**ABSTRACT**

The social complexity of animal groups can be defined by how much information individuals need to predict others’ actions in social interactions. Individuals can use different sources of information to predict the behaviour of others. A standardised set of measures to capture predictability from the individual’s perspective would facilitate the comparison of social complexity between species. We present three measures for quantifying the predictability of relationships in social groups. Predictability can be considered high if interaction distributions are highly consistent, are based on easily assessable parameters (such as kinship, rank, sex, or association), or if dyads can be classified into repeatable relationship types. We applied these three metrics to Western chimpanzees (*Pan troglodytes verus*) and sooty mangabeys (*Cercocebus atys atys*) living in Taï National Park, Côte d’Ivoire. Our consistency measure provides a useful tool to identify interaction types where insufficient data is available. Predictability differed between and within communities and species. Chimpanzee interaction distributions were overall less consistent than mangabey interaction distributions. The impact of the easily assessable parameters varied within species, but showed few species differences. Most male chimpanzee dyads were characterised by ambivalent relationships with high levels of grooming and aggression, potentially making relationships highly unpredictable; this relationship type was absent in both mangabeys and female chimpanzees. Our results suggest that the predictability of social relationships was lower in chimpanzees than mangabeys, indicating more complexity in chimpanzee sociality compared to mangabeys, but that social complexity did not vary only along one dimension. Thus the multivariate approach chosen here can form the basis for more comprehensive comparisons of social complexity within and between animal species.

Key Words: Chimpanzee, Sooty Mangabey, Social Relationships, Complexity, Predictability, Interactions