Psychological Essentialism in Young Children: An Aristotelian-Thomistic Perspective

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Piaget proposed that children are not capable of forming more complex concepts until approximately age six or seven. However, extensive research since the 1970s has demonstrated that children develop conceptual capacity much earlier. One influential branch of this theory and research is psychological essentialism, developed by Susan Gelman and others. This essay proposes that there is a strong association between psychological essentialism and the philosophical position of classical realism, as formulated by Aristotle and Aquinas.

Keywords: psychological essentialism, Aristotle, concept development

When do young children develop the ability to form concepts? Piaget (1929, 1975), in his famous stage formulation, postulated that children categorize things initially based on perceptual features and gradually shift to more sophisticated concepts by approximately age 6 or 7. However, extensive research since the 1970s has demonstrated that children between ages 2 and 6 are capable of forming categories much earlier than believed by Piaget or Vygotsky (see Miller, 2011). One branch of this theory and research is psychological essentialism, a position developed by Susan Gelman and others and summarized in her book, *The Essential Child* (2003). In this book and later writings, Gelman mentions that philosophers have dealt with the concept of essence since Greek classical realism; however, she cites only Plato's approach, and that, only briefly.

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This essay will (1) present the theory of psychological essentialism as applied to young children between birth and age 6 and (2) present an Aristotelian-Thomistic (A-T) model as a comprehensive metatheory quite compatible with psychological essentialism.

Psychological Essentialism

Psychological essentialism is a theory applied to humans at all ages and is defined by philosopher Neufeld (2022) thusly: psychological essentialism is the hypothesis that humans represent some categories as having an underlying essence that unifies members of a category and is causally responsible for their typical attributes and behaviors (p. 1).

Applied to young children between birth to age 6, Gelman (2003) describes essentialism the following way:

> Roughly, essentialism is the view that categories have an underlying reality or true nature that one cannot observe directly but that gives an object its identity. In other words, according to essentialism, categories (such as "boy," "girl," or "intelligence") are real, in several senses: they are discovered (rather than invented), they are natural (rather than artificial), they predict other properties, and they point to natural discontinuities in the world. (p. 3)

As the reader will note, these two formulations are very similar. Gelman and others who hold for psychological essentialism claim that this phenomenon occurs very early in child development and have produced a rich body of empirical data to support that claim.

Domains and Characteristics of Essentialism

The following are domains of study: (a) natural living kinds (boy, girl, cat, flower, coral, bird); (b) nonliving natural kinds (gold, oil, metal, salt, shell); (c) social kinds (doctors, teachers); (d) ethnicities (Mexicans, Asians); (e) simple artifacts (pencils, cups, tables); (f) complex artifacts (computers, machines), and (g) noncoherent (invented words identified with objects, e.g., this is a ZAK).

Essentialism claims that young children recognize the domains as having "an underlying reality" beyond perceptual features and that this understanding allows them to categorize (i.e., form concepts about) these domains based on levels of abstraction about their properties. Psychological essentialists have designed studies to test the essentialist hypothesis. These areas of research include (a) inductive potential; (b) hidden, non-obvious properties; (c) nature vs. nurture; and (d) causal determinism. Each of these will be considered.

Inductive Potential

Gelman and her collaborators have investigated how young children use properties belonging to a category to make inductive inferences about those properties in other members of a category. In a series of studies, they showed that

"children readily infer that members of a category share underlying, nonobvious properties, and language can be an important source of information identifying category membership" (Gelman, 2003). Hence, once the child knows the label of members of a category, for example, that a perch and a shark are fish and that a perch breathes under water, she will infer that the shark also breathes under water. This finding has many replications (Gelman & Coley, 1990).

What about age ranges? Children age 2.5 can make inferences based on category membership (Gelman & Coley, 1990) and studies have found that even younger children inferred that objects of similar shape have similar properties (Graham et al., 2001; Welder & Graham, 2001). By age 4, children can easily accomplish these conceptual tasks.

There are inferential differences among domains. Studies show that children draw more inferences about natural kinds, both biological (animals and plants) and non-living (gold, shell), than artifacts (doll, cup). This suggests that natural kinds are more "kind-like" (see Gelman, 2003, p. 52).

