

INTENTIONALITY AND TENDENCY: HOW TO MAKE ARISTOTLE UP TO DATE

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ABSTRACT

In the history of philosophy, Aristotle is famous for stressing the existence of directedness in nature. Nonetheless, he did not distinguish between the categories of intentionality and tendency. But it is necessary to do so.

During the last decades, the philosophy of physics has witnessed a revival of concepts like tendency, capacity, power and propensity. Sometimes these concepts, especially that of tendency, are meant to refer to entities which have a kind of directedness and which undergo self-produced changes. In the paper it is argued, firstly, that such an Aristotelian concept of tendency cannot possibly be dispensed with, and, secondly, that it makes a customary characterization of intentionality problematic. A tendency has *directedness*, but directedness is often used as *differentia specifica* of intentionality. The true graphical representation of both tendency and intentionality is the arrow. Therefore, if tendency and intentionality are different categories, neither of them can be characterized merely by the concept of directedness. Four theses are put forward:

1. Even modern physics uses implicitly an Aristotelian category of *causa sui*, although not the (one-goal) final causality of Aristotle.
2. Ontological systems have to incorporate the category of tendency, as well as that of intentionality.
3. The existence of tendencies, with their kind of directedness, necessitates a more precise characterization of intentionality.
4. The true contrast between tendency and intentionality makes some peculiar part-whole relationships visible. Relationships that have not, so far, been given adequate attention within formal ontology.

Introduction.

There is no doubt much in Aristotle's world-view that is far away from the truth. His astronomical theory, which places the Earth in the center of the universe and regards the superlunar world as unchangeable, is irreversibly gone. The same goes for his non-evolutionary biology. I hope the same fate is reserved for his views on women and natural slaves. In ontology proper, however, I think it is quite the other way round. Here, we need more Aristotelian ideas.

In my opinion, Aristotle's views on universals come fairly close to the truth. Today, looking at the spread of post-structuralist and post-positivist denials of a language-independent, structured world, I find an Aristotelian immanent realism important not only within philosophy, but in a broader cultural context as well. The view that universals can exist in re will not, however, be argued for in this paper. It will simply be presupposed.

My discussion will concentrate on another typical Aristotelian idea, that of natural purpose or intrinsic self-change. This does not mean that my remarks will be exegetical or historical. The primary driving force behind this paper is not my reverence for Aristotle, but a problem which a simultaneous interest in the philosophy of physics and phenomenological philosophy has made me aware of: the problem of distinguishing between the categories of tendency and intentionality. Strictly speaking, this problem belongs primarily to material ontology, but its solution requires some formal ontology at the same time as it indicates a lacuna in formal ontology.

The problem.

During the last decades, the philosophy of physics has witnessed a revival of concepts like tendency, capacity, power and propensity.¹ Sometimes these concepts, especially that of tendency, are meant to refer to entities which have a kind of directedness and which undergo self-produced changes. I shall argue, firstly, that such an Aristotelian concept of tendency cannot possibly be dispensed with, and, secondly, that it makes a customary characterization of intentionality problematic. A tendency has directedness, but directedness is often used as differentia specifica of intentionality. The true graphical representation of both tendency and

¹ See e.g. This revival of the concept of tendency starts with Anscombe & Geach, Three Philosophers (Blackwell: Oxford 1961) and continues with R. Harré's The Principles of Scientific Thinking (Macmillan: London 1970) and (together with E.H. Madden) Causal Powers (Blackwell: Oxford 1975). It is further developed by R. Bhaskar in A Realist Theory of Science (Leeds Books: Leeds 1975). The concept of propensity is primarily connected with Popper's so-called propensity interpretation of quantum mechanics; see e.g. "Quantum Mechanics Without "The Observer"", in Bunge (ed) Quantum Theory and Reality (Springer: Berlin 1967). Since my paper was originally written there has also appeared N. Cartwright's Nature's Capacities and their Measurement (Clarendon Press: Oxford 1989), as well as my own Ontological Investigations (Routledge: London 1989).

intentionality is the arrow. Therefore, if tendency and intentionality are different categories, neither of them can be characterized merely by the concept of directedness.

