capable of crossing large bodies of water. 2) The earliest evidence of a broad spectrum diet, hafted weaponry, long-distance import of raw materials and deep sea fishing date between 42 ka and 30 ka and are concentrated at Niah Cave (Sarawak, Malaysian Borneo), and Lena Hara Cave and Jerimalei (East Timor). 3) The earliest evidence of symbolic behavior appears between 35 ka and 25 ka in the form of shell beads from Matja Kuru 1 and 2 (East Timor) and Lena Hara and a burial at Moh Khiew (Thailand). By 42 ka, if not a little earlier, at least pieces of the modern human behavioral toolkit that would have facilitated the human dispersal to Australia are present in SE Asia. The broader implications of the Southeast Asian Late Pleistocene human behavioral record are discussed.

Preliminary results of the bioarchaeological investigation of an Iron Age tomb at Wadi Fidan 61, Jordan

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Wadi Fidan is the gateway to the Faynan district, one of the largest sources of copper ore exploited by ancient societies in the southern Levant. This report describes the preliminary analysis of a tumulus at Wadi Fidan 61 (WFD61) excavated in 2012. WFD61 is located in close proximity to- and contemporaneous with- a previously excavated cemetery WFD40. WFD61 contained an undisturbed context with a minimum number of 17 simultaneous primary burials (13 adults, 4 subadults) distinct from a more recent looted context with a minimum number of 3 adults and 3 subadults. The well-preserved remains of the tumulus provide an excellent opportunity to expand our understanding of the overall health and activity patterns of this Iron Age population. Standard protocol data collection was used for age, sex, and pathological assessment. Preliminary results indicate the existence of infectious disease and malnutrition (through periostitis and cribra orbitalia) and a high prevalence of dental pathology including LEH, antemortem tooth loss, severe attrition, abscesses, caries, and periodontal disease. High frequencies of DJD and healed trauma suggest that individuals were habitually involved in hard physical labor and perhaps copper mining. These findings are consistent with previous studies of the WFD40 cemetery. Two hypotheses regarding the relationship between the tumuli and nearby cemetery are discussed: spatial segregation of the sites may be attributed to either a temporary spike in mortality from acute disease or previously undetected mortuary variation by kin group. Future work will incorporate biodistance and biochemical analyses for further testing of these hypotheses.

Uniting perception and reality in human nutrition: integration of qualitative and quantitative data to understand consumption

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The process of food consumption involves both the food items that are eaten and the meanings with which they are associated. Human nutrition studies commonly focus on evaluating the intake of particular nutrients in comparison to daily recommended intakes using food frequency questionnaires, food diaries, or dietary recalls. While these methods can ascertain sufficiency or deficiency, they do not provide insight into individual beliefs related to consumption. Individual perceptions of nutrient intake underlie decisions regarding consumption and influence motivation to alter eating habits. Qualitative methods provide the necessary depth to investigate perceptions and meanings related to food. To fully understand the process of consumption, qualitative and quantitative methods must be united. This paper focuses on the integration of datasets in a study of calcium and vitamin D intake in young adults. Food frequency questionnaires were used to calculate actual nutrient intake and interviews were used to explore perceptions related to consumption. Young adults were identified as under-consuming both nutrients; however, when their perceptions of their consumption were investigated, the majority of young adults believed they were consuming an adequate amount of calcium and vitamin D. The beliefs of these young adults were based on their personal interpretations and understanding of the availability and importance of calcium and vitamin D from foods. These results reveal a disconnect that emerged through the consideration of two disparate data sets and advocate for mixed method approaches in nutritional anthropology.

