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Aristotle and distributed language: capacity, matter, structure, and languaging

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ABSTRACT

Non-representational views of language require non-Cartesian concepts. Some in this vein have looked to philosophers such as Husserl, Merleau-Ponty, and Peirce, but none so far have looked to Aristotle. This paper argues that Aristotle's metaphysics offers an attractive and powerful set of concepts to scaffold the distributed language approach. I provide a brief exposition of the central commitments of Aristotelian metaphysics and of the distributed approach to language. After drawing connections between these two sets of concepts, I offer two advantages of this synthesis. First, it allows for a natural incorporation of causal pluralism, which acknowledges that events at different timescales are causally efficacious in different ways. Second, it enables reinterpretation of findings from orthodox linguistics; insights about the structure of language are preserved but the ontological commitments to internal representations are abandoned.

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1. Introduction

Non-representational views of language require non-Cartesian concepts. Despite their non-Cartesian pedigree, Aristotle's metaphysical views have yet to be mined for insights into ecological and distributed views of language. The aim of this paper is to use Aristotelian insights to provide an interpretive framework for the methodologies and empirical findings of the distributed language research program.¹ Similar work has successfully been done elsewhere: [Gallagher \(2005\)](#), for example, draws on Merleau-Pontian phenomenology as an interpretive framework for findings and methods in embodied perception. The value of the Aristotelian framework depends on how much work it can do. Given length constraints, I'll suggest just two valuable implications: commitment to causal pluralism and reinterpretation of findings from orthodox psycholinguistics.²

§2 is a brief introduction to the distributed language approach (DLA). §§3–6 are concerned with presenting the Aristotelian notions of matter, structure, and capacity. §7 discusses the method of cognitive event analysis utilized in DLA and describes it using the resources of §§3–6. And §8 discusses the two just-mentioned advantages of synthesizing DLA with Aristotelian metaphysics.

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¹ It's worth saying that this paper is *not* in the business of providing a new set of investigative tools. Thanks to an anonymous reviewer for stressing this point.

² The position I advocate in this paper has a number of competitors, including (but not limited to) [Kravchenko \(2007, 2009\)](#) and [Cuffari et al. \(2014\)](#). Further work is to be done to weigh the merits of the Aristotelian view against others. The primary point of departure is that Kravchenko and Cuffari et al. tend to draw on more-or-less explicitly Maturanian resources (though Cuffari et al. are clear that they do not take on Maturana wholesale). This Aristotelian account does not draw on Maturanian concepts, even though there are some areas of overlap. For example, Cuffari, et al. (p. 7) state that the amygdala does not emote, and I make a similar point in §7 that brains do not form hypotheses.

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A brief methodological point before beginning: Aristotle’s framework is thoroughly naturalistic and the conceptual tools used to analyze animals, plants, and non-living artifacts are the very same tools used to analyze human beings. So the overall framework will be introduced with simple examples (like artifacts) and then extended to more complex examples (like human language use).

2. Distributed language

‘Distributed language’ picks out a cluster of approaches in linguistics. They reject code-like views of language, and emphasize the dynamic, interactive character of language. Interactions occur at (and across) various timescales ranging from milliseconds to centuries. I will focus on the approach as it has been developed in (among other places) [Cowley \(2011, 2014\)](#), [Thibault \(2011\)](#), [Steffensen \(2013\)](#), [Jensen \(2014\)](#), and [Pedersen \(2012\)](#), and will refer to this as the ‘Denmark distributed language approach’ (hereafter: Denmark DLA).³

‘Languaging’ is a central concept for Denmark DLA. It is a type of activity undertaken by the vast majority of human beings: it’s what we do when we’re ordering coffee, catching up with old friends, giving a lecture, running a meeting, participating in religious services, disciplining children, ordering a drink, and so on. It’s the meaningful activities that agents do in concert with one another. There are several key characteristics of languaging:

- it is whole-bodied;
- it occurs at multiple, interacting timescales;
- it consists of several logical orders; and
- it is fundamentally interactive.

2.1. Languaging is whole-bodied

Identifying language as ‘whole-bodied’ is to take an embodied and embedded stand with respect to the concept of language and the empirical methods for understanding linguistic activity. Conceptually, it holds that disembodied language is a myth: to conceive of language is to conceive of a kind of activity performed by agents. [Strawson’s \(1974\)](#) view of mind illuminates this. Having a concept of mind, according to Strawson, depends on having a concept of personhood. To imagine a person thinking is to imagine *a person*—a living, fleshy human being—engaged in a specific range of rational activities: speaking vehemently, arguing, writing, and rewriting. Similarly, to conceive of language is to conceive of agents doing things with language. Language is no more static or disembodied than running, cooking, eating, or typing. Empirically, the body participates in languaging in both obvious and subtle ways. Obvious ways include responding to facial expressions and vocalizations, making facial expressions, and gesturing (among other things). Subtle ways include spontaneous coordination of both posture and gaze ([Shockley et al., 2009](#)) and coordination of tempo and pitch ([Spurrett and Cowley, 2010](#)).

2.2. Languaging occurs at multiple, interacting timescales

Talking is enormously complicated, given how easy it is. When we’re speaking and listening to others, we’re reacting to their pacing and pitch; we’re using well-entrenched modes of talking; and we’re employing new slang and old grammatical patterns. Denmark DLA highlights that linguistic interaction is a complex meshwork of processes occurring at different rates (cf. [Steffensen, 2015](#); [Thibault, 2011](#)). Some of those timescales and activities include:

- milliseconds: neural activity
- tens of seconds: bodily dynamics
- seconds: “moves” and “turns” of conversation
- minutes: flow of situated social events
- hours: ongoing social events
- days, weeks, months: development of novel modes of speech (e.g., slang)
- years: development of speech by an agent
- decades and centuries: cultural evolution
- millennia: biological evolution

To inquire into the nature of human beings as languaging agents is to make an inquiry into these levels of activity. Languaging is an activity that has wide social roots, deep personal historical roots, and even deeper evolutionary roots.

³ Denmark DLA because Cowley, Steffensen, Jensen, and Pedersen are all at the University of Southern Denmark. Others, like [Kravchenko \(2007, 2009\)](#), self-identify as taking a distributed language approach but Kravchenko’s approach is markedly different from Denmark DLA.