Hidden, Non-Obvious Properties

Gelman (2003) introduces this topic as follows:
> In this chapter, I make the case that by four years of age children construct beliefs and assumptions about properties that are "internal … but unknown" (to borrow from Locke) and that these beliefs have serious consequences for reasoning about what things are. This set of constructions contradicts standard views of children as focused on what is concrete, perceptual and in immediate contact. (p. 60)

She argues this point with studies of stability vs. transformation (constancy, growth and metamorphosis); and of boundary intensification (internal parts and substance, authentication).

Regarding constancy, Piaget's research led him to believe that constancy about transformations of physical quantities, gender identity, and animal identity was not achieved until age 7. However, Gelman argues that younger children can manage some of these tasks if language is simplified. For example, Siegal and Robinson (1987) found that gender constancy judgements improved significantly when the order of questioning was changed. Ann and Ellen (1994) had similar findings. However, Gelman acknowledges that findings with younger children (3 to 6) are mixed with regard to conservation tasks and gender and animal consistency tasks but argues that these transformation tasks can be accomplished if children are given a category, such as dog, and then asked if the dog has certain properties (e.g., four legs, barks, wags its tail), but they do much worse when asked to reason from properties to a category. They also do better when given property information which relates powerfully to a category (Keil, 1989).

Growth and change studies have demonstrated that young children judge that young biological kinds grow and change but remain the same kind. Gelman et al. (1998) found that 3-year-old children expect animals and people to grow

larger over time but not smaller. Gelman (2003) summarizes this, and other data, as follows: "Several studies with a variety of methods demonstrate that by four or five years of age, children treat a range of natural categories as resistant to transformation" (p. 66). Hence, though young children lack scientific knowledge to explain growth constancy, they reason that "internal and unknown" properties cause constancy.

Turning to boundaries, Kalish (1998) found that preschool children judge basic-level animal and artifact categories as objective and real (a deer does not belong with a horse but with another deer). However, the same study found that boundary judgements were more definitive for animals than artifacts, e.g., a bowl could match with a pot or barrel. Keil (1989) varied the ambiguity of animals (lions, a mix of lion and tiger features, and tigers) to see if children would conclude that the mix was a different kind. Kindergarten children judged the mix as either one kind or the other, not a new kind.

Regarding internal parts, R. Gelman (1987) found that preschool children, when asked about the inside and outside of animals and a variety of inanimate objects, reported that animals have blood, bones, and organs inside but that inanimate objects had mechanical parts or nothing. Gelman and Wellman (1991) studied children ages 4 and 5 to see if they thought that removal of outer or inner parts mattered, e.g., if you took off the fur of a dog but left the insides could the dog still move, eat, still be a dog? Results showed that the children regarded internal parts as crucial for function and identity.

Finally, authentication refers to the question of what evidence young children find crucial for authenticating an animal (or any domain) as a member of a given kind and whether that evidence would include non-obvious features (Gelman, 2003, p. 83). This point is central to Gelman's notion of the abstract placeholder, which is her claim that preschool children understand essences as "abstract placeholders" — long before they learn specific properties which distinguish kinds.

These issues led Lizotte and Gelman (1999) to investigate why children classify objects as they do, e.g., why an animal is classified as a dog vs as a wolf or as an animal vs as a toy. Subjects for the study were five-year-olds and college students. They were shown pictures of two German Shepherd dogs which looked alike but were told the dogs were actually different. The task was to help the zookeeper separate the animals based on questions tapping the ontological level (one is an animal, the other a toy), the basic level (one is a dog, the other a wolf), and the nominal (one is Amanda, the other Melissa). Subjects were told to use four options to help sort out the dogs: (a) inspection of the insides with X-rays and a microscope; (b) knowledge of origins, such as discovering who their parents were; (c) observing their behavior; and (d) knowledge of their age. Results showed that college students easily chose origins, insides, and behaviors. The five-year-olds also tended to choose origins, insides, and behaviors over age.

The researchers' conclusion: young children use these criteria to determine kind identity.