Improving access to socioeconomic data for genetic studies of racial health disparities

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Researchers are increasingly using clinic-based biological databanks in genetic studies as they can provide accessibility to a large population with longitudinal phenotypic data. Typically, the only environmental data linked to these samples are those extracted from electronic medical records (EMRs). Anthropological studies have demonstrated the importance of socioeconomic data in contributing to a variety of diseases. Socioeconomic status (SES) is an important factor to consider when analyzing racial disparities in health, yet is rarely included in genetic studies, due in part to the difficultly in collecting socioeconomic data when samples are not directly ascertained for that purpose. We developed a SES score using information available within the EMR of the Vanderbilt University Medical Center biobank, BioVU. Using ~16,000 individuals, we employed a combination of free-text searches and ICD-9 codes to extract relevant SES data. Results suggest that occupation and education level are two important SES elements that can be extracted from the EMR. We identified ~11,000 individuals with education information and ~15,000 individuals with occupation information. Occupation, education, health insurance, homelessness, and other variables have been incorporated into a summary SES score. This score will be validated in a comparative sample in which EMR data and surveys with SES information are available. This algorithm will enable biobank genetic studies to incorporate SES data into their analyses. Ultimately, measurement of SES will help to elucidate the impact of social environment on racial disparities in common diseases.

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The New and Old in Hominid Brain Evolution: Why Paleoneurology Needs the Lunate Sulcus

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The lunate sulcus, symplesiomorphic in pongids, separates area V1 (primary visual cortex) of the occipital cortex from parietal association cortex, and in hominids and modern humans is placed posteriorly compared to pongids, and is an important landmark with anatomical reality in delineating the anterior limit of area V1. It is crucial to arguments regarding whether brain reorganization preceded brain enlargement in early hominid evolution. Most recently, Falk (2014) has suggested that we get rid of the lunate sulcus as it appears unlike a true "Affenspalte" as found in other primates, and is variable in modern humans as shown by Allen et al (2006). Much more of an issue, however, is Falk's suggestion that the clear-cut lunate sulcus on the Stw505 *(A. africanus)* specimen is possibly a lateral calcarine sulcus.

We will show that the lateral calcarine NEVER appears on any of the ca. 300 ape (bonobos, chimps, gorillas, orangs, hylobatids) or human endocasts in our collection, while the lunate sulcus, either as a complete crescent, or a broken sulcus appears on all pongid and most human brains, demonstrating that the crescentic furrow on Stw505 cannot be a lateral calcarine sulcus. Furthermore, since the lunate appears on Stw505, AL 168-28 (*A. afarensis*), and on the Taung specimen as Dart described it in 1925, and is reported on some of the *Homo erectus* and Neandertal specimens, it makes no sense to rid paleoneurology of this crucial landmark which bears on the important issue of when brain organization took place.

Primitive fist-walking and the radiocarpal morphology of *Rudapithecus hungaricus*

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This study presents a quantitative analysis of the radiocarpal joint of the late Miocene European hominoid *Rudapithecus hungaricus*. We compare two newly discovered fossil specimens, a scaphoid and a lunate, from *Rudapithecus* to a large sample of extant anthropoid specimens and two Miocene fossil apes, *Proconsul* and *Equatorius*. First, we show that the angle at which the scaphoid and lunate articulate demonstrates a morphological pattern that can be used to distinguish between hominoids and other anthropoids. Cercopithecoids and platyrrhines have larger articulation angles compared with hominoids, a trait that strongly correlates with increased mediolateral wrist stability and pronograde quadrupedalism. *Rudapithecus* has a scaphoid-lunate articulation angle which is more similar to extant hominoids (*Pan*, *Gorilla*, *Pongo*, and *Hylobates*) than the extinct hominoids, cercopithecoids, or platyrrrhines. Secondly, we quantify the relative carpal contribution to the radiocarpal joint, a feature that can be used to discriminate between Hylobatidae, Homininae, and Ponginae. In *Pan* and *Gorilla* the scaphoid occupies over 50% of the carpal portion of the radiocarpal joint. In *Pongo* and *Rudapithecus* the opposite is true, and it is the lunate that dominates the wrist joint. This particular feature suggests greater dorsoventral flexibility for *Pongo* and *Rudapithecus*, and greater wrist stability for *Pan* and *Gorilla*. We also show that although *Pongo* has an extremely unique mode of quadrumanous locomotion, it retains primitive radiocarpal characteristics that have disappeared in the African apes. This suggests the shared features of *Rudapithecus* and *Pongo* may represent functional similarities related to terrestrial fist-walking.

