

Early Forms of Apprehension and Moral Evaluation

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Preamble

The following essay is an exercise in doing the second functional specialty, Interpretation, in relation to research materials from my essay, "Lonergan's Puzzling Comment about the *Vis Cogitativa*."¹ Section I briefly reviews the puzzle and suggests how Lonergan's theoretical meaning of 'development' offers clues for resolving it. In Section II the significance of his comment expands in relation to a much larger puzzle as old as Aristotle's *sensus communis* and as current as contemporary neuroscientific reports on the binding problem. Given this much larger puzzle, Section III pauses to ask methodological questions about how to proceed. There the question is what heuristic framework might be adequate in interpreting texts from several disciplines ranging from the neuroscience of attention to psychology and intentionality theory. I identify four features of such a framework and then apply them in the last two sections of this essay.

What audience might there be for this essay? Some scholars are already investigating topics ranging from the genealogy of morals and child development to the psychology of perception and object recognition. This essay reports on findings relevant to such investigations. Another audience will be scholars interested in doing functional specialization, especially those experimenting with the second and third specialties, Interpretation and History respectively. This essay assembles materials for the latter specialists whose distinct task is to arrange interpretations of an issue in a developmental sequence ranging from the least comprehensive to the most developed view to date. Where will this essay stand in such a sequence?

¹ *Journal of Macrodynamical Analysis* 10 (2018): 37-45.

I Reviewing the Initial Puzzle

At the beginning of his “Humus 2,”² Philip McShane quotes an unpublished letter from Lonergan to Fred Crowe. The cited passage reads:

Incidentally, re anxiety, what the Freudians call the Super-Ego is Aquinas’ *cogitativa*: just as the little birds know that twigs are good for building nests and the little lambs know that wolves are bad, so little human beings develop a *cogitativa* about good and bad; it reflects their childish understanding of what papa and mamma say is good or bad and in adult life it can cause a hell of a lot of trouble.³

To repeat my earlier observations, this passage is puzzling for three reasons. It is not obvious, even with the examples, how the Freudian superego is an instance of the *vis cogitativa*. Second, Lonergan’s linking of the two terms is a noticeable departure from the traditional interest in the *cogitativa* as part of an inquiry into how human sensibility already recognizes the universal in classifying a perceived object as an instance of a class of objects. It seems unrelated to the questions about object recognition that prompted both Aristotle’s speculation about a *sensus communis* and medieval writers’ interest in a variety of inner senses. Third, when contemporary neurosciences take up the ‘binding problem’ (i.e. the ordering or unifying of different types of sensations into a ‘compound’ awareness of a single object), they make no mention, as far as I have found, of Freud’s superego.

For these three reasons this ‘musing on the *vis cogitativa*,’ as McShane calls it, intrigued me. My earlier essay assembled the relevant texts on the *vis cogitativa* and the superego in Lonergan’s published works. Because these terms occur together when he comments on development, I repeat two of his texts at the start of this study.

1. [By ‘development’ he meant:] a flexible, linked sequence of dynamic and increasingly differentiated higher integrations that meet the tension of successively transformed underlying manifolds through successive applications of the principles of correspondence and emergence.⁴

² Philip McShane, ‘Humus 2: Vis Cogitativa: Contemporary Defective Patterns of Anticipation.’ Available online under “Humus” at philipmcschane.org. Quoted verbatim from the letter without alteration.

³ From a letter dated December 27, 1955.

⁴ *Insight: A Study of Human Understanding. Collected Works of Bernard Lonergan 3* [CWL 3], ed. by Frederick E. Crowe and Robert M. Doran (Toronto: University of Toronto Press, 1992), 479.

2. [I]t hardly will be remiss to indicate that our definition of development serves to supply a single scheme that unites otherwise unrelated principles. Thus, the notion of finality brings together Freud's wish fulfillment, his somewhat ambiguous sublimation, and Jung's archetypal symbols. The unconscious neural basis neither means nor wishes in the proper senses of those terms, for both meaning and wishing are conscious activities. But the unconscious neural basis is an upwardly directed dynamism seeking fuller realization, first, on the proximate sensitive level, and secondly, beyond its limitations, on higher artistic, dramatic, philosophic, cultural, and religious levels. Hence it is that insight into dream symbols and associated images and affects reveals to the psychologist a grasp of the anticipations and virtualities of higher activities immanent in the underlying unconscious manifold.

A similar phenomenon on a different level is offered by Freud's superego: within consciousness, it is a compound of preceptive symbols and submissive affects; by its finality it anticipates, by its subordination it reflects, by its obsessive and expansive tendencies it caricatures, the judgments of rational consciousness on the conduct of a rational being.⁵

These remarks provide some initial clues as to why Lonergan linked the two terms. The following experiment in the second functional specialty of interpretation will follow these clues in trying to understand what Lonergan meant by his 'musing.' In doing so, this seemingly minor puzzle will open onto a much more significant set of puzzles.

II A Larger Puzzle

I assume Lonergan's puzzling remark is related to a more general and much older puzzle: How do we explain the preconceptual apprehension of objects as unities? Aristotle's response was in terms of the *sensus communis*. Our different 'external senses' receive their varied sensations, but what we apprehend⁶ are objects as unities with varied properties, e.g. the color, shape, position, texture, smell of a single object. Presumably a 'power' (*vis*) over and above the distinct senses must be at work in unifying these distinctly different sensations.⁷ The medievals were alert to

⁵ CWL 3. 482.

