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Autonomy in chimpanzees

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Abstract Literature on the mental capacities and cognitive mechanisms of the great apes has been silent about whether they can act autonomously. This paper provides a philosophical theory of autonomy supported by psychological studies of the cognitive mechanisms that underlie chimpanzee behavior to argue that chimpanzees can act autonomously even though their psychological mechanisms differ from those of humans. Chimpanzees satisfy the two basic conditions of autonomy: (1) *liberty* (the absence of controlling influences) and (2) *agency* (self-initiated intentional action), each of which is specified here in terms of conditions of understanding, intention, and self-control. In this account, chimpanzees make knowledge-based choices reflecting a richly information-based and socially sophisticated understanding of the world. Finally, two major theories of autonomy (Kantian theory and two-level theory) are rejected as too narrow to adequately address these issues, necessitating the modifications made in the present approach.

Keywords Autonomy · Animal ethics · Chimpanzee research · IOM chimpanzee report · Research ethics

Introduction

The title of this paper is intentionally provocative. Literature on the mental capacities and cognitive mechanisms of the great apes, other than humans, has been

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largely silent about whether they can act autonomously. This guardedness derives from a lack of clarity about the meaning of "autonomy," but also from skepticism that great apes have the level of cognitive capacity required for autonomous action. "Autonomy," "respect for autonomy," and "rights of autonomy" are among the most important concepts in contemporary moral theory. "Respect for autonomy" and "rights of autonomy" are moral notions, whereas "autonomy" and "autonomous action" are not. We here analyze "autonomy" as a psychological mechanism of decision and action. We center the analysis on whether chimpanzees can act autonomously, rather than on whether they are autonomous persons. Chimpanzees may or may not be persons, a difficult philosophical problem that we do not attempt to decide.

We focus our discussion on chimpanzees because the richest literature exists on their psychology, relative to that of other great ape species. Our perspective is that a philosophical theory of autonomy supported by psychological studies of the cognitive mechanisms that underlie chimpanzee behavior will help us understand the ways in which chimpanzees act autonomously and the ways in which their psychological mechanisms differ from those of humans. No feature in our analysis is built on a moral notion, nor is our goal to reach moral conclusions. However, the implications of our claims about autonomy in chimpanzees are morally substantial because they stand to support the hypothesis that chimpanzees have a significant moral status.

Concepts and theories of autonomy

There is a strong theoretical convergence to the conclusion that the starting point for a theory of autonomy is individual self-governance: self-rule free of controlling interferences by others and without limitations in the individual that prevent free and informed choice and action. This general scheme presumes that two conditions of autonomy are essential: (1) *liberty* (the absence of controlling influences) and (2) *agency* (self-initiated intentional action). Disagreement exists over the analysis of these conditions and whether additional conditions are needed.[1] Each of these notions is indeterminate until further specified, so we start with how to construct a properly specified theory.

We assume from the outset that any theory of autonomy merits rejection if it classifies as nonautonomous human acts that unmistakably are forms of self-governance of one's own affairs. Such self-governance is present, for example, in acts of individuals playing games with friends, deciding what to eat, punishing a rule-breaker, studying how to repair a damaged house, and defending one's family members against a physical attack. Some level of autonomy is present in each of these actions. A theory is unacceptable if its conditions determine that these human actions are *non*autonomous.

Later we will critically examine two distinguished theories of autonomy that require elevated cognitive capacities. We argue that the criteria of autonomy in

[1] See the different conceptual analyses of autonomy and theories of autonomy discussed in [1, 2].

these influential theories are too demanding and need to be qualified by an account of degrees of autonomy.

A concise theory of autonomous action

We first sketch an account of autonomous action that one of us has elsewhere developed in more detail [3, 4]. This account is designed to be coherent with the assumptions that we make when we judge the choices of ordinary persons to be autonomous. We analyze autonomous action in terms of individuals who self-initiate action that is (1) intentional, (2) adequately informed (that is, sufficient understanding, in the sense of comprehension, is present), and (3) free of controlling influences.

