.3	27.4	44.6	32.5	32.1	51.6	37.8
Common cuckoo	44.3	68.3	50.6	50.5	72.5	56.3	97.1	98.9	97.6
Common shelduck	33.7	64.3	41.7	22.8	44.0	28.3	38.6	58.9	46.9
African wild dog	49.6	73.5	55.9	23.0	40.9	27.7	36.1	52.1	41.6
Northern pike	83.4	91.8	85.5	69.1	80.6	72.1	73.3	82.5	76.0
Grass snake	30.1	53.9	36.3	29.7	35.8	31.4	50.9	53.9	52.2
Tufted duck	71.5	81.1	74.0	73.7	81.0	75.6	74.3	82.6	76.8
Red-backed shrike	28.0	53.2	34.6	26.7	52.0	33.4	59.9	80.4	68.1
European hare	91.5	95.3	92.5	39.4	48.2	41.7	41.4	49.0	43.5
Common warthog	62.5	73.7	65.2	12.4	21.5	14.9	15.1	25.7	18.3



Appendix 3.2

Odds ratios (ORs) for in-depth species knowledge among professionals and laypeople who did or did not correctly identify species, and Pearson correlations between species identification and in-depth species knowledge (subdivided into four themes).

	N	OR	95%	CI	<i>r</i>	<i>p</i>
Professionals						
Origin	920	9.38	8.56	10.28	0.73	<0.01
Habitat	985	8.36	7.66	9.13	0.75	<0.01
Diet	956	20.67	18.43	23.18	0.77	<0.01
Behavior	957	8.51	7.76	9.33	0.77	<0.01
Total	1,909	10.09	9.63	10.57	0.83	<0.01
Laypeople						
Origin	2,543	4.81	4.59	5.03	0.67	<0.01
Habitat	2,650	4.94	4.72	5.16	0.63	<0.01
Diet	2,681	13.19	12.46	13.96	0.70	<0.01
Behavior	2,644	6.05	5.77	6.35	0.66	<0.01
Total	5,259	6.25	6.10	6.40	0.76	<0.01
All respondents						
Origin	3,494	5.75	5.52	5.99	0.72	<0.01
Habitat	3,680	5.72	5.50	5.95	0.71	<0.01
Diet	3,675	15.05	14.31	15.82	0.76	<0.01
Behavior	3,649	6.75	6.48	7.04	0.73	<0.01
Total	7,249	7.18	7.04	7.33	0.81	<0.01

Appendix 4.1

Comparison between the prevalence of the most featured animal classes, orders, families, and species on clothes marketed at boys and girls.

	Boys (n=526)	Girls (n=296)	χ^2	φ_c
Class				
Mammals	47.5%	65.5%	24.74***	0.173
Dinosaurs	43.5%	0.0%	178.63***	0.466
Birds	4.4%	13.2%	21.05***	0.160
Insects	0.0%	20.6%	117.09***	0.377
Order				
Carnivores	29.5%	22.0%	5.45	0.081
Saurischian dinosaurs	25.7%	0.0%	90.90***	0.333
Even-toed ungulates and cetaceans	9.7%	14.5%	4.37	0.073
Rodents	5.3%	16.9%	29.52***	0.189
Ornithischian dinosaurs	13.9%	0.0%	45.08***	0.234
Butterflies and moths	0.0%	19.9%	112.95***	0.371
Rabbits, hares, and pikas	0.2%	6.4%	30.96***	0.194
Songbirds	0.6%	5.4%	19.61***	0.154
Pterosaurs	2.9%	0.0%	8.60*	0.102
Odd-toed ungulates	1.1%	2.7%	2.76	0.058
Family				
Canids	12.7%	4.1%	16.44***	0.141
Felids	6.8%	13.5%	10.04*	0.111
Deer	7.8%	11.1%	2.60	0.056
Mice	4.4%	15.5%	30.72***	0.193
Tyrannosaurids	10.6%	0.0%	33.82***	0.203
Bears	7.2%	3.0%	6.15	0.086
Ceratopsids	5.5%	0.0%	16.92***	0.143
Stegosaurids	5.3%	0.0%	16.31***	0.141
Rabbits and hares	0.2%	6.4%	30.96***	0.194
Brush-footed butterflies	0.0%	6.1%	32.70***	0.199
Pteranodontids	2.9%	0.0%	8.60*	0.102
Species				
House mouse	4.4%	15.5%	30.72***	0.193
Dog	10.3%	2.0%	19.00***	0.152
Brown bear	4.4%	0.3%	10.88*	0.115