Phenomenological philosophy has, I think, for two reasons neglected the problem of how to distinguish between tendencies and intentional acts. First, since most phenomenological philosophers have, as they say, 'bracketed' the natural sciences, they simply cannot see the problem. Second, if they had paid attention to physics, they would probably have met the widespread but false opinion that physics, from Newton and onwards, has been freed from the category of tendency. Most philosophers of physics, on the other hand, have not grappled with the problem because they have confined their interests to the natural sciences. This is not, however, true of Bhaskar, Harré and Popper, but they have for some other reason not perceived the problem; probably because of too vague a conception of intentionality.

As far as I know, there is only one philosopher who has found the similarity between tendencies and intentional acts (and states) interesting. That is David Armstrong.² He employs the similarity between them, i.e. their directedness, in an attempt to reduce intentionality to tendency. According to Armstrong, intentional states are no different in kind from physical states. His argument, very briefly, is that since causality can involve tendencies, i.e. directedness, causality can also explain the directedness of intentionality. And so, he maintains, the causal theory of mind is not threatened by the existence of intentional states.

I am opposed to Armstrong's reductionist position, but I think his argument shows the need for a more detailed and accurate delineation of intentionality. Merely to talk of directedness is not enough.

Aristotle.

Before discussing tendency vis-a-vis intentionality, I shall say a few words about Aristotle's conception of directed or purposeful intrinsic self-change. This conception is to be understood against the background of three distinctions: (a) that between artificial and natural change, (b) that between efficient and final causality, and (c) the distinction between actuality and potentiality.

(a) According to Aristotle, everything has a nature, i.e. something which makes the thing what it essentially is. When a thing undergoes a change this change may be caused by its nature, but not necessarily so. A change may also be caused by something external to the thing's nature, usually another thing. In such a case there is artificial change; in the former

² See D.M. Armstrong & N. Malcolm Consciousness & Causality (Blackwell: Oxford 1984) pp. 149-53.

case there is natural change. The distinction between artificial and natural changes, it should be noted, is not identical with the distinction between changes which are caused by something spatially external and spatially internal, respectively. Something which is spatially internal may none the less be external with regard to the thing's nature. Sickness due to a virus which has entered our body is artificial change. Growing older is natural change.

(b) When a sculptor hews out a statue according to Aristotle, the final cause is the idea the sculptor has of the statue. The efficient cause is made up of his hands and tools. The final cause is here external to the thing which is being changed. When a child grows up, or when an acorn becomes an oak, however, the final cause is internal. But independently of whether it is internal or external, the final cause is goal-directed. Final causality always involves directedness.

When the final cause is internal it can in and of itself generate changes, but when it is external it has to be mediated by an efficient cause. If we are to believe Aristotle, the final cause of the acorn changes in and of itself the acorn into an oak, but the sculptor's idea cannot in and of itself change the marble block into a statue. There has to be an efficient cause in-between the final cause in the sculptor and the change in the marble block. The final cause, the sculptor's idea, causes directly his hands to move but only indirectly the coming into being of the statue.

If one takes into account the fact that external final causality is mediated by efficient causality, the distinction between natural and artificial change runs parallel with that of final and efficient causality. It means that natural changes are always brought forth by final causality, and that artificial changes are always brought forth by efficient causality. The concept of purposeful intrinsic self-change is then extensionally equivalent both with the concept of natural change and that of final causality.

(c) The Aristotelian distinction between actuality and potentiality involves in fact a trichotomy. We ought to distinguish between actuality, potentiality and potency. An acorn has, first, a lot of actual properties like weight, shape and colour. Second, it has a de re possibility (potentiality) to become an oak. But, third, over and above this potentiality, it also has a tendency or potency to become an oak. The acorn 'strives' to change itself into an oak.

