

SHORT ABSTRACT:

The Evolution of Post-Reproductive Lifespan

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First Choice:

202 [Demography and Life Course Studies](#)

Second Choice:

1204 [Biology and Demography](#)

We present initial tests of alternative explanations for the extension of the human lifespan, using data collected among Tsimane. The “grandmother hypothesis” proposes that older women increase offspring fertility and grandoffspring survivorship through provisioning. The “embodied capital” theory proposes that a shift in productivity from younger to older ages selects for increased investments in survival and longevity. The “patriarch hypothesis” proposes that an extended lifespan provides direct reproductive benefits to men, who do not experience reproductive cessation. The “mother hypothesis” argues that direct care of offspring will come from mothers, and extended lifespan is due to long-term child dependence. First, we test predictions regarding the behavior of older people with respect to descendent kin. Second, we measure the effects of older individuals’ survival on children’s survival and morbidity. Third, we examine how absolute levels of resource production and investment in descendants change with the increasing age, and dependency, of grandparents.

LONG ABSTRACT:

The Evolution of Post-Reproductive Lifespan

This paper investigates the biodemography of longevity and the behavioral contributions of post-reproductive individuals among the Tsimane, a traditional population subsisting on a combination of foraging and simple horticulture. It seeks to explain why the human lifespan is extended in comparison to other primates and mammals of similar body size.

We present some initial tests of the empirical adequacy of several alternative explanations for the extension of the human lifespan. One principal idea, the “grandmother hypothesis” (Hawkes et al. 1998), focuses on intergenerational transfers among women and proposes that older women can increase their inclusive fitness by raising offspring fertility and grandoffspring survivorship through provisioning. The “embodied capital” model (Kaplan et al. 2000) proposes that human economic and childrearing niche is skill- and knowledge- intensive, shifting productivity from younger to older ages and that this shift in productivity selected for increased investments in survival and longevity. The patriarch hypothesis (Marlowe 2000) proposes that an extended lifespan provides direct reproductive benefits to men, who do not experience reproductive cessation. Finally, the mother hypothesis (Peccei 2001) argues that most direct care of offspring will come from mothers, rather than grandmothers.

A common proposal in three of these models is that older individuals can increase their inclusive fitness through non-reproductive, kin-directed behavior. Our approach is to examine the direct and indirect benefits that older individuals may provide their genetic descendants, and to address the question of “Why longevity?” from two complementary perspectives. First, we will examine the behavioral pathways by which individuals may affect their descendants’ well-being. Analyses are conducted to determine if and how men and women adjust their behavior as they age to provide childcare, protection, and other services for grandchildren and other descendant kin. We will examine alternative predictions derived from these models regarding if and how older individuals negotiate residence patterns, time budgets, and resource production in ways that benefit children and grandchildren. The following questions will be addressed: 1) Do older individuals choose to reside in villages with the greatest possible number of kin descendants, controlling for the number of alternative caretakers; 2) Are older individuals net consumers or net producers, and what is the direction and intensity of resource transfers to specific kin; 3) How do age and physical condition affect the contributions of older individuals; is there an age in which older people become net producers; 3) what percentage of the children’s care and food come from parents and grandparents, respectively.

We will also examine how absolute levels of resource production and investment in descendants change with the increasing age, and dependency, of grandparents. The second approach is to measure proximate and ultimate effects of older individuals on descendant kin. At a proximate level, we will examine whether parental and grandparental presence positively impacts physical growth and negatively impacts rates of morbidity and illness of children and grandchildren. At an ultimate level, we will examine whether the presence of grandparents is associated with an increase in children’s completed fertility and grandchildren’s survivorship.