

# Re: Hamilton's rule

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*Source:* <http://sci.tech--archive.net/Archive/sci.bio.evolution/2005-11/msg00324.html>

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- *From:* "Perplexed in Peoria" <jimmenegay@xxxxxxxxxxxxxx>
  - *Date:* Tue, 22 Nov 2005 16:40:17 -0500 (EST)
- 

"Jim McGinn" <jimmcginn@xxxxxxxx> wrote in message  
[news:dlvnf0\\$mbt\\$1@xxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:dlvnf0$mbt$1@xxxxxxxxxxxxxxxxxxxxxxxx)

>

> Perplexed in Peoria wrote:

>> "Jim McGinn" <jimmcginn@xxxxxxxx> wrote in message  
[news:dlrpsa\\$1p1j\\$1@xxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:dlrpsa$1p1j$1@xxxxxxxxxxxxxxxxxxxxxxxx)

>>>

>>> Perplexed in Peoria wrote:

>>>> "Jim McGinn" <jimmcginn@xxxxxxxx> wrote in message  
[news:dll6as\\$1qn2\\$1@xxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:dll6as$1qn2$1@xxxxxxxxxxxxxxxxxxxxxxxx)

>>>>>

>>>>> Perplexed in Peoria wrote:

>>>>>> "Guy Hoelzer" <hoelzer@xxxxxxx> wrote in message  
[news:dlh6sj\\$274\\$1@xxxxxxxxxxxxxxxxxxxxxxxx](mailto:news:dlh6sj$274$1@xxxxxxxxxxxxxxxxxxxxxxxx)

>>>>

>>>>

>>>> Guy asked:

>>>>>> I don't see how your graph justifies HR at all.

>>>>>>>

>>>>

>>>> PIP replied:

>>>>>> Well, the graph doesn't exactly justify HR. The relationship  $R = P + (D-P)r$

>>>>>> plus some simple reasoning justifies HR.

>>>>>

>>>>

>>>> JMc asked:

>>>>>> Simple reasoning?

>>>>

>>>> PIP, responding to Guy, continues:

>>>>>>> The logic is that the definition

>>>>>>> of 'r' (IBD) and the assumption of random mating leads to the relationship

>>>>>>>  $R = P + (D-P)r$ . That relationship, leads (by a different line of reasoning)

>>>>>>> to Hamilton's rule. We use the IBD definition of 'r' because it leads

>>>>>>> to a nice (and correct) rule.

>>>>

>>>> JMc asked:

>>>>>>> Can you explain to us the intellectual mechanics that brought you to

>>>>>>> this conclusion?

Re: Hamilton's rule

>>>>

>>>

>>> PIP responds:

>>>> Part 1. The recipient receives a fraction  $r$  of his genes from the donor,  
>>>> and the remaining  $(1-r)$  fraction from the general population.

>>>

>>> You lost me already. Sorry. I'm thinking maybe you skipped a step.

>>> If not then it seems you are employing a skyhook.

>>

>> Not a skyhook, but I was employing shorthand language. Sorry, I will try  
>> to be more precise below.

>>

>>> I thought all

>>> organisms received all their genes from their parents. Now your  
>>> saying that some of them come from, "the general population." What  
>>> do you mean by this, and how would you apply it, ...

>>

>> A nicely asked question. Ok. A fraction ' $r$ ' of the typical recipient's  
>> genes (on average) come from the common ancestors that the recipient  
>> shares with the donor AND they are identical (by descent) with the  
>> genes that the donor received from the same ancestors. I described this  
>> using the shorthand language that these genes 'come from' the donor.

>>

>> The remainder (fraction  $(1-r)$ ) of the recipient's genes come from  
>> sources that don't provide genes to the donor. These genes are expected  
>> (on average) to have the same allele frequencies as the general population.  
>> I used the shorthand language of saying that these genes come from  
>> the general population.

>

> You just described the steps for calculating  $R$ . This was not the  
> question I asked.

Yes it was. You quibbled about my language of saying that recipient genes  
'come from' the donor. I explained that language.

> Read again what you wrote. I was interested in the, "simple  
> reasoning," that, "justifies HR."

And that simple reasoning appears in 'part 2' of my argument, to which you  
did not respond in your last posting, and which you have snipped in this  
posting.

> And what exactly you meant by the last sentence in which you stated,  
> "We use the IBD definition of ' $r$ ' because it  
> leads to a nice (and correct) rule."

It means what it says. Among all possible choices for a metric of how  
closely related the donor is to the recipient, Malecot's IBD metric  
has the advantage that it results in a simple Rule when you investigate  
the selective impact of social behaviors.

Re: Hamilton's rule

If you wish to continue critiquing my derivation of the rule, I would suggest that you go back to the posting that contained that derivation and insert your comments into that posting without deleting the steps of the derivation. I am willing to clarify, but not to do a lot of retyping.

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• **References:**

- ◆ **Re: Hamilton's rule**  
◇ *From: Jim McGinn*

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