The condition of intentionality

An individual could not be autonomous unless he or she acted intentionally. Intentional actions require plans in the form of representations of the series of events proposed for the execution of the action. We will not assess the precise form these representations must take, but we do not assume that language is (or is not) a necessary condition of representations. We do assume that an act must correspond to the actor's conception of the act. Unintended acts, such as an unplanned dropping of one's food to the ground—whether human or chimpanzee—are nonautonomous.

Self-initiated intentional actions include any behavior and any effect specifically willed in accordance with a plan, including merely tolerated effects. In this conception one can desire not to do what one intends to do, in the same way that one can be willing to do something but be reluctant to do it, or even detest doing it. A chimpanzee who exposes herself to danger in order to protect an infant is, we presume, convinced that there is no meaningful way to avoid being exposed to danger, but after considering the alternative of harm to the infant, accepts the danger. Although this acceptance is a toleration of an exposure that is not desired, the act is the actor's *own* intentional act [5].

Our theory is concerned with intentional action and is not restricted to what is intended. For example, one can consent intentionally to being scarred in surgery, while not intending to be scarred. What it means for an act to be intentional need not be equated with what the agent of the action intends. We will not further pursue the merits of this distinction. We simply stipulate that we are concerned exclusively with what it means for an action to be intentional.

Now, do chimpanzees act intentionally? Current evidence about their forms of planning and acting indicates that they are capable of executing actions deliberately, and even doing so over lengthy time scales [6]. Chimpanzees can form cognitive maps of the space around them, choosing efficient travel routes to reach a food source and doing so even after a significant delay in interacting with the food source—suggesting that they intentionally choose where to move in space [7]. Chimpanzees select efficient over inefficient tools in manipulating their environments [8] and carry specific, appropriate tools over long distances in order to use

them at remote sites [9]. Chimpanzees vigorously attack individuals of neighboring groups, venturing far outside of their own territory in order to do so and remaining more silent on these "border patrols" than is typical in their daily travel [10]. In addition, chimpanzees produce screams that differ in acoustic signature depending on the nature of an aggressive interaction, indicating that they can intentionally modulate their vocalizations [11]. Chimpanzees also demonstrate intentionality in their gestural communication, choosing visual over auditory signals significantly more when a potential recipient is looking their way, and ceasing to produce a signal once they have received the desired response [12, 13].

Numerous experimental studies have established that chimpanzees discriminate intentional from accidental actions in observing others' behavior (reviewed in [14]), though some are skeptical that these experiments tap into similar capacities in humans and nonhuman animals (e.g., [15]). For example, when a human experimenter attempts to hand them food but appears to accidentally drop the food item, chimpanzees show fewer signs of protest than when that experimenter begins to hand them food but then intentionally (teasingly) pulls away the food item [16]. Similarly, in a paradigm in which chimpanzees are competing with a human experimenter to locate a hidden food reward, they will exploit the experimenter's reaching gesture towards one of the potential food locations—correctly inferring the target of her intentional reach as the probable location of the food reward, given her demonstrated intention to obtain that reward [17]. These findings support the conclusion that chimpanzees possess a conceptual structure capable of distinguishing between intentional and nonintentional action.

The behavioral and life sciences together with the philosophy of mind may shed only limited light on the intentionality of chimpanzees and on the level of cognitive sophistication that goes into building their nests and protecting their young, but what we know is impressive. Chimpanzees act intentionally in numerous facets of their daily lives, whether in interacting with their physical environments or with others in their social spheres. There is evidence that chimpanzees act based on a conception of their immediate goals, with a plan as to how their actions will influence their surroundings. Over the course of moments and even days, observational and experimental methodologies alike indicate that chimpanzees choose to act in a manner that corresponds to their plan of action.

