

Re: The Baldwin Effect: What is it trying to say?

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- *From:* William Morse <wdmorse@xxxxxxxxxxxxx>
 - *Date:* Fri, 9 Dec 2005 00:25:22 -0500 (EST)
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Guy Hoelzer <hoelzer@xxxxxxx> wrote in
[news:dn32pv\\$2c98\\$1@xxxxxxxxxxxxxxxxxxxxxx](mailto:news:dn32pv$2c98$1@xxxxxxxxxxxxxxxxxxxxxx):

> I hope this thread gets plenty of attention. I am very interested in
> the Baldwin effect myself and would like to understand it better.
>
> in article [dmve35\\$kve\\$1@xxxxxxxxxxxxxxxxxxxxxx](mailto:dmve35kve1@xxxxxxxxxxxxxxxxxxxxxx), whitesickle@xxxxxxx at
> whitesickle@xxxxxxx wrote on 12/4/05 10:55 AM:

>> Second, I read Baldwin's Effect was associated with
>> genetic assimilation and canalization but some researchers now are
>> saying it doesn't depend on genetic assimilation.

>
> I think the point of genetic assimilation and canalization under the
> Baldwin effect was that these are means of codifying (making more
> permanent) adaptive responses to environmental challenges that are
> plastic in individuals. Perhaps the researchers suggesting that the
> Baldwin effect does not depend on these mechanisms have discovered or
> imagined other codifying mechanisms.

(snip)

>> Learning is the most cited example of Baldwin's Effect. Yet ever
>> since recorded civilization humans have remained basically unchanged
>> by Darwinian evolution.

>
> Wow. I find this to be wildly at odds with my personal viewpoint.
> What reasoning or evidence do you have to support this claim.

>
>> Our "learning" or education has increased as has
>> our knowledge but genetically we haven't much.

>
> I suppose the word "much" is subjective, so there is room for
> differing opinion on this claim. In my estimation, the human gene
> pool has changed enormously over the past few thousand years, given
> the constraints on gene pool evolution that accompany rapid population
> growth. I think that gene pools tend to change much more dramatically
> during times of population contraction, given the same selection
> pressures.

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- >> Therefore, there hasn't
- >> been any evidence of Baldwin's Effect on Darwinian evolution as I
- >> see. If one defines evolution to also entail cultural evolution then
- >> I would argue Baldwin's Effect has had some effect on evolution...but
- >> not a whole lot.
- >
- > Well, yes I would certainly include cultural evolution in this
- > subject, because individually plastic behaviors can become codified as
- > cultural practices.
- >
- >> The only way I see Baldwin's Effect having a significant
- >> effect is if the continuation of learning and knowledge goes beyond
- >> the idea of effecting changes in phenotypic plasticity without a
- >> direct connection between phenotype and genotype.
- >
- > Here is a classic, though somewhat hypothetical, illustration.
- > Pinnipeds (seals and sea lions) evolved from canid ancestors.
- > Imagine that the environment of the ancestral canid population changed
- > such that this dog-like species was forced to forage for intertidal
- > marine species, rather than say hunting for other large mammals (maybe
- > in packs). This would be an example of behavioral plasticity. Now
- > that these canids are depending on their ability to hunt for marine
- > prey, any mutation that makes them better at doing so would be favored
- > by selection. Had the canids not manifested intertidal foraging
- > behavior, this mutation would be of no value. Hence, this population
- > of canids might have evolved into an early form of pinniped through
- > the genetic codification of a behaviorally plastic change. Does this
- > seem unlikely to you? I could see how it might seem like an unusual
- > circumstance, but I would argue that we haven't explored this line of
- > thinking well enough to reject it as a general phenomenon.
- >
- > Guy
- >
- >

I have understood the Baldwin effect to be the extension to learned behavior of the general process by which an organism's behavior affects the environment, which in turn changes the selection pressure acting on the population. To give an example where learning is not involved, once a species of plant figured out how to make woody trunks so they could raise their leaves higher than competitors, it affected which of that species of plants own seeds would survive – the ones that could grow tall trunks.

Baldwin recognized that learned behavior could act the same way, in which case evolution might appear to be Lamarckian, especially if a behavior that was initially learned became genetically programmed in later generations. The illustration of a change in foraging behavior in canids is an excellent one. The evolution of the beaver is another example – as the proto-beaver starts to take advantage of natural dams and learns to

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improve on them, it changes what traits will be advantageous in future proto-beavers.

So I see the Baldwin effect as having very general applicability in understanding evolution – potentially coming into play anytime an organism has a significant and consistent impact on its environment and can change that impact through learning.

Now as to Michael's argument that the Baldwin effect can't be significant because we haven't seen any change in human genetics in the past 10,000 years, I would note several points:

As of 10,000 years ago the human population was already rather large, and many of the behavioral changes were confined to a fairly small part of it and were often themselves of relatively short duration – e.g. the armor worn by knights – so it is unsurprising that human genetics has not undergone rapid change during that time period.

While somewhat older than 10,000 years, there is a very good recent example of what I would consider a Baldwin effect change in the human genome – namely the rapid acquisition of the ability to digest lactose in adult humans in several different populations of humans in northern Europe and in Africa. This came about because of the adoption of herding dairy animals by these populations, which suddenly made the ability to digest lactose as an adult a significant asset in surviving.

And the evolution of language almost has to be a result of the Baldwin effect. Current homo sapiens have a "language instinct" – the ability to learn language is innate. But this can not always have been the case – earlier hominids must have had to teach their children how to communicate, gradually turning the indexical verbal and gestural signals of apes into a pidgin language that then became partly genetic until it evolved into a fully symbolic system of communication.

Yours,

Bill Morse

• *Follow-Ups:*

◆ ***Re: The Baldwin Effect: What is it trying to say?***

◇ *From:* John Wilkins

• *References:*

◆ ***The Baldwin Effect: What is it trying to say?***

◇ *From:* whitesickle@xxxxxxx

◆ ***Re: The Baldwin Effect: What is it trying to say?***

Re: The Baldwin Effect: What is it trying to say?

◇ *From:* Guy Hoelzer

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