Gelman (2003) sums up the chapter on hidden, non-obvious properties as follows:

> In several ways, children privilege internal, non-obvious properties in their categories. First, by 4 or 5 years of age, children often recognize that an animal cannot be transformed into another kind of thing (for example, a racoon cannot become a skunk) — its category membership is stable over striking transformations. Second, preschoolers treat the boundaries of animal superordinates as more objective and real than the boundaries of artificial superordinates. And third, nonobvious properties, especially internal properties, are salient to young children and privileged in their determination of what things are. The main message of this chapter is that children's categories cannot be reduced to salient perceptual cues and that internal or nonobvious properties are significant in children's concepts. (p. 87)

Nature versus Nurture

Gelman holds that preschool children recognize inheritance and favor kinship over outward similarity and social relationship (Springer, 1992). When nature and nurture are pitted against each other, 4-year-olds pick nature as more important, e.g., kangaroos will continue with properties of the concept, kangaroo, although raised by goats (Gelman & Wellman, 1991). Similar findings regarding inheritance emerged in cross-cultural studies (Atran et al., 2001; Gil-White, 2001). With regard to gender, Taylor (1996) found that 4 year old children judged that boys, raised with females, would still prefer to play football rather than play with dolls, and girls, raised with boys and men, would wear dresses and would want to be a nurse instead of a fireman.

Gelman sums up this section noting the following:

> Many of the studies reviewed in this chapter are testing more than the idea that certain properties are inherent in an individual — they additionally test whether these properties are passed down parent to child via inheritance. I believe that these varying essentialist processes, though distinct from one another, all share three features: the essence is transferable, thereby, accounting for how new members of a kind acquire their characteristics; transfer takes place early in the development, so that the individual has the relevant properties in a formative period; and once the transfer has been accomplished, it is extremely difficult to remove or change. (p. 105)

Causal Determinism

Gelman asserts that preschool children, even as young as 2, search for causes over effects as essential to kinds, as essential to what something is. She particularly opposes the classical and prototype theories of concept formation due to their claim that concepts are formed based on similarity and associations only, ignoring causality. She cites arguments in favor of causality in the writings of Markman (1989) and Murphy (1993).

Direct empirical studies have supported Gelman's claim. Gopnik and Sobel (2000) found that 2-year-old children used causal information to solve an induction categorization task. By ages 3 and 4, their subjects clearly favored internal causal explanations over perceptual information in forming categories. Preschool children search for internal causes when they view an event violating causal laws (a screen passing through a box) by investigating hidden internal causes (Chandler & Lalonde, 1994), and Shultz (1982) found that 4-year-old children, when viewing a radiometer which spins when light is beamed on it, endorsed a belief that there was some "invisible thing" going between light and the propeller causing it to spin.

Gelman also considered young children's perspectives on inherent causes, those causes internal to the thing itself, and teleological causes, causes leading the thing to direct its action toward a goal. Preschool children attribute goal-directed action more to animals than to machines or to artifacts. For example, when asked why birds fly, 4-and 5-year olds cite internal causes, such as inborn dispositions, growth, and nature, and favor these explanations for living kinds over artifacts. Gelman (2003) concludes that children have a "skeletal sense of self-generated cause before they have learned about specific internal causal mechanisms" (p. 128). Hence, these are "placeholders" for later elaborate conceptual formulations.

Gelman sums up her position thusly:

1. Features that are causes are more core than other sorts of features, are more than associations, and are more important than effects.
2. Young children provide consistent, domain-specific causal explanations for properties that members of a category share.
3. Psychological essentialism does not claim that full-fledged explanatory theories of causality exist in preschoolers. It claims a placeholder position, such that richer levels of abstraction occur with later learning. (p. 135)

After making her case for psychological essentialism via the four areas of study noted above, Gelman turns her attention to acquisition, asking what mechanisms account for psychological essentialism in young children?

The Roles of Parental Training and Language

Parental Training

Gelman points out that young children have three sources of learning to account for essentialism: direct observation of the environment, explicit talk in the form of movies and stories but particularly parental explanations of categories and reality, and cues from language, particularly parental naming patterns about category boundaries, e.g., "This is a dog. That is a cat."

Perceptual observation no doubt provides some essential information, especially about the domain of natural living kinds and children's experience

with humans and animals. For example, a child having a dog will observe that the dog wags its tail, barks, jumps up, has hair, etc. Observation of artifacts (a cup, a house) provides some information — but much less for young children.