The condition of understanding (being adequately informed)

An action is also not autonomous if the actor is not adequately informed (that is, has no appropriate understanding) of the action and the conditions under which it is performed. Starting with the extreme of *full* or *complete* understanding, an individual understands an action if the individual correctly apprehends everything that would describe the nature of the action and the foreseeable consequences or possible outcomes that might follow as a result of performing and not performing the action. This criterion demands foreseeability, not omniscience. Less complete understanding, which is typical in effectively all autonomous acts, occurs by degrees. At extremely low levels of understanding, too little information is understood for actions to be autonomous.

An account of understanding requiring a substantially elevated level of understanding, such as the level achieved by experts in a discipline, would be misleading if made a condition of autonomy. Few of us would qualify in the case of most of the actions we perform. Accordingly, understanding should be analyzed in terms of the competence to comprehend rather than expertise, therefore requiring only adequate comprehension of an action's consequences for purposes of competent decision-making.

Chimpanzees understand a remarkable amount about the world around them and their interactions with others. Chimpanzees mirror humans in their understanding that objects continue to exist when they disappear from view (or "object permanence") [18]. They can discriminate relative quantities of objects, understanding, for example, that three items are a greater quantity than two items [19]. They have also been shown to modulate their behavior based on knowledge of what other individuals can see and hear [20, 21].

A clear example that chimpanzees make knowledge-based decisions comes from situations in which they utilize their knowledge to successfully steal food from a human experimenter. In an experimental task paradigm, an experimenter places food in two clear boxes so that the food is visible to both her and to the chimpanzee. One of these boxes has a door that the chimpanzee can open silently, while the other box has a door that makes a loud scratching noise when opened (through a rachet mechanism on the door); the chimpanzees have been familiarized with opening both doors prior to the test. After placing food items in each of these boxes, the experimenter then turns her back. Chimpanzees selectively approach the "quiet" door, stealing food from this box—knowing that, if they approach the noisy door, the experimenter will turn around and steal away the food item. They do so spontaneously, without training—underscoring that they reason about the outcome of their actions rather than forming a mere learned association between their action and that of the experimenter. This experimental finding thus suggests that chimpanzees make decisions based on their understanding of others, in this case an understanding of how best to exploit others' attentional sensitivity [21].

These experimental findings buttress many observations to the effect that chimpanzees make choices reflecting a richly information-based and socially sophisticated understanding of the world. For example, in interacting with members of their social group, chimpanzees dramatically differ in how they respond to a dominant or a subordinate social partner. When a dominant individual approaches, chimpanzees routinely produce the appropriate vocalization indicating their subordinacy (called a "pant grunt"), and will take any opportunity to groom, or strengthen their relationship, with the dominant individual. In contrast, when interacting with a subordinate, chimpanzees behave quite differently, moving to displace the subordinate individual in a coveted feeding position or producing an aggressive display towards that individual to reinforce their own position as dominant. Chimpanzees are keenly aware of their social relationships and cognizant of their bonds with allies and potential conflicts with rivals. They possess a refined, functional understanding of the world around them, which forms the basis of their actions.

The conclusion that chimpanzees can act intentionally with an adequate understanding raises moral questions about the justification of their use in research. Specific to our purposes, in the report of the Committee on the Use of Chimpanzees in Biomedical and Behavioral Research of the Institute of Medicine (IOM), one of the conditions necessary to justify research on chimpanzees in comparative genomics and behavioral research is that "all experiments [must be] performed on acquiescent animals" [22]. "Acquiescent animal" is a notion similar to that of the assent of the child in pediatric studies in humans. The notion of "acquiescence" is not defined in the report (just as "assent" and "dissent" in children are virtually never defined in literature on these notions), nor does the Committee identify the conditions under which an animal is and is not acquiescent. However, a one-sentence characterization is provided: "Evidence of acquiescence includes situations in which animals do not refuse or resist research-related interventions and that do not require physical or psychological threats for participation" [22]. The report also asserts that "investigators would have to substantiate the[ir] statement that the animals 'volunteered' for the procedures" [22].