It's one thing to say that language has many dimensions. It's another to hold that those dimensions interact. The former supposes that research into activities at a preferred timescale is insulated from activity at other timescales. The latter identifies the complexities incumbent with overlapping rates of change. Here's a simple and brief example. The more comfortable I am with someone, the more smoothly our conversations go: fewer pauses, no halting starts and stops, and no accidental cuttings-off. I can follow their cues in the conversation and they can follow mine. The smoothness of our conversational flow is, in part, a product of the relationship that we have cultivated. But part of what helps people to develop the relationships that they do is the smoothness of conversational flow.⁴ There emerges a cycle in which conversational flow encourages a budding relationship, which offers more opportunities for refining the conversational flow. Social relationships and conversational interactions are dynamic processes; and, those processes are also dynamically related to each other. Slow changes in social relationships drive fast changes in conversational dynamics, and fast-paced conversational dynamics likewise drive slowly changing social relationships.

2.3. *Languageing consists of several logical orders*

Languageing activity occurs at multiple, interacting timescales. But none of these timescales require that languageing agents think of themselves as engaged in languageing. (By contrast, chimpanzees, as far as we know, communicate but don't conceptualize their activity in abstract categories like we do.) Cowley (2011) says that we "take a language stance" when we hear "words" like we see "things" in pictures: one can conceptually "zoom in" to observe changes in pacing and pitch, but one can also conceptually "zoom out" (i.e. take a language stance) to hear the words constituted by the changes in pacing and pitch. Phenomena at the "zoomed in" level constitute phenomena at the "zoomed out" level. This relationship is captured by describing the phenomena of different levels as being of different logical orders.⁵ When zooming out and seeing the larger picture constituted by the smaller details one moves from a lower logical order to a higher logical order. A helpful illustration is provided by reruns of Bob Ross's *The Joy of Painting*. Ross often began his paintings by smearing paint on a canvas, and transforming those smears into landscapes through a variety of techniques. At some point in watching him paint, the colors on the canvas shift from being blobs of paint to being shrubs, mountains, and "happy, little trees." In a way, the shrubs, mountains, and trees on the canvas are still blobs of paint: there would be no shrub without the blob of paint constituting it. But describing the images as blobs of paint misses that viewers immediately and without hesitation recognize them as shrubs, mountains, and trees. The images start out as blobs and then we begin to see them differently. The blobs are still there in a sense, but we're looking at them in a fresh way.

Languageing at small timescales—the "zoomed in" level, the level of paint-blobs, to continue with the analogy—is *first-order* languageing. At these timescales, languageing is fast-paced interactivity. Researchers here are concerned with phenomena including postural sway, gaze coordination (Shockley et al., 2009), conversational pitch and pacing (Spurrett and Cowley, 2010), and voice synchrony (Cummins, 2014). A rough, but useful, thumbnail sketch of first-order languageing is: an understanding of what we're doing when we're ordering coffee, but without concepts like 'ordering,' 'requesting,' 'speech act,' or even 'word.' Languageing at larger timescales—the "zoomed out" level, the level of images constituted by the paint blobs—is *second-order* languageing. At these slower timescales, higher-order patterns are "culturally transmitted and socially enforced" (Thibault, 2011, p. 10). Researchers are concerned with population-level patterns including lexicogrammatical patterns, norms about meaning, and values.⁶ (I'll have more to say about first- and second-order languageing in §7 when making the case for complementarity between Aristotelian metaphysics and Denmark DLA.)

Neglecting logical orders leads to category mistakes. Ryle (1949) illustrates this. Suppose you have a visitor to your university who asks to tour the grounds. You show her the library, the athletic facilities, the various departments, and so on. At the tour's conclusion, the visitor says, "I asked to see the university. You showed me the library, the athletic facilities, and so on. But not once did you point out to me the university." Clearly the visitor's mistake is to suppose that the university exists alongside the library and athletic facilities. In doing so she has made a category mistake: the university is of a different logical order than its constituent buildings. In the same way, words are of a different logical order than vocal tract activity; the former do not exist alongside the latter.

2.4. *Languageing is fundamentally interactive*

At nearly every timescale, languageing requires interaction among agents, environments, and social norms. Bodily dynamics and turn-taking involve responding to others; location in social events requires being with others; words function at the level of populations, not individuals (Cowley, 2014); and agents realize values of care in their interactions (Hodges, 2009; Steffensen, 2012). Interactions occur within as well as across timescales. And, as mentioned above, interactions include

⁴ Cf. Erickson and Schultz (1982), who show that successful conversation can be timed by a metronome.

⁵ Talk of 'logical orders' goes back at least to Russell's (1908) hierarchy of logical types: individuals belong to level 0; relations and properties of level 0 entities belong to level 1; relations and properties of level 1 entities belong to level 2, etc. In general, an entity of logical type $n + 1$ is constituted by entities of logical type n . Even though the phenomena are conceptually distinct, this doesn't prevent their realizations from having dynamic interactions.

⁶ Rączaszek-Leonardi's development of Pattee's work on symbols as replicable constraints is, of course, relevant here, but space concerns prohibit addressing it. See Rączaszek-Leonardi (2009, 2012), Rączaszek-Leonardi and Kelso (2008).

dynamic relations among other entities that are dynamically related. Any seemingly non-interactive functions of language are conceptually dependent on interactive functions of language.

3. Capacities

So far, I've introduced a few essential features of languaging. In this section and the next, I will unpack three central Aristotelian notions: capacity, matter, and structure. These Aristotelian concepts are synthesized in §6 and mapped onto Denmark DLA's method of cognitive event analysis in §7.

The headline for §§3–4 is: individuals are the types of things that they are, and have the capacities that they have, because of their constitutive matter and structure. Philosophical analysis begins with individuals and capacities (rather than matter and structure) since that is what we encounter in our ordinary experience.

Capacities, also called 'abilities' or 'powers,' are special kinds of properties of individuals that enable the individual to produce or undergo change. Examples are easy to come by: the President has the capacity to enact laws and also the capacity to be voted out of office; water has the capacity to boil and to freeze. The philosophical literature on capacities is vast, but I'm going to focus on only three relevant points⁷:

- capacities related to agents are subagential, agential, or superagential.
- capacities are distinguished by their canonical effects
- capacities interact with one another

Agent-level capacities are changes produced or undergone by agents. Utterances like "Sarah plays baseball" or "Tim is late for work," identify agent-level capacities: the power to play baseball or be late for work.⁸

Subagential capacities are capacities of biological subsystems. Changes initiated by subagential capacities include the movement of blood through my body by my heart and the intake of air by expansion of my lungs. Superagential capacities are capacities of collections of agents. A change initiated by a superagential capacity is the voting in of a new president by a populace. I can vote for a president and my vote is part of the election of a new president. But my vote doesn't elect a new president.

