LETTER

REPLY TO AUERSPERG ET AL.: Puffin tool use is no fluke

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Auersperg et al. (1) question whether our observations (2) provide compelling evidence of tool use in puffins. While we welcome their possible alternative explanations in which birds picked up sticks for another purpose, then scratched only accidentally, we argue that 1) these other purposes are unlikely given the behavioral ecology of our study populations but 2) regardless, they are not mutually exclusive with the subsequent behavior qualifying as tool use, and 3) careful examination of the video evidence refutes interpretation as merely an accidental application of the object.

Puffins on our colonies prefer soft nest material (in Iceland, E.S.H.'s endoscope inspections of more than 1,000 nests revealed exclusively grass and feathers), and the sticks were not taken into nests. As for the suggestion of courtship, displays with sticks have never been seen in puffins on our colonies (nor, to our knowledge, elsewhere). Furthermore, our observations were made during chick rearing, beyond the peak of courtship and nest making.

However, even if the stick initially had another purpose, this would not preclude the actions that followed from representing tool use. Object manipulation is often discussed as a precursor—developmentally and evolutionarily—to tool use (3, 4), and many tool-using animals handle objects well before they begin to use them as tools (e.g., refs. 5 and 6). Furthermore, careful viewing of our footage shows that the bird's movements were precise and delicate: Its head stops in time such that the stick neither bumps against the body nor shifts/dislodges from the beak, and upon contact the head moves side to side in a scratching motion [i.e., the bird is not simply "touching" its chest as Auersperg et al. (1) wrongly recount]. Hence, the stick itself was likely part of the "intended" behavioral sequence. The point that the sequence is unrepeated is moot: the automated video recording ends before the bird drops the stick, and hence we cannot tell if it was repeated or not. Our other observation was very similar to that captured on video, except the bird came into view already holding the stick and scratched for ∼5 s. As for the skepticism whether birds would use tools to scratch within-reach body parts, the same is true of other species scratching with tools (7, 8), and our paper offered possible explanations for how the stick might have increased the efficiency or convenience of the behavior.

We agree our observations were few, but novel tool-use discoveries often report similarly small numbers [e.g., refs. 9 and 10, and including the interesting cormorant report mentioned by Auersperg et al. (1)]. Besides, with <1% of puffins monitored in the few populations under scientific study, the behavior could have recurred unnoticed. Our observations widen the known tool-use repertoire of wild birds and expand its taxonomic breadth to another avian suborder. As highlighted on the PNAS website, "Brief Reports describe observations of immediate impact that may hold potential to initiate new avenues of research" (11). We hope our account will do exactly that—drive future research by encouraging others to look for and report novel behaviors and to explore their cognitive implications through further observation and experimentation.

1 A. M. I. Auersperg, R. Schwing, B. Mioduszewska, M. O'Hara, L. Huber, Do puffins use tools? *Proc. Natl. Acad. Sci. U.S.A.* **117**, 11859 (2020).
2 A. L. Fayet, E. S. Hansen, D. Biro, Evidence of tool use in a seabird. *Proc. Natl. Acad. Sci. U.S.A.* **117**, 1277–1279 (2020).
3 M. Hayashi, T. Matsuzawa, Cognitive development in object manipulation by infant chimpanzees. *Anim. Cogn.* **6**, 225–233 (2003).
4 K. Koops, T. Furuichi, C. Hashimoto, C. P. van Schaik, Sex differences in object manipulation in wild immature chimpanzees (Pan troglodytes schweinfurthii) and bonobos (Pan paniscus): Preparation for tool use? *PLoS One* **10**, e0139909 (2015).
5 N. Inoue-Nakamura, T. Matsuzawa, Development of stone tool use by wild chimpanzees (Pan troglodytes). *J. Comp. Psychol.* **111**, 159–173 (1997).

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6 B. Kenward, C. Rutz, A. A. S. Weir, A. Kacelnik, Development of tool use in New Caledonian crows: Inherited action patterns and social influences. *Anim. Behav.* **72**, 1329–1343 (2006).
7 S. M. Lindshield, M. A. Rodrigues, Tool use in wild spider monkeys (Ateles geoffroyi). *Primates* **50**, 269–272 (2009).
8 J. Boswall, Tool-using by birds and related behaviour. *Avic. Mag.* **83**, 88–97 (1977).
9 T. Breuer, M. Ndoundou-Hockemba, V. Fishlock, First observation of tool use in wild gorillas. *PLoS Biol.* **3**, e380 (2005).
10 C. Rutz, S. Deans, Nuthatch uses tool in London park. *Ethology* **124**, 135–138 (2018).
11 PNAS, Information for authors (revised April 2020). https://blog.pnas.org/iforc.pdf. Accessed 28 April 2020.