

Deceit and self-deception

Flowers: what are they signaling?

Broadly speaking: particular floral phenotypes signal (or advertise) the presence of a reward to animal pollinators. Reward may be:

- nutritious (nectar) or
- reproductive (deceptive: flowers that smell like female pollinators)

Sexual deception in Australian orchids

- Sexually deceptive pollination requires that flowers attract male insects at least twice, first to remove pollen (male function), and then to deposit it on a second flower (female function), preferably at some distance from the first.
- *SN*: A wingless female emerges from the ground and emits pheromone while perched on a stem, attract a male, and then that male transports her to a nectar source during copulation.
- *AFU*: *Chiloglottis* orchids have faintly scented flowers that have hinged labella which crudely resemble female wasps. A male, presumably deceived into thinking that the labellum is a female, grasps the labellum, gets pollen on himself, and then, still eager, flies into another orchid, thus pollinating flower #2.

Male wasps aren't confused if:

- The flower is too tall (they don't go to actual females over 25 cm off the ground, either).
- The flower has no pheromone on it. Female pheromone and the odor produced by the orchids are identical. When experimentally enhanced, flowers with very high pheromone levels were always preferred by males, to actual females.
- Visual cues seem to be weakest: the labellum is roughly twice the size of actual females, and wasps like beads impregnated with pheromone just fine.

Within social species: Why deceive others?

All cases backfire when: you get found out. This would seem to suggest that a primary goal for individuals living in social groups is to deceive well, not to minimize deceit.

But:

- "...in most competitive interactions, there will be oscillations in the successes of each competitive strategy. Such oscillations are due in part to differential selection regimes operating to fine-tune each strategy under a set of constraints. In the context of deception, selection will often operate to make signalers ultimately sneaky and perceivers ultimately skeptical." (Hauser p583)
- In other words: Simply being a good liar isn't an ESS (Evolutionarily Stable Strategy), because the individuals to whom you are lying have an equal interest in discerning your lies. Hence: arms races

Arms races & the Red Queen

- In Lewis Carroll's *Through the Looking Glass*, the Red Queen tells Alice: "It takes all the running you can do, to keep in the same place."
- The Red Queen has since been co-opted as evolutionary shorthand for interactions between any two evolving, and responsive, players: e.g. predator and prey, host and disease, social conspecifics.
- Any co-evolved relationship which incurs costs to both sides will result in a struggle for survival and/or reproduction. That is, both players need to be constantly running (adapting, changing their responses on the playing field) because the landscape in which they exist is constantly changing.

Adaptive landscapes

- The adaptive landscape is a conceptual framework for evolution—a tool useful in understanding why organisms do not attain globally optimal designs. It can be applied to any characters that evolve—morphology, physiology, behavior, etc.
- The adaptive landscape is the surface that describes that subset of design space that is physically, chemically, and biologically possible, given a particular environment.
- Imagine a sheet of ice on a pond. Air bubbles rise to the high spots on the underside of this piece of ice, and roll up from the low spots.
- Bubbles : particular populations/individuals in the design space of the sheet of ice
- Height of the peak : how adaptive that morph is
- Depth of the valley : how difficult it is to go between peaks, e.g. from a locally high peak (somewhat adaptive) to a globally high peak (optimal)
- Force of gravity (pushes bubbles up by driving water down): natural selection

Adaptive landscapes: implications

- The likelihood that a morph that is locally well-adapted can become a morph that is globally well-adapted (move between peaks) is not affected by the difference in relative height between those peaks, but on the depth of the valley separating them.
- Natural selection cannot move morphs down from a high point. It therefore cannot be solely responsible for a move from a peak to another peak. Morphs must move by some non-adaptive process to a valley, at which point natural selection can kick in again and move the morph up another peak.
- From a peak, a move in any direction is immediately bad—less adapted than the current condition.
- Changing environmental conditions can convert a peak into a valley.
- Original ref: Wright, S. 1932. The roles of mutation, inbreeding, crossbreeding and selection in evolution. *Proceedings of the Sixth International Congress of Genetics* 1:356-366.

Shouldn't natural selection lead to an ever better, more refined ability to accurately perceive the universe?

