Social Ambiguity and Multimodal Interactions in Guinea baboons

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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).

Out 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 Pougnault 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".

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