

## Development of emotional expressions in chimpanzees (Pan troglodytes)

Kim A. Bard, Ph.D.  
Centre for the Study of Emotions  
Department of Psychology  
King Henry Building  
University of Portsmouth  
Portsmouth PO1 2DY UK

e-mail : [kim.bard@port.ac.uk](mailto:kim.bard@port.ac.uk)  
telephone : +44 23 92 846 332  
FAX : +44 23 92 846 300

### Acknowledgements

Research was supported in part by NIH grants RR-00165, RR-03591, and RR-06158, and conducted at the Yerkes Regional Primate Research Center of Emory University. Thanks to Kelly McDonald, Kathy Gardner, Dr. Kathy Platzman, Carolyn Fort, Dr. Patricia Hebert, Yerkes Nursery Caretakers, & many Emory University students for their invaluable assistance with assessment and daily care of the nursery chimpanzees, during the study period from 1987 to 1995. Grateful appreciation is extended to Dr. David Leavens for his helpful comments.

## Introduction

Chimpanzee infants, like human infants, exhibit some emotional expressions in the first days of life, and additional expressions develop over the first months of life. [1] We know relatively little about the influence of the rearing environment on the development of emotional expression in chimpanzees (or in human infants [2]). The specific aim of this study was to assess whether early rearing had an effect on development of emotional expressions in chimpanzees.

## Methods

### Subjects

Neonatal chimpanzees, placed in the nursery at birth due to inadequate maternal care, participated in this study. [3] Twenty-one chimpanzees were raised in a Standard Care (ST) nursery in which the philosophy was that social, emotional, and communicative needs of young chimpanzees would be met by being raised with same-aged peers, but that humans were necessary to provide for health needs. Sixteen chimpanzees were raised in the Responsive Care nursery (RC) with a different philosophy, specifically that specially trained humans would meet the infant's emotional, social and health needs. Moreover, these adult caregivers would act to enhance the development of chimpanzee species-typical communication. [1, 4]

### Procedures

Emotional expressions were recorded as they occurred during the Brazelton Neonatal Behavioral Assessment Scale (NBAS).[5] NBAS assessments were conducted every other day from 2/3 days through 42 days of age. For each individual NBAS session, the expressions that occurred were noted, with the age of the individual. Thus, I

obtained the number of individuals exhibiting each vocal and/or facial expression, and the average age when each expression first occurred.

### Results and Discussion

Chimpanzee infants, like human infants, exhibit expressions of positive and negative emotions early in life. Moreover, many expressions were emitted in similar contexts. [1] Every chimpanzee fussed (by 4 days of age on the average), cried (by 5 days of age on average), and smiled (by 11 days of age on average). Most infants vocalized greetings (78% by 7 days of age), effort grunts (86% by 14 days of age), and laughter (81% by 37 days of age). Rearing environment significantly influenced (1) the number of individuals who exhibited anger (14% of ST versus 88% of RC expressed anger:  $\chi^2(1) = 19.3, p < 0.01$ ); (2) the number of individual who expressed greetings (67% of ST versus 94% of RC vocalised greetings,  $\chi^2(1) = 3.931, p < .05$ , Fischer's exact  $p = 0.053$  to correct for small expected frequencies); and (3) interacted with gender in the number of smiles recorded during the NBAS test (Females smiled more than males when raised in ST but when raised in RC there was no gender difference,  $F(1,30) = 7.33, p \leq 0.01$ ).

The chimpanzee emotional system appears to develop in interaction with the emotional responsiveness of social partners. There were significant differences in some realms of emotional expression as a function of rearing environment. It appears that a more responsive rearing environment results in a more positively expressive infant, and less fussy infant [6], effects which are evident even within the first weeks of life. Minimally, the study suggests that early emotional interactions are important in the development of emotional expression.

### References

1. Bard KA: **Social-experiential contributions to imitation and emotion in chimpanzees.** In: *Intersubjective communication and emotion in early ontogeny: A source book* Edited by Braten S. pp. 208-227. Cambridge, UK: Cambridge University Press; 1998: 208-227.
2. Trevarthen C, Aitken KJ: **Infant intersubjectivity: Research, theory, and clinical applications.** *Journal of Child Psychology and Psychiatry* 2001, **42**:3-48.
3. Bard KA: **Evolutionary roots of intuitive parenting: Maternal competence in chimpanzees.** *Early Development and Parenting* 1994, **3**:19-28.
4. Bard KA: *Responsive care : A behavioral intervention program from nursery-reared chimpanzees.* Tuscon, AZ: The Jane Goodall Insititute; 1996.
5. Bard KA, Platzman KA, Lester BM, Suomi SJ: **Orientation to social and nonsocail stimuli in neontal chimpanzees and humans.** *Infant Behavior and Development* 1992, **15**:43 -56.
6. Bard KA: **Crying in infant primates: Insights into the development of crying in chimpanzees.** In: *Crying as a sign, a sympton, and a signal: Developmental and clinical aspects of early crying behavior* Edited by Barr R, Hopkins B, Green J. pp. 157 - 175. London: MacKeith Press; 2000: 157 - 175.