Gelman and her colleagues (Gelman et al., 1998) conducted an elaborate study of maternal language interaction between mothers and children, looking for evidence that well-educated mothers teach their children essentialist beliefs. The task involved looking through picture books. Findings on over 3,000 coded interactions indicated that mothers produced very little explicit talk about essential properties, e.g., "All" statements, discussion of unobserved "insides"; however, they did provide "implicit talk about kinds" in discussions of kinship relations (Gelman, 2003, p. 162). Mothers did link individuals of the same kind. For example, they pointed out that two horses were two horses. Also, mothers did produce about 3.27 generic noun phrase comments per 100 utterances, which Gelman interpreted as important input for children. These occurred more frequently for animals than artifacts. However, Gelman concluded that maternal training, though somewhat productive, cannot account for the rich essentialist beliefs demonstrated in multiple studies of young children. She sums this up in a concise statement: "It seems that children may be largely constructing essentialist beliefs themselves based on indirect evidence" (Gelman, 2003, p. 175).

Language

Gelman presents a complex analysis of language as it impacts the essentialism hypothesis (see Gelman, 2003, Chapter 8; Gelman & Roberts, 2017). Some have argued that language does not play a significant role in the development of essentializing in young children (Balaban & Waxman, 1997; Pinker, 1994). Gelman accepts some of their claims but argues persuasively that naming/labeling and generic language, defined as language that communicates "some fact, opinion, or belief about a category" (Gelman & Roberts, 2017, p. 7001) significantly impact essentialism in young children. The language explosion in young children (who accumulate by age 6 about 14,000 of the roughly 50,000 words available to adults) supports these two processes.

Gelman points out that naming tells children which individuals belong to the same kind and establishes boundaries between kinds (Gelman & Markman, 1986). In this labeling process, count nouns (nouns that are quantifiable as singular and plural) are primary, are judged to be stable, and convey that a category is highly complex and structured (Hall & Moore, 1997). Moreover, young children accept familiar category names as relating to objects outside themselves. In Gelman's opinion: "Children's use of familiar category labels suggests an implicit, powerful realism concerning well-known kind terms" (Gelman, 2003, p. 190).

Gelman considers generic noun phases, defined as nouns referring to all or most category members and their shared properties (e.g., "A lion is an animal";

"Dogs bark") as very important in preschool children's development of essentialism. Findings demonstrate that by age 2.5 to 3 children hear and produce generic noun phrases at high rates, particularly for animals (Gelman, 2003, p. 203). These generics express a truth as observed in the environment and can but need not be stated as universals (Hollander et al., 2002). Further, the noun phrases are used to distinguish "all" and "some" qualifiers by age 4 (Hollander et al., 2002), and are cross cultural (Gelman & Tardif, 1998).

Gelman concludes that language is not the only process by which young children develop concepts, but words have "a privileged status, relative to other properties, such as perceptual similarity, functions, behaviors, feature correlations, factual knowledge, etc." (Gelman, 2003, p. 238). As expressed in Gelman and Roberts (2017): "Rather, a word serves as invitation to form a category… and to extend and modify it with growing knowledge and expertise" (p. 7903). And generics are particularly important in this acquisition of new knowledge (Gelman, 2021).

Essentialist Theory

Gelman and others have demonstrated empirically that preschool children understand kinds as having an "underlying essence" going beyond perceptual features and have determined a number of variables underpinning that claim, particularly language. Of the five primary theories explaining concept formation, Gelman explicitly rejects the classical and prototype models and believes that the theory-theory model best explains essentialist findings. The theory-theory model (Murphy & Medin, 1985) holds that categories and concepts are learned via pre-existing knowledge and one's "folk psychology" understanding of the world. When we learn a new concept, we do so by relying on correlated attributes and prediction from old to new knowledge, much like a scientist proceeds in theory construction and revision. However, this model does not rely merely on similarity but presupposes an actual knowledge of the object which is used to reason about the new object. Essentialist theory and research show that, by the age of 2, children start to show some of this ability, and by age 4, they are quite good at it.

In the last chapter of her book (Ch. 11), Gelman takes on the question: Why do we essentialize? First, she asserts that humans have a tendency to essentialize. She then states: "I am left with the conclusion that children's own constructions are critical. In other words, there are important properties of the mind that give rise to essentialism" (Gelman, 2003, p. 303). Gelman proceeds to consider a number of mental property theories which have been offered to account for the essentializing. They range from purely brain based to primarily environmental. Each is evaluated based on evidence and careful reasoning. Her own theory (Gelman, 2003, p. 312), identified essentialism as domain-general yet invoked differently in different domains, claims that humans have a cluster

of properties, referred to as root capacities, which lead to the different findings under different domains. These capacities include (a) the appearance/reality distinction, leading to the ability to recognize non obvious properties; (b) induction from property clusters, leading to inferences about the unknown; (c) causal determinism, leading to use of causal reasoning about kinds; (d) tracking identity over time, leading to recognizing the importance of origins; (e) deference to experts (adults, teachers), leading to acceptance of category abnormalities; and (f) all the above collectively, leading to realist assumptions about categories and names, boundary intensification between objects, immutability, stability over transformation, and importance of nature over nurture (Gelman, 2003, p. 314). She sums this up as a developmental model that is "an interaction of domain-general tendencies and information provided by world, community, and language" (Gelman & Roberts, 2017, p. 7900).

