Table 16.6. Net reproduction rate corresponding to mothers' parity progression ratio, h for first and second child, and k for subsequent children, according to (16.8.2)

h	k						
	0.40	0.45	0.50	0.55	0.60	0.65	0.70
0.60	0.59	0.61	0.64	0.68	0.73	0.79	0.88
0.65	0.66	0.69	0.73	0.78	0.83	0.91	1.00
0.70	0.74	0.78	0.82	0.87	0.94	1.02	1.14
0.75	0.82	0.86	0.91	0.98	1.05	1.15	1.28
0.80	0.91	0.96	1.01	1.08	1.17	1.28	1.43
0.85	1.00	1.06	1.12	1.20	1.30	1.42	1.59

States. Now, since

$$R_0 = \frac{1}{1+s}\left(h + \frac{h^2}{1-k}\right),$$ (16.8.2)

we have

$$\frac{dR_0}{dk} = \frac{1}{1+s}\left(\frac{h}{1-k}\right)^2.$$

Around $s = 1.05, h = 0.80, k = 0.65$, we have $dR_0/dk = 2.55$, so that each increase of 0.01 in k produces an increase of 0.0255 in R_0, and similarly for decreases.

To see the effects of successive childbearing decisions on population growth we need also to take account of timing. The age at which a woman has her first child, and the successive interbirth intervals, will evidently make a difference in the rate at which the population grows. Timing is the one element lacking in the present model. For the effect of its omission, consider $h = 0.80$ and $k = 0.65$, so that $R_0 = 2.63/2.05 = 1.28$. If the mean age of childbearing (strictly, the length of generation) is 25 years, the intrinsic rate is 0.0099; if it is 30 years, the intrinsic rate is 0.0082.

16.9 For a Given Probability of Survivors, Lower Mortality Lowers the Rate of Increase

When mortality is high, a man who wants to have a son who will see him through his old age requires many children. This point has often been made before, but we still need clarification of the relation between mortality and the rate of population increase among people who want a certain assurance of *surviving* children. With number of births given, the rate of increase r goes up as mortality μ_x goes down; we will see that the relation between r and μ_x is reversed if the birth rate is determined by the wish to have surviving sons.