Table 1 Behavioural variables sampled for repeatability

Variable	Definition	Calculated as
Activity	Time spent not resting or autogrooming (%)	Focal sample activity at each minute summed per category; observations spent resting or autogrooming subtracted from total (%)
Submission	Frequency of submissive behaviours (crouch, pant grunt)	Frequency/h submissions given
Aggression given	Frequency of aggression given (chase, hunch-over or physical aggression)	Frequency/h aggression given (ad lib. data, corrected to total group observation time)
Aggression received	Frequency of aggression received (chase, hunch-over or physical aggression)	Frequency/h aggression received (ad lib. data, corrected to total group observation time)
Number of neighbours	Number of individuals within 2 m	Average number of individuals in proximity, sampled once per focal observation
Approach others	Frequency of focal subject approaching others (not aggressively)	Frequency/h of focal subject approaching and staying in 2 m proximity of others
Being approached	Frequency of focal subject being approached by others (not aggressively)	Frequency/h of focal subject being approached with a neutral or positive response by the subject
Grooming density	Number of individuals the focal subject grooms	Total number of individuals focal subject gives grooming to divided by all available grooming partners
Grooming diversity	Skew of grooming given	Shannon–Wiener diversity index corrected to group size effect (see text for the formula)
Grooming initiated	Frequency of grooming given	Frequency/h of grooming given by focal subject, so that each grooming partner is counted only once/focal observation
Grooming received	Frequency of grooming received	Frequency/h of grooming received by focal subject, so that each grooming partner is counted only once/focal observation
Point affinitive behaviours	Frequency of short duration affinitive behaviours (kiss, kiss-bite, gentle touch, embrace, sexual inspection, genital touch, mount, mate, hand- or fingers-to-mouth)	Frequency/h of point affinitive behaviour by focal subject
Play initiated	Frequency of play initiated	Frequency/h of play initiated by focal subject
Play received	Frequency of play received	Frequency/h of play initiations accepted by focal subject
Scratching	Frequency of self-scratching (rough and gentle)	Frequency/h of self-scratching. Counted separately when separated by 5-s interval or the scratched body part changed
Auto-grooming	Duration autogroom	Frequency/h focal autogrooms. Recorded as durations to the nearest second

All frequency measures are corrected by the individual observation time, except aggressive conflicts (corrected by summed group observation time following the ad libitum recording)

inter-observer reliability was tested against my observations. Their inter-observer reliability had to meet the minimum criterion of 90% similarity before data were considered as reliable.

In each zoo, chimpanzees were observed at least 4 days a week, all day. Data were obtained by focal animal sampling (Martin and Bateson 1993) of 15-min (AR) or 10-min (CH and BB) duration, during which we recorded the focal individual's main activity at 1-min intervals and all social interactions and self-directed behaviours continuously. In addition, aggressive conflicts were recorded ad libitum. In each zoo, each animal usually was observed only once, occasionally twice, a day. The order of individuals was randomised at the beginning of the study and thereafter kept consistent but varying the first focal individual each day. By the end of the study period, all individuals in a group had been observed for the same amount at each time of the day.

The data collection periods and the obtained observation hours were: AR, September 2002–October 2005, 1,541 h of focal observations (X=70 h/individual); CH, June–September 2008, 86 h of focal observations (X=3.6 h/individual); BB, May–September 2009, 93 h (group BBa, X=5 h/individual) and 154 h (group BBb, X=14 h/individual) of focal observations. (BBa was observed less than BBb due to a management decision that prohibited further observations.)

Behavioural variable extraction

From the focal observation data, I extracted the individual scores of behavioural variables. Originally, I selected 23