

## Intentionality and the Aristotelian–Thomistic View of Concepts

Thomas L. Spalding  
*University of Alberta*

James Stedman  
*University of Texas Health Science Center San Antonio*

Curtis Hancock      and      Christina L. Gagné  
*Rockhurst University*                      *University of Alberta*

In this paper we describe the problem of intentionality for modern theories of concepts and propose that taking an Aristotelian–Thomistic (A–T) approach to concepts helps to alleviate this problem. We begin by describing some recent problems within the psychological literature on concepts that might lead one to adopt an A–T approach to concepts (see Spalding and Gagné, 2013). We then discuss Quine’s dilemma of intentionality and show how that dilemma plays out across a number of possible approaches to philosophy and psychology including psycho-functionalism, the current default philosophy of psychology. We then describe how the A–T approach to concepts deals with the problem of intentionality and suggest that it may provide a better way of thinking about intentionality than other modern approaches. We end by discussing some possible objections to the approach. We show that the A–T approach is, perhaps, surprisingly compatible with other recent work in psychology and that taking this approach to concepts and intentionality does not introduce Cartesian problems of dualism into modern psychology.

Keywords: intentionality, Thomas Aquinas, psycho-functionalism

Concept formation is a foundational process for cognition. Concepts allow us to perceive individual objects as members of a kind, to attribute properties common to the kind to the specific individual object, to communicate with others

about such objects, and so on. Indeed, concepts are often thought of as the building blocks of cognition (Solomon, Medin, and Lynch, 1999). Thus, weaknesses in theories of concepts will propagate throughout our understanding of cognition as a whole.

In recent years, despite a great deal of empirical work investigating how concepts are learned and represented, a concern has begun to arise that our theoretical views of concepts are deeply inadequate. Indeed, Machery (2009) has suggested that the theoretical confusion is so great that scholars should seriously consider the possibility that there can never be a theory of concepts.

Why this pessimism about the possibility of a theory of concepts? There are three general theoretical approaches to concepts (exemplars, prototypes, and the theory-theory), all of which are supported by empirical data, but which appear to be completely incompatible with each other. Furthermore, quite a lot of recent research results are not compatible with any of the three theories. For example, research giving rise to data that does not fit any of the standard approaches has been conducted on generics (statements that are taken as generically true of a kind, even if infrequent, e.g., Cimpian, Brandone, and Gelman, 2010; Cimpian, Gelman, and Brandone, 2010; Graham, Nayer, and Gelman, 2011), psychological essentialism (a belief in categorical essences, e.g., Gelman 2003, 2004), and k-properties (properties that seem to directly reflect the kind, see e.g., Prasada and Dillingham, 2006, 2009). For example, none of these results fits well (or at all) with the kind of statistical accumulation that underlies exemplar and prototype theories. In short, the wide array of apparently mutually incompatible experimental results, as well as being incompatible with the general theories of concepts, points strongly to the need for a very different kind of theoretical foundation for our understanding of concepts.

Recently, Spalding and Gagné (2013) proposed that an Aristotelian-Thomistic view of concepts might provide a good underlying theoretical approach to the psychology of concepts. They described the A-T view of concepts, showed that the A-T view is not the so-called classical view of concepts that was rejected in the 1970s and 1980s, and then showed that the A-T view is consistent with the empirical evidence for each of the three main modern theoretical approaches, as well as a number of other recent empirical research results that do not fit well with any of the three general theories. One of the critical points made by Spalding and Gagné is that the A-T approach to concepts is, in many respects, driven by the broader A-T approach to knowledge and by A-T metaphysics. Therefore, adopting the A-T approach to concepts may lead to solutions (or at least interesting approaches) to some other problems that are related to concepts and to philosophy of mind, more generally. In this paper, we expand on Spalding and Gagné's claims by considering how adopting an A-T approach would impact our understanding of the intentionality of human thought.

### Intentionality in Philosophy and Psychology

Intentionality is the property of human thoughts such that thoughts are about or refer to or are directed toward something beyond themselves (see, e.g., Feser, 2006, pp. 15–16; Madden, 2013, pp. 12–13). Recent discussions of intentionality largely originate in the work of Brentano (1874/1973). Despite various reservations about the details of Brentano's claims that need not concern us here, discussions of intentionality have been central in both analytic (e.g., Quine, 1960) and phenomenological philosophy (e.g., Husserl, 1900/1970). Indeed, intentionality has been an extremely difficult problem in the philosophy of mind. The central difficulty is that it is very difficult to see exactly how a characteristic like intentionality could arise from purely physical antecedents, and indeed Brentano claimed that intentionality was flatly irreducible to the physical. According to Quine (1960), one must accept one horn of the following dilemma: either one accepts that thoughts have intentionality (thus giving up on physicalist, reductionist philosophies) or one accepts physicalist, reductionist philosophy (thus giving up on intentionality).

There have been a number of responses to this dilemma. Some have happily chosen the pro-physicalist horn of the dilemma (e.g., Churchland, 1986), and have thrown out intentionality (along with any other intentional or mental states such as belief) as purely epiphenomenal. Still others have attempted to avoid the dilemma by finding some way to reduce intentionality to the physical (e.g., Fodor, 1987) without taking the further step of declaring that intentionality is epiphenomenal, though none of the solutions has won widespread support. As Gallagher and Zahavi (2008, p. 110) put it, "The assumption has consequently been that you either naturalize intentionality by downward reduction of intentional states to behavior, neurophysiology, and ultimately physics, or you argue that such reduction is impossible and then conclude that the intentional vocabulary is empty talk and should be eliminated from our scientific discourse."