Unpacking her theory, the reader will notice that Gelman develops a theory of how essentializing happens in humans. The "why" is still left at the level of "it happens." The Aristotelean-Thomistic account will explore this point further.

The Aristotelian-Thomistic (A-T) Model

Early on in her book, Gelman acknowledges that formulations regarding essentialism have been present in Western thought since the Greeks. She specifically mentions Plato's account as presented in the *Republic*. Of course, presocratic Greeks struggled with the nature of reality, particularly with the issue of change and permanence as "the real" underpinning of material being. Heraclitus famously held for change as real and permanence as illusion, whereas Parmenides argued for the opposite: permanence as "the real." Plato's solution located "the real," as observed by humans, as in constant flux and as knowable only as such (the allegory of the cave) but also located the underlying, unchanging forms in the world of ideas, knowable only by intellectual rediscovery.

Plato's student, Aristotle, disagreed with his mentor and formulated the hylomorphic theory, which locates both form and matter in all we observe. This dispute over the nature of reality is depicted exquisitely in Raphael's masterpiece, The School of Athens, where Plato is shown pointing upward toward the ultimate reality in the world of ideas, and Aristotle points outward toward the observable world.

Aristotle's ideas underwent centuries of commentary and development (e.g., by Arab philosophers such as Avicenna and Averroes) and then re-entered the Western (Latin) tradition in medieval works such as those of Thomas Aquinas. Here we will not try to unravel all these historical developments, but will primarily rely on the formulations available via Thomas Aquinas. We posit that this Aristotelean-Thomistic tradition offers the best metatheory as the underpinning for psychological essentialism.

The A-T Approach

General Principles

Aristotelean-Thomistic metaphysics starts with Aristotle's hylomorphic theory which analyses all reality (being) according to four causes: efficient, material, formal, and final (see Physics II 3, Metaphysics I 3, Metaphysics V 2). The efficient cause is defined as the agency generating a particular thing. The formal cause is that which organizes matter to have the characteristics and structure it has. The material cause is the stuff/matter from which something is generated. The final cause is the end point or purpose of the object. Aristotle's own classic example is the sculptor carving a statue. The sculptor is the efficient cause as he sculpts the statue. The material cause is the block of stone being carved. The formal cause is the image being sculpted, e.g., a statue of Hermes which defines what it is. And the final cause is the purpose: to create art to be exhibited. Importantly, there is a tight link between the final and formal causes: the form is determined by the final cause. For example, if part of the purpose of creating the sculpture is to create something beautiful and to honor Hermes, then the form of the statue is likely to reflect that. If the purpose were to denigrate Hermes, then the statue would perhaps be ugly.

A second principle is the theory of substance and accidents. Feser (2019) says that substances: "… just are the sorts of things which exist in themselves rather than inhering in anything else" (p. 24). Accidents are characteristics of substances, inhering in the substance. Some are proper accidents (or properties, or necessary accidents) that flow from the substantial nature of the thing (e.g., a given human can use reason, which is driven by the nature of the human), and others are not, which we might call pure (or non-necessary) accidents (e.g., the fact that a person happens to be sitting at a particular moment in time). Material substances are composed of matter and substantial form. Various accidents that inhere in the substance are also composed of matter and form. Feser's example is a stone, a substance existing in and of itself. Accidents inhering in the stone are shape, color, weight, and so forth. Feser further points out that most artifacts are not substances in and of themselves. Rather they are compositions of parts (of particular kinds) that have substantial forms and are put together to create a thing that behaves the way it does because the substantial forms have been composed in a particular way to make it perform, e.g., a computer assembled from various parts.

