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Ecological competence in wild Bornean orangutans: food sharing, processing, and nutrition

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Wild orangutans cope with dramatic, unpredictable fluctuations in food availability throughout development which have significant implications for energy balance for growth, development, and maintenance of body function. Foods that are especially important when preferred fruits are not available (e.g., bark/pith, termites, seeds) can require force, manual manipulation, and/or skill to access. Orangutans' extended life history may mitigate ecological risk associated with the challenging environment of juvenile growth and development. Given the complexity of important foods, orangutans' semi-solitary lifestyle, and the relatively brief period between weaning and independence, offspring transition to ecological independence during their extended nursing period. Here, we examine mother-offspring food transfer in the context of nutritional quality and complexity, with handling time as a proxy. Data were collected between July 2009-July 2019 in Gunung Palung National Park, Indonesia. We predict complex food items are transferred most frequently. In 245 observations of food sharing, fruit was most frequently transferred, followed by invertebrates and bark/pith. Handling time and transfer frequency were negatively correlated ($Rho=-0.75$, $p<0.001$): slower-eaten fruits were shared more frequently than rapidly-eaten fruits. Fruit size and sharing frequency were also negatively correlated ($Rho=-0.73$, $p<0.001$). There was no correlation between sharing frequency and free simple sugar concentration ($Rho = 0.36$, $p=0.13$), though sharing frequency and total nonstructural carbohydrate concentration were correlated ($Rho=0.46$, $p=0.04$). Food sharing was most common when mothers ate large, slowly-eaten fruits rich in nonstructural carbohydrates. Food sharing allows mothers to transfer more complex foods to their offspring, and may facilitate knowledge transfer as offspring become ecologically competent.

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