Others have accepted that physicalist philosophy must be abandoned (such as some of the phenomenologist philosophers and psychologists, see Gallagher and Zahavi, 2008, for discussion), as intentionality is too important to give up. A phenomenological approach to intentionality attempts to provide a descriptive analysis of the structure of conscious thought and the intentionality that this involves. Notably, this involves the philosopher or psychologist in investigating the relation of mind to the world, rather than mind to the brain (Gallagher and Zahavi, 2008, p. 111).

Another approach is to accept that the horns of the dilemma describe two completely different aspects of reality (e.g., Chalmers, 1996, 2010), one physicalist and one not reducible to the physical, essentially accepting a quite Cartesian kind of dualism. In particular, this property dualist approach divides thought into "easy"

and “hard” aspects, with the easy aspects being directly explainable in functional, physicalist terms, and the hard aspects being real, but not explainable in physicalist terms. The easy aspects include many common psychological characteristics or aspects of cognition, such as memory, perception, or judgment, while the hard aspects are those that are generally considered subjective, such as the personal experience of pain or of knowing. Notably, much of the hard aspect of thought also has to do with its intentionality.

In short, intentionality is still a very live, and a very difficult, issue in philosophy of mind. Although the psychologist interested in concepts can (and usually does) go about her work without worrying greatly about these foundational philosophical disputes, it is clear that in doing so, psychologists are simply ignoring Quine’s dilemma, and that failure to resolve the dilemma is ultimately a problem for a coherent theory of concepts. It is also clear that none of the approaches above is completely satisfactory for all of psychology.

Most psychologists interested in concepts are unlikely to chose the pure, pro-physicalist horn of the dilemma, as that would mean that the very concepts they are studying are not, in fact, concepts of anything. Such concepts would have no actual content; they would not in fact be about anything at all. At the same time, many psychologists (when asked) would be likely to say that they hold a physicalist view — all concepts will eventually be reduced to something about the brain — but very possibly without realizing that such reduction likely means the elimination of the aboutness of the concept. Indeed, many psychologists tend to equate being “scientific” with holding a physicalist philosophical approach to all such questions. Thus, they are left with simply hoping for someone to accomplish a non-eliminative reduction of intentionality to the physical. In the meanwhile, they take intentionality as a given. Unfortunately, though, this means that there is no explanation for the intentionality that they take to permeate the concepts that they so rigorously study. Nor are many psychologists comfortable with the idea that there is a simple dividing line running through thoughts such that some are physical and some are not. Property dualism, when spelled out, divides psychology into “scientific” psychology and “nonscientific” psychology, rather than presenting a unified field of psychological knowledge.

We intend to show that the aboutness of a concept (and, *mutatis mutandis*, thoughts in general) falls out of an A-T approach to concepts. Given Spalding and Gagné’s (2013) previous claim that the A-T approach could be fruitfully applied to empirical research on concepts, we will argue that adopting the A-T approach may provide a useful way of understanding intentionality in such a way that a coherent theoretical framework for concepts can be developed that extends from a metaphysical foundation through experimental results.

To show this, we will review previous approaches to the philosophy of science as applied to psychology and show that these approaches are not sufficient to ground intentionality. We will then briefly describe the A-T view of concepts,

and place it in the context of the A-T model of knowledge and truth. In so doing, it will become clear that intentionality falls out of the A-T approach to knowledge, rather than being a separate characteristic of thought that requires its own explanation. We will end by describing some of the ways that the A-T approach is compatible with the scientific approach that psychologists generally take, arguing that giving up on a pure physicalist philosophy in favor of hylo-morphism and A-T metaphysics does not mean giving up on a meaningfully scientific approach to psychology.

### *Philosophy of Science in Psychology*

The ontological and epistemological philosophical underpinnings of psychology from the late 1940s up until the late 1960s was operationism, a derivative of logical empiricism (Ayer, 1936). Though discussed in the 1930s (Stevens, 1935), operationism was elaborated by McCorquodale and Meehl in 1948 as an explanation, in terms of philosophy of science, for the psychological constructs (hypothetical constructs) of motivation, intelligence, and learning. Later, Chronbach and Meehl (1955) expanded the meaning of hypothetical constructs via the principle of construct validity and the idea of the nomological network. They claimed that the meaning of a construct, such as intelligence, is established by its ability to predict behaviors and by its interaction with other constructs in a network of functional relationships. Although most psychologists working or trained during that time rarely appeared directly aware of operationism as the philosophical undergirding of experimental work, still these ideas were present in theory building and explanation.

Logical empiricism came under heavy attack within philosophy during the 1960s and was discredited. Noting this decline, some psychologists and some philosophers interested in behavioral science proposed alternative ontological/epistemological positions. Over time, three took shape: social constructionism (Gergen, 1994), hermeneutics (Messer, Sass, and Woolfolk, 1988; Taylor, 1985), and scientific realism (Meehl, 1991). Of the three, scientific realism remains the preferred, if poorly understood, default position for most psychologists because this view maintains the claim that objective knowledge is possible. For example, Meehl, commenting on research on the “g” factor of intelligence, claimed “g” as something real existing in the subjects studied, as predicting and explaining their cognitive behavior, and as being confirmed by observation. The reader will note that scientific realism retains elements of logical empiricism.