Languaging is an agent-level capacity, which is suggested by Denmark DLA case-studies. Steffensen (2013), for example, looks at two employees who are trying to discover why their company's invoices don't have the Company Identification Number written on them. (This number must, by Danish law, appear on the invoice; otherwise, the invoice can't be paid.) Steffensen analyzes a one-minute audio-video recording of the employees working on a solution to their problem. The mundane but important point is that the *agents* exercise their languaging capacities in service of solving a problem.⁹ Languaging recruits a variety of environmental resources but is nonetheless a capacity of the agent. (In §7 I will have much more to say about Steffensen's case-study in relation to Aristotelian metaphysics.)

Describing languaging as an agent-level capacity glosses over numerous complexities; even so, three points should be addressed.¹⁰ First, this view *excludes* languaging as the product of an internal system. Modular views of language construe linguistic capacities as sub-agential, and languaging as agent-level doesn't leave room for internal modules. Second, this view excludes languaging as a superagential capacity. Social norms and lexicogrammatical patterns don't order another round of beer; the speaker is the one who does that. Third, languaging as an agential capacity *depends* on subagential and superagential capacities. There could be no languaging without biological organs doing what they regularly do; and there could be no languaging without other agents and social institutions. Even though languaging is an agent-level activity, it requires sub-agential and super-agential resources. Another way of putting this is that manifestations of agent-level capacities are always manifestations by an agent and in an environment in which the capacity can be made manifest (this will be discussed in greater detail in §6).¹¹

The next feature is that capacities have canonical effects (or: "typical manifestations"). Fragility is a capacity, and an object with this capacity has shattering as a canonical effect. Dissolvability is a capacity, and an object with this capacity has dissolution in water as a canonical effect. Shattering and dissolving are different canonical effects and so are manifestations of different capacities. Canonical effects distinguish capacities.¹² Consider an agential capacity like getting someone to shut a

⁷ These three points are constraints that an account of languaging would need to satisfy, including (e.g. Noë's (2004) perception-action cycles and Berthoz's (2012) perc-action. Thanks to an anonymous reviewer for suggesting this connection.

⁸ This runs into some difficulties. Suppose Sarah is at bat and the pitcher hits her in the leg. We might say: (1) Sarah was hit, (2) Sarah's leg was hit, (3) Sarah was hit in the leg. Did Sarah undergo getting hit or did her leg?

⁹ Cf. Spurrett and Cowley (2010) and Cowley and Nash (2013).

¹⁰ Thanks to two anonymous reviewers who urged me to clarify this point.

¹¹ Consider an analogy. Pitching at a baseball game is an agent-level capacity. But this activity requires complicated activity of many bodily subsystems. Additionally, I cannot pitch at a baseball game without a number of superagential conditions also being satisfied: there has to be a batter, and eight other people in the field, all participating in accordance with very strictly defined rules. The actual pitching is done by the pitcher, but the pitching is possible only because of the exercise of subagential and superagential activities. Pitching doesn't "belong" to the pitcher; rather, the pitcher is capable of pitching because of the complex coordination of subagential, agential, and superagential activities.

¹² For more on individuation of capacities, see Lowe (2010).

door. A speaker can do this by uttering, “please shut the door” or by motioning for the door to be shut (though I’ll address in a moment that this doesn’t always work).¹³ When the hearer shuts the door, the canonical effect is manifested.

The final point is that capacities interact with one another by enabling or inhibiting manifestation of canonical effects. Consider a sailboat. The boat has both a capacity to float and a capacity to be moved by wind (with canonical effects of actually floating and being moved by the wind). These capacities together enable the sailboat’s movement; the sailboat wouldn’t be able to move without either of these capacities. But we can imagine other circumstances that would inhibit the sailboat’s moving: if it’s tethered to the dock or has run ashore. The boat’s being tethered—the manifestation of its capacity to be tethered—inhibits the boat’s capacity to move.¹⁴ To return to the agential capacity to get someone to shut a door, I might utter “please shut the door,” but the exercise of another capacity might inhibit the manifestation of the utterance’s canonical effect: perhaps my audience didn’t hear me, or is upset with me, or has had too many drinks. So even though my utterance or action has canonical effects that manifest under the relevant conditions, exercise of other capacities might inhibit the manifestation of the relevant canonical effects.¹⁵

4. Matter, internal structure, and superstructure

Individuals and their capacities are what we encounter in the world: we see wine glasses shattering, dogs running, and people talking. But powers and objects aren’t among the basic furniture of reality. In this section, I will discuss two foundational elements of an Aristotelian ontology: matter and structure. Structured matter constitutes individuals and enables manifestation of their capacities. To repeat the headline claim from the beginning of §3: individuals are the types of things that they are, and have the capacities that they have, because of their constitutive matter and structure. In §3, I focused on individuals and capacities; here, I focus on individuals’ constitutive matter and structure.

We begin with a few commonsense observations¹⁶: if boats were made of concrete, they would sink; if sails were attached to the hull instead of the mast, boats wouldn’t be propelled by wind; and if sails were made of chain mail, boats would capsize. These commonsense observations and dozens like them lead to a commonsense point: boats can’t be made out of just anything and the parts can’t be organized in just any old way. This commonsense point implies an important metaphysical claim: for an object to be what it is and to do what it does, it has to be constructed out of the right sorts of materials that are arranged in the right sorts of ways. In other words: objects are made up of *matter* that is *structured* in a specific way; their structure makes them the types of objects that they are.

When considering some individual, it’s possible to look at its matter-structure makeup but also its location in a larger arrangement. Leaves and bark make a tree and collections of trees make a forest; hulls, masts, and sails are all bits of organized matter but they are also organized in the right way to make a sailboat. Larger structures are important for understanding why an individual’s matter is structured as it is: a sail has a particular shape because that’s what has proven best for moving a boat through the water. If the sail weren’t connected to the boat in the way that it is, then it wouldn’t have the shape it does. In considering how some bit of organized matter is related to other bits of organized matter, we are considering the individual’s *superstructure*. When focusing on a particular individual, the structure organizing that individual’s matter its *internal structure*. [Diagram 1](#) illustrates the relevant relations among matter, objects, internal structures, and superstructures.

The examples given to illustrate the notion of structure thus far have been of spatial organization. Other structures include biological structures, (functional relationships among organs), social structures (power relationships among individuals), chemical structures (bonding relations among molecule), and mathematical structures (the successor relation between numbers). The idea of structure is a slippery one, but a useful characterization is: a structure is a set of relations holding among some set of entities (i.e. instances of matter) that make an object the type of object that it is.

