# **Assignment #4: Non-Random Mating**

[A4-1] Selfing [A4-2] deCODE

# Assignment [4-1]: Selfing

Calculated the **frequency of selfing** based on the genotype frequencies below for a population at equilibrium that engages in mixed-selfing and outcrossing.

Genotype	$A_1A_1$	$A_1A_2$	$A_2A_2$
Frequency	0.828	0.144	0.028

#### Assignment [4-2]: deCODE

Researchers at the deCODE Genetics company in Reykjavik mapped out kinship among all known Icelandic couples whose members were born between 1800 and 1965. They then compared the numbers of children and grandchildren descended from these 160,811 couples.

Researchers were shocked to find that for women born between 1800 and 1824, marriages between third cousins produced an average of 4.04 children and 9.17 grandchildren, while marriages between eighth cousins or more distantly related couples had averages of only 3.34 children and 7.31 grandchildren.

For women born between 1925 and 1949, with mates related at the degree of third cousins, the average number of children and grandchildren were 3.27 and 6.64, compared with 2.45 and 4.86 for those with mates who were eighth cousins, or more distantly related.

These findings seem to contradict our assumption that higher levels of inbreeding would results in a decrease of fitness. Try to find a possible explanation.



### Assignment [4-1]: Selfing

Genotype	$A_1A_1$	<b>A</b> 1 <b>A</b> 2	$A_2A_2$
Frequency	0.828	0.144	0.028

observed Heterozygosity

$$\rightarrow H_o = 0.144$$

expected Heterozygosity

$$p = 0.828 + \frac{1}{2}0.144 = 0.9$$
$$q = 1 - 0.9 = 0.1$$
$$\rightarrow H_e = 2pq = 0.18$$

$$F = 1 - \frac{H_o}{H_e} = \frac{H_e - H_o}{H_e}$$

$$F_I = \frac{0.18 - 0.144}{0.18} = 0.2$$

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## Assignment [4-2]: deCODE

According to Stefansson, the reason that related couples were more biologically successful may be because these couples have "just right" genes when combined — not too similar, but not too dissimilar, either.

However, Buehler added he "can't think of any genetic explanation for why the third or fourth cousins would have more babies."

Instead, Buehler supposed that related couples might shack up more often, simply because of pheromones.

"Maybe what we're seeing here is biologic attraction," Buehler said. "If you really look alike, feel alike and think alike, then maybe you have sex more often and have more babies. We do know that there are pheromones which cause attraction, and I wouldn't be surprised if related people have higher sexual desire for one another."



 $\leftarrow \mathsf{link} \mathsf{ to full article}$