The ideas about acquiescence in this report are appealing, but we suspect that the more appropriate notion is that of decision-making and action, as in "the animal decided (free of controlling influences such as manipulative rewards) to engage in the activity." No presumption should be made that the chimpanzees decided *to engage in research* or *to consent to participation*, two unsuitable formulations of what was decided. We examine the concept of voluntariness in the next section below, but we note here that "volunteered" in the IOM report presumes that chimpanzees in this circumstance have at least minimally acceptable understanding (an adequate degree of information) as the basis of their actions and are not manipulatively controlled.

This requirement does not invoke a lofty standard such as informed consent, but it does demand *knowing cooperation* by the individual—in effect, a *knowing and intentional decision to engage in* an activity. Similar to children who have the capacity to provide assent, this decision to participate will not be based on a full understanding of the implications of one's participation of the sort explained in a typical informed consent document. Nonetheless, the validity of assent presumes that children of an appropriate age and development can understand the choices available to them in a given situation and have some level of capacity to decide whether to engage in an activity. We propose that sufficiently mature, mentally competent chimpanzees likewise can reflect on the options present in some situations and can decide in favor of an activity, just as sufficiently mature but still young children can do so in some situations.

This judgment is also reasonable in light of what we know about chimpanzee social cooperation. Chimpanzees choose to act together with other individuals when necessary to achieve a goal, and will selectively cooperate with individuals whom they know to be better collaborators [23]. Similarly, they choose with whom to associate during their daily social interactions in the wild, showing a social group structure often called "fission–fusion" in which they travel in groups of differing number and composition across hours and days [10]. Analogous to these choices of within-species social partners, chimpanzees can also show volition in choosing to

interact with humans if given the opportunity to express their choice by moving away from a human experimenter or producing distress vocalizations. Chimpanzees deprived of opportunities for choice typically show the highest levels of physiological stress; those kept isolated from others show large rates of behavioral aberrations relative to group-living individuals [24]; and chimpanzees kept in physically austere environments during early development demonstrate life-long behavioral and cognitive deficits [25].

Apes would obviously refuse to be acquiescent in, or to decide in favor of, most activities that bring pain or distress. Chimpanzees are known to avoid situations that cause them pain, fleeing when they are the victims of an aggressive interaction and showing acoustically distinct screams in this specific situation [10, 11]. They precipitously avoid potential dangers in their environment, such as poisonous snakes and fire, moving away from these dangers and producing alarm vocalizations [26, 27]. Chimpanzees clearly can choose to cooperate and will refuse strenuously when they perceive the potential for harm or danger.

We do not claim that their decisions and actions approximate informed consent or knowing assent specifically to research, which is a bolder hypothesis than we are advancing about what they decide to do. We maintain only that their behaviors and known decision-making capabilities indicate adequate understanding, intentional action, and decision-making in favor of some activities.

Control and the absence of controlling influence

The third of the three conditions constituting autonomy is that an individual, like an autonomous political state, must be in control of his or her own affairs, which involves freedom from controls exerted either by external sources or by internal states that destroy self-directedness. Being in control is analyzable in terms of our first two conditions above: self-initiated intentional action and having adequate understanding, plus a state of freedom from controlling influences, which we analyze in this section.

