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2017

## Aristotle and Game Theory on Human Nature and Ethics

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Notes:

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### Recommended Citation

Revlett, Beau R., "Aristotle and Game Theory on Human Nature and Ethics" (2017). *Oswald Research and Creativity Competition*. 3.

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In this paper, I consider whether Aristotle's ethics is consistent with one modern scientific view of humans. The modern scientific view I discuss is based on Nancy Cartwright's argument that game theory uncovers something akin to the Aristotelian natures of humans. Following Martha Nussbaum, I focus on the role of human nature in Aristotle's ethics. Specifically, I focus on two kinds of ethical conclusions Aristotle grounds in claims about human nature. I consider Nussbaum's interpretation that Aristotle's claims about human nature are dependent upon common beliefs and values. I argue that game theory's account of humans allows a relatively value-free grounding of exactly one kind of Aristotle's conclusions. I conclude that while the game theoretic account has some advantages, future work can more productively focus on the similarities between the two accounts. I summarize Cartwright's account of natures, Aristotle's two kinds of conclusions, and Nussbaum's interpretation, then make my argument.

## I. Cartwright on natures

Nancy Cartwright revises Aristotle's natures.<sup>1</sup> According to Cartwright, claims about natures are scientifically verifiable. For a claim to be scientifically verifiable, some scientific inquiry must justify it similarly to how physics justifies claims about the natures of particles. Physics justifies claims about the natures of particles by considering the behavior of a particle in an idealized situation, for example an experiment. Cartwright calls this idealized situation a nomological machine. Physics deduces from the regular behavior of particles in various nomological machines some laws of nature about particles. These laws of nature describe what the particle tends to do in special nomological machines. That is, they describe what it is in a

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<sup>1</sup> See Cartwright (1999) for her account of Aristotelian natures, especially chapter 4.

nature of particles to do. The inference from special nomological machines to the natures of particles is warranted because the nomological machines are arranged so that their behaviors are regularly in a state where they have little impact on particles. Thus, the behavior of the particle in the nomological machine is how the particle would behave if it could express its nature unconstrainedly.

Game theory proceeds inversely to physics. Instead of placing its natural subject—a human—in a nomological machine, it places an idealized subject in a natural situation. Cartwright argues that allows the same kind of knowledge of humans that physics provides of particles—that is, knowledge of the natures of humans. I assume Cartwright’s argument successful. I explore what it means for a person who accepts modern science and is assessing Aristotle’s ethics. I return to Cartwright in section IV; in II and III, I discuss Aristotle.

## II. Aristotle’s two kinds of ethical conclusions

Consider two kinds of ethical conclusions Aristotle grounds in claims about human nature. The first concerns what can be coherently desired for a human being. Consider the following passages from Book VIII of the *Nicomachean Ethics*.

- (1) If it is well said that a friend wishes goods for his friend for that person's own sake, then that person will have to remain the type of being he is. Then it is to him as a human being [or: on condition of his remaining a human being] that the friend will wish the greatest goods. (1159a8-12)<sup>2</sup>
- (2) Being is a good thing for the good person, and each person wishes good things for himself. But nobody would choose to have everything on condition of becoming

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<sup>2</sup> All translations and citations of Aristotle originate in Nussbaum (1995).

other—as, for example, the god right now has the good. He will wish to have the good while continuing to be whatever he is. (1166a19)

I reconstruct Aristotle's argument as follows.

(P1) If some change C is to be coherently desired for an entity E, then C must not cause E to change its identity (from 2).

(P2) If C causes E to become a member of a different species, then C causes E to have a different identity (from 1 and 2).

(C1) If C causes E to become a member of a different species, then C cannot be coherently desired for E (from P1 and P2).

Aristotle does not mention human nature in these passages. To connect this to human nature, one must reach the following.

(CX) Knowledge of human nature provides knowledge of whether C causes E to become a member of a different species.

I call this CX because Martha Nussbaum uses intermediate premises and conclusions to argue for it, as discussed below.

The second kind of conclusion concerns social arrangements. Consider the following passages, from Books VIII and IX of the *Nicomachean Ethics* and Book I of the *Politics*:

(3) It seems likely that [philia (friendship)] belongs by nature to the parent towards the child and the child towards the parent; not only among human beings, but even among birds and most animals; and that it belongs also to members of the same nation towards one another, especially among human beings. (...) This is why we praise those who love and benefit other human beings. (...) It seems likely that philia hold cities together as well. (1155a16-23).

- (4) It seems rather peculiar to give all goods things to the eudaimōn [i.e., the happy person] and to leave out friends, which seem to be the greatest of the external goods. (...) And surely it is peculiar to make the happy person a solitary; for nobody would choose to have all good things in the world all by himself; for the human being is a political creature and naturally disposed to living-with. (1169b8-10, 16-19)
- (5) It is evident that (...) the human being is by nature a political animal, and that the person who is citiless through nature and not through luck is either an inferior creature or greater than a human being. (1253a1-4)

I identify two of this kind of conclusion:

(C2a) By nature, humans have friendship to their parents and children and others with whom they live (from 3 and 4).

(C2b) By nature, humans belong to cities and have friendship to others in their nation (from 3 and 5).