Empirical examples of deception from non-human animals

- Playing dead or playing injured to fake out would-be predators (possums, some snakes, shorebirds, including piping plovers Hauser p587-9)
- Playing dead to attract prey: Lake Malawi cichlids
- Transvestite cuttlefish get the girl, sometimes

Lie detection in humans (See table 7.4 from Hauser p606)

How self-deception differs

- Better liars get gamed less: the arms race goes to s/he who deceives / discovers most readily.
- Self-deception theory suggests that, once you yourself are fooled, you are more able to hide your ongoing deception from others.
- Another possible advantage is that conscious knowledge of ongoing deception is frequently accompanied by stress, thus knowledge may be rendered unconscious so as to minimize stress. (Trivers 2000; also Burt & Trivers 2000)

Self-deception in the service of deceit is predicted to flourish in at least five kinds of situations:

1. Denial of ongoing deception (your pupils won't dilate, voice won't raise in pitch, etc., if you yourself are convinced that no, I did not eat the last cookie, ding your car, have sex with that woman...)
2. Unconscious modules involving deception: Unconscious modules involving deception (apparently pure-cost strategies that we adopt unconsciously, but which, upon further reflection, may be the result of strategy). Example: people who always walk away with other people's pens, or lighters.
3. Self-deception as self-promotion (Self-exaggeration of positive traits, denial of negative traits, all combining to create an unlikely amalgam.) Tricks of the trade include: biased memory, biased computation, changing from active → passive voice when describing positive → negative outcomes, etc...

4: Construction of biased social theory

- Topics of our many social theories include relationships, employment, larger societal issues.
- Many social theories must be right. But we tend to be verificationists as we construct them, looking for confirming evidence, and conveniently forgetting or undervaluing contradictory evidence.

5: Fictitious narratives of intention

- Rationalizing our actions or words based on previously unconscious motivation which is, nonetheless, at the tip of the tongue should it be called upon.
- Creating situations that allow us to do what we want, even though we can't logically, or consciously justify it.

Costs of self-deception

- Misapprehension of reality, especially social
- Fragmentation of the mental system: conscious lies are easiest to stick to when they closely match the truth. Presumably the same is true of self-deception.

Neurophysiological capacity for self-deception

- Nervous signals reach the brain in 20 ms; such signals take 500 ms to register in consciousness. Plenty of time for amendments, changes, deletions, etc to occur, which can decouple why you're doing something, from why you think you're doing something.
- Stimuli received just 100 ms before an experience reaches consciousness (but after the experience has actually occurred) can affect the conscious understanding of the experience.
- 350 ms before we consciously intend to do something, the relevant neuronal activity begins; and there is a further 200 ms delay after we "intend" to do something before we actually do it. Our conscious mind appears to be more on-looker than decision-maker.

Self-deception and homophobia

- Experiment: Fully heterosexual men (those with no homosexual behavior or fantasies) are divided into two groups:
 - relatively homophobic (uncomfortable with, fearful of, and hostile toward, homosexual men), and
 - not homophobic (as assessed through questionnaires).
- All are outfitted with plethysmographs (measure changes in penis circumference), and interviewed about their perception of their own arousal level, while watching three kinds of sex videos: hetero, lesbian, and male homosexual.
- Results: Both sets of men respond with similar levels of actual arousal to the hetero and lesbian videos, but only homophobic men show a significant response to the male homosexual video. Post-video interviews show self-deception in only one group, on one issue: homophobic men deny their response to the male homosexual video.
- Ref: Adams et al. 1996. Is homophobia associated with homosexual arousal? J. Abnorm. Psychol. 105: 440-445.

Self-deception and genomic imprinting

- Genomic imprinting (reminder): parent-specific gene expression. In other words: the ability of some genes to “know” where they originated, and to be expressed, or just produce different effects, only when they were maternally (or paternally) inherited.
- Genomic imprinting pits half of the nuclear genotype against the other half, easily selecting for biased information flow within the organism which may resemble classical self-deception (or: “*selves*-deception”).
- For example, there is growing evidence that different parts of the body may express maternal and paternal factors differently.
 - In chimeras (Frankenmice consisting of mixtures of normal cells and doubly-maternal or doubly-paternal cells),
 - maternal cells survive and proliferate preferentially in the neocortex (social interactions, planning, memory), while
 - paternal cells do well in the hypothalamus (hunger, growth rate, sex drive).
- “It is easy to imagine that mechanisms useful in self-deception to deceive others may prove useful in within-individual conflict. If selfish impulses are kept unconscious, the better to hide them from others, and they may also stay unconscious, the better not to be spotted by oppositely imprinted genes.” (Trivers, R. 2000. The elements of a scientific theory of self-deception. *Annals of the New York Academy of Sciences* 907(April): 114-131.)