



HAL
open science

Social Ambiguity and Multimodal Interactions in Guinea baboons

Lise Habib-Dassetto, Mathilde Adet, Jules Cauzinille, Arthur Marques, Alban Lemasson, Cristel Portes, Julie Gullstrand, Marie Montant

► **To cite this version:**

Lise Habib-Dassetto, Mathilde Adet, Jules Cauzinille, Arthur Marques, Alban Lemasson, et al.. Social Ambiguity and Multimodal Interactions in Guinea baboons. EVOLANG, May 2024, Madison (WI), United States. hal-04650490

HAL Id: hal-04650490

<https://hal.science/hal-04650490v1>

Submitted on 18 Jul 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Social Ambiguity and Multimodal Interactions in Guinea baboons

Lise Habib-Dassetto^{*1,2,3}, Mathilde Adet⁴, Jules Cauzinille^{1,2,5}, Arthur Marques³, Alban Lemasson^{6,7}, Cristel Portes³, Julie Gullstrand¹, And Marie Montant¹

*Corresponding Author: habiblise@gmail.com

¹ Aix Marseille Univ, CNRS, CRPN-UMR 7077, Marseille, France

² Aix Marseille Univ, CNRS, ILCB

³ Aix Marseille Univ, CNRS, LPL, Aix-en-Provence, France

⁴ Le Mans Univ, France

⁵ Aix Marseille Univ, CNRS, LIS-UMR 7020, Marseille, France

⁶ Rennes Univ, Normandie Univ, CNRS, EthoS (Ethologie animale et humaine)-UMR 6552, Paimpont, France

⁷ Institut Universitaire de France

Many linguistics, comparative psychologists and ethologists consider human language to result mainly from our general communicative abilities and complex, multimodal, structured, and flexible interactional system (i.e., a coherent, integrated set of behaviors occurring between two or more individuals), some of whose characteristics may be shared by other primate species (Beckner et al., 2009; Heesen & Fröhlich, 2022; Levinson, 2019). Therefore, the study of complex interactional abilities (e.g., joint action, turn-taking and/or repair mechanisms) in non-human primates (NHP) should help us to understand the evolution of communication (Heesen & Fröhlich, 2022). According to the “social complexity hypothesis for communicative complexity” (Freeberg et al., 2012), animals who live in complex social environments develop complex communication systems. Indeed, social life (e.g., size of the group, reproductive system, hierarchical system) acts as a selection pressure for the evolution of vocal signals’ configuration (for reviews: Cheney & Seyfarth, 2018; Lemasson et al., 2022). Rebout et al. (2020) showed in macaques that compared to intolerant species, tolerant species, who experience more uncertain social interactions, display greater vocal diversity and flexibility. To our knowledge, there are no studies investigating the link between intra-specific features of sociality (e.g., social status, affiliative relationships, hierarchy) and structures of interactions.

Our study aims at investigating the intra-specific effect of sociality on the complexity of multimodal communicative interactions in dyads of Guinea baboons. This species lives in multi-males/multi-females and multi-levels social groups: a group is the sum of several harems, and males, who do not disperse, tend to be tolerant with the other males and sometimes share a harem (Dal Pesco & Fischer, 2018, 2020). Hierarchy is not strictly linear, but males dominate

females. We preliminarily tested two social parameters that seem important in that species: the stability of the relationship (determined by the frequency of interactions) and the sex(es) involved in the interaction, as the stakes differ between dyads of males (MM), females (FF), and both sexes (FM). Drawing on Rebout et al. (2020), we consider that these two social parameters will determine whether the outcome of an interaction is more or less uncertain. We hypothesize that this uncertainty should influence the structure of the interaction.

Using focal sampling method (Altmann, 1974), we filmed 66h of a group of 18 Guinea baboons housed at the Primatology Station of Rousset-sur-Arc (France, CNRS). Within a repertoire of 81 multimodal units (vocalizations, gestures, facial expressions, other non-vocal behaviors), we coded the components units of 370 sequences of dyadic interactions on the software BORIS (Friard & Gamba, 2016). A “communicative interaction” was composed of at least one directional signal (Liebal et al., 2004; Pollick & de Waal, 2007). To address the “social complexity hypothesis”, we analyzed sequences structure considering their length (number of units), diversity (of units) and their temporal organization (number of units per second and inter-individual overlaps).

Our results show that inter-sex interactions (FM), which always present a sexual stake and are therefore less uncertain than intra-sex interactions (FF and MM), are composed of the weaker diversity of units. We also show that MM interactions have more units per second and more inter-individual overlaps than the other types of dyadic interactions (FF and FM). In the same way, the less frequently individuals interact with each other, the faster they interact and the more their units overlap. In addition to the uncertainty of the relationship, it might be that MM interactions are influenced by the risk interactants take. Relationships between males can indeed lead to dangerous agonistic behaviors, because of potential hierarchical stakes. Three hypotheses could explain the acceleration and overlap in the interactions between males and/or between individuals interacting rarely: (1) the increase in risk would induce an increase in stress and therefore would speed-up the interaction (Lemasson et al., 2010), (2) individuals interacting rarely (especially males) would choose not to leave space for a potential response from the other interactant (Henry et al., 2015; Katsu et al., 2019 on how the quality of a relationship can influence inter-unit delays), (3) as suggested by Pognault et al. (2022) individuals might use overlap instead of turn-taking as a demonstrative strategy. These preliminary results require further analyses, especially on an individual scale, before we can draw conclusions about their link with the “social complexity hypothesis”.

