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Book Review

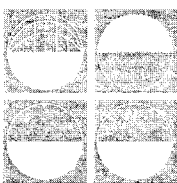
THE BIODEMOGRAPHY OF HUMAN REPRODUCTION AND FERTILITY. Edited by Joseph Lee Rodgers and Hans-Peter Kohler. Kluwer Academic Publishers, 2002. 258 pp. Hardbound, \$145.00.

There is perhaps no better example of the blending of biology, sociology, and demography than that of human reproduction and fertility. The volume in question focuses on the developing subfield of biodemography, and examines fertility from a biodemographic perspective that successfully overcomes the obscure and artificial boundaries between the disciplines for a more complete vision of fertility. The chapters of this book are taken from a conference entitled "The Biodemography of Fertility," which took place in Rostock, Germany, in 2000.

While each individual chapter of the book focuses on an issue of reproduction and fertility, the exact topics range in scope from phenotypic plasticity to energetics to G6PD deficiency. The text is well organized, however, and is divided into three main areas: 1) bio-evolutionary models (chapters 1-3), 2) evolutionary life history models (chapters 4-7), and 3) genetic models (chapters 8-12). Each chapter begins with a list of keywords and a thorough overview. There is not, however, a commentary provided at either the beginning or end of each main area, and an attempt on the part of the editors to integrate the papers would have been helpful. Each main section, with the focus on the contribution of each individ-

ual chapter, will now be addressed in greater detail.

The first main area of the text, while the shortest, is perhaps the most interesting and daring in its findings and implications. This section begins with Mealey discussing the idea of anorexia as a disease of low fertility. The author points out that the incidence of anorexia has increased drastically in rich countries. She argues that evolutionary models predict, at least in species other than humans, that anorexia is a set of coordinated responses to stress that lead to reproductive success. In modern human society, however, anorexia has gone amiss, and has become somewhat of a social manipulation used by the more dominant women of society to suppress the fertility of their competitors. Next, Hughes et al. focus on the potential adaptivity of phenotypic plasticity using an evolutionary biological perspective. This is an issue that has been studied almost exclusively in non-human populations (plants and non-human animals), with mixed results. The authors argue, however, that the adaptive plasticity hypothesis can, in some form, be tested on humans. They argue that there are several traits in humans that can take on different states throughout the lifetime of an individual. Hence, it is possible to estimate genetic variances, heritability, and phenotypic plasticity on these human traits. In the third chapter, Miller looks at the role of nurturant schemas in human reproduction, with a particular emphasis placed on bonding schema. After developing and detailing the idea of nurturant schema,



the author applies the construct to five areas of parenting, two areas before the birth (conception intendedness and pregnancy wantedness) and three areas after the birth (parental bonding, parenting behavior, and parental satisfaction). The author boldly states that this schema construct can lead to a unified theory of the motivation for all areas of parenting.

The second main area of the text starts with Anderson and Low using the Panel Study of Income Dynamics to examine women's life histories after a nonmarital first birth. They argue that having a first birth outside of marriage both affects the value of an investing male partner and decreases the woman's value in the mating arena. Their results by and large support this perspective, as they found that a significant percentage of these women did not marry by age 45 and that these women have fewer children over the life course. The main weakness of this piece is that the authors do not statistically account for possible selection effects, although they do discuss their implications. In the next chapter, Valeggia and Ellison attempt to join together the areas of biology of life history and human demography by focusing on energetics and their importance in the regulation of female fecundity. Women must make a substantial energetic investment in reproduction. It is therefore argued that any attempt to analyze female fertility patterns (individual or aggregate) must also consider a measure of energy availability. Energetics (e.g., energy intake, expenditure, and balance) must be considered alongside developmental history (e.g., age at menarche, menopause) and reproductive history (e.g., age at first birth, time since last pregnancy, cumulative duration of lactation) when examining issues such as reproductive ability and ovarian function.

Next, Low et al. examine the modern day tradeoffs made between education, work, and fertility. They use a creative nonlinear dynamic model to examine these tradeoffs when resources become limiting. The model starts with a hypothetical cohort of 1,000 women at age level 0 born into one of nine different socioeconomic classes. Women in each age group have some probability of dying or surviving to the next age level, and, above age level 0, they also have some probability of attaining education, work, or pregnancy. Based on these variables and their combinations, there are about 450 states in which a woman can exist. Interestingly, the model indicates that under virtually all conditions, pregnancy in the early 20s leads to the greatest lineage success for women. In the seventh chapter, Sear et al. analyze the trade-off between current and future reproduction in rural Gambia. Life history theory postulates that all organisms have a predetermined amount of energy that must be dedicated to somatic functions and reproduction, and therefore trade-offs exist when these resources are allocated. This piece tests whether women who expend energy in early reproduction have lower current fertility than do women who have not dedicated energy to past reproduction. Interestingly, they find quite the opposite, as women of higher parity had higher current fertility rates than lower parity women.

The final main area of the text, which contains the largest number of chapters, begins with Hunt and Rowe using the National Longitudinal Study of Adolescent Health (Add Health) to test the moderating effect of time spent with siblings on the relationship between genetic and environmental influences and the timing of first intercourse. Despite the acknowl-

edged problem of right censoring in the data, the authors come to several interesting conclusions, including that the heritability of sexual onset was greater for brothers than sisters and the shared environmental effects were greater for sisters than brothers. It was also found that time siblings spent together moderated effect of shared environmental factors on onset of first intercourse for both brothers and sisters. In the following chapter, Murray et al. discuss the selection pressure experienced by genetic alleles that compensate for disease vulnerability as well as alleles relevant to sexual behavior as a result of the fertility transition. Not all individuals contribute equally to the fertility transition, and an unexpected effect of the fertility transition is this change in allelic frequencies. The observed increase in the prevalence of many modern diseases may be, in fact, resulting in part from these changes in allelic frequencies. Next, Gloria-Bottini et al. discuss potential decreased fertility of women carrying the risk allele for G6PD in Sardinian mothers. In what comes out to be a very short piece, the authors primarily conclude that female carriers of the G6PD risk allele seem to have an increased risk of either low birth weight infants or spontaneous abortion. In the eleventh chapter, Murphy and Wang investigate three different scenarios of intergenerationally-transmitted fertility behaviors: 1) fertility is not heritable, 2) there is a partial correlation between daughters' fertility and mothers' fertility, and 3) daughters have the same fecundability as their mothers. Based on results attained from simulation models under alternative assumptions, the authors assert that the effect of intergenerational transmission of fertility on the population dynamics in modern societies is substan-

tial and that in pre-transitional societies, apart from predisposition to marry, the only reasonable means for intergenerational transmission is biological fecundability. This area of the text, and the text itself, concludes with a piece by Rodgers et al. addressing variance in human fertility. Using data from the Danish Twin Registry, the authors attempt to establish whether the genetic variance in fertility in MZ and DZ twins is due to biology or psychology. They discover that, in fact, both domains are significantly related to the genetic variation in fertility, although the biological component consistently accounted for more variance.

Overall, this book is quite successful in integrating the social and the biological aspects of human reproduction and fertility. Although a bit disconnected (the text would have greatly benefited from a strong introduction or conclusion that clearly tied each chapter, or at least each main section, of the book together), each chapter was very interesting in its own right, and provided a solid jumping off point for those interested in the study of biodemography. While I do not believe that this would qualify as an introductory level book (indeed, a substantial background in biodemography would add much to an individual's understanding of the content of this text), each chapter provides a rich literature review and a solid theoretical foundation, so that even a novice biodemographer can come away with the understanding that this is a sound and growing subfield, worthy of further interdisciplinary research.

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