To my mind, the distinction between potentiality and potency/tendency makes visible a conflation in the Aristotelian concept of final causes. A distinction has to be made between a final cause in itself and the goal towards which the final cause is directed. The goal is a potential property, but the final cause itself, the potency or tendency, is an actual part of the thing in question. These properties are related in such a way that the potency/tendency generates changes only as long as its goal exists only potentially. When the goal is actualised,

the potency/tendency passes out of being.

There are two fundamentally different kinds of actual properties: ordinary ones and tendencies. Tendencies are actualities not potentialities. Even when one tendency counteracts another tendency in such a way that no change occurs, both these tendencies are actual. A tendency is identical neither with the changes (of ordinary actual properties) it tends to produce nor with the (potentially existing) goal towards which it tends.

Tendencies can, like ordinary properties, endure, which means that a tendency may be regarded as a state of a substance. When the acorn grows into the oak, it changes ordinary actual properties most of the time, but the tendency to grow remains the same. The tendency is non-changing. In one sense, therefore, the acorn can be said to be in a state of growth, i.e. in a state of change. In ontologies where enduring tendencies are allowed, the concept 'state of change' has a non-contradictory interpretation.

Newtonian self-change.

What happened to final causality in the post-medieval anti-Aristotelian revolution? The concept had to leave science, the saying goes. Not all sayings, however, are true.

In Newtonian corpuscularism, as in all kinds of atomism, each corpuscle or atom is an indivisible and unchangeable unit. By definition, they cannot change either qualitatively or quantitatively. Atomistic ontologies contain only one kind of change, change of place.

According to Newton's first law of motion, a moving body not affected by any forces continues of itself to move along a straight line with constant speed. In physics, such uniform motion is called inertial motion. Trivially, inertial motion involves changes, changes of place. Non-trivial, however, is the fact that it involves self-changes. In the absence of forces a body in motion will, in and of itself, continue to change place. Right in the middle of Newtonian mechanics, the Aristotelian notion of self-change has survived.³ Today, Newtonian mechanics has been superseded by relativity theory and quantum mechanics, but the concept of inertial movement has not disappeared. It plays a prominent role in relativity theory. The fact is that not only Aristotelian physics, but classical and modern physics as well, presupposes the concept of self-change or self-movement. If physics is taken realistically there are in the world movements causa sui. We have an 'argument from physics' in favour of causa sui.

The reason why inertial motion has not been properly conceptualised as causa sui, is, I think, due to some subtleties in the Newtonian concept of uniform motion. According to the ordinary interpretation, uniform motion is a state. At first, this may seem self-contradictory. Is

³ As far as I know, Mario Bunge is the first philosopher who has noticed this; see his Causality (Harvard UP: Cambridge, Mass. 1959) pp.108-11.

not motion change of place? How can a change be regarded a state? The mystery disappears if one keeps the concepts of velocity (which refers to a tendency) and change of place distinct.

That there has to be a distinction between velocity and change of place, can be seen from the fact that a velocity can either exist at a (mathematically) momentary point of time or endure for a time period, whereas a change of place necessarily takes some time. There can be a velocity but not a change of place in a momentary instant. Velocity and change of place, although in some way existentially dependent upon one another, are not identical aspects of being. This means that a thing which undergoes a change of place, may, during the same time, be in a state of uniform velocity.

Inertial motion involves two moments at one and the same time: change of place and velocity. It is a complex state of affairs simultaneously constituted by a state and a change. Actually, even in this it resembles Aristotelian self-change. As I remarked in relation to Aristotle, when an actual change has a final cause, then this cause (tendency) exists as an actual state of the changing thing. In a self-changing entity there is a non-changing property (tendency) which brings forth the changes of the entity.⁴

If the distinctions between natural and artificial change and between efficient and final causality are applied to inertial motion, then inertial motion seems to be a natural change with a final cause. Obviously, an inertial motion has no external and no efficient cause. Does that, however, really imply that inertial motion can be regarded as having directedness and being caused by a final cause?