There is one superstructure that applies across all objects. Time is a superstructure whose relata are configurations of individual objects; it is that which organizes all. Just as an understanding of the spatial relation between a sail, mast and hull is important for understanding why sails are structured as they are, temporal relations among events are important for understanding why processes go as they do.

Let’s make this concrete with an example. Ants are highly social creatures and individually rather simple. Ants in a colony, however, are capable of forming lines to and from food sources without a centralized controller. The mechanisms behind this are well-understood: as ants emerge from a colony, they move about in random directions in search of food. When they come across some food, they create pheromone trails by releasing pheromones as they walk. Ants are attracted to pheromone trails and will follow one if they should happen to come upon it. Pheromone trails start out weak and evaporate fairly quickly, but with hundreds of ants roaming about randomly, some are bound to stumble upon the trail. These ants follow the scent to the food and release more pheromones as they move with the food, thereby strengthening the attractive power of that trail. The

¹³ This is clearly connected to perlocutionary acts (Austin 1975). Space prohibits me from further developing the connection, but conceiving of languaging as a kind of capacity holds interesting possibilities for connecting Denmark DLA with recent work in speech act theory. See [Lassiter \(2014\)](#) for an attempt to connect Gibsonian affordances with perlocutionary acts.

¹⁴ [Mumford and Anjum \(2010\)](#) offer a description of interacting capacities in terms of vector addition.

¹⁵ How does one tease apart which capacities are enabling and which are inhibiting? The sailboat case is a rather simple one, but languaging across multiple timescales presents cases of much greater complexity. Thanks to an anonymous reviewer for this probing question.

¹⁶ Aristotle’s method is characterized by appeals to these sorts of commonsense observation (cf. [Shields, 2012](#)).

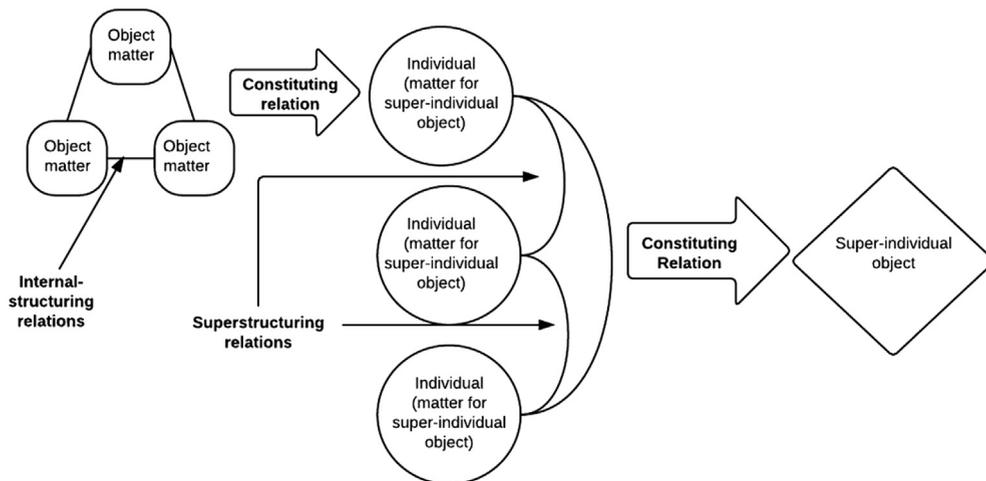


Diagram 1. Relationships of internal structures, matter, and superstructures for individuals and a super-individual object.

stronger the trail becomes, the more ants are drawn to it. What emerges are well-defined lines of ants ferrying food from the source to the anthill.

Using the matter-structure resources so far described, each ant is an individual with the capacities to lay down and follow pheromone trails. Ants are constituted by internally structured matter. The matter includes pheromone-producing mechanisms; the internal structures include the relations among the ant's pheromone-producing mechanisms and its other biological mechanisms. A superstructure that enables manifestation of the ant's capacity is the spatial relation between the ant and the food. The colony is the super-individual object, which is constituted by large collections of ants in a sufficiently small spatial proximity. The colony consists not only of the ants but also the anthill: for if there were no physical mechanism bringing the ants together and preventing them from wandering about into the wilderness, then there would be no colony. The anthill plays an active role in the life of the colony. Additionally, the colony has capabilities of its own, among which include forming organized lines to transport food.

This example can also illustrate the existence of limits on what sorts of structures can constitute an object. The NetLogo Ants model allows users to experiment with colony size, the evaporation rate of pheromones, and the diffusion rate of pheromone trails (Wilensky, 1997, 1999).¹⁷ If the colony is too big or small, or if the pheromones evaporate too quickly or slowly, or if trails diffuse too quickly or slowly, then the capacities of the colony change. For example, if the pheromones evaporate very slowly and trails are diffuse quickly, then individual ants have trouble identifying the locations of food sources: there are pheromones everywhere and ants can't lock onto a single trail leading to food. Or if food sources are far away from the nest, then the colony requires a greater number of ants to form stable trails. So what that the model tells us is that capacities of individual ants to ferry food depends on structural features of the colony. More generally: capacities of the individual depend on properties of the group, and properties of the group depend on capacities of the individual. The structures constituting the super-individual object enable the individual object to be what it is: identity depends on what's beyond the bounds of the individual.

It will be useful to summarize the points of the last two sections. Capacities are abilities that objects have to initiate and undergo change. Linguaging is one such capacity possessed by agents. Individual agents are constituted by matter and structure; and agents are also matter for super-individual objects. Agents are matter by being spatially, temporally, and socially related to other (natural and artificial) individuals and objects. Agents and their environments are dynamically related: I am part of what makes my environment the kind of thing it is, and the environment is part of what makes me the kind of thing I am. But the way in which the environment and I constitute one another is different. I am part of the environment as matter. The environment is part of me as superstructure, relating me to other individuals in the environment.¹⁸

5. Brief perspectivist interlude

With the distinctions made by the Aristotelian account, one might be tempted to ask: what is a token object *really*? Aristotle gets at this issue in *On Sophistical Refutations*, where he criticizes the arguments of his Sophist predecessors. One targeted argument is: a person is tan but her teeth are white. Therefore, the person is both white and non-white. Aristotle rebuts the argument by pointing out that the term 'is' in the premises is qualified while the 'is' of the conclusion is unqualified.