We investigate absence of controlling influence through the categories of *influence* and *resistance to influence*. To be acting autonomously, an agent cannot be under the controlling influence of either another individual or an internal condition, such as an uncontrollable desire, uncontrollable rage, or mental illness. Not all influences are controlling. Many influences are resistible, and some are even trivial in their impact on autonomy. The category of influence includes acts of love, threats, education, lies, manipulative suggestions, physical force, and emotional appeals, all of which can have different impacts on different individuals. Our analysis focuses on two categories of influence that can deprive of autonomy: coercion and manipulation.[2]

Coercion of an individual renders any resultant behavior nonautonomous. Many forms of compliant behaviors occur because of threats that coerce, such as female chimpanzees' acquiescence in mating with males that repeatedly act aggressively towards them [28]. *Coercion* occurs if and only if an individual or group uses a

[2] See the original formulation of this view in Faden and Beauchamp [4, ch. 10].

credible and severe threat of harm or force to control another [29, 30]. A credible threat disrupts and reorders an individual's self-directed course of action. Some threats will coerce virtually all individuals—for example, the threat of being killed. Being coerced does not entail that the individual coerced lacks voluntary decision-making capacity in deciding to comply with the threat, nor does it mean that the individual did not choose to perform the action. However, coercion is autonomy-depriving because of the control exerted.

Manipulation is not coercive, but it may still deprive an individual of autonomy. It involves getting an individual to do what the manipulator wants by altering the individual's understanding of a situation and motivating the individual to do what the agent of influence intends. Many, but not all, offers of rewards are forms of manipulation. Other forms are the manipulation of *information* through different communication techniques and the manipulation of *options*. Many forms of manipulation are incompatible with autonomous decision-making, whether or not the individual manipulated is aware of the influence. Negatively stated, action that is *controlled to a significant degree* by a manipulative influence on another is not autonomous, though reaching this conclusion in any given case depends on the degree of influence exerted. (On degrees, see the next section below.)

If, by contrast, when an individual is presented with an attractive option, but not an overwhelmingly attractive one, the individual has often been given a resistible incentive. Resistance is part of control, as is wariness about accepting the incentive. Forbearing is as important as acting under such conditions; either way, the individual can be acting autonomously.

We have focused in this section on *external* controlling influences, which are primarily influences by one individual on another, such as the coercive placement of chimpanzees in captivity and confinement, but these influences also include accidents, natural disasters, and the like. No less important are *internal* controlling influences on the individual, such as those caused by mental illness, stress, and fear. These mental states, which may be externally caused, also can deprive individuals of autonomy. We will not pursue problems of deficiency in internal self-control or self-initiated action; we simply stipulate that an adequate theory of the absence of controlling influences will acknowledge that there are both internal and external forms of autonomy-depriving influence.

Degrees of autonomy and substantial autonomy

Charles Darwin argued that there are numberless gradations in mental power in the animal world, with nonhuman apes and humans on one end of a continuum. Although hierarchical approaches to evolution are not well-regarded today, an account of degrees of psychological capacity is crucial for our analysis of autonomy.[3] Some of the conditions of autonomy we have discussed—notably understanding and absence of controlling influences—come by degrees. For

[3] For a brilliant exposition of Darwin and the moral importance of his theories about nonhuman animals, see Rachels [44].

example, threats can be more or less severe and understanding more or less complete. Many nonhuman animals show different capacities of understanding, independence, and resistance to attempts to influence, just as human children (and adults) do.

For an action to be classified as either autonomous or nonautonomous, cutoff points on the continua of understanding and resistance to influence are required. To fix these points, only a *substantial satisfaction of the conditions of autonomy is required, not a full or categorical satisfaction of the conditions*. That is, an individual must have a substantial understanding and a substantial degree of control in resisting influences to be acting autonomously. This point about human actions applies for chimpanzee actions as well. An area of minimal autonomy would have to be located on this continuum for humans and chimpanzees alike.[4] Edmund Wall has argued that "if an agent exercises *any amount of control* or effective guidance over his own behavior, then he acts, and the *degree of that control* is the degree of voluntariness with which he acts" ([32, pp. 130–131], emphasis added). This could be true of voluntariness, but it is not true of autonomy, which requires that a threshold line be drawn between what is substantial enough to be minimally autonomous and what is insubstantial and so lacking in autonomy. Neither Wall nor anyone, to our knowledge, has provided such a threshold analysis, yet this matter is critical for deciding both whether chimpanzees act autonomously and whether humans who are low on the scale of understanding or control act autonomously.