### III. Nussbaum's interpretation of Aristotle

Nussbaum claims that Aristotle does not simply claim C2a and b, but argues for them based on common beliefs and values.<sup>3</sup> She also claims that he extends this argument to reach CX. She does this by interpreting (3) and (4). She emphasizes that, in (3), Aristotle supports his claim about human nature with “seems likely.” She interprets this as allusion to common belief. In (4), Nussbaum claims that Aristotle's invocation of what “nobody would choose,” a reference to common values, is evidence for the claim that humans are “naturally disposed to living-with” (105). Thus Nussbaum makes the following argument.

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<sup>3</sup> See Nussbaum (1995: 103-106) for her full argument.

(P3) What belongs to human nature is in part constituted by some common beliefs and values (from 3 and 4).

(P4) A relevant common belief is that it is part of human nature to be a friend to one's parents and children and others in one's nation (from 3).

(P5) A relevant common value is that humans should have friends (from 4).

(C2a) By nature, humans have friendship to their parents and children and others with whom they live (from P3-P5, (3), and (4)).

(C2b) By nature, humans belong to cities and have friendship to others in their nation (from P3-P5, (3), and (5)).

Now, Nussbaum connects C2a and b to CX. She notes that though (3) and (4) justify social arrangements, they both reference the boundary between the human and other species. In (4), a citiless being is either sub- or superhuman. In (3), humans share with other species friendship with parents and children, but are distinguished by friendship to all in their nation. Thus, Nussbaum makes the following argument.

(C2c) Knowledge of human nature includes knowledge that humans have friendship to their parents, children, those with whom they live, and others in their nation (from C2a and b).

(P6) Membership in a city and friendship to those in one's nation distinguish humans from other species (from 3 and 4).

(C3) Whether E has friendship to its parents and children and others in its nation determines whether E is a member of the human species (from P6).

(CX) Knowledge of human nature provides knowledge of whether C causes E to become a member of a different species (from C2c and C3).

#### IV. Aristotle's ethics and Cartwright's natures

Nowhere in Cartwright's account of the discovery of natures are such common beliefs and values involved. Thus, game theory promises a relatively value-free account of the natures of humans. I say "natures" not "nature" because of two differences between Cartwright and Aristotle.<sup>4</sup> First, according to Cartwright, an entity does not have just one nature, but many. Entities' natures interact to produce its behavior. Perhaps the set of all an entity's natures might be called its Nature. But modern science does not have access to all an entity's natures. So I will not discuss this stronger use of 'nature.' Second, according to Cartwright, no one nature distinguishes an entity as a member of one species rather than another. Members of different species can share natures.

The second difference forces a rejection of P6 and C3, which link C2a and b to CX. Thus it forces a rejection of Nussbaum's argument for CX. CX is the link between C1 and human nature. Thus, Cartwright's natures cannot ground Aristotle's first kind of ethical conclusion in the way that Nussbaum proposes human nature does.

Remaining is the second kind of ethical conclusion, including C2a and b. Game theory can ground these. I aim to only sketch what game theory can do. Evolutionary game theory can be used to analyze social contracts.<sup>5</sup> Humans need social contracts because they face cooperation problems. A cooperation problem is when every human in a group behaves self-interestedly, yet the outcome is against the self-interest of each group member. Social contracts

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<sup>4</sup> See Cartwright (1999: 81) for her account of the differences between her and Aristotle's natures.

<sup>5</sup> See, for example, Skyrms (2007) for a more detailed account of evolutionary game theory's treatment of social contracts.

bind humans in a group to behave against their short-term self-interest to prevent outcomes against the long-term self-interest of all in the group. Social contracts include conventions of friendliness to family, housemates, and compatriots. The following argument is evolutionary game theory's way of reaching C2a and b.

(P3\*) By nature, humans face cooperation problems.

(P4\*) By nature, humans create social contracts to solve cooperation problems.

(P5\*) Some social contracts humans have created bind humans to belonging to cities and having friendship to their parents, children, others with whom they live, and others in their nation.

(C2a) By nature, humans have friendship to their parents and children and others with whom they live.

(C2b) By nature, humans belong to cities and have friendship to others in their nation.

Consider two advantages of this account. First, and to the point of this paper, it is freer of values than Nussbaum's interpretation. Second, it explains not only the social arrangements Aristotle observed, but the diversity of social arrangements across human experience. No matter what form cityhood, friendship, households, and nationhood have taken, this accounts for them. Moreover, P5\* does not bind humans to one nature: if some group finds a different solution to a cooperation problem, that solution belongs to them by nature.

This reveals two consistencies between this account and Aristotle's. First, both give humans some control over their nature. In Aristotle, humans exercise that control through common beliefs and practices. In evolutionary game theory, it is through social contracts. Second, both place as fundamental to humans their incompleteness, or lack of self-sufficiency.



In Aristotle, humans become complete via the virtues and living in a city. In evolutionary game theory, humans become complete via solutions to cooperation problems.

Future work can explore these connections. One may more closely explore the similarities between the accounts, or to what extent the game theoretic account is value-free, or the significance of the game theoretic account's failure to ground Aristotle's first kind of conclusion. One may question the application of Cartwright's account to humans. But the overlap between the accounts is promising on two fronts: first, it suggests the possibility that Aristotle's ethics can be reconciled to modern science; second, it suggests the possibility that modern science can ground ethics.

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