¹⁷ Available at <<https://ccl.northwestern.edu/netlogo/>>

¹⁸ This helps add detail to the claim that interacting agents are, in a sense, co-constituting (cf. Steffensen et al., 2010). Because of my social and spatial relations with my interlocutor, I act in specific sorts of ways: I am doing whatever I am doing (e.g. word choice, posture, gaze) because of my relations to this other individual. But structure is part of what makes me the sort of individual that I am. So the social and spatial relations that I bear to my audience make me the speaker that I am.

(To see this, add the phrase ‘in places’ after ‘white’ and ‘non-white’ in the conclusion.) He applies this same distinction to the notion of existence, saying that things exist in qualified and unqualified ways. An example of something existing in an unqualified way is a particular human being; an example of something existing in a qualified way is a particular *tall* human being or a particular *fast-talking* human being.¹⁹

The Aristotelian ontology comes packaged with a robust perspectivalism. An answer to the question, “what is an *x*?” always depends on the sense in which one is talking about the thing existing. An agent, for example, can be considered in any of the following ways:

- as an entity capable of initiating and undergoing change (i.e. with respect to its capacities)
- as a biological entity whose subsystems are organized in various ways;
- as it is related to other individuals and objects;
- as satisfying a role in constituting a super-individual object.

And it can be considered synchronically as well as diachronically in all these ways.

Here’s the takeaway. It’s necessary to identify the relevant qualifiers when describing languaging agents. The agent-as-matter for a super-individual object is the same agent as the agent-as-organized-matter and so we would expect that these two facets of the agent would interact in some way. But what holds for an agent qualified in one way does not necessarily hold for an agent qualified in another way: relationships holding between me and my brain are different from relationships holding between me and my social network.

6. Connecting capacities, matter, and structure

Capacities and individuals were introduced together in §3; and matter and structure were introduced together in §4. The relationship between capacities and individuals on the one hand, and matter and structure on the other is this: when individuals are internally structured in the right way and located in the right superstructure, capacities of individuals emerge and canonical effects manifest themselves.

To see this, consider the ant colony again. Ants have an internal organization in which they release pheromones upon finding food. When an ant is not close to a food source, it won’t release the relevant pheromone. So when the ant and the food source are spatially structured in the right way, the ant’s capacity to release food-pheromones emerges and the canonical effect is manifested. The ant’s biology is its internal structure, its organs are its matter, and its relation to the food source is its superstructure. The emergent capacity is releasing food-pheromones.

But now consider the ant as matter for the colony. When the ant is spatially related in the right way to the colony and when these many ants are all spatially related in the right way to food sources, then the capacity to retrieve food emerges as one of the colony’s powers. The relation of the ants and food source are the colony’s internal structure, the ants and food source are its matter, and its relation to the local ecosystem is its superstructure.

Consider another example: [Clark and Chalmers’ \(1998\)](#) now-famous Alzheimer patient Otto. Otto comes to rely on his notebook to help him remember information that he frequently needs, like the address of the post office. The notebook is functionally equivalent to a biotypical agent’s neural structures involved in memory; consequently, the notebook is part of Otto’s cognitive system. The thought experiment begins with the question of whether the notebook is part of Otto’s cognitive system and then affirms that it is through functional identity of the notebook with the bits of neural tissue involved in memory. The Aristotelian approach, on the other hand, looks at what Otto does: he uses the notebook in order to get to the post office and can’t get there without it. So manifestation of Otto’s capacity to walk to the post office requires the notebook, along with a body of a specific sort and a post office to walk to. The important point is that what Otto *does* is first identified and then the enabling components are discovered.

An upshot of the Aristotelian view is that questions about the boundaries of mind are non-starters.²⁰ The *wrong* question is: what bits of matter count as part of this object? The *right* question is: what enables this individual to do the things that it does? Identification of the matter, internal structure, and superstructures allows the natural scientist to get a clearer understanding of how those parts contribute to manifestations of the object’s capacities. Such an approach abstracts away from the need to settle what is and isn’t part of his cognitive system but provides a scheme by which to identify the constituent elements of an individual engaged in some activity.

7. From capacities to cognitive event analysis

So far, I’ve unpacked central concepts of Denmark DLA and Aristotelian metaphysics. In this section, I offer *prima facie* motivation for the complementarity of these philosophical and scientific toolkits by connecting first- and second-order

¹⁹ This is the distinction between substance and accident: see Aristotle’s *Categories*.

²⁰ This is another way of describing Adams and Aizawa’s “coupling-constitution fallacy.” For exposition, see [Adams and Aizawa \(2001, 2008, 2010\)](#), [Adams \(2010\)](#), [Aizawa \(2010\)](#). For criticism, see [Hurley \(2010\)](#), [Menary \(2007\)](#), [Ross and Ladyman \(2010\)](#), [Kagan and Lassiter \(2013\)](#), [Rockwell \(2010\)](#). Steffensen’s (2013) methodology of cognitive event analysis holds that the parts of a distributed cognitive system are identifiable only after the fact.

linguaging with individual capacities and structures. After providing the initial motivation, I connect Denmark DLA's method of cognitive event analysis with elements of Aristotelianism.

In §2, I introduced Denmark DLA's distinction between first- and second-order languaging. First-order languaging is made up by fast-paced interactivity; second-order languaging is constituted by population-level patterns. This distinction is captured by Aristotelian concepts. First-order languaging is a manifestation of an agent's capacities. Agential capacities are enabled in virtue of being in the right superstructures. Second-order languaging patterns are those superstructures. They organize agents-as-objects and enable agents to manifest first-order languaging capacities.

Furthermore, recall the analogy with Bob Ross's paintings. In one sense, images in the paintings are just blobs of paint; in another, they are clearly trees and shrubs. The same with languaging: on fast timescales, utterances are noises produced at various speeds and pitches. On slower timescales, they are words, sentences (grammatical or not), and speech acts. What the Aristotelian toolkit provides is a way to frame how these different logical levels are dependent on one another. Just as there are no trees without paint blobs, there are no words without noises.²¹ Trees on canvas depend on paint blobs just like words depend on noises for their matter. But dependence runs in the other direction as well: although there *can* be blobs without trees, the paint blob wouldn't have the shape it has without the shape of the tree to structure the paint blob. And just as there *can* be noises without words, agents wouldn't make the noises that they make without the population-level patterns to structure the sounds.²²

The points of contact between Aristotelian ontology and Denmark DLA reach beyond the theoretical and down to research methods. One valuable method is cognitive event analysis, which involves millisecond-scale analysis of video and audio recordings (Steffensen, 2013; Pedersen, 2012; Steffensen et al., 2010). It proceeds in two stages. First, investigators identify the event to be analyzed. Events are individuated with respect to changes in layouts of affordances. (Affordances are opportunities for action; this will be discussed shortly.) Second, researchers track the dynamics of the lower-order interactions by means of an event trajectory analysis. Event trajectories in problem solving consist of three periods: the 'before' period in which there is a problem with no clear solution; the event pivot in which the subject makes a key move to solve a problem; and the 'after' period in which the subject reacts to what was found during the event pivot. The event pivot is that moment around which the rest of the time is oriented; it is the "eureka!" moment which enables agents to see the solution to their problem.