There is no reason to doubt that animals with the capacities for understanding, agency, and control seen in chimpanzees are acting autonomously. As we have seen, numerous lines of evidence indicate that they act intentionally based on information they process regarding their surroundings. They can choose to avoid pain and distress, and they show signs of distress and suffering when deprived of such choices.

Two demanding theories of autonomy

There are different accounts of how to set threshold lines of autonomous action. Some accounts present a remarkably high threshold of the satisfaction of conditions of autonomy that would render many individuals normally regarded as acting autonomously to not be acting autonomously. In our assessment, many and perhaps all of the leading general theories of autonomy set the bar of autonomy too high—excluding not only the actions of nonhuman animals, but many human actions that clearly are autonomous. In this section, we explain why the lofty conceptions of autonomy embraced in two celebrated philosophical theories are overly demanding and thereby unsuitable as general theories of autonomous action.

Kantian theories of autonomy

Historically, the most influential theory of autonomy almost certainly has been that of Immanuel Kant, who concentrated on *moral* autonomy as a way of distinguishing

[4] For a relevant insight about minimal autonomy, see [31, p. 82].

humans from all other animals [33, 34]. In presenting a Kantian account, Christine Korsgaard writes that, "Human beings are distinguished from animals by the fact that practical reason rather than instinct is the determinant of our actions" ([35, pp. 110–111], see also [36]). Neither Kant nor Kantians who have written after him have exhibited the precise conditions or full implications of this theory. For example, it remains unclear in these theories whether humans who have reduced capacities of understanding and practical reasoning below the level of Kant's extremely demanding standards—for example, young children—are merely "animals," and therefore not autonomous actors; but we here set aside this complicated issue.

For Kant, one has autonomy if and only if one knowingly gives to oneself universally valid moral principles and wills to act on them. Although his theory is wholly centered on moral autonomy and what persons morally must and must not do, the account is also reasonably interpreted, as Korsgaard's language suggests, as an account of autonomy based on practical rationality. Accordingly, for present purposes we interpret the word *autonomy* in Kantian theory as referring to a state of rationally framing and giving to oneself a rule (or maxim) of action and knowingly seeking to act in accordance with the rule [37]. The rule for Kant is a *moral* rule. In what we say below, we do not suggest that chimpanzees have a capacity to formulate, accept, and act on moral rules. We also do not suggest that chimpanzees have capacities of rational deliberation and choice of precisely the sort Kant often seems to require.

This theory of autonomy is problematic if for no reason other than that it renders many humans nonautonomous who clearly are acting autonomously. For example, many brain-damaged, elderly, or mentally handicapped individuals and young children must be classified as nonautonomous in this theory if they cannot meet these Kantian conditions of autonomy, and many cannot. Kant regarded all nonhuman animals as incapable of autonomous action, and in the course of his argument he seems to exclude many humans as well. We think the account of degrees of autonomy that we have offered is a more promising approach to the determination of who is and who is not an autonomous actor. Some nonhuman animals are likely to have agency and practical rationality at a level that exceeds the capacity of many humans, in which case, they would likely be higher on the scale of autonomy than many humans (though Kant's theory does not seem to be scaled, unlike ours).

Are all nonhuman animals nonautonomous in the way Kant suggests? Some recent research on chimpanzees and other great apes makes this claim about practical rationality far from clear. Here is what we know about these animal minds when it comes to questions of the acceptance of action-guiding conventions and self-governance in accordance with them: Chimpanzees make clear choices about their actions. They are consistent in choosing which parts of their environments to utilize, with female chimpanzees remaining in "core areas" to avoid contact (and competition) with other females [38]. Captive chimpanzees show similar selectivity in consistently utilizing specific parts of their environment while avoiding others [39]. Chimpanzees employ clear decision-making strategies in foraging, for example, in choosing only to hunt when there is an abundance of fruit available

in their environment, allowing them to obtain enough food even if the risky hunting venture does not pay off [40]. Chimpanzees also show selectivity in choosing with whom to mate, with males preferring older females to younger females as mating partners [41].

