

Our investigation identified the biasing factors that are the most important in attempts to apply the Index to the St. Thomas sample. These are, the small size of the observable skeletal sample and the exclusion of older adults, not from samples, but from data observations because of preservation problems. While the differing effects of population growth and migration on past populations can be estimated and modelled in many circumstances, it is extremely hard to know when various models of mortality are appropriate.

Effects of Schizophrenia on Universal Human Facial Expression

K.L. SCHMIDT, Department of Anthropology, U.C. Berkeley, Berkeley CA 94720

Schizophrenia is known to interrupt normal facial expression in many of its sufferers. There is also a great deal of evidence for the universality of human facial expressions. In this research, I investigated the hypothesis that schizophrenia is recognizable cross-culturally because it affects species-wide facial expressions in humans. I expected that evaluators, without previous knowledge of the subjects, would be able to distinguish the facial expression typical of patients with schizophrenia from that of non-patient controls.

I collected cross-cultural evaluations of the nonverbal expressivity of patients with schizophrenia and non-patient control subjects from Papua New Guinea and New Zealand. Videotapes of interviews with subjects (without sound) were shown to evaluators, New Zealanders and a Papua New Guinean unaware of the diagnostic status of the subjects. Evaluators provided a 1-7 rating of expressivity and a judgment about whether or not subjects appeared unusual in any way, along with a list of facial expressions and nonverbal behavior that contributed to their judgment.

In both populations, subgroups of consistently less expressive patients could be distinguished. Cross-cultural evaluations confirmed the existence of universally recognizable flattening of expressions in Papua New Guinean patients. Seventy-five percent of low scoring patients also exhibited smooth pursuit eye-tracking dysfunction, a biological marker for schizophrenia. This suggests that the underlying condition of schizophrenia was similar to patients in New Zealand and elsewhere.

Schizophrenia appears to disrupt universal human facial expression. In addition to overall flattening of expressions, there are also problems in particular areas of facial expression and body movement. Eyes and hand movements were among the more commonly reported areas of disrupted expression in patient subjects. Cross-cultural evidence for this pattern of disturbance provides clues to the evolution of normal human interaction and facial expression.

Relationship between prehensile tail anatomy and kinematics in two atelines. D. SCHMITT, Duke University, Durham NC 27710, J.E. TURNQUIST, University of Puerto Rico, Medical Sciences Campus, San Juan, PR 00936, M.D. ROSE, New Jersey Medical

School, Newark, NJ 07103, P. LEMELIN, NEOUCOM Rootstown, OH 44272

Ateles and *Lagothrix* both have prehensile tails that are used during locomotion and feeding. These two genera, however, differ in locomotor behavior and tail anatomy. *Lagothrix* spends more time traveling quadrupedally and less time arm-swinging than does *Ateles*. *Ateles* has more numerous caudal elements with wider transverse processes, particularly in the region at the base of the tail, bulkier mm. abductor caudae medialis, and more cranially placed mm. intertransversarii caudae than does *Lagothrix*. The osteological and myological differences suggest to us, and others, that during arm-swinging *Ateles* should show more tail extension (the tail should reach farther forward) and be better able to control lateral body sway.

To test these predictions, *Ateles fusciceps* and *Lagothrix lagothricha* were videotaped while brachiating along a 25' long pole in a large enclosure at the Dumond Conservancy in Miami. Tail-body angle and the degree of lateral body sway were calculated by digitizing simultaneously collected lateral, frontal and overhead images of both species.

The predictions from the anatomical data were fully supported by the kinematic data. *Ateles* consistently hyperextends its tail to a greater degree than does *Lagothrix*, and experiences smaller side-to-side trunk movements during arm-swinging.

These data support the notion that the prehensile tail is a critical element in ateline arm-swinging. It also supports the hypothesis that vertebral features may be used to infer the nature of locomotion in fossil species. Furthermore, these data suggest that tailless Miocene catarrhines with postcranial features similar to atelines must have controlled lateral body sway by mechanisms more like those of the hylobatids.

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Relationships between corpus callosum morphology and behavior in normal human females.

P. THOMAS SCHOENEMANN, Center for Functional Imaging, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720

Sex differences in corpus callosum morphology (when controlling for brain size) have been reported in the literature. Females tend to have a larger relative corpus callosum cross-sectional area, with a more bulbous splenium. This has led to suggestions that these anatomical differences are the result of selection on different behavioral abilities during our evolutionary history (Holloway 1983, 1990). A number of recent studies suggest that corpus callosum morphology is related to behavioral ability on some cognitive tasks.

The present study assessed the strength of corpus callosum / behavioral ability correlations for an expanded range of behavioral domains, both between- and within-families. 36 pairs of sisters (72 individuals total) were given a diverse battery of cognitive tests (linguistic,

mental rotation spatial ability, frontal-lobe specific, and general reasoning ability), a test of throwing ability, and were asked to provide information about their relative degree of sociality. High resolution MRI brain scans (voxel size: $\sim 1.3 \text{ mm}^3$, with no gaps between slices) were obtained, from which several neuroanatomical features were quantified, including overall brain volume, cortical grey volume, total corpus callosum cross-sectional area, and cross-sectional areas of the genu, body and splenium of the corpus callosum. Within- and between-family correlations were calculated (controlling for age and simple reaction time) among the behavioral and neuroanatomical variables. Between-family correlations were either very small or negative. Within-family correlations were similar, although with somewhat larger *negative* associations (some reaching significance). Of interest is the fact that the highest positive correlations occurred between corpus callosum measures and sociality variables. The possible evolutionary implications of these findings are discussed, as are questions regarding the difficulty of applying within-species associations to evolutionary questions.