Steffensen considers a 55000 ms event in which two workers attempt to find their Company Identification Number to put on an invoice. The first 45000 ms leading up to the event pivot are marked by frustration and fixating on the same solutions to the problem. The employees repeat that the number should already be on the invoice as its coming out of the printer. One of the participants returns periodically to the noticeboard where he has previously found the identification number. At –8575 ms (roughly 36 s into the problem solving), one of the subjects reframes the problem by using language that marks him as the receiver of the invoice rather than the sender. Doing so prompts the other participant to utter that the number would be there if printed on paper with the company logo—this is the event pivot which allows the subjects to solve the problem. In the following 4200 ms, the subjects change the paper tray that the printer is drawing from in order to get the number. It turns out that the computer was set to printing *draft* invoices that do not have the number as opposed to *finalized* invoices that do.

How does this example map onto the Aristotelian resources presented in §§5–6? There are four important points of contact:

- (1) beginning analysis with recognition of agent capacities
- (2) individuating cognitive events
- (3) tracking manifestation of capacities
- (4) *post hoc* analysis of the cognitive system to identify the interacting parts

First note that cognitive event analysis begins with identifying activities—in Steffensen's case study, we see two agents looking for the Company Identification Number. The Aristotelian view begins in the same way: we encounter in our experience individuals manifesting capacities.

Second, the boundaries of the cognitive event are marked off by changes in the layout of affordances. Affordances are properties of objects in the environment that offer opportunities for action for appropriately attuned organisms. The complement to *affordance* is *effectivity*. An organism's effectivities are its dispositions to engage in those opportunities for action in virtue of being appropriately attuned. For example, the coffee mug affords grasping, i.e. it is graspable. I have the effectivity of grasping the mug, i.e. I can grasp the mug. And I pick up on the mug's graspability because I have the effectivity of grasping the mug.²³

The Aristotelian view developed in this paper doesn't suggest individuating events in terms of affordances, or any way for that matter. Even so, the account developed adapts to individuating events with respect to affordances. The key move is to

²¹ Obviously this doesn't hold for sign languages, but that is something that is able to be accommodated within the framework.

²² It's worth noting that mapping first-order languaging to agent capacities and second-order languaging patterns to superstructures exemplifies the robust perspectivalism discussed in §5: the focus on first-order or second-order languaging is a shift in focus between speakers as individuals or as matter.

²³ For affordances, see Gibson (1979). For effectivities, see Warren and Shaw (1985) and Shaw et al. (1982). For a recent discussion of both, see Chemero (2009).

connect the notion of *affordance* with the basic vocabulary of capacity, matter, and structure. The affordance/effectivity pair mirror the two ways of understanding *capacity*: it includes both what an individual can do as well as undergo. I have the capacity to eat ice cream and the ice cream has the capacity to be eaten. Changes in the layout of affordances, then, are changes in the layout of capacities of individuals in the environment to produce or undergo change. Agents in exercising the relevant effectivities are exercising capacities for picking up on affordances, i.e. capacities for objects in the environment to undergo changes.

Third, researchers track the dynamics of lower-order activities. Examples tracked include voice modulation, co-occurrence of bodily movement and speech, and coordination of speech by the employees. On the Aristotelian account, tracking the dynamics of lower-order activities involves tracking how capacities interact. In considering the co-occurrence of movements and speech, for example, subagential capacities for bodily and vocal tract movement are found to be interestingly related. These biological subsystems are themselves open for further analysis in terms of their capacities, matter, internal structures, and superstructures. Relevant lines of inquiry can include: what is it about the matter from which the subsystems are constituted that enables this; how are they biologically related to one another; is their spatial relation at all relevant; is body and vocal tract coordination species-specific; how do the capacities of these subsystems interact with the capacities of other subsystems? And because researchers identify the work of capacities before identifying the relevant matter and structure, organismic boundaries are tangential to discovering how lower-order activities dynamically interact.

Fourth, cognitive event analysis and Aristotelian metaphysics both emphasize a *post hoc* analysis concerning the constitution of the cognitive system. The resources recruited as part of a distributed cognitive system can't be determined beforehand but only during analysis of the event (Steffensen, 2013). For the Aristotelian view, agents and their capacities are identified prior to the constitutive matter, internal structures, and superstructures. Such an understanding is only available *post hoc*. For example, if I remember to take my books to the library because I set them in front of the door, then my books being in front of the door is part of the environment in which I manifest my abilities. If the books were on a shelf or on my night stand, then I may not have remembered to return them. So it's *those* books being *there* that enabled exercise of my ability to remember the books. But the relevance of the books' location to the manifestation of my capacity is obvious only after the fact: I remembered because I saw them and I saw them because they were in my way. Before the manifestation of my capacity, there might have been any number of things that could have caused me to remember to take the books: seeing the library slip on my refrigerator, remembering that I'm supposed to meet a friend at the library, or wondering how much I owe in library fines. Or, I might not have remembered at all.

Aristotelian resources dovetail with Denmark DLA concepts and methods. But how might these resources actually contribute to on-the-ground Denmark DLA research? As I said above, Aristotelian metaphysics is not up to generating new research techniques; nonetheless, they do help to sort out and identify the various elements of a cognitive system and thereby help generate novel questions. For example, Steffensen writes,

But at –4450 [ms] White suddenly looks up from his paper, gazes towards Black's computer screen, and, during Black's utterance act in lines 18–19, stands completely motionless for 4000 ms. Though we cannot observe any cognitive work, we can assume that *neurally* something is happening. Briefly, the [distributed cognitive system] pivots on a brain that comes up with the logo paper hypothesis (2013, p. 214).