Let us see what a collision between two material heavy bodies looks like, first from an Aristotelian point of view and then from the Newtonian perspective. According to Aristotle, heavy bodies not affected by external forces move towards the center of the universe. When they are externally affected they none the less retain, independently of their actual movement, their tendency to move towards this center. Aristotelian heavy bodies have a specific directedness independently of all collisions and their actual direction of movement. They tend towards the mid-point of the universe whatever happens to them. This tendency belongs to the nature of heavy bodies, and it is their final cause. Their 'goal' is to be in rest in the center of the universe.

A Newtonian body in inertial motion moves of itself towards the points along a straight line, and the body has in this sense a specific directedness. If the body is pushed it will change direction, i.e. it will get a new specific directedness. The important thing in the

⁴ This implies that there is also a distinction to be made between causa sui and spontaneity. See my Ontological Investigations chapter 7.

present context, however, is the fact that the old direction is not retained even as a tendency. According to Aristotle, the nature of a heavy body gives it one specific directedness. According to Newton, the nature of a body with mass is such that it in and of itself maintains a motion in a certain direction, but the situation, not the nature of the body, determines this direction.

If, for a moment, we fancy that stones can have intentions, then the difference between the Aristotelian and the Newtonian point of view looks as follows. An 'Aristotelian stone' has one specific all-embracing intention, the project of its life, namely to come to rest in the center of the universe. A 'Newtonian stone' has no such project. Its intentions are changing and situation-bound.

Aristotelian self-change gets a single direction from the nature of the thing involved, whereas Newtonian self-change has, so to say, multiple direction. This, I think, is the real difference between Aristotelian and Newtonian causa sui. I want to stress that inertial motion really is a kind of causa sui, even though it does not deserve the name 'final causality' meaning 'one-goal causality'.

Most modern discussions of tendencies focus attention on dispositions and efficient causality. I have, however, tried to show that the concept of tendency is tied to that of causa sui. Furthermore, I claim that my 'argument from physics' makes it very probable that even a modern material ontology needs the category of causa sui. Aristotle's species of it, final causality, is perhaps not needed in physics, but the genus causa sui seems to be necessary. This, in turn, means that there is a kind of non-mental directedness which has to be taken into account in a definition of intentionality.

Intentionality.

Now, with the former section as background, the problem of the difference between tendency and intentionality can be made more concrete. We can ask what the difference is between the directedness of a body in inertial motion and a person who walks along a straight line with an intention to walk in a straight line? Does the difference merely consist in the fact that the person, but not the material body, is conscious of the directedness? Does the world contain only one kind of directedness which has two modalities: physical and mental? Or, are there two radically different categories, tendency and intentionality, which, because of some superficial similarities, both deserve the epithet 'directed'?

Let us look at some possible definitions of intentionality,⁵ and compare them with physical

⁵ Those who refuse to speak of real definitions altogether, may take the proposed definitions which follow as merely some undefined kind of characterizations.

directedness. In the definitions which follow, the term 'entity' can denote anything whatsoever, concrete or abstract, simple or complex. Here is the first proposal.

D1. An entity has intentionality =def. the entity is being directed towards another entity.

This is the definition I hinted at already in the beginning of this paper. As I have said, it is too wide. It applies to tendencies as well. Therefore, let us try a more Brentanist version:

D2. An entity has intentionality =def. the entity is being directed towards an inexistent entity.

This definition has another flaw. If we opt for D2 we will make a relational theory of (some) intentional acts false by definition. Since, like Kevin Mulligan and Barry Smith, I not only think such a theory is non-contradictory, but happen to believe in it, I cannot subscribe to D2.⁶ However, a slight modification solves this particular problem. Let us look at D3.

D3. An entity is capable of intentionality =def. the entity is capable of being directed towards an inexistent entity.

According to the last definition, inertial motion cannot be regarded as being intentional, since such a motion has to be directed towards existent points in space. Inertial motion is not capable of being directed along an inexistent line. This fact, however, does not solve our general problem. Change of place is a specific kind of physical change. Do we have any reasons to believe that no other kinds of inertial changes can appear in physics? Let us see whether we at least can conceive of such a kind.