Cougar	2.5%	3.4%	0.57	0.026
Moose	2.9%	2.7%	0.02	0.004
Domestic cat	0.6%	6.1%	23.11***	0.168
Reindeer	2.5%	2.0%	0.17	0.014
Tiger	3.0%	0.3%	6.84	0.091
T-rex	2.7%	0.0%	8.02	0.099

Note: Only classes, orders, families, and species with expected cell counts above 5 were included in the table. χ^2 = Chi square value; ϕc = effect size (phi coefficient or Cramer's V); * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

Appendix 5.1

Specificity of text references per class.

		Total number of text references	Species	Genus	Family	Order	Class	Other
	Mammals	445	61.3%	5.6%	27.9%	5.2%	0.0%	0.0%
	Birds	211	21.8%	4.7%	24.6%	7.1%	41.7%	0.0%
	Insects	44	11.4%	2.3%	34.1%	47.7%	4.5%	0.0%
	Reptiles	34	0.0%	0.0%	52.9%	44.1%	2.9%	0.0%
	Bony fish	30	20.0%	3.3%	10.0%	0.0%	0.0%	66.7%
	Dinosaurs	27	0.0%	14.8%	0.0%	0.0%	85.2%	0.0%
	"Other invertebrates"	26	7.7%	0.0%	15.4%	42.3%	30.8%	3.8%
	Amphibians	11	9.1%	0.0%	0.0%	90.9%	0.0%	0.0%
	Cartilaginous fish	1	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%

Note: Percentages indicate the proportion of references at the species, genus, family, order, class, or 'other' level.












Appendix 5.2

Prevalence of different types of anthropomorphism in main, supporting, and minor characters.

		Type of Anthropomorphism			
		Clothing	Behavior	Facial features	Any form
Role	Main	34.2%	81.9%	91.0%	96.1%
	Supp.	17.8%	40.3%	55.5%	63.2%
	Minor	11.1%	15.1%	19.9%	29.2%
	Total	14.3%	25.9%	33.5%	42.1%

Appendix 5.3

Prevalence of different types of anthropomorphism per class.

	Class	Total	Type of Anthropomorphism			
			Clothing	Behavior	Facial features	Any form
	Amphibians	30	20.0%	53.3%	46.7%	70.0%
	Mammals	983	22.4%	37.3%	46.0%	57.3%
	Reptiles	90	10.0%	24.4%	52.2%	56.7%
	"Other invertebrates"	105	4.8%	14.3%	41.9%	43.8%
	Insects	220	9.1%	20.5%	34.1%	37.7%
	Birds	617	9.4%	16.7%	13.6%	23.2%
	Cartilaginous fish	5	0.0%	20.0%	20.0%	20.0%
	Bony fish	128	1.6%	3.9%	17.2%	18.8%
	Dinosaurs	59	1.7%	8.5%	16.9%	16.9%
	Total	2237	321	579	749	942

Note: The proportion of animals portrayed anthropomorphically was higher for amphibians than for mammals, but statistical testing revealed that this difference was not significant ($\chi^2(1) = 1.93$, $p = .165$, Cramér's $V = 0.04$).



Overview supplementary materials (Online)

The following supplementary materials can be found in the online repository 4TU.ResearchData (doi: 10.4121/19673580):

Chapter 2

S_Ch2_Questionnaire

S_Ch2_Scoring_Guide

S_Ch2_Datasheet

Chapter 3

S_Ch3_Questionnaire

S_Ch3_Datasheet

Chapter 4

S_Ch4_Codebook

S_Ch4_Datasheet

Chapter 5

S_Ch5_Booklist

S_Ch5_Codebook

S_Ch5_Datasheet

Chapter 6

S_Ch6_Questionnaire

S_Ch6_Datasheet

Chapter 7

S_Ch7_Interview_Guide

S_Ch7_Consent_Form