At about the same time, psychology rediscovered “the mind,” and the cognitive revolution began. Scientific realism continued as the preferred overall ontological/epistemological viewpoint of cognitive psychology; however, scientific realism made only truth and ontological claims about psychological reality, namely, that cognitive constructs a) are real and exist in subjects and b) that these discoveries

can be known. However, scientific realism did not provide an underlying explanation of the mechanisms and interactions of cognitive constructs. That became the task of functionalism, specifically of psycho-functionalism.

### *Psycho-functionalism*

In her review, Levin (2013) points out that functionalism has antecedents (Ryle, 1949; Turing, 1950; Wittgenstein, 1922/1953) but emerged as a definitive philosophical position in the last 35 years of the twentieth century. Several major strains of this position developed: machine functionalism, psycho-functionalism, and analytic functionalism. So, far from being monolithic, functionalism itself is divided, with arguments in favor of and attacking the various strains. Psycho-functionalism is the variation most closely tied to cognitive psychology, so only that theory will be discussed.

Psycho-functionalism maintains that mental states and processes are entities (constructs) that are defined by the role they play in cognitive psychological theories. They may be tied to brain structures and processes but this is not a requirement. However, there does seem to be a trend toward attempting to ground these constructs in neuroscience (see Stedman, Hancock, and Sweetman, 2009). They can include mental states and processes easily identified with common sense (folk psychology) or they can go beyond common sense to incorporate more refined constructs identified by laboratory findings. Psycho-functionalism can also exclude or seriously question folk psychology ideas if research findings contradict those ideas.

Contemporary cognitive psychology is replete with theories grounded in psycho-functionalism expressed as models and/or mechanisms: for example, perceptual binding (John, 2002), working memory (Baddeley and Hitch, 1974), category formation (Smith, Patalano, and Jonides, 1998), and so forth. Some theories assume that there are direct ties from functional mechanisms to brain structures and processes and others do not. All postulate multiple mental states and processes that interact and play definite roles in the theory. In many cases, psycho-functional cognitive theories compete, and their truth claims are to be settled by empirical observation. As pointed out above, this is the case with concept formation.

In summary, scientific realism is the default position of most psychologists, including cognitive psychologists. Currently, scientific realism counts on psycho-functionalism to explain models and mechanisms, including the models put forth for concept formation. Regarding the problem of intentionality, the question is this: How well does psycho-functionalism account for the intentionality of human concept formation/thought?

For illustration, let's consider an example from the exemplar model of concept formation. At its most basic level, the exemplar model claims that category (concept) formation occurs when people compare new information to exemplars stored in memory. As pointed out by Hintzman (1986), exemplars are learned through repeated presentations and naming of category members (as children learn to tell

dogs from cats) and the repeated naming allows the pairing of a common name with a set of exemplars, which in turn allows generalization over those exemplars when the name (or other similar cue) is presented. It is worth pointing out here that exemplar models do not specify how people incorporate anything other than the direct presentations of the exemplars into the concept. For example, suppose you are told a definition or an exception (a whale is not a fish); how does that relate to all the previously stored exemplars, or even to new exemplars if the definitional features are not perceptible? Does the system return to each stored exemplar to update its representation? Regardless, the critical point for the current discussion is that such a system can properly generalize a name to a class of items.

Let's take a hypothetical experiment in which young children are asked to classify animals as cat or not-cat. The exemplar model, even at this simple level, would require a number of psychological constructs: sensation-perception, learning (of exemplars), many constructs in the area of memory and recall, some mechanism accounting for comparing new stimuli to exemplars, an account of language to perform the response. Because cognitive psychology is increasingly linked to neuroscience, interactions with brain structures must also be factored in. Psycho-functionalism is expected to serve as the ontological and epistemological underpinnings for this process.

In the psycho-functional model, the stimulus element is merely the initiating anchor point. The cat (i.e., the actual cat) starts the process. However, psycho-functionalism's focus of explanation is on the mechanisms mentioned above and their interaction. The response element is more important than the stimulus because it is the empirical demonstration that the model has predicted correctly. Hence, with regard to intentionality, the "what the concept is about," the psycho-functionalist epistemological/ontological account has little to say. Psycho-functionalism does start with a referent, the cat, but simply assumes the existence and knowability of cats. Most importantly, to the extent that this approach says anything about the intentionality of thought, it assumes that there are conceptual representations that arise due to the cat stimulus, and that this suffices to make thoughts of or about the cat, so long as those thoughts have those representations as content.

One might look at this description and say, "well, the exemplar is from the thing, so therefore the intentionality is accounted for" without realizing two important points. First, the "from" is basically undefined and it is unclear how this "from" actually gives rise to intentionality. That is, even assuming (as psycho-functionalism tends to do) that the representations are physically caused by the presentation of the stimulus, it is difficult to see how one physical characteristic being caused by another makes that physical characteristic about the other in the relevant sense. For example, the fact that a knife left in a fire becomes hot does not make the heat of the knife "about" the fire in the relevant sense, nor does it make the knife "about" the fire. Thus, we have to note that this way of thinking about intentionality as due to a representation being caused by the stimulus both assumes and hides intentionality. It does not explain intentionality.

