

# Social personality traits in chimpanzees: temporal stability and structure of behaviourally assessed personality traits in three captive populations

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Received: 1 January 2011 / Revised: 30 May 2011 / Accepted: 8 June 2011 / Published online: 23 June 2011  
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**Abstract** Animals of many species show consistency in behaviour across time and contexts that differs from other individuals' behaviour in the same population. Such 'personality' affects fitness and has therefore become an increasingly relevant research topic in biology. However, consistent variation in social behaviour is understudied. In socially living species, behaviour occurs in a social environment and social interactions have a significant influence on individual fitness. This study addressed personality in social behaviour of 75 captive chimpanzees in three zoos by coding observed behaviour. Fifteen behavioural variables were significantly repeatable (range 0.21–0.93) in at least two of the three zoos. The behaviours showed considerable long-term stability across 3 years, which did not differ from the short-term repeatability. The repeatable behaviours were then analysed with factor analyses. They formed five independent factors, three of which consisted of social traits and were labelled 'sociability', 'positive affect' and 'equitability'. The two non-social behaviour factors were labelled 'anxiety' and 'activity'. The factor scores were analysed for sex and population differences. Males had higher factor scores in all traits except 'sociability'. The factor scores differed also between the zoos, implying

considerable external effects in trait expression. The results show that chimpanzees show personality in a broad range of social and non-social behaviours. The study highlights the importance of assessing personality in the social behaviour, especially in cohesive social species, as only then can we understand the consequences of personality in socially living species.

**Keywords** Personality · Sociability · Anxiety · Activity · Chimpanzee · *Pan troglodytes*

In many animal species, individuals show consistent differences in behaviour (Réale et al. 2007; Sih and Bell 2008). Such variation has been called 'personality' (Gosling 2001), 'behavioural type' (Sih and Watters 2005), 'coping style' (Koolhaas et al. 1999), 'behavioural syndrome' (Sih and Bell 2008) and 'temperament' (Réale et al. 2007). Each of these terms has a particular emphasis, but all share the feature that behaviour is more consistent temporally and contextually within than across individuals (Sih and Bell 2008). Animal personality is increasingly important in behavioural, evolutionary and theoretical ecology (e.g. Dall et al. 2004; McNamara et al. 2009; Réale et al. 2010; Sih et al. 2004), comparative psychology (Gosling 2001; Weiss et al. 2007; Uher 2008) and applied behavioural sciences (Ruis et al. 2000). Personality traits have moderate heritability (Bouchard and Loehlin 2001; Dingemanse et al. 2002) and they influence fitness (Smith and Blumstein 2008). This presents a challenge to explain how behavioural variation is maintained in a population (Dingemanse and Wolf 2010). Furthermore, given that behavioural flexibility should be more adaptive than consistency in an environment that varies unpredictably, the causal factors that underpin behavioural consistency and the fitness consequences that follow it are in

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Communicated by D. Watts

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