A third principle is act and potency. Act is defined as conferring a form, as defined above, on reality through causal action. Potency is the capacity to be acted on or changed, to receive the form. In the statue example above, the stone has the potency to be carved and carving confers its form as a statue of Hermes.

Finally, there is the use of the term essence in A-T metaphysics. Wuellner (1956) defines essence as the internal principle by which a thing is what it is, its

quiddity. He points out that essence is often spoken of as being the same as form or nature. As we will see, there is considerable overlap between this A-T concept and psychological essence.

As Applied to Humans

The A-T tradition (following Aristotle's lead) famously distinguishes physical things into inanimate objects and living organisms which, in turn, are divided into plants, animals, and human beings. Psychological essentialism is concerned with cognition of objects at all these levels. However, while the previous section was focused on the existence of an essence in all those types of objects, it says little about how such essences could come to be known. In this section, we will consider A-T's focus on cognition (for more detailed expositions, see Brennan, 1941; Feser, 2009; Spalding et al., 2019, Ch. 2 and 3), which provides two kinds of information: first, it describes the powers of the various kinds of living organisms, and second, with respect to humans, in particular, it describes how humans can come to know essences.

The A-T analysis starts with the external senses as receiving varying input from external objects. Little more will be said, except to point out that the A-T model postulates that the external senses operate according to the hylomorphic theory. Each sense organ is a composite of matter and form specifically attuned to receive specific types of input. Expressed in terms of act and potency, the eye, for example, has the potential for receiving certain reflections of light and is actuated by those stimuli.

The A-T tradition is one of carefully observed human cognition. The A-T tradition postulates brain constructs essential to human cognition, specifically, the internal senses: the common sense, imagination, memory, and the estimative (in non-human animals) or cogitative sense (in humans), all of which are seen by the tradition as located in the central nervous system.

The common sense has a number of functions, including (a) integration of the external senses; (b) discriminating separate senses according to their functions, meaning visual to visual stimuli, auditory to auditory stimuli, and so forth; (c) unifying the separate sensations into a single sensory perception; and (d) modification of currently sensed object by sensory memories related to past experience with that object. The reader will note that these functions are similar to current neuroscience and psychological ideas of perceptual binding.

The imagination receives the "bound perception" from the common sense and performs the following: (a) retaining and recalling sensation organized by perceptual binding; (b) in humans, producing the ability to recombine perceptions not directly sensed into imaginary kinds (unicorns); and (c) generating the phantasm which is a sensory image product of perceptual binding and combinations of previous sense perceptions. The phantasm is enriched over time by learning and experience and becomes more complex over time.

Memory serves as a store for these phantasms. Spalding et al., 2019 described the A-T view of memory as follows:

> It is important to remember that memory works in concert with all the other internal sense powers such that any phantasm might be stored, whether it is the more or less direct production of an external sensed object, or a combination of other sense information from the common sense, or whether it is a phantasm (created by the common sense) of an imaginary thing (p. 40).

The estimative sense (as it is called in non-human animals) or the cogitative sense (as it is called in humans) gauges the dangerousness or desirableness of the sensed object. For example, when a wolf encounters a sheep, it is the estimative sense that allows the wolf to judge that the sheep would be good to eat, and thus to provide the initial impetus to chase the sheep. Furthermore, it is this sense that allows the wolf to generalize this judgment (i.e., that things that look or smell like this are good to eat and should be pursued), even though the wolf has no abstract concept of "sheep" in the sense that a human would (see, e.g. Spalding et al., 2019, or Brennan, 1941; for more detail).

Human Higher-Order Cognition

The material presented above is compatible with current neuroscience and cognitive psychology (see, e.g., Freeman, 2008). The A-T model breaks with the naturalist approach by proposing a moderate dualism. It should be noted that this is not Cartesian substance dualism claiming two separate substances, mind and material body. Feser (2006, 2009) refers to the A-T model as a hylomorphic dualism because it is grounded in Aristotle's principles: the four causes, substance and act, and potency. Hence, the human substantial form is one substance (not two) but has special powers, the intellect and the will. The intellect interacts with the phantasm and abstracts the form from the particular. For example, someone looks at his dog, Tippy, a single dog, but can form the concept of dog as a universal concept. As Feser (2006) says: "Concepts are inherently abstract and universal, whereas material phenomena are concrete and particular" (p. 203).

