

tionship between caries and betel staining is assessed using data from two sites in the Mariana Islands in Micronesia. While the data suggest there is a relationship between betel staining and the absence of caries, it is not clear that the two are correlated. The relationship between betel chewing and gender is also discussed.

**The effect of infant age on infant attraction, tolerance and handling in *Ateles geoffroyi*.**

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Typically other females are most interested in infants, however in black handed spider monkeys (*A. geoffroyi*) males have been observed to engage in infant handling, even though infants younger than 6 months of age spend most of their time either on or in close proximity to the mother. We examine whether the age and sex of the infant has an effect on male infant attraction, tolerance and handling in *A. geoffroyi*. All occurrence data was collected from January 2007 to July 2010 on a community of 35 wild spider monkeys at Runaway Creek Nature Reserve, Belize. During 884 hours of observation, 102 infant handling bouts, 12 infant handling attempts, and 27 infant tolerance bouts were recorded. Large juvenile, sub-adult and adult males handled infants the most [N=76, 75% of all bouts]. Male infants were handled more often than female infants [Pearson  $X^2=5.263$ ,  $df=1$ ,  $p<0.05$ ] and younger infants were handled more often than older infants [Pearson  $X^2=3.853$ ,  $df=1$ ,  $p<0.05$ ]. At less than 6 months, male and female infants were handled equally, but at greater than 6 months male infants were handled significantly more often [Pearson  $X^2=12.448$ ,  $df=1$ ,  $p<0.01$ ]. Overall, infants appear to be more attractive to males when they are younger and the continued interaction with male infants as they age may be related to the strong bonds among closely related adult males that characterize spider monkey society. This may reflect kinship-based affiliation or bond formation.

This study was funded by the Natural Sciences and Engineering Council of Canada (NSERC) and research funds from Athabasca University.

**Diet quality, weight loss, and maternal investment in vervets.**

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In wild populations, primate females face the challenge of achieving adequate

levels of nutrition to support gestation and lactation. This is in sharp contrast to the over-nutrition in modern societies where many mothers of young infants are on weight-loss diets. Yet, little is known about the consequences of diet and weight loss on maternal behavior in the overweight to normal range.

The Vervet Research Colony contains multigenerational social groups of vervets for studies of behavior and development. In 2004, the diet was changed to prevent overweight and obesity and provide a more natural level of fiber in the diet. Data on weight and mother-infant interactions were assessed for effects of the diet change. The results showed the mean body weight of breeding females declined 10% after the transition to the high-fiber diet. Behaviorally, mothers on the high-fiber diet had significantly higher rates of rejecting ventral contact and higher rates of leaving their infants. The high-fiber diet infants played a greater role in maintaining ventral contact, resulting in comparable levels of mother-infant contact for the two diets. The effects of the diet change on maternal rejection were significantly related to the mother's body weight, with lower-weight mothers scoring higher in maternal rejection. These results demonstrate that maternal behavior is responsive to changes in maternal condition, and that beneficial changes in the diet may have unintended consequences on behavior. They also demonstrate the resilience of infants in responding to variation in maternal behavior within the normal range.

This study was funded by NIMH, R01-MH61852.

**First virtual reconstructions of the frontal lobe and temporal pole of the Taung (*Australopithecus africanus*) endocast.**

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The Taung type specimen for *Australopithecus africanus* includes a natural endocast that reproduces external morphology of a large portion of the right cerebral hemisphere, and a separate fragment of the fossilized face that articulates with the endocast. The natural endocast lacks the right temporal pole and rostral part of the frontal lobes, which were embedded in the back of the facial fragment. Although these structures have previously been recon-

structed manually using the external morphology of the facial fragment as a guide, we used advanced 3D-CT technology to prepare virtual reconstructions of the frontal lobes and right temporal pole. We then joined these parts of Taung's virtual endocast to a virtual image of the natural endocast, and reconstructed the remaining missing areas using mirror imaging. The resulting virtual endocast of Taung was compared with 3D geometrical models of chimpanzee and bonobo endocasts reconstructed from CT scans of dry skulls representing individuals at the same dental developmental age as Taung. We employed recently developed automated computational tools that allowed processing of 3D free-form surfaces and quantification of the mean anatomy within each species (chimpanzees and bonobos) as well as the pattern of variability around these means. These results were compared to those for Taung, and allowed us to test Raymond Dart's hypothesis that Taung's brain was advanced toward a human condition in the shape of its prefrontal as well as parieto-occipital association cortices. Our findings lend strength to Dart's suggestion that australopithecine brains evolved in a global rather than mosaic manner.

Research supported by the French Institute for Research in Computer Science and Control (3DMORPHINE Collaborative Research Initiative), the HOPE (Human Origins and Past Environments) International Program and the French Ministry of Foreign Affairs.

**Dental tissue allometry in modern human males and females.**

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The dental crowns of modern humans are sexually dimorphic with respect to external size, and males have a greater dentine-pulp complex than females but differences in enamel quantity or thickness between the sexes are not pronounced. Allometric relationships of crown components have not been examined between the sexes, yet this information is critical for understanding how tooth crowns are assembled. We suggest two sources of variation in enamel distribution between males and females: tooth size and sex. To address this we examine sex-specific and sex-combined allometry in crown components to explore the potential effect of size and sex.

Coronal enamel and dentine-pulp volumes and surface area of the enamel-dentine junction (EDJ) were calculated from three-dimensional surface models generated from high-resolution CT