What, for instance, would inertial change of electric charge be like? An entity with such a kind of inertia would, when not affected by forces influencing the charge, have a constant change-of-charge-velocity. The entity would and in and of itself bring forward the corresponding actual changes of electric charge. Its change-of-charge-tendency would be directed towards inexistent electrical charges, i.e. towards some quantities of electric charge which are to come into existence in the near future. I think we can find no philosophical reasons to exclude such tendencies from physical theorising. This means that definition D3 (D2, too, by the way) is not acceptable. Like D1, it is too wide. It applies to some conceivable tendencies, not only to intentionality.

⁶ See my Ontological Investigations section 13.5, especially note 14; Mulligan and Smith, 'A Relational Theory of the Act', Topoi 5 (1986), pp. 115-30; Smith, 'Acta cum fundamentis in re', Dialectica 38 (1984), pp. 157-78.

Let us try another line of thought. If an entity which has a certain tendency is not affected by counteracting forces, then the tendency has to realize itself. This means that, even though a tendency can be directed toward something actually inexistent, a tendency can never point at something which is necessarily inexistent. A tendency has to be directed towards something which is physically possible. This constraint, obviously, is not a constraint for intentional acts. Self-contradictory thoughts are possible, but self-contradictory tendencies are not. This gives the clue to our next attempt at a definition:

D4. An entity is capable of having intentionality =def. the entity is capable of being directed towards logically impossible entities.

Here we have a definition which does not encompass tendencies, but now other flaws appear. The reason why the definition D4 contains the phrase 'is capable of having intentionality', instead of just 'has intentionality', is the fact that most intentional acts are not directed towards logically impossible entities. The phrase 'is capable of having intentionality', unfortunately, gives rise to problems of its own. Assume that higher animals, or small children, can have perceptual (intentional) acts without being capable of thinking. Then, they are capable of intentionality but not capable of being directed towards self-contradictory entities. This means that D4 is extensionally too narrow. It says something essential about intentionality, but it does not characterize the category of intentionality.

Temporally extended entities.

There is, however, a simple solution to our problem. A solution which has nothing to do with the kinds of entities which intentional acts and states may be directed towards. Instead, it brings in the notion of temporal extension. All four definitions above disregard temporal features. Tacitly, I would say, they presuppose that the directedness spoken of may be temporally punctual. Both when we think of tendencies and of intentional acts, we easily think of them as momentary. Let us now see what they look like during a temporal interval.

Once again we take a state of inertial motion as exemplifying the concept of tendency. In a momentary instant there is only a velocity with its directedness. There can be no change of place in such an instant, since a change necessarily takes some time. In a time interval, however, the velocity and the change of place of an inertial motion are existentially dependent upon each other.⁷ If there is no change of place there can be no velocity, and vice

⁷ For a fuller treatment of the notion of 'existential dependence' and part of its Husserlian background, see my Ontological Investigations chapter 9.

versa. In other words: the directedness of an inertial velocity is, in a temporal interval, existentially dependent upon a change of place. This holds true for inertial changes in general, not only for change of place. A tendency, not counteracted by another tendency, is always, in a temporal interval, existentially dependent upon a corresponding change.

If, on the other hand, we look at an intentional act like a perception or a thought of something, then nothing similar appears. The directedness of such intentional acts are not existentially dependent upon changes, which, in turn, depend upon the intentional act. An intentional act may exist in a momentary instant as well as endure for a time without any corresponding changes occurring. Of course, the intentional act itself may change, but that is irrelevant since it corresponds to the case where one tendency is exchanged for another. It does not correspond to the case where one particular tendency brings forth changes. I would like to propose a fifth definition:

D5. An entity has intentionality =def. the entity is (i) directed towards another entity, and there is (ii), in a temporal interval, no mutual existential dependence between the directedness and changes of the entity.⁸

Alas, even this proposed definition seems to have a counter-example, namely intentions. If a person really has a specific intention, he will necessarily act (i.e. produce changes) in order to realize this intention. We seem to have, contrary to D5, an intentional act which is existentially dependent upon connected changes. Let us, however, take a closer look at intentions.