Thus numerous aspects of their behavior show deliberate choice and self-governance beyond mere reliance on the dubious explanatory category of instinctual behavior. Though some contest that chimpanzees lack capacities for relational reasoning underlying so many features of sophisticated human cognition [42], adequate evidence exists that chimpanzees are capable of deliberate decision-making. To explain critical features of chimpanzee behavior in terms of unlearned responses that are universal laws of the species is a dubious and now appropriately discarded approach.

Two-level theories of autonomy

Perhaps the most influential theory of personal autonomy in philosophy holds that autonomy consists in the capacity to control and identify with one's first-order desires or preferences by means of higher-level (second-order) desires or preferences through processes of deliberation, reflection, or volition [43, 44]. Gerald Dworkin defines autonomy as a "second-order capacity of persons to reflect critically upon their first-order preferences, desires, wishes, and so forth and the capacity to accept or attempt to change these in the light of higher-order preferences and values" [44, p. 20]. In this theory, all and only autonomous individuals possess such distanced self-reflection, in which second-order mental states have first-order mental states as their intentional objects. Action from a first-order desire not endorsed by a second-order desire, preference, or volition is not autonomous; it is merely "animal behavior." The truly autonomous actor is able to reflectively accept, identify with, or repudiate a lower-order desire independent of others' manipulations of that desire. Here, Harry Frankfurt says, an individual "wants a certain desire to be his will" [43, p. 16]. This higher-order capacity to want, accept, or repudiate first-order preferences *constitutes* autonomy, and no person or action is autonomous without this capacity.

It is more assumed than argued or demonstrated in this philosophical theory of autonomy that nonhuman animals in fact lack the relevant form of autonomy or rationality and thereby fail to qualify as autonomous. A typical view is that of Frankfurt:

> It seems to be peculiarly characteristic of humans… that they are able to form what we shall call "second-order desire."… Many animals appear to have the capacity for what we shall call "first-order desires."… No animal other than man, however, appears to have the capacity for reflective self-evaluation that is manifested in the formation of second-order desires. Animals therefore are not autonomous. [43][5]

[5] Frankfurt's account of autonomy is less well developed than his theory of persons, but see further his account of autonomy in [45, chs. 9, 11].

Frankfurt's thesis about reflective self-evaluation and his statement that "No animal other than man, however, appears to have the capacity for reflective self-evaluation that is manifested in the formation of second-order desires" is an empirical claim, but where is its support? Is it so clear that nonhuman animals do not have second-order preferences that maintain some control over first-order preferences? Put another way, is it clear that chimpanzees do not control first-order desires by higher-order thought about whether to act on those desires? Neither in Frankfurt's nor any other theory of autonomy known to us is an argument presented that accommodates the available empirical evidence.

Higher-order theories of autonomy should not be taken as identical to theories of the capacity commonly termed "meta-cognition" (reflecting on one's own cognition), but information about meta-cognition is helpful in thinking about what is known about chimpanzee abilities to reflect on their own minds. Tests of meta-cognition in the psychological literature are rare with chimpanzees. The studies that have been performed are inconclusive as to whether chimpanzees show meta-cognitive capacities for reflection on their own thoughts, including those connected to higher-order reflection. Chimpanzees as well as rhesus monkeys exhibit "memory awareness" when they make decisions based on a conscious reflection on their own past experiences [46, 47]. Similarly, chimpanzees reflect on whether they already possess the information they need in order to solve a problem at hand [48].