Feser (2009) comments on the process of abstraction by noting that the objects of the phantasm are sensory, although they may be images that are rich and complex. By way of explanation, he first quotes Aquinas: "the active intellect…causes the phantasms received from the senses to be actually intelligible, by a process of abstraction" (ST 184.6).[1] Then Feser points out that, by abstraction, the intellect proceeds "to strip away all particularizing or individualizing features of the phantasm, so as to produce a truly universal concept or intelligible species, leaving you (for instance) with the idea not just of

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[1] Citations to Aquinas' Summa Theologica (ST) are formatted by Part. Question. Article (e.g., ST I.84.4) and then further by objection (ob. 3), response (Res.), or reply to objection (e.g., ad 3), as needed. Quotations are drawn from Aquinas (1981).

this particular cat, but of 'catness' in general, or that which is common to all cats. The abstract concept is then stored in the possible intellect" (Feser, 2009, p. 145).

A-T and Psychological Essentialism Compatibility

Perhaps the first thing to note is the degree of overlap between psychological essentialism and Aristotelean-Thomistic classical realism, starting with the term "essence." As described above, the concept of essence has deep roots in Aristotle's hylomorphic theory. Essence is akin to form in the matter and form compound which makes observed things what they are. (Gelman, 2003, pp. 59, 325), also refers a number of times to substance in a way that sounds like the A-T notion of substance as an object existing in and of itself and accidents as inhering in a substance, but not necessary to its substantial form with properties also inhering in a substance, but flowing from the essence.[2] Gelman often calls on the process of abstraction that mirrors the A-T formulation described above; and cause, as emerging from the objects composed of matter and form, is also an A-T formulation. Finally, psychological essentialism's subdivision of domains appears very similar to Aristotle's subdivisions of physical kinds as noted above. In sum, one might say that psychological essentialism correlates with the A-T model at a very high level (see, e.g., Spalding & Gagné, 2013, pp. 82-84, for a discussion). It seems possible that theory and research in psychological essentialism have a natural affinity with the A-T model.

Neither Aristotle nor Aquinas wrote extensively about concept development in young children. However, as Caston (in press) points out, Aristotle, in his discussion of abstraction, noted that young children initially call all men "father" and all women "mother," until they are able to differentiate the specific (e.g., father) from the general (e.g., men), based on concepts that are more unique and relational. Indeed, Aristotle recognizes that young children produce simple concepts and that these concepts become more complex with experience and learning. Aquinas also treats of this issue, primarily in parts of his work where he deals with the training of children into good adults (see, for discussion, Spalding et al., 2019, Ch. 6). Although Aquinas is, in a sense, primarily interested in inculcating virtues in children, it is important to remember that to Aquinas, use of right reason, logic, knowing natural science,

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[2] In the A-T tradition, a strong distinction is drawn between accidents, which are true of an individual substance at an individual point in time or space or condition, but that do not derive from the essence (e.g., a person might at this moment be sitting), and properties, which are true of a particular kind of subject either always or for the most part and which derive from the essence, for example, rationality of a person (see, e.g., Spalding & Gagné, 2013, p. 80). Modern work has lost the terminological distinction, but the idea re-appears in the work on psychological essentialism, for example, in the discussions of causal determinism.

and so on are all in themselves virtues to be inculcated (see, for example, Aquinas' *Commentary on Aristotle's Nichomachean Ethics*, Book VI, Lecture 7),[3] and that they can only be developed (for example, in the case of natural science, which would include the development of concepts of things in the world) via experience of the world and via the language and examples of the teachers. This formulation appears quite compatible with Gelman's account of the gradual conceptual development in children from ages 2.5 through 5, though Gelman's account is much more elaborate and supported by empirical evidence. For example, she acknowledges that the concepts young children form are abstractions but are "placeholders." These "placeholder" concepts become much more complex and layered as learning and experience provide more information, particularly scientific information. It is also worth noting that Gelman's description of the role of language in the process is largely compatible with the A-T approach to language (see Stedman et al., 2023).

Although Aristotle and Aquinas do not describe concept development in children in great detail, they (as well as many more recent writers in the A-T tradition) write extensively about essences, properties, accidents, definitions, and so on, including how concepts are learned and developed by an individual (without specifically discussing children). Spalding and Gagné (2013) provide a detailed discussion of aspects of the A-T view as they relate to modern theories of concepts.