The second point to be made here is that there is an issue about the mind only having access to the exemplar representation. Thus, the mind, when considering the exemplar, is *ONLY* accessing the exemplar representation and *NOT* the thing. In particular, if the concept is “that which is presented to the mind” (as has been largely held by theories of concepts at least since Locke) then the thought is about the representation, not the thing, and hence you lose any intentionality that reaches out beyond the mind. Now of course it should be obvious that there is an important difference between thinking about a mental representation and thinking about a thing in external reality, but if the conceptual representation is the content of the thought, it is very hard to see how the thought can actually be about the thing. This “problem of the bridge” and the notion that a concept is “that which is presented to the mind” will be discussed more fully in the section on the Aristotelian–Thomistic approach.

In sum, the primary epistemological/ontological thrust of psycho-functionalism is to account for and explain the mechanisms of concept formation. Hence, psycho-functionalism’s account of intentionality is very minimal at best. It should be noted that the prototype and theory-theory models, also based on the psycho-functionalist ontology/epistemology, fare no better, and for exactly the same reason — the problem is one of ontology/epistemology, rather than the psychological theories, *per se*.

### **The Aristotelian–Thomistic (A–T) Alternative**

Spalding and Gagné (2013) described A–T ontology in general and the application of the A–T model to concept formation in particular. The A–T framework commences with sensory information regarding objects in the environment. This information is organized by the “internal senses,” including the common sense, which receives and arranges all sense data; the phantasm, which retains the sense data; the imagination, which combines and reassembles sense data from the phantasm; and the memory, which retains the sensory level images for later use. The intellect, by the process of abstraction, then acquires the universal form of the object.

It should be noted that the A–T model of concept formation calls for a second movement. For a concept to be finalized, the universal, held in the mind, must be predicated. In this second process, there is the movement from universal back down into the internal senses, the phantasm in particular. This act, known as the “existential judgment,” affirms the existence of this particular dog, as in, “The dog [universal] is my dog, Tippy [the existent dog].”

Hence, the A–T model starts in the senses and sense data are processed by neural systems compatible with current neuroscience (see Stedman, 2013). Then, the faculty of the intellect abstracts the universal as a concept and returns to the particular stimulus through the existential judgment. But let us see how this model would apply to the hypothetical exemplar concept formation study described above.



Tommy, age 5, looks at a stimulus picture of a cat. This sensory information is processed by neural structures; and, in the A-T model, produces a phantasm representation of the cat stimulus. At the same time, the memory presents exemplars of cats and dogs at the phantasm level. The intellect, via the process of abstraction, then produces the form common to all cats and dogs, the blueprint or structural model as described by Shields (2003). Tommy then makes a comparative judgment involving this picture of a cat to the abstracted blueprints of dogs and cats (stored in the passive intellect according to A-T theory). Then he makes an existential judgment: this picture is like cats, not dogs. Then Tommy makes the full existential judgment to the experimenter: that (the particular stimulus) is a cat.

The A-T process, described above, offers a full account of intentionality, “what the concept is about.” This might be easier to see if we leave the hypothetical experiment and consider Tommy out on the street. He sees a cat. This stimulus enters his sensory/perceptual system and becomes available for comparisons to abstractions of cats, dogs, raccoons, and other four-legged animals. Tommy, after comparison, makes an existential judgment about the stimulus that started the process: “Oh, see that cat.” This judgment regarding the stimulus that started the process completes the intentionality circuit. The A-T process starts with and affirms the existence of a particular cat; psycho-functionalism simply assumes the cat is there.

The critical distinction is not that Tommy makes such judgments or behaves in such a way (obviously, Tommy’s behavior does not depend on which theory psychologists adopt!). Instead, the critical distinction revolves around the question: Why does the A-T view warrant such behaviors while psycho-functionalism does not? This difference depends on two aspects of the theories that go beyond the simple description we have given above, and into the metaphysical assumptions and claims of the views. First, in the psycho-functionalist view, the concept is the content of the thought; the “that which” the mind grasps. This creates a clear issue for how one can connect to anything outside the head (this is sometimes known as “the problem of the bridge”). In this case, there is a difficult gap that directly relates to how the thought can be about the thing outside the head, if the content of the thought is the concept. This gap, in turn, opens the door for a radical skepticism. In the A-T view, on the other hand, a concept is not “that which” the mind grasps, but “that by which” the mind grasps something; the concept is not the content of the thought. Instead, the concept is just what allows the mind to grasp the form or nature of the thing; the mind’s grasp of the thing in the world is supported by the abstracted species of the thing, plus the phantasms and other sensory information as described above. But none of these is what the thought is about; they are what allows the thought to be about the thing.

Second, the A-T view describes the concept in this way, not as a response to the problem of the bridge, but based on the A-T view of form and matter, which was independently motivated by metaphysical concerns. In particular, in the A-T view of form and matter, the form that is abstracted by the human mind is the same form as

that “in” the thing, though existing in an intentional mode rather than in the matter of the thing. Thus, there is a direct link of the A–T thought to the form of the thing, and this provides or creates the aboutness of the thought. Psycho-functionalism cannot avail itself of the same approach, as psycho-functionalism does not include the matter/form distinction in its philosophical description of the things in the world.