These experimental paradigms present chimpanzees with situations in which they are knowledgeable or ignorant of information relevant to solve a given task. The dependent measure in these tasks is whether chimpanzees selectively seek information when they are ignorant by reflecting on their own ignorance and acting to gain information prior to solving the problem. For example, in a "knowledgeable" condition, a chimpanzee would witness an experimenter hiding food behind one of three barriers. When choosing between these possible hiding locations, it would not be necessary for the chimpanzee to seek additional information by moving to the other side of the barriers—because he is already knowledgeable about the food's location. In contrast, in an "ignorant" condition, the food is hidden behind one of the barriers out of view of the chimpanzee. In this case, the ignorant chimpanzee should choose to move to the other side of the barriers, checking where the food is located prior to making his selection; and chimpanzees do just that, selectively choosing to obtain knowledge when they are ignorant [46]. However, some authors have debated whether these paradigms truly tap into meta-cognitive capacities rather than mere associative learning abilities, and work on this topic is ongoing [49, 50].

Whatever the connection of meta-cognition to two-level theories of autonomy and whatever the status of the empirical claims made in this split-level account, it is a defective theory of autonomy in general—human or otherwise. The theory is problematic as a theory of autonomy independent of any consideration of human and nonhuman animals. Here is why: nothing prevents a reflective acceptance, preference, or volition at the second level from being caused by and assured by a strong first-order desire. The individual's acceptance of or identification with the first-order desire would then be no more than a causal result of an already formed

structure of desires. This second-level identification is governed by the strength of the first-order desire, not by an independent identification. This form of identification is not sufficiently independent to qualify as *autonomous*.

This theory also seems to render *nonautonomous* many ordinary actions that are almost universally considered autonomous, such as cheating on one's spouse when one truly wishes not to be such a person or selecting tasty snack foods at a food market when one has never reflected on one's desires for snack foods. A growing body of literature in human psychology also suggests that decisions we may initially have believed to be based on second-order, reflective processes—such as our attitudes towards other racial groups or choosing a spouse—may be strongly shaped by implicit, unconscious biases [51, 52].

To make the split-level theory plausible as an account of autonomy, a supplementary theory would have to be added that distinguished influences or desires that rob an individual of autonomy from influences or desires consistent with autonomy. That is, it would have to add a plausible account of what we have called the absence of controlling influences at the second level.

Conclusion

We have suggested a rich psychology for chimpanzees that includes self-awareness, beliefs, intentional acts, and cognitive understanding. If these capacities can be validly attributed to other great apes, as we think they can, they too have properties relevantly similar to human capacities. Even if we still know relatively little about the inner mental landscape of the lives of these animals, our knowledge has dramatically increased in the last 50 years. We once had profound difficulty addressing a concept such as *intention* in psychology, but today, research comfortably investigates this dimension of the lives of chimpanzees. Even if neither evolutionary descent nor the physical and functional organization of animal systems gives us the depth of insight we would like to have in understanding mental states, we can expect new knowledge to mount at an unprecedented rate in upcoming years.

Philosophical accounts of autonomy typically begin with the model of a person, which is, roughly speaking, identical to the concept of a noncompromised human being. We have argued that no warrant supports the assumption that only properties distinctive of the human species count toward autonomy, and we have suggested that species membership is not the best approach to thought about cognitive faculties.[6] Even if certain properties are strongly correlated with membership in the human species, they are only contingently connected to being human, and they either are or could be possessed by members of some nonhuman species. Any claim here must be warranted or falsified by empirical evidence.

Capacities of autonomy in chimpanzees have not been carefully examined in contemporary philosophy and psychology, but what we now know provides a credible basis for the attribution of a significant degree of autonomy in the

[6] For a number of these issues, see Varner [52].

performance of actions. Even if the human animal is, on average, at a far higher level of autonomy, some measure of autonomy can be gained or lost over time by both humans and chimpanzees, and, if our arguments are sound, some chimpanzees will be at a higher level than some humans.

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