Chimpanzee stable isotope data in hair: diet selectivity and habitat use. M.J. SCHOENINGER, University of Wisconsin, Madison WI 53706, J. MOORE, University of California at San Diego, La Jolla, CA, J.M. SEPT, Indiana University, Bloomington, IN 47405, J.CASAMAJOR, University of Wisconsin, Madison WI 53706.

Carbon and nitrogen stable isotope ratios in chimpanzee (*Pan troglodytes*) hair collected from night nests are compared with other primate data (Schoeninger et al. 1996 *AJPA* 109:69-83 & in press *Oecologia*). 1) Ugalla, a savanna/woodland south of Uvinza in western Tanzania, had an average $\delta^{13}\text{C}$ value (-22.0 ‰ , s.d.=0.3, n=12) most similar to Madagascar prosimians from a drought afflicted forest. 3) Data from the Soudano-Guineen woodland of southwestern Mali are similar ($\delta^{13}\text{C}=-22.0 \text{ ‰}$, n=2). 2) Ishasha River (savanna/woodland of eastern Zaire) data ($\delta^{13}\text{C}=-23.1 \text{ ‰}$, s.d.=0.3 ‰ , n=10) approximate New World monkeys and African prosimians from dry, deciduous forests. Ishasha chimps apparently feed only in the forest or forest edge rather than the savanna. 4) Lake Telle region swamp forest of northern Congo samples ($\delta^{13}\text{C}=-25.4 \text{ ‰}$, n=2) approximate New World monkeys from closed-canopy evergreen forests.

$\delta^{15}\text{N}$ values at Ugalla (2.3 ‰ , s.d.=0.6, n=9) indicate dependence on legumes consistent with fecal evidence of Caesalpinaceae seeds. Most Ishasha $\delta^{15}\text{N}$ values (5.9 ‰ , s.d.=0.8 ‰ , n=7) are similar to those in the fruit-eating *Ateles* and frugivorous folivore *Brachyteles* and significantly lower than insectivorous *Cebus* and *Galago*. Two Ishasha samples (10.2 ‰ and 10.4 ‰) have values indicative of meat eating or of starvation.

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Morbidity and mortality in the Late PPNB population from Basta (Jordan). M. SCHULTZ, Zentrum Anatomie, University of Göttingen (Germany), M. BERNER, Abteilung Anthropologie, Museum of Natural History, Vienna (Austria) and T.H. SCHMIDT-SCHULTZ, Zentrum Biochemie, University of Göttingen (Germany).

Nature, cause, spread and frequency of inflammatory and deficiency diseases, as well as physical strain in the Late PPNB population from Basta were studied to enlarge our knowledge of the morbidity and the mortality of early Neolithic populations. Furthermore, an attempt was made to reconstruct the living conditions such as nutrition, housing and working conditions, geographic and climatic facts, and sanitary and hygienic factors of this population.

For this study, 39 more or less well represented skeletons were examined by macroscopic, endoscopic, radiological, light and scanning-electron microscopic techniques.

In 2 out of 29 individuals, cut marks could be observed in the skull. This could be interpreted as ritual or special mortuary practices. There is strong evidence of skull trauma. Out of 29 individuals, 5 show healed fractures of the skull vault. Osteoarthritis is present, but relatively mild. The intensity of osteoarthritic changes increases with individual age. There are no significant differences between males and females in the frequency of diseases. Stress markers, such as Cribra orbitalia (n = 5/22), transverse linear enamel hypoplasia (n = 19/24), Harris lines (n = 7/7) and periosteal reactions (n = 11/24) demonstrate that life was relatively hard.

There is only little evidence of malnutrition. Possible anemia was found in 9 out of 30 cases, scurvy in 2 out of 24 cases. Alterations due to inflammations are relatively frequent, but, as a rule, fewer than in Bronze Age populations: meningitis (n = 14/30), mastoiditis (n = 2/22), sinusitis frontalis (n = 8/13) and sinusitis maxillaris (n = 14/20). The frequency of the diseases of the teeth and the jaws indicates poor hygiene: stomatitis (n = 5/20), dental calculus (n = 19/24), parodontopathy (18/24), dental abscesses (n = 6/23) and intra vitam tooth loss (n = 7/23). Dental caries was extraordinarily rare (n = 2/22).

Morphological Affinities of European Upper Paleolithic and Modern Holocene Populations. B.A. SCHUMANN, Department of Anthropology, Florida Atlantic University, Boca Raton, FL 33431.

The European Upper Paleolithic, from 45,000 to 10,000 BP, marks the first appearance of anatomically modern humans in Europe. While this population has played an integral role in the debate over modern human origins, its use in determining the relationship between Pleistocene modern humans and more recent, Holocene