An A-T account would start with the external senses but concentrate first on the internal senses, particularly on the memory and imagination. As discussed above, these two brain-based constructs, to put them in the language of psychology, produce the phantasm. The intellect then performs abstraction to produce the form or essence as known. In the young child, this process of abstraction would occur at very low levels of representation by the phantasm, as described by Caston (in press):

> Such "first concepts" will be basic in the following regards. (1) As they involve the least abstraction, their content will be closest or even identical to the quasi-perceptual representations on which they are based, (2) they may be temporally earliest as well, since they require the least effort. For the same reason, (3) they are likely to be the most concrete, not the "highest, most abstract thoughts." (p. 25, draft)

In the A-T model, this simple concept is understood by the intellect as simple, yet still an abstract "placeholder" until more elaborate phantasms are developed.

As noted previously, Gelman holds for the theory-theory model as developed by Murphy and Medin (1985) which claims that new concepts are learned from pre-existing knowledge and "folk psychology." Further, her research has led her to conclude that "important properties of the mind give rise to essentialism" (Gelman, 2003, p. 303). She has spelled out the mechanisms (capacities) which young children use to develop these "first concepts" as

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[3] Aquinas' *Commentary on Aristotle's Nichomachean Ethics* is cited by Book and Lesson number (Aquinas, 1993).

described above by Caston. These first concepts, particularly as related to animate domains, serve as the basic pre-existing knowledge used to build further conceptual knowledge.

The theory-theory model and the A-T model appear quite compatible (see Spalding and Gagné, 2013, p. 82, for a brief discussion). As noted above, Caston (in press), following Aristotle's hylomorphic theory as applied to the human intellect, describes abstraction and formation of first concepts. Complex concepts develop much in the manner described by theory and research in psychological essentialism, as "placeholder" concepts which become "filled" with additional knowledge of related properties and functions (see Spalding & Gagné, 2013, for a more detailed discussion of how the concept develops with reflection of the intellect and with development of the phantasms). Indeed, Aquinas directly describes a very similar point: "likewise the human intellect does not acquire perfect knowledge by the first act of apprehension; but first it apprehends something about the object, such as its quiddity, and this is its first and proper object; and then it understands the properties, accidents, and the various relations of the essence" (ST 1.85.5 Res). In addition, Spalding and Gagné (2013, p. 83) point out that for Aquinas: "the concept can entail the belief that a thing has a cause of its being, even when the nature of that cause is unknown (ST I-II.3.8. Res.). Thus, people may hold an essentialist belief about a particular kind, without being able to articulate what the essence of the kind actually is." Critically, the reflection of the intellect, and hence the development of the concept, relies upon causal beliefs and determinations derived in large part from previous experience, much as with the "theory theory" (see Spalding and Gagné, 2013, p. 82).

As noted in the last chapter of her book, Gelman asked a crucial question: "Why do we essentialize?" Gelman provides an answer addressing how essentializing proceeds but not why it happens. The A-T approach provides a philosophical answer to how and why it happens; Gelman answers "why" in a way that boils down to "It Happens," as the way the mind works based on observation and experimentation. In the A-T approach, it is certainly the case as well that Aristotle and Aquinas based their ideas on careful observation, but in the A-T approach, the vision of the human cognitive system is primarily based on a deep metaphysical analysis of reality, and an equally deep analysis of how the human cognitive system would need to be structured in order to operate within that reality. We propose that the A-T model provides the best answer to Gelman's "why" question, yet the fact that the A-T model and psychological essentialism come to so many similar conclusions is impressive.

Conclusions

Gelman and others have demonstrated that young children can generate "first concepts," as described by Caston, Aquinas, and others within the A-T

tradition, and those first concepts become much more complex by age 4. These findings conflict with formulations by Piaget and also Vygotsky (see Miller, 2011), who held that 3-year-olds appear to develop complex concepts but that these are pseudo-concepts. However, essentialism does appear to support Vygotsky's claim that verbal interaction with adults is crucial in child concept formation, which is also consistent with the A-T view of the learning and development of concepts. In summary, we argue that it is fair to say that many of the main tenets of psychological essentialism are pre-figured in the A-T tradition. Furthermore, we propose that a deeper investigation of the A-T tradition could bring to light many distinctions (e.g., between properties and accidents) and ideas (e.g., the point that central knowledge about a concept — in the A-T tradition often called definition — requires a use of a concept, but is not the creation of the concept) that would be interesting in the further development of psychological essentialism.

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