The duality of intentions.

To have an intention is not only to have a mental representation, there has to be a tendency to act, too. An intention has to contain both intentionality and a tendency. This fact, however, does not imply that intentionality and tendency are identical. The right conclusion is that they are different moments in Husserl's sense, and that, consequently, intentions are complex states of affairs. In other words, an intention is constituted by two categorially different kinds of directedness: intentionality and tendency. There are some well known observations which support this 'dual aspect theory of intentions'. One may (a) be mistaken about one's own intentions, and (b) one's intentions are not always put into action.

(a) If an intention is made up of both an intentional state and a tendency, two possibilities

⁸ There are some subtleties involved which cannot be discussed here (cf.note 7). I have to write mutual dependence, since an intentional state is, in all probability, one-sidedly dependent upon changes in the brain.

arise. Either these moments have the same directedness or they point in different directions. The latter fact obtains when one is mistaken about one's real intention. One is then not mistaken about one's intentional state, but mistaken about one's presumed corresponding tendency to act.

(b) In other cases, although one is not mistaken about one's intention, one none the less never tries to realize it. These cases can easily be accounted for in terms of tendencies. A tendency can have counteracting tendencies, which means that a tendency can exist actually without bringing forth the corresponding changes. Buridan's ass does not move, but it has actual tendencies to move. Such facts are impossible to account for if intentions are identified with intentional acts or states.

An intention is constituted by a tendency and an intentional state even when the intention (or, more correctly, its moment of intentionality) is directed towards something physically or logically impossible. A man trying to create a perpetuum mobile has a tendency to act. And often he acts. He tries to build a physically impossible machine. Similarly, a man who believes in the existence of square circles may try to draw such figures again and again. In cases like these, the intentional state of the intention is directed towards something impossible, but the tendency of the intention is directed towards something possible. If this were not the case, a man with an impossible intention could not, contrary to our experience, do anything in order to realize his impossible vision.

I think these remarks suffice to show that intentions cannot be used as counter-examples to D5. This being so, I claim that the definition D5 captures the essence of the category of intentionality.

Formal ontology today.⁹

Now, at last, I come to formal ontology. In order to make clear the difference between tendency and intentionality, I needed two concepts from formal ontology, that of 'moment' and that of 'existential dependence'. The latter is used in the final definition of intentionality, and without the former I could not have stated my thesis about the duality of intentions. Most interesting, however, from the point of view of formal ontology, is the fact that I also needed the concept of temporal extension. Traditional accounts of formal ontology leave this notion out. All part-whole relations discussed, as well as the concept of existential dependence itself, seem to be regarded as having no essential relation to time. In this respect, of course, formal ontology is similar to formal logic. The question is: should it be?

⁹ I use the concept of formal ontology as it is used in B. Smith (ed) Parts and Moments. Studies in Logic and Formal Ontology (Philosophia: München 1982).

Some of my claims about inertial motion can be summed up by saying that an inertial motion is a complex state of affairs which makes the following two statements true:

(a) In a temporal interval, inertial motion contains two mutually existentially dependent moments, velocity and change of place.

(b) In a momentary instant, inertial motion is identical with its velocity.

Together, statements (a) and (b) imply that velocity is part of inertial motion in another sense than that in which the change of place is part of inertial motion, and that to make this sense clear one needs the distinction between temporal interval and momentary instant. Or, one needs at least a distinction which corresponds to that between a line (temporal extension) and a point (momentary instant). Points seem not to be part of a line in the same way as the extended line-parts are parts of it. This difference in part-whole relationships is, I think, something for formal ontology to explore.

Summary.

1. Even modern physics uses implicitly an Aristotelian category of causa sui, although not the (one-goal) final causality of Aristotle.
2. Ontological systems have to incorporate the category of tendency, as well as that of intentionality.
3. The existence of tendencies, with their kind of directedness, necessitates a more precise characterization of intentionality.
4. The true contrast between tendency and intentionality makes some peculiar part-whole relationships visible. Relationships which have not, so far, been given adequate attention within formal ontology.