The phrase of concern is “a brain that comes up with the logo paper hypothesis.” Obviously, there is neural activity going on; White and Black would have to be dead for the contrary to be true. But talk of hypothesizing brains sounds suspiciously like all-purpose processing systems (e.g. Fodor, 1983). Agents hypothesize; subagential parts don't.²⁴ Aristotelian resources help to make these distinctions clear: there is neural activity, but it is part of the matter constituting the agent who comes up with the hypothesis. Neural activity contributes to White's hypothesizing just as the ant's dropping pheromones contributes to the colony's transporting food. Once it's clear that the brain is contributing to, but not actually doing, White's hypothesizing, researchers can work to identify other causal contributors. For example, it would be interesting to consider what would have to be the case for White to fail to “see” the solution to the problem: could someone with a different cultural history fail to get the answer? Someone with a similar cultural history but with a different work history? Similar cultural and work history but substantially different personal experience? While these sorts of questions are available on other philosophical frameworks, the relevance of superstructures in an explanation of languaging places cultural and social factors on par with neural ones. As a result, an Aristotelianized Denmark DLA is capable of forming sophisticated explanations of complex, biosocial phenomena while avoiding internalist intuition pumps asserting that the real action is going on “in the head.”

8. Upshots

In this section, I suggest that there are two important areas where the Aristotelian ontology can do useful work: (1) providing a principled basis to argue for causal pluralism²⁵ and (2) providing a way to build on findings from internalist psycholinguistics.

²⁴ Though obviously, neural activity is necessary for hypothesizing to happen.

²⁵ Chemero (2012) uses tools from nonwellfounded set theory to analyze self-organizing (specifically: autocatakinetic) systems in light of Aristotle's four causes.

8.1. Causal pluralism

Causal pluralism is the position in philosophy of science that there are different types of causal forces and that they play different roles in the tokening of some event.²⁶ Suppose for example that a driver skids on a steep, icy hill; slams his brakes, only to find that they aren't working; and wrecks his car. If we're looking for an answer to the question "Why did the car crash?", there are going to be different answers depending on our interests. The police officer is interested in the icy conditions. The civil engineer is interested in the steepness of the hill. The mechanic is interested in the failed brakes. Each factor contributes differently to the accident. There is no explanatory overlap among the accident's causes.²⁷

Similarly, there is no explanatory overlap among the causal elements of matter, structure, and capacity. For some individual, an appeal to matter might involve looking at the matter constituting that individual or considering the individual as matter for a super-individual entity. Appeal to structure can be either internal structure or superstructure. Appeal to capacity is the capacities of the individual, capacities of matter-form composites constituting the individual (e.g. the brain), or capacities of the superindividual entity. These causal categories complement one another but don't overlap. Neural explanations complement social explanations; neither crowds out the other since each is explaining a different facet of the behavior.

Causal pluralism is a powerful resource in the toolkit of Denmark DLA. It opens up theoretical space in order to accommodate sophisticated biosocial explanations of cognitive activities without positing internal cognitive mechanisms. As an example, consider Cowley's (2014) analysis of the 750-ms utterance 'ah bene' between an Italian mother and daughter. They are eating peas, and the daughter asks the mother if they are from her (the mother's) garden. The mother responds negatively and starts to launch into a complaint about it. The daughter cuts off her mother's lament with 'ah bene.'

The categories of capacity, matter, internal structure, and superstructure sort causal contributions for the daughter's utterance of 'ah bene.' The daughter's utterance is intended to alter her mother's present train of thought, so the daughter is exercising her capacities to change her mother's conversational trajectory. Underwriting this are components of matter, internal structure and superstructure. For the underlying organized matter, there is clearly neural activity happening (p. 6, n. 11): the daughter wouldn't be able to make the utterance as she does without having a brain that's structured in a species-specific way. Furthermore, the daughter's utterance matches the mother's speech rate and the fundamental frequency of the utterance drops significantly as part of what Cowley describes as the 'musicality of speech.' The matching of speech rates and changes in fundamental frequency happens because of the underlying organized matter of brain and vocal tract but also because of spatial and social superstructures. The daughter, in filling a social role *qua* daughter, exercises a capacity to cut off her mother's lament with an utterance of 'ah bene'; also, matching speech rates and changes in frequency can happen only in the relevant spatial proximity. The action is thus describable in terms of the speaker's organized matter (her biological subsystems), superstructures (her social and spatial relationships with her mother) and capacities (deflecting her mother's lament). Importantly, the ways in which biological subsystems contribute to the utterance of 'ah bene' is different from the ways superstructures contribute to the utterance. The utterance—the exercise of the capacity—is a social act, and the speech rate's being what it is depends on the social and spatial superstructures. But there would be no speech rate to speak of without the organized matter of the biological subsystems. The social and spatial superstructures shape the activities of biological subsystems; they act as *constraints* on the activities of subsystems. The biological subsystems exercise capacities that *contribute* to the agent's capacity. The subsystems contribute as they do, in part, because of the constraints on them. In short, understanding why the daughter made her utterance as she did requires appeal to a variety of causal forces and the full story requires appeal to these myriad causal forces.

8.2. Reinterpreting previous findings

One challenge for Denmark DLA (as well as other accounts that locate the mechanisms of language across multiple, interacting timescales) is the accumulation of data premised on the supposition of a language module. One might be led into thinking, as Fodor (1975) puts it, that internalist psycholinguistics is the only game in town.²⁸ The challenge is that non-representational approaches to language are relative newcomers on the scene and have to begin building from the ground-up.

Clearly, Denmark DLA can't build on internalist psycholinguistics as it currently stands: Denmark DLA rejects internal representations and mainstream psycholinguistics does not. But Aristotelian metaphysics offers a way in which to build on findings of internalist psycholinguistics but without endorsing the underlying *ontology*. The way to do this hearkens back to

²⁶ This contrasts with *causal monism*, which holds that there is only one kind of causal relation. That causal relation is usually understood as what Aristotle called *efficient causation*, which is the typical push-and-pull of the physical world. If I knock over a beer bottle with my hand, my hand's hitting the bottle is the efficient cause of the bottle's being knocked over. A closely allied position to causal pluralism is *explanatory pluralism*: phenomena are best addressed by means of a plurality of theoretical frameworks (cf. Dale et al., 2009). The difference between explanatory and causal pluralism is that the former is concerned with pluralism in explanations while the latter is committed to pluralism in ontology.

²⁷ Cf. Jaworski (2011). One concern among philosophers is *causal overdetermination* (cf. Kim, 1993). A mental event is overdetermined if, in addition to a sufficient physical cause, there is also a mental cause. If a mental event is causally overdetermined, then there is explanatory overlap among the event's causes. Causal pluralism defuses worries about overdetermination by allowing different types of causal forces.