Acknowledgements

This work is supported by the Institute of Convergence ILCB (ANR-16-CONV-0002).

References

- Altmann, J. (1974). Observational Study of Behavior: Sampling Methods. *Behaviour*, 49(3–4), 227–266. <https://doi.org/10.1163/156853974X00534>
- Beckner, C., Blythe, R., Bybee, J., Christiansen, M. H., Croft, W., Ellis, N. C., Holland, J., Ke, J., Larsen-Freeman, D., & Schoenemann, T. (2009). Language Is a Complex Adaptive System: Position Paper. *Language Learning*, 59(s1), 1–26. <https://doi.org/10.1111/j.1467-9922.2009.00533.x>
- Cheney, D. L., & Seyfarth, R. M. (2018). Flexible usage and social function in primate vocalizations. *Proceedings of the National Academy of Sciences of the United States of America*, 115(9), 1974–1979. <https://doi.org/10.1073/pnas.1717572115>
- Dal Pesco, F., & Fischer, J. (2018). Greetings in male Guinea baboons and the function of rituals in complex social groups. *Journal of Human Evolution*, 125, 87–98. <https://doi.org/10.1016/j.jhevol.2018.10.007>
- Dal Pesco, F., & Fischer, J. (2020). On the evolution of baboon greeting rituals. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 375(1805), 20190420. <https://doi.org/10.1098/rstb.2019.0420>
- Freeberg, T. M., Dunbar, R. I. M., & Ord, T. J. (2012). Social complexity as a proximate and ultimate factor in communicative complexity. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 367(1597), 1785–1801. <https://doi.org/10.1098/rstb.2011.0213>
- Friard, O., & Gamba, M. (2016). BORIS: A free, versatile open-source event-logging software for video/audio coding and live observations. *Methods in Ecology and Evolution*, 7(11), 1325–1330. <https://doi.org/10.1111/2041-210X.12584>
- Heesen, R., & Fröhlich, M. (2022). Revisiting the human ‘interaction engine’: Comparative approaches to social action coordination. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 377(1859), 20210092. <https://doi.org/10.1098/rstb.2021.0092>
- Henry, L., Craig, A. J. F. K., Lemasson, A., & Hausberger, M. (2015). Social coordination in animal vocal interactions. Is there any evidence of turn-taking? The starling as an animal model. *Frontiers in Psychology*, 6. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2015.01416>

- Katsu, N., Yamada, K., Okanoya, K., & Nakamichi, M. (2019). Temporal adjustment of short calls according to a partner during vocal turn-taking in Japanese macaques. *Current Zoology*, 65(1), 99–105. <https://doi.org/10.1093/cz/zoy077>
- Lemasson, A., Coye, C., Rebout, N., & Levréro, F. (2022). The evolution of primate vocal communication: A social route. *Revue de Primatologie*, 13, Article 13. <https://doi.org/10.4000/primatologie.14835>
- Lemasson, A., Ouattara, K., Bouchet, H., & Zuberbühler, K. (2010). Speed of call delivery is related to context and caller identity in Campbell's monkey males. *Naturwissenschaften*, 97(11), 1023–1027. <https://doi.org/10.1007/s00114-010-0715-6>
- Levinson, S. C. (2019). Interactional Foundations of Language: The Interaction Engine Hypothesis. In P. Hagoort (Ed.), *Human Language* (pp. 189–200). The MIT Press. <https://doi.org/10.7551/mitpress/10841.003.0018>
- Liebal, K., Call, J., & Tomasello, M. (2004). Use of gesture sequences in chimpanzees. *American Journal of Primatology*, 64(4), 377–396. <https://doi.org/10.1002/ajp.20087>
- Pollick, A. S., & de Waal, F. B. M. (2007). Ape gestures and language evolution. *Proceedings of the National Academy of Sciences*, 104(19), 8184–8189. <https://doi.org/10.1073/pnas.0702624104>
- Pougnault, L., Levréro, F., Leroux, M., Paulet, J., Bombani, P., Dentressangle, F., Deruti, L., Mulot, B., & Lemasson, A. (2022). Social pressure drives “conversational rules” in great apes. *Biological Reviews*, 97(2), 749–765. <https://doi.org/10.1111/brv.12821>
- Rebout, N., De Marco, A., Lone, J.-C., Sanna, A., Cozzolino, R., Micheletta, J., Sterck, E. H. M., Langermans, J. A. M., Lemasson, A., & Thierry, B. (2020). Tolerant and intolerant macaques show different levels of structural complexity in their vocal communication. *Proceedings of the Royal Society B: Biological Sciences*, 287(1928), 20200439. <https://doi.org/10.1098/rspb.2020.0439>