Adopting an A–T approach to intentionality not only links to A–T metaphysics in terms of form and matter (and thus the inherent intentionality across both sensory and intellectual operations), but also in terms of the A–T approach’s metaphysical analysis of causality. In particular, in the psycho-functionalist approach, there is a difficult question concerning why intentionality should arise from a fundamentally mechanistic world. Indeed, intentionality, in the psycho-functionalist view, seems to arise purely as a function of the existence of mind, without any precursors in the world, and without any obvious explanation in terms of anything beyond the mind itself. In the A–T view, on the other hand, intentionality as aboutness is a characteristic of sensory and intellectual operations and hence of minds, but it is also connected to the A–T principle of finality (i.e., final causality), by which there is a “directedness” at all levels of the world. Thus, intentionality in the narrow sense (i.e., as the aboutness of a thought) arises only for minds (including sensory-based, nonintellectual minds of animals), but the broader characteristic of directedness is one that exists throughout nature in the form of final causes. So, intentionality is the specific form of directedness that minds are capable of, rather than a completely new and mysterious power that only exists to explain the apparent nature of our thoughts. Feser (2014, Ch. 2, and particularly pp. 100–105) provides an in-depth discussion of intentionality and finality in the A–T view, as compared with recent attempts by analytic philosophers to extend mental intentionality into the physical realm in order to deal with some of the problems associated with a mechanistic view of the world, a kind of reversal of the structured relation between claims about mind and world found in the A–T approach.

The fact that the A–T view of concepts derives directly from its view of things in the world and ultimately from its metaphysical commitments, and that it is this difference that accounts for the inability of the psycho-functionalist view to account for intentionality in a similar way, might raise concerns that adopting the A–T view (and with it, the “intentionality” horn of Quine’s dilemma) will make it impossible to have a real science of psychology. Indeed, the real difficulty in Quine’s dilemma appears to be exactly that giving up on the physicalist horn means losing the ability to do science in this area. However, we would argue that the A–T model, compared to the psycho-functionalist model, actually offers a much better defense of scientific realism.

As noted previously by Meehl (1991), scientific realism holds that the scientific method produces knowledge that is objective and about real entities existing in real people (subjects), concepts in our case. While it is true that this objective knowledge might change over time based on new findings, still the claim of objectivity and

existing entities holds. Psycho-functionalism does attempt an objective description of the entities within the person, with ties to brain functions; however, as pointed out by Spalding and Gagne (2013), it fails to be able to discriminate which theory is superior and fails to present a solid link back to environmental stimuli, an essential for scientific realism. The A-T model, as elaborated above, fulfills all the requirements of scientific realism: a) a clear-cut initiation in the senses with ties to brain function, b) a description of entities within the concept formation process that binds together all the psycho-functional theories of concept formation, and c) a return to knowledge of the initiating stimulus via the existential judgment. Finally, we should note that from the A-T perspective, Quine's dilemma is a false one, precisely because the physicalist horn of the dilemma assumes a world without final causality, and hence without the directedness that is inherent in the A-T principle of finality.

Of course, the propriety of adopting the A-T perspective is controversial, despite our argument above that the A-T view meets the needs of scientific realism. Many believe either that modern science has shown that there are nothing but efficient causes, or that modern science would be undermined by admitting the possibility of the other causes, even if such causes have not been shown to be non-existent. Recent work, however, should at least partially undermine such beliefs. A detailed defense of the A-T view as a superior foundation for science compared to other modern philosophical approaches is far beyond the scope of this article, but can be found in Feser (2014), and particularly for the study of the mind, in Madden (2013). A few issues are worth considering here, however.

The first point above, that science has shown that only efficient causes exist, is simply not true. Indeed, such a claim is something that cannot be shown by science, but could only be established via philosophical argument because, by hypothesis on this view of science, science can only investigate efficient causes, and thus has no way of proving or disproving the existence of any other cause. It is important to understand that science's turn to exclusively efficient causes was based on a methodological assumption, rather than being based on the results of scientific investigation (and, this assumption was, itself, often motivated by concerns outside the needs of the science, see e.g., Burtt, 1925). Now, one might believe that the success of science in using efficient causality is a kind of argument for assuming that only efficient causes exist. But, that is far from a demonstration (and, of course, it does not logically follow, because the fact that science has found out many things about the operation of efficient causality in the natural world does not in any way entail that it has missed nothing about other kinds of causality). As Feser (2014, pp. 23-24) points out about this conception of science, despite its successes ". . . it simply does not show us that those aspects exhaust nature, that there is nothing more to the natural world than what the method reveals."

In terms of the second point above, that science would be undermined if any causes other than efficient causes were actually to exist, it is unclear what evidence

or argument supports this claim. Feser (2014, Ch. 2) provides a very detailed exposition of the four causes and particularly the role of final causality in understanding the natural world. Madden (2013, Ch. 7) provides a more accessible description. We wish to emphasize four aspects of the relation between the A–T view and modern science. First, as described by Feser (2014, pp. 91–100), there are serious arguments that efficient causality itself must be embedded within a system of final causality in order to guarantee the necessity of the outcomes of efficiently causal systems, and (pp. 101–105) some modern analytic philosophers are independently re-affirming this connection by proposing the necessity of new metaphysical entities that appear to be closely related to A–T final causes. Thus, there are current, serious arguments being made for the necessity of final causes, not all by people from the A–T tradition.

