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Ann E. Russon

Kristin Andrews
York University

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Pantomime in great apes

Evidence and implications

Anne E. Russon* and Kristin Andrews

¹Psychology; Glendon College; Toronto, BC Canada ²Philosophy; York University; Toronto, BC Canada

We recently demonstrated, by mining observational data, that forest-living orangutans can communicate using gestures that qualify as pantomime.¹ Pantomimes, like other iconic gestures, physically resemble their referents.^{2,3} More elaborately, pantomimes involve enacting their referents.⁴ Holding thumb and finger together at the lips and blowing between them to mean “balloon” is one example.⁵ Here we sketch evidence of pantomime in other great apes, methodological concerns and sophisticated cognitive capabilities that great ape pantomimes suggest.

Pantomime in Other Great Apes

We subsequently identified credible reports of pantomime in other great apes. These extend the distribution of pantomime in nonhuman species. Resemblances they share with our orangutan pantomimes, in their contexts and messages, also contribute to showing up patterns and enhancing validity. We offer several examples.

Orangutans groomed a partner briefly to solicit grooming; so do chimpanzees and gorillas.⁶⁻⁸ Orangutans feigned eating, seemingly to express benign interactive intent to a reluctant partner.⁹ Wild mountain gorillas, orangutans and other primates also use ritualized eating to notify their interactive intentions; in some species, it can indicate benign intent.¹⁰⁻¹³ In one such case, both partners feigned interest in the same non-food item that they “ate.” This tactic has been detected in chimpanzee reconciliation and likened to a collective lie that helps break tension and bring adversaries back together, with

one deceiving and the other acting as if deceived.¹⁴

Orangutans feigned inability to solve a task to solicit help. So did a home-reared chimpanzee, Viki, when about 18 months old.¹⁵ Viki often pretend-dragged an imaginary pull toy and got its imaginary cord “stuck” on a handle. She usually “freed” it herself and then resumed her pretend-dragging. One day, in front of Hayes, Viki made a weaker attempt than usual to “free” the “stuck” cord, “failed” and gave up, looked up at Hayes and called “Mama.” Hayes interpreted this as asking for help, so she “freed” Viki’s “stuck” cord. Viki watched closely, accepted the “freed” cord and resumed pretend-dragging.

Some orangutan pantomimes showed the partner how to do something. So does a chimpanzee event reported as demonstration teaching.^{16,17} While resting, Ricci, an adult female, noticed her daughter Nina trying unsuccessfully to crack nuts with an odd-shaped stone hammer. Ricci joined Nina, who immediately sat in front of Ricci and handed her the stone. With Nina watching closely, Ricci turned the stone to its best position for nut cracking—much more slowly and deliberately than usual, cracked 10 nuts with it and let Nina eat almost all of them, then dropped the stone and left. Nina resumed cracking, holding the stone the way Ricci had shown, and cracked nuts successfully within 15 minutes. Boesch interpreted this as Ricci’s recognizing Nina’s difficulties and helping her correct the hammering technique by showing her how to grip and use the stone effectively, in a very conspicuous fashion. His interpretation of this event as teaching was hotly contested, partly because it is the

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*Correspondence to: Anne E. Russon;
Email: arusson@gl.yorku.ca

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only such case. Interpreted as pantomime, it is less anomalous. Importantly here, it shares the “show how” feature we identified in several orangutan pantomimes.

Eye of the Beholder

Critics have claimed that these orangutan pantomimes and other great ape iconic gestures exist only in the eye of the beholder.¹⁸⁻²⁰ We agree in part, but in a different way than critics probably intended: we argue that only certain beholders can identify and interpret these gestures. Gestural meaning is context-dependent for humans^{2,21-25} and great apes.²⁶⁻³⁰ This is especially true for pantomime and other iconic gestures, which are often idiosyncratic rather than standardized and sometimes created in the moment from the actor’s mental content.³¹⁻³³ Thus interpreting and even detecting pantomimes requires beholders who share the actor’s immediate and broader context, because this shared understanding is the basis for identifying the contingencies linking the pantomime’s imagery with the eliciting communicative encounter.

