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Gestural communication of orangutans (*Pongo pygmaeus*)

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This study represents a systematic investigation of the communicative repertoire of Sumatran orangutans (*Pongo pygmaeus abelii*), with a focus on intentional signals in two groups of captive orangutans. The goal was to analyze the signal repertoire with respect to (1) the number and frequency of signals (gestures, facial expressions, and actions), (2) the variability of individual repertoires as a function of group, age class, and sex, and (3) the flexibility of use in terms of 'means-end dissociation' and 'audience effects' and to interpret the findings in terms of the ecology, social structure and socio-cognitive skills of orangutans. The results show that orangutans use a remarkable number of signals including tactile and visual gestures as well as several more complex actions, though few facial expressions and no auditory gestures were observed. One third of signals were used within a play context, followed by one fourth of interactions in the context of ingestion. Although the repertoire included several visual gestures, most of the signals produced were tactile gestures and they were used particularly in the contexts of affiliation and agonism, whereas visual gestures dominated in the context of grooming, ingestion and sexual behavior. Individual repertoires showed a remarkable degree of variability as a function of age and group affiliation. Orangutans used their signals flexibly in several functional contexts and adjusted the signal they used depending on the attentional state of the recipient, similar to findings of other great ape species and gibbons. Thus, the communicative behavior of orangutans is characterized by a variable and flexible use of signals possibly reflecting their highly variable social structure and their sophisticated socio-cognitive skills, with the dominance of tactile gestures corresponding to the arboreal nature of this species.

Keywords: *Pongo pygmaeus*, communication, gestures, facial expressions, flexibility