Second, in understanding how efficient causes might require final causes, it is important to remember that the A–T view does not presume that final causes take the place of efficient causes. Instead, all of the four causes are seen as necessary for a full understanding. Furthermore, the A–T view assumes that final causes play out via efficient causes. Thus, there is an asymmetry between the A–T and mechanistic approaches to nature, in that the mechanistic approach must establish that efficient causes are sufficient to explain everything, while the A–T view only needs to show that the other causes are necessary in addition to efficient causes (see particularly the discussion in Feser, 2014, pp. 92–98). Indeed, in the A–T view all the causes work together in a tightly integrated way in any physical event.

Third, it is important to remember that in the A–T view, the role of final causality in the world need not presuppose anything “supernatural.” For example, while the A–T view claims final causality in natural objects (e.g., that an acorn “points to” an oak), this final causality is embedded in the nature of the thing itself (the formal and material causes) and plays out (or not) via efficient causes. Thus, final causality need not presume a directing intelligence, a common concern among those who believe that final, formal, and material causes undermine science. Note, in fact, that the worry that there must be a directing intelligence for there to be any finality, is actually yet another effect of our modern, deep assumption that all causes are efficient — in other words, we believe there must be a directing intelligence because we feel that we need some other (efficient) cause to push the events in the proper direction. But this is largely because we are used to thinking of all causes as efficient, not because there is some inherent need for a directing intelligence to guarantee finality.

Finally, as Madden (2013, p. 251) points out, “remember that the Aristotelian does not arrive at this view as an ad hoc attempt to gerrymander an account of nature around our commitments in the philosophy of mind.” Instead, the A–T analysis of the causes (and of the form/matter distinction) is developed precisely to understand the natural world at the most basic metaphysical level, and its application to man is to man as part of that natural world. In this sense, as mentioned above, intentionality falls rather naturally out of independently motivated metaphysical com-

mitments in the A-T view. There is no good reason to believe that these metaphysical commitments will undermine science as a method or as a process of knowing the world. They will, though, tend to undermine strictly mechanistic metaphysical views, and an associated “scientism.” However, science as a method and process need not require such “scientism” as a metaphysical commitment. Indeed, there are strong arguments that “scientism” (if it were to be rigorously accepted and applied) actually undermines science (see, e.g., Feser, 2014, pp. 6–28).

### *Objections to the A-T Model*

Spalding and Gagné (2013) dealt with a number of problems that had previously been attributed to “classical” views of concepts by showing that such problems were primarily based on a misunderstanding of the Aristotelian (and Thomistic) views of concepts. Here we will focus on two other kinds of objections that are likely to immediately arise when one considers the A-T view with respect to intentionality from the psychological and philosophical perspectives. From the psychological perspective, the question that immediately arises is why a more complicated view (such as the A-T view) should be needed in order to understand concepts at all. From the philosophical view, the question that immediately arises concerns whether the A-T view is going to suffer from the well-known interaction problems associated with dualism.

### *Non-human Animals Discriminate Kinds without Requiring an A-T Intellect*

One objection that might be raised to the A-T model is that it seems that all that is required for a good theory of concepts is to be able to account for people’s ability to discriminate between classes of objects, and that correct discrimination thereby ensures that the thoughts that relate to that discrimination have all the intentionality that is needed. Furthermore, one might claim that research with non-human animals shows that human and non-human concepts are both simply the result of discrimination learning, or associative learning more generally. Hence, not only is there no need for a special, intentional way of thinking about human concepts, but even the broader A-T idea of a distinction between sensory and intellectual powers is proven to be wrong. There are several points that could be made in response to this objection, but we will limit ourselves to two.

First, human cognition involves far more than just discrimination, as concepts feed into reasoning, for example, in ways that are at the very least not yet shown to be true for non-human animals. While humans can, in appropriate circumstances, respond in ways similar to non-human animals, they often do not. For example, recent research on risky decision-making has shown a very interesting pattern of both continuity and discontinuity with non-human behavior. In particular, when risky decisions are based on descriptions (e.g., Kahneman and Tversky, 1979), humans

show a marked bias to be risk averse in seeking gains, but risk seeking for losses. In short, the person treats the smaller gain or loss as a kind of given, and does not want to risk losing the gain, but will risk a larger loss in order to “get rid of” the initial loss. However, if the analogous risky behavior is examined in the context of decisions from repeated experience (e.g., Ludvig, Madan, and Spetch, 2013), then the risk preferences reverse, and in this task human risk behavior looks just like non-human risk behavior. The interesting points, of course, are that a) there is a clear continuity between non-human and human risky decision making from experience and yet b) there is also a clear discontinuity in that the human decisions from description cannot be a result that “builds up” from the experience of making individual risky decisions, as the risk preference reverses. That is, the pattern of behavior in the decision from description task is not one that results from simple associative learning over many trials: it is not simply a generalization of previous risky decisions. Instead, the reasoning process in the human is quite different and must, in some way, override the associative learning that has presumably built up over the person’s exposure to individual risky decision experiences.

