

EC 490

Lecture 11

Inequity aversion in monkeys and apes?

1. If the true model of the standard human utility function involves inequity aversion, then we should wonder whether this is mainly a product of cultural evolution or biological evolution. (Of course, if it's biological than culture will almost certainly have caused its further adaptation.) To address this question, we turn in the first place (as usual) to our primate relatives.
2. The standard model of inequity aversion is

$$U_i(X) = x_i - \alpha/n - 1 \sum \max(x_k - x_i, 0) - \beta/n - 1 \sum \max(x_i - x_k, 0), k \neq i$$

where α represents 'envy' and β represents 'guilt'.

One typically adds that $0 = \beta_i < 1$ and $\beta_i = \alpha_i$ - that is, guilt doesn't operate without envy.

3. An interesting behavior that humans sometimes display is refusing low offers in versions of the UG with *impunity*, that is, in which refusal doesn't affect the proposer's payoff. People are more likely to do this when proposers are informed about it, and more likely again to do it if they can inform proposers themselves. This isn't direct evidence for inequity aversion. It might more parsimoniously be taken to reflect utility from asserting dignity. Indeed, it fails to fit the utility function above on a straightforward interpretation: I don't decrease inequity by denying myself money while you walk off with some. On the other hand, perhaps in the subjects' utility functions dignity was traded off against money; and perhaps subjects perceive that insulting greedy

- partners reduces *their* dignity. Dignity itself is difficult to interpret behaviorally without reference to interest in equity.
4. People are much more likely to resist inequity when they're the ones receiving the smaller endowment. They also tolerate it much more readily when they think that larger gains accrue to those who contributed more. When people in UG games can write notes to low-offering proposers *in addition to* punishing them monetarily, they tend to accept lower offers – it seems that expressing disgust trades off against the more standard form of UG retaliation.
 5. Non-human primates, like many animals, engage in reciprocity. Most don't share food except with their own infants, but both chimpanzees and capuchins are exceptions, especially with respect to meat procured through joint hunting. (Recently, male chimpanzee hunters have been observed to exchange meat with females for sex.) They learn to match effort at joint procurement to effort contributed by partners. This makes evolutionary sense: a sensible investor should prefer to work with better co-investors, and to go shopping for better investors if a present co-investor is too lazy or selfish.
 6. Four cognitive / behavioral conditions on inequity aversion: the lover of equity should
 - (i) notice when reward magnitudes and/or quality differs between individuals;
 - (ii) react negatively to such differences, at least when they favor the other;
 - (iii) take action to reduce inequity, at least when it favors the other;
 - (iv) respond aversively to over-compensation (even if this merely produces rationalization).

Do non-human primates evince (i) – (iv)?

7. Capuchins and chimps very strongly manifest (i) and (ii). They will refuse inferior rewards when they see identically deserving compatriots receiving superior ones. They don't do this when they can merely *see* superior rewards, as long as no one else is receiving them. Nor is this simply frustration at declining rewards relative to conditioned expectations; subjects don't refuse inferior rewards merely because they formerly received superior ones.
8. Importantly, monkeys and apes don't refuse inferior assets when no effort is required to obtain them. If this weren't so, we would suspect the interpretation of the experiments. It would be very strange if evolution produced animals that refused to eat anything but the best food obtainable by anyone in the group. It is easy, however, to understand why selection would favor social animals who don't like to perform tasks with greedy partners.
9. Note that capuchins won't refuse very good rewards. "Every capuchin has his price." That price is 1 grape.
10. Capuchins have *not*, so far, demonstrated sensitivity to proportional differences in effort that 'unjustly' yield the same rewards.
11. Chimps are much more tolerant of inequity with their old friends than with newer acquaintances.
12. Note that the utility function in (2) above does *not* fit the behavior described so far. Declining my cucumber while you get a grape resembles the behavior observed by some humans in the Impunity game. Are monkeys and apes factoring consideration of dignity into their utility? Note that

in natural conditions, unlike the lab conditions, neither humans nor capuchins nor chimps must keep being insulted by greedy partners; they can walk away, to (sensibly) seek out a better partner. Perhaps refusing inferior rewards without being able to punish the undeserving rich is simply the closest subjects can come in these conditions to walking away.

13. There is as yet no direct evidence from this experimental paradigm of response to over-compensation. Neither capuchins nor chimps who get grapes when others get cucumber have been observed to share them. (Clearly, however, this isn't really tested if rewards are single grapes.) In fact, chimps seem altogether indifferent to others' rewards *except* to manifest envy. When 18 chimps could choose between rewards for themselves and pairs of equitable rewards for themselves and partners, all but 1 ignored their opportunities to maximize social welfare. Given that both chimps (like capuchins) help one another in all sorts of ways given opportunities for reciprocity, this is evidence that standard chimp social preferences mainly express (weak) reciprocity.
14. This impression is reinforced by the fact that both capuchins and chimps are highly sensitive to conditions in which *others* can help *them*. When capuchins can obtain food by cooperating to pull trays, individuals will continue cooperating with individuals who observe equity, but discontinue cooperation with individuals who don't. Chimps show similar dispositions.
15. My interpretation of this (quite limited) weight of evidence is that chimp and capuchin utility functions are *not* best written down as incorporating inequity aversion. The evidence seems better interpreted as follows. Chimps and

capuchins are disposed to weak reciprocity. We can make sense of their tendency to display self-defeating envy in the lab by hypothesizing that this approximates behavior which, in normal conditions, would be sensible – breaking off activities with greedy partners. But we can't say we really understand the behavior until a way is found of testing the hypothesis in more ecologically typical situations.

16. I think we should also look for inequity aversion in some other non-human species. There are other ways in which chimps seem socially obtuse by comparison with elephants, toothed whales, parrots and corvids.