²⁸ 'Internalist psycholinguistics' is used to cover approaches to the psychology of language that posit internal representations.

debates between Platonists and Aristotelians on the status of forms (what I have been calling ‘structure’ throughout this paper).²⁹ Plato hypothesized a realm of forms: abstract and eternal objects that make objects in the world the types of things they are by means of a “participation” relationship. Beautiful objects are beautiful because they “participate” in the form of beauty; circular objects are circular because they “participate” in the form of circle.³⁰ Aristotle’s insight was to conceive of forms—that in virtue of which an object is a token of a specific type—as constitutive of concrete objects, not separate from them. So forms don’t exist separately from the objects they constitute; they structure matter to make the individual a token of a type.

Even though forms don’t exist separately from objects, knowers can coherently talk about forms *as if* they were capable of existing independently of their instantiations. Knowers do this by getting past superficial differences to see what objects have in common. And what tokens of a type have in common is the structural arrangement of their parts, i.e. their forms. Mathematics is a paradigm of identifying structural arrangements. Geometrical objects don’t exist independently of objects they structure; there are no circles existing independently of circular objects. But knowledge of, or talk about, structures doesn’t make them on par with individuals.³¹ Ryle’s (1949) example of a category mistake (mentioned in connection with first- and second-order languaging in §2.3) illustrates the same point. Assuming the circle to be an entity alongside a plate is a category mistake just like assuming the university to be an entity alongside the library.

This brief history lesson offers a way to understand findings from internalist psycholinguistics. On the mainstream view, the myriad of findings suppose an internal representational and computational system that is describable independently of conditions of embodiment and embeddedness.³² This is like the Platonic view of forms. The forms exist separately from concrete particulars but the tangible objects are our first epistemic point of access with them. For internalist psycholinguistics, the language module exists separately from individual agents insofar as particular conditions of the agent don’t supply interesting or relevant information about the module. For Plato, the fact that *this* concrete table has a scratch in it is irrelevant for the contents and structure of the form of table. For internalist psycholinguistics, the fact that *this* speaker grew up speaking a certain dialect is irrelevant for the contents and structure of the language module.

Just as Aristotle brought Plato’s forms down to earth, so too does an Aristotelianized Denmark DLA bring internalist insights about language into the hurly-burly of everyday life. Insights into an internal language system are insights into languaging as described in abstract terms. They identify some of the logical constraints that hem in accounts of human languaging but they uncover nothing about the material instantiations of those constraints. As an example, suppose the following transformational rule is housed in a language module (cf. Harley, 2014, p. 41):

$$NP_1 + V + NP_2 \rightarrow NP_2 + \text{auxiliary} + V^* + \text{by} + NP_1$$

(‘V*’ indicates that a different form of the verb is used.) Here are sentence pairs that exemplify this rule:

- the vampire chases the ghost → the ghost is chased by the vampire
- the psychologist reads the paper → the paper was read by the psychologist
- the philosopher drinks the coffee → the coffee was drunk by the philosopher

Thinking of transformational rules in the way that Aristotle thought of Platonic forms leads to this conclusion: transformational rules are as much a part of language as having equidistant points on a perimeter is a part of a Ferris wheel. Noun phrases and subordinate clauses exist as much in the real world as points and circles: which is to say they don’t. But noun phrases and subordinate clauses are part of an abstract system describing natural phenomena as much as points, circles, and diameters. But these logical constraints are not to be mistaken for an account of mechanisms. As structures, they have no ontological purchase independent of the materials that they structure: no circles without circular objects and no transformational structures without actual languaging events. Informative abstractions are culled through analysis of languaging activities without having to reify these abstract structures in the heads of languaging agents.³³ Consequently, an Aristotelian Denmark DLA is capable of taking advantage of some findings from internalist psycholinguistics with the understanding that abstractions provide formalized, but not internalized or unchanging, constraints on languaging activity. The resulting account thereby comes out superior to internalist psycholinguistics: an Aristotelian Denmark DLA, in line with the causal pluralism discussed in §8.1, has the resources for integrating the formal constraints discovered by orthodox psycholinguistics with the interactive resources agents deploy in actual communicative events. The formal constraints are just one part of a complex story about how we language.

²⁹ The contemporary notion of *essence* maps more-or-less neatly onto ancient notions of *form*.

³⁰ Throughout his works, but most notably in *Parmenides*, Plato acknowledges the difficulty in spelling out the details of what it means for an object to “participate” in an abstract Form but doesn’t offer an account of it.

³¹ In *Categories* 1b25, Aristotle describes individual tokens as ‘primary substance,’ and forms-as-substances ‘secondary substance.’

³² Mea culpa: I am grossly oversimplifying the diverse field internalist psycholinguistics that emerged after the decline of behaviorism.

³³ Thanks to Carol Fowler for this elegant way of stating the position.

There are two important caveats. The first concerns the level of abstraction relevant to the language-mathematics analogy. The sort of abstraction under consideration is a high one indeed: that π is a constant was a hard-won discovery and requires abstraction away from any and all token instances of actual circles. Similar discoveries for the language sciences will likewise be hard-won. The formal dynamic principles of languaging are not yet well-enough understood to make clear why certain utterances seem to obey transformational rules. We're nowhere near that. So identifying the logical boundaries of languaging is something that is still far off in the future.

The second concerns the concept of languaging prior to such a high level of abstraction. Once the formal account has been achieved—keeping in mind that an entirely formal description of languaging doesn't involve positing anything new in the world—all overt references to embodiment and embeddedness are gone. Even so, the phenomenon that's being modeled is conceptualized as embodied and embedded; the formal descriptions of these events are formal descriptions of embodied and embedded activities. As an analogy, suppose that we had a formal model describing how outfielders catch fly balls. In our model, we would describe the velocity of the fielder and the ball, the spatial relationship between the fielder and the ball, and the apparent motion of the ball for the fielder, among other things. There is nothing in the model requiring that we ignore the embodied and embedded character of the task. In fact, how we've constructed the model *depends* on our conceiving of the task as embodied and embedded by requiring coupling relationships between the ball and the player. The same point can be made about formal descriptions of languaging phenomena. A formal model is a model of an embodied and embedded activity and does not require positing extra entities in order to explain what's going on. That is, the philosophical foundations of languaging developed here leaves room for formalized models without abandoning an embodied and embedded view of languaging.

9. Conclusion

In this paper, I've introduced and developed a handful of Aristotelian notions for underwriting the concept of languaging. These resources are exceptionally powerful and offer a way of conceptualizing languaging in its natural, hurly-burly form but leaving space for formal characterizations. They open up space for introducing multiple types of causal forces and enable appropriation of non-embodied findings in language by reframing what's been discovered. There is a lot more to be worked out, but the promise of a powerful suite of resources is encouragement to undertake the work.

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