Second, given the A–T approach’s insistence on the continued involvement of the sensory powers in all human thought that relates to particular items, and given the A–T approach’s insistence on the continuity of sensory powers between human and non-human animals, one should expect that the A–T approach might have some interesting things to say about the relationship between human and non-human cognition. As it turns out, the similarity between human and non-human animals’ discrimination learning is actually a strength of the A–T approach. Thomas Aquinas, for example, is very clear that humans and non-human animals share a sensory power (the estimative or cogitative power) that allows the organism to respond to kinds of objects without the distinctively human power of the intellect. Note also that this view includes a version of intentionality of those sensory-based “thoughts” in both human and non-human animals. Thus, the A–T approach, in comparison with those approaches that derive from a more Cartesian dualist approach, provides a more reasonable way of accounting for both the continuities and discontinuities between human and non-human cognition.

#### *Is the A–T Model the Same as Cartesian Dualism?*

A more philosophical concern that one might have is that the A–T model, with its discussion of form and matter, re-introduces the kinds of problems associated with Cartesian dualism. On the contrary, there are many advantages to the A–T view, but one conspicuous one is that it avoids the problem of interactionism that Descartes (and his descendants) suffer, despite the fact that the A–T distinction of matter and form is sometimes thought of as a kind of dualism. Descartes generates a problematic dualism because he tries to understand the soul–body relationship in terms of efficient causality. That is, the soul relates to body as an altogether

separate substance that nonetheless seems able to influence the body. In other words, for Descartes, the soul is a separate substance somehow affecting or otherwise colliding with the body (like billiard balls striking each other). But how can this interaction take place? The difference between a non-physical substance and a physical substance seems to preclude a cause-effect relationship between them.

There are (at least) two related and critical differences between this Cartesian understanding and the A-T view. The Cartesian mind/matter distinction is, in fact, quite different from the A-T form/matter distinction. First, the A-T view is very clear that mind and body are not two separate substances. Instead, the person is one substance made up of form (soul) and matter. Indeed, the A-T view is clear that “primary substances” are ordinary individual things, all of which consist of form and matter, so this is not something unique about humans. Thus, the Cartesian “thinking substance,” the mind, is not actually comparable to the A-T soul (form) at all. It is particularly important in this context that the A-T form (soul) is not what does the thinking, in direct contrast to the “thinking substance” of Descartes. In the A-T view, there is no separate immaterial thinking substance. Instead, there is a thinking person and thinking is a function of form and matter in combination. The distinction being drawn is, in short, a completely different kind of distinction in the two views.

Second, although the views appear to share something called “matter,” the nature of matter is really very different in the two views. Descartes’ interactionist troubles arise in large part due to his mechanistic view of matter, such that only efficient causes are to be admitted. Thus, the Cartesian soul must have some way of acting as the efficient cause of bodily actions and effects. Similarly, there is a real difficulty in understanding how the body can affect the “thinking substance” of the mind — how can a physical, efficient cause have any impact on an immaterial thinking substance? How is it, for example, that a brain injury affects a person’s ability to think? However, if, with the A-T view, one understands the soul as a formal rather than efficient cause, the soul-body composite becomes a unity. Instead of the human person consisting of two distinct entities, whose interaction becomes a puzzle, the human person is a unified entity, consisting of soul and body. The soul (the form of the body) actualizes the body to be specifically human. In light of this formal causality, the soul and body become two aspects of a single, unitary human being. Thus, the problem of interaction is avoided: there is one entity actuated by its form (soul or life principle), instead of two altogether different substances trying to interact. The soul affects the body, not via efficient causality as one billiard ball striking another, but via formal causality. Similarly, there is no difficulty in understanding that bodily injury, illness, drunkenness, strong emotions, and other bodily factors affect the ability to think, a point made repeatedly by both Aristotle and Thomas Aquinas, because thinking just is a function of the combined body and soul (form). Rather than a substance dualism, the A-T model, at the level of the individual person, is a kind of “uniformism” due to this distinct causal and metaphysical analysis.

### Conclusions

Intentionality, the aboutness of human thought, is a deep and abiding puzzle in both philosophy and psychology. Intentionality in concept formation, what the concept is about, is in need of thorough explanation in order that the intentionality of the rest of human thought can be understood. We have argued that psycho-functionalism, the current ontological–epistemological underpinning of cognitive psychology, fails to address intentionality adequately. We claim that the A–T model offers a better account of intentionality and, in addition, is fully compatible with scientific realism, the ontological–epistemological philosophy of science espoused by most behavioral scientists. Finally, we have addressed some objections that might be raised against the A–T model, particularly the objection that the A–T model is equivalent to Cartesian substance dualism.