The functional influence on trait covariance in platyrrhine mandibles

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Covariance structure has important implications for understanding morphological adaptability. "Functional" models suggest there are two modular units in the mammalian mandible, the alveolus and ramus. I hypothesize that if function influences trait correlation, covariance should differ among primates with diverse diets. The following predictions were tested: 1) trait covariance is greater in the entire mandible, as well as within each functional module, in primate taxa displaying durophagous diets (*Cebus apella*, *Pithecia pithecia*) when compared to non-durophagous taxa (*Saimiri sciureus*, *Callicebus torquatus*); and 2) alveolar-ramal functional models accurately represent adult primate mandibular covariance.

Geometric morphometric techniques were applied to three-dimensional fixed and sliding semi-landmark data collected on an adult sample of platyrrhine mandibles (n=127). Pair-wise comparisons of covariance magnitudes between dietary groups were conducted using singular value decomposition scores. RV-coefficients were calculated to determine the best modular fit. All significance values are based on permutation tests.

Durophagous primates possess greater magnitudes of overall mandibular covariance compared to non-durophagous primates ($p<0.001$). However, when the alveolus and ramus were compared independently, only alveolar units displayed differences in covariance magnitudes ($p<0.01$) amongst dietary groups. This suggests that mandibular trait covariance is influenced by functional demands and the degree of covariance corresponds to that demand. Additionally, some modular units within the mandible (i.e. alveolus) are more susceptible to influence from external forces than others. Lastly, RV-coefficient results did not support the alveolar-ramal functional model. Thus, while function plays a critical role in determining mandibular covariance other factors, such as developmental processes, must also be considered.

Chimpanzee Foot and Ankle Joint Motion during Vertical Climbing

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Fossil hominin studies have used foot and ankle joint morphology to assess the prevalence of arboreal climbing in early hominins. Typically, these studies compare fossil hominin joint morphology to that of great apes, which are known to climb trees frequently in the wild. However, the actual mechanics of great ape ankle and midfoot joints during climbing are still poorly understood. To address this gap, we measured the motion of these joints in chimpanzees during vertical climbing, and compared it to motion measured during terrestrial quadrupedalism.

We collected kinematic data from two male chimpanzees (*Pan troglodytes*) (7.4±0.1 yrs; 38.6±3.4 kg) using a four-camera motion capture system (ProCapture, Xcitex Inc.). We used a seventeen-point leg and foot marker set to measure three-dimensional motion at the ankle and midfoot joints. Subjects were recorded climbing a 15cm diameter tree trunk and walking quadrupedally on a flat runway.

Our results indicate that chimpanzees dorsiflex their talocrural joints slightly more during climbing than during terrestrial quadrupedalism. However, the actual difference is small enough to suggest to us that the high dorsiflexion range of the chimpanzee ankle may not be an adaptation for climbing. We also found that chimpanzees adopt highly inverted subtalar and transverse tarsal joints during climbing, suggesting that these joints may be better indicators of climbing proficiency than the talocrural joint. Finally, chimpanzees exhibit relatively high dorsiflexion angles at their tarsometatarsal joints during climbing, particularly on the medial side of the foot, suggesting that heightened mobility in this region may represent a climbing adaptation.

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Variable response of masticatory function on mandibular form

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Comparative studies of human populations have documented a predictable relationship between dietary variation and measures of mandibular size and robusticity. Recent work, however, has highlighted variability in form-function relationships in recent humans suggesting that the influence of function on mandibular form is not homogeneous across populations. To better understand variation in the morphological response to masticatory function, we examined two mouse models that exhibit baseline differences in mandibular cortical bone thickness. "Robust" (C3H/HeJ) and "gracile" (C57BL/6J) strains were both separated into hard-diet and soft-diet trial groups. The hard-diet trial groups were fed normal pelleted mouse chow, while the soft-diet trial groups were fed