

Abstract

Many studies with non-human primates have tried to assess if Theory of Mind - the ability to understand that others have their own intentions, goals, beliefs, knowledge, which can be different than one's own - represents a fundamental cognitive difference between humans and other primates. Exploring this question through behavioural paradigms that are based on competition has generated some interesting results. Moreover, field reports suggest that primates have some understanding of conspecifics' intentions in the context of tactical deception. Deceptive behaviour is widespread in the animal kingdom but this does not necessarily suggest high cognitive complexity. However, deception could involve Theory of Mind, which would allow individuals to mislead conspecifics in an effective way. This has been suggested for great apes, particularly in the genus *Pan*, but results and observations remain controversial.

At the same time, deception is a socio-competitive phenomenon, including a winner - generally the deceiver - and a loser - the deceived. Motivation to deceive is probably influenced by the relationship between the two competitors. I hypothesised that a subject is less prone to deceive a valuable social partner, such as a friend, than another individual. To explore this hypothesis, I designed a task for a captive group of chimpanzees, *Pan troglodytes verus*, housed at Basel Zoo, Switzerland, to study the link between deception and social relationship. The study began by determining the social relationships between the different animals, expressed as an association and a social index. During the study, three new individuals were integrated into the group, which allowed me to study the development and stability of the relationships, and some of the factors influencing them, such as group origin, age, sex, and study period.

Results indicated that females had higher association indices with in-group than out-group members, while males showed the reverse pattern. Similarly, females were more preferred as partners by in-group subjects than out-group ones, with males again showing the reverse pattern. Over time, the inter-group association index became larger while the intra-group association index remained stable and high. For the social index, I obtained similar results although age did play a role, something that was not found for the association index. Indeed, when analysing affiliative social behaviours only, subjects avoided out-group adults as partners but preferred in-group adults, while for juvenile partners the pattern was reversed. This was mainly due to the fact that out-group individuals spent much time playing with the juveniles.

To test the link between social relationships and deceptive motivation, I designed the following experimental task. In an initial training phase, the chimpanzees had to first make an association between the presence of an artificial symbol, two differently coloured cubes, and food at two different predefined places in the outdoor enclosure, such that each cube was an indicator of food availability at one of two sites. In a transfer phase, the chimpanzees were presented the symbolic cubes at a new location (in the inside enclosure), to check if the sight of the cube induced them to reach the corresponding enclosure. In a third phase, the chimpanzees would be

presented the cues between the two outdoor enclosures, but in a way that allowed them to hide the cube, to prevent others from obtaining the information. This would allow them to access the food alone, by being the only ones to know that food is available at a specific location.

Despite an intensive training regime only one individual, an adult female, showed evidence to have well learnt the association between the symbolic cubes and the presence of food at a particular location after the training phase. I then exposed her to the transfer phase, by presenting one of the two cubes at a novel location in the indoor enclosure. I found no indication that she understood that the cube, if presented at a novel location, predicted the presence of food outside. Based on these results, it was not possible to test whether chimpanzees can use symbolic information deceptively in order to install false beliefs in others about the presence of food.