Resource Availability, Mortality, and Fertility: A Path Analytic Approach to Global Life-History Variation

MARK A. CAUDELL1* AND ROBERT J. QUINLAN1

Abstract Humans exhibit considerable diversity in timing and rate of reproduction. Life-history theory (LHT) suggests that ecological cues of resource richness and survival probabilities shape human phenotypes across populations. Populations experiencing high extrinsic mortality due to uncertainty in resources should exhibit faster life histories. Here we use a path analytic (PA) approach informed by LHT to model the multiple pathways between resources, mortality rates, and reproductive behavior in 191 countries. Resources that account for the most variance in population mortality rates are predicted to explain the most variance in total fertility rates. Results indicate that resources (e.g., calories, sanitation, education, and health-care expenditures) influence fertility rates in paths through communicable and noncommunicable diseases. Paths acting through communicable disease are more strongly associated with fertility than are paths through noncommunicable diseases. These results suggest that a PA approach may help disaggregate extrinsic and intrinsic mortality factors in cross-cultural analyses. Such knowledge may be useful in developing targeted policies to decrease teenage pregnancy, total fertility rates, and thus issues associated with overpopulation.

Human populations exhibit considerable variation in timing and frequency of reproduction. Adolescent fertility rates in Niger, for example, were over 31 times higher than in South Korea (World Health Organization 2009). Variation in fertility rates across populations result, in part, from differences in sources of mortality (Roff 2002; Stearns 1992). Sources of mortality may respond differently to social resources (e.g., access to health care, water, and sanitation services; education; income equality, etc.). Here we test hypotheses from LHT concerning the nature of mortality (i.e., intrinsic vs. extrinsic) and mortality effects on reproduction. In general, LHT predicts that high mortality rates cue fast life histories which are characterized by early reproduction and relatively low parental investment per offspring (Borgerhoff Mulder 1992; Bulled and

1Department of Anthropology, Washington State University, Pullman, WA 99164-4910
*Correspondence to: Mark Caudell, Department of Anthropology, Washington State University, Pullman, WA 99164-4910. E-mail: mcaudell@wsu.edu.

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