### References

- Ayer, A. J. (1936). *Language, truth, and logic* (second edition). New York, Dover.
- Baddeley, A. D., and Hitch, A. D. (1974). Working memory. In G. Bower (Ed.), *The psychology of learning and motivation*, Volume 8 (pp. 47–89) New York: Academic Press.
- Brentano, F. (1973). *Psychology from an empirical standpoint*. London: Routledge and Kegan Paul. (originally published 1874)
- Burr, E. A. (1925). *The metaphysical foundations of modern physical science*. London: Kegan Paul, Trench, Trubner & Co.
- Chalmers, D. (1996). *The conscious mind: In search of a fundamental theory*. New York: Oxford University Press.
- Chalmers, D. (2010). *The character of consciousness*. Oxford: Oxford University Press.
- Churchland, P. (1986). *Neurophilosophy*. Cambridge, Massachusetts: MIT Press.
- Cimpian, A., Brandone, A. C., and Gelman, S. A. (2010). Generic statements require little evidence for acceptance but have powerful implications. *Cognitive Science*, 34, 1452–1482.
- Cimpian, A., Gelman, S. A., and Brandone, A.C. (2010). Theory-based considerations influence the interpretation of generic sentences. *Language and Cognitive Processes*, 25, 261–276.
- Cronbach, L. J., and Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52, 281–302.
- Feser, E. (2006). *Philosophy of mind: A beginner's guide*. Oxford: Oneworld.
- Feser, E. (2014). *Scholastic metaphysics: A contemporary introduction* (Volume 39). Heusenstamm, Germany: Editiones Scholasticae.
- Fodor, J. A. (1987). *Psychosemantics*. Cambridge, Massachusetts: MIT Press.
- Gallagher, S., and Zahavi, D. (2008). *The phenomenological mind: An introduction to philosophy of mind and cognitive science*. London: Routledge.
- Gelman, S. A. (2003). *The essential child: Origins of essentialism in everyday thought*. New York: Oxford University Press.
- Gelman, S. A. (2004). Psychological essentialism in children. *Trends in Cognitive Science*, 8, 404–409.
- Gergen, K. (1994). *Realities and relationships: Soundings in social construction*. Cambridge, Massachusetts: Harvard University Press.
- Graham, S. A., Nayer, S. L., and Gelman, S. A. (2011). Two-year-olds use the generic/nongeneric distinction to guide their inferences about novel kinds. *Child Development*, 82, 493–507.
- Hintzman, D. (1986). "Schema abstraction" in a multiple-trace memory model. *Psychological Review*, 93, 411–428.
- Husserl, E. (1970) *Logical investigations*. London: Routledge and Kegan Paul. (originally published 1900)
- John, E. R. (2002). The neurophysics of consciousness. *Brain Research Reviews*, 39, 1–28.
- Kahneman, D., and Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263–292.



- Levin, J. (2013). Functionalism. *The Stanford encyclopedia of philosophy* (pp. 1–41). <http://plato.stanford.edu/entries/functionalism>
- Ludvig, E. A., Madan, C. R., and Spetch, M. L. (2013). Extreme outcomes sway risky decisions from experience. *Journal of Behavioral Decision Making*, 27, 146–156.
- Machery, E. (2009). *Doing without concepts*. Oxford: Oxford University Press. doi: 10.1093/acprof:oso/9780195306880.001.0001.
- Madden, J. D. (2013). *Mind, matter & nature: A Thomistic proposal for the philosophy of mind*. Washington, D.C.: The Catholic University of America Press.
- McCorquodale, K., and Meehl, P. E. (1948). On a distinction between hypothetical constructs and intervening variables. *Psychological Review*, 55, 95–107.
- Meehl, P. (1991). Four queries about factor reality. *History and Philosophy of Psychology Bulletin*, 3, 16–18.
- Messer, S. B., Sass, L. A., and Woolfolk, R. L. (1988). *Hermeneutics and psychological theory: Interpretative perspectives on personality, psychotherapy, and psychopathology*. New Brunswick: Rutgers University Press.
- Prasada, S., and Dillingham, E. M. (2006). Principled and statistical connections in common sense conception. *Cognition*, 99, 73–112.
- Prasada, S., and Dillingham, E. M. (2009). Representation of principled connections: A window onto the formal aspect of common sense conception. *Cognitive Science*, 33, 401–448.
- Quine, W. V. O. (1960). *Word and object*. Cambridge, Massachusetts: MIT Press.
- Ryle, G. (1949). *The concept of mind*. London: Hutchinson.
- Shields, C. (2003). Aristotle's psychology. *The Stanford encyclopedia of philosophy* (pp. 1–25). <http://plato.stanford.edu/entries/Aristotle-psychology>
- Smith, E. E., Patalano, A., and Jonides, J. (1998). Alternative strategies of categorization. *Cognition*, 65, 167–196.
- Solomon, K. O., Medin, D. L., and Lynch, E. (1999). Concepts do more than categorize. *Trends in Cognitive Sciences*, 3, 99–105.
- Spalding, T. L., and Gagné, C. L. (2013). Concepts in Aristotle and Aquinas: Implications for current theoretical approaches. *Journal of Theoretical and Philosophical Psychology*, 33, 71–89.
- Stedman, J. (2013). Aristotle and modern cognitive psychology and neuroscience: An analysis of similarities and differences. *Journal of Mind and Behavior*, 34, 121–132.
- Stedman, J., Hancock, C., and Sweetman, B. (2009). Cognitive psychology, neuroscience, and the problem of abstraction. *Contemporary Philosophy*, 29, 28–36.
- Stevens, S. S. (1935). The operational definition of psychological concepts. *Psychological Review*, 42, 217–263.
- Taylor, C. (1985). *Philosophy and the human sciences*. Cambridge: Cambridge University Press.
- Turing, A.M. (1950). Computing machinery and intelligence. *Mind*, 59, 433–460.
- Wittgenstein, L. (1953). *Tractatus logico-philosophicus* [C.K. Ogden, Trans.]. London: Routledge and Kegan Paul. (originally published 1922)