

**From:** Alan Rogers <[REDACTED]>  
**To:** Gordon Getty <[REDACTED]>  
**Cc:** Robert Trivers <[REDACTED]>, Robert Frank <[REDACTED]> Jeffrey Epstein <jeevacation@gmail.com>  
**Subject:** Re:  
**Date:** Mon, 25 Nov 2013 21:05:26 +0000

---

Charlesworth and Charnov published an age-structured theory of kin selection in 1981 (JTB 88:103) and Taylor and Frank did it a different way in 1996 (JTB 180:27). I added time delays to the Charlesworth-Charnov model in 1993 (Evolutionary Ecology 7:406). These models all grow out of the ideas that Hamilton introduced in his "Moulding of senescence" paper in 1966. But Hamilton 1966 didn't do kin selection. He did however argue that reproductive value is not the right way to formulate the problem. His model (and also those mentioned above) use the numerator of reproductive value, but the normalization is different. To put this differently, the reproductive value at age  $x$  needs to be weighted by  $l_x$ , the probability of surviving to that age. This weighting is missing from the formulation directly in terms of reproductive value.

Alan

2013/11/25 Gordon Getty <[REDACTED]>