Beholders who do not share this knowledge are not equipped to recognize the localized references expressed, let alone interpret them. Scientifically, this problem is not insurmountable. Observers who are highly knowledgeable about the actor and communicative partners, the specifics of the communicative exchanges that elicited pantomime, and the broader living context that participants share are equipped to identify and interpret some pantomimes. For great apes, experienced researchers collecting observational field data within a framework of lengthy sampling periods are examples. The orangutan and other great ape evidence we presented meets these requirements.

These pantomimes are also liable to dismissal as anecdotes. We agree that anecdotes should be viewed with caution. However, the pantomimes we identified in great apes are not anecdotes. “Anecdotes” refer to isolated incidents reported because their unusual nature attracted attention; they are commonly reported by observers whose motives, observational expertise and knowledge of the species and/or actors involved limited credibility and without

the concurrent and historical contextual data needed for interpretation.^{34,35} All the cases we identified were obtained from systematically collected data, reported by observers trained in scientific observation and knowledgeable about these events’ current and historical context, and supported with extensive background information. We also note that the interpretations of critics who are insufficiently knowledgeable about the species, individuals and situations involved suffer the same weaknesses as anecdotes, and should be viewed with equal caution.

Implications for Language and Cognition

Gesture-first theories of language origins propose that ancestral hominids went through a pantomime stage that enabled the evolution of spoken language.³⁶ Gesture-first advocates consider several properties of pantomime as critical stepping stones to language: it is productive (enables creation of novel messages) and it serves as an entryway to syntax and narrative.^{18,36-38} Even this limited data set on great ape pantomime shows these properties.

In orangutan pantomimes, we identified productivity, compositionality (creation of large meaningful units by combining smaller ones) and systematicity (gesture order contributes to meaning).¹ These and other great ape pantomimes also show triadic communication (i.e., communication involving self, other and object) in a wider range of situations than other evidence suggests.³⁹⁻⁴³ They communicated messages as complex as what tool to use, what action to perform with it and on what target, and who should perform it (e.g., “assistant” use “machete” to “chop” open “coconut”). In a few cases, the tool action enacted was itself a complex, sequentially organized combination of behaviors (e.g., how to hold an awkward hammer rock, including rotating it into the best position, and how to crack nuts with it). These complex pantomimes suggest understanding the semantic relations expressed, so they imply corresponding cognitive abilities; this is consistent with other evidence on great ape language and cognition.^{44,45}

In addition, one orangutan pantomimed complex and sequential information that portrays a story. Kikan re-enacted part of a past event: a caregiver had used a pencil to remove a sliver from the sole of Kikan’s foot and then daubed latex from a fig leaf stem on the wound to dry it. A week later, after gaining this caregiver’s attention, Kikan picked a leaf and poked its stem at the sole of her (now healed) foot in similar fashion. This suggests rudimentary narrative abilities, where narrative is defined minimally as “the representation of an event or a series of events.”⁴⁶ This case counters the common view that narrative is a uniquely human capacity.⁴⁶ It also shows some of the components of episodic memory or reconstructing one’s own past experiences as situated in time,^{47,48} in that Kikan reconstructed key elements of a personally important experience. She was only an infant (three years old), so older orangutans may be expected to show greater sophistication.

Finally, some orangutans pantomimed to themselves. An adult female re-enacted a human’s whittling a stick and cutting hair with scissors to herself.⁴⁹ Similar re-enactments by human children are considered part of understanding the actions involved⁵⁰⁻⁵² and pantomime, like language, may contribute to externalizing cognition.⁵³ Thus this orangutan’s pantomiming to herself may serve as a way of explaining the event that she re-enacted. Linking self-pantomime to explanation is important because it has been suggested that chimpanzees, unlike humans, do not develop a general explanatory drive, and that while they make use of empirical generalizations, they are not interested in uncovering the causal relations that underlie them.⁵⁴

Conclusions

This evidence suggests pantomime could have been within the grasp of the common human-great ape ancestor, so it could have emerged prior to the emergence of the human lineage. Its emergence before the human lineage does not weaken the likelihood that it set the stage for the evolution of language. This evidence also suggests cognitive abilities commonly considered beyond great apes’ reach. Thus

pantomime offers a valuable window on great ape mentality, especially since patterns emerging from the observational reports we mined open the door to systematic study.

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