⁶ 'Apprehend' and 'apprehension' are used in this essay to mean an intentional act of attending to some object that is accompanied by a minimal understanding of an object as of a determinate kind.

⁷ To cite one of the earlier texts, in writing on the *sensus communis*, one author formulated the old philosophical puzzle: "while recognizing that some contemporary philosophers are still influenced by an atomistic view of sense

even more complexity in the apprehension of objects. They posited a variety of *vires* to account for the everyday experience of objects. For example, we commonly recognize similar objects over time (*vis memoriae*) and have similar emotional responses to them (*vis aestimativa*).⁸ While such multiplication of subtle distinctions once seemed mere word play, contemporary neurosciences are more appreciative of the analytic sophistication of the medievals in their writings about the puzzles of object recognition and evaluation.

The terminology has changed such that the ‘binding problem’ is the current title for the old set of puzzles.

The binding problem in cognitive science has many facets, but one problem traditionally at its core is to explain the unity of perception. How is the information processed by different sensory systems brought together to provide a unified representation of the world? Call this the perceptual binding problem. The problem is Janus faced. On one side, we want to explain phenomenal binding: the fact that we experience a single world rather than separate perceptual fields for each sensory modality. On the other side, we are faced with a computational or functional problem, namely, to explain how a neural net like the brain links representations of objects with representations of their properties, for example, the representation of an apple with representations of its color, shape, taste and heft. In general, we want to know how the brain manages to represent the assignment of instances (this apple) to types (red).⁹

This statement of the puzzle leaves implicit even more complexity in object recognition. The binding problem is not monolithic but a series of puzzles.

impressions, most acknowledge that we are aware not merely of isolated disparate sense data, but of concrete individual sensible things, which at the level of the external senses are wholes composed of many sensible aspects. One of many philosophical problems faced by these philosophers, however, is to explain precisely how these distinct simultaneously presented sensible aspects are objectively (that is, with respect to their being distinct sensible aspects of one individual concrete sensible thing) and subjectively (that is, with respect to the unity of the diverse activities of the external senses, all as pertaining to the same awareness center or subject of awareness) cognized as belonging to the same individual sensible thing.” Stephen J. Laumakis. “The *Sensus Communis* Reconsidered” in *ACPA Quarterly* 82 (Summer 2008): 429.

⁸ Could the child’s superego, in responding affectively to acts and objects, be an instance of what an earlier scholarship meant by the *vis aestimativa*?

⁹ James W. Garson. “(Dis)solving the Binding Problem” in *Philosophical Psychology* 14 (No.4, 2001): 381. This cited text conflates two distinct problems here: (1) the question of the unity of the object of experience and (2) the question of the apprehension of the object as a member of a class.

The singular term ‘problem’ suggests that binding is a unitary problem. In fact, the binding problem is a class of problems, and some of the confusion in discussions of binding may stem from the fact that different phenomena are being referred to by a single name. Besides visual binding, which includes binding information across visual space, binding information across types of features, and binding neural signals across cortical space, binding occurs in other modalities. For instance, auditory binding may be needed to discriminate the sound of a single voice in a crowd; binding across time is required for interpreting object motion; and cross-modal binding is required to associate the sound of a ball striking a bat with the visual percept of it, so that both are effortlessly perceived as aspects of a single event.¹⁰

So how does Lonergan’s puzzling remark open onto this contemporary set of problems? Addressing this question follows upon some basic questions about how functional specialists in interpretation might proceed in handling puzzles that cut across several fields of inquiry.

III Methodological Puzzles

How are we to go about interpreting this series of puzzles? Historically writers have used various ‘frameworks.’ While Aristotle used metaphysical categories to describe intellectual ‘motions’ leading to acts of object recognition, Descartes, in separating the *res extensa* and the *res cogitans*, generated an epistemological question about how motions occurred between the two. Cognitive psychology brackets the epistemological question, but twentieth-century depth psychology suggested that cognitive acts themselves were the playthings of a Cartesian ‘evil genius.’ Intentionality theory corrected Descartes’ flawed wording of the puzzle, but new puzzles arose about the neurochemical and

¹⁰ Adina L. Roskies. “The Binding Problem” in *Neuron* 24 (September 1999): 7. Another author suggests how the various puzzles might be classified and kept distinct. “For any case of binding, the binding problem can actually be dissected into three separable problems. Different theories have focused primarily on one of the three.

(a) Parsing. How are the relevant elements to bind as a single entity selected and segregated from those belonging to other objects, ideas, or events?

(b) Encoding. How is the binding encoded so that it can be signaled to other brain systems and used?

(c) Structural description. How are the correct relations specified between the bound elements within a single object?”

Anne Treisman. “Solutions to the Binding Problem: Progress through Controversy and Convergence” in *Neuron* 24 (September 1999): 105.

biological antecedents of intentional acts. A contemporary study of the identified puzzles should proceed from an adequately informed historical perspective and also from the findings of the relevant sciences of the day.¹¹ So this study begins by acknowledging the historical shifts from metaphysics to epistemology and then to cognitive and depth psychology and more recently to the neurosciences.

The general heuristic employed in the neurosciences today anticipates making and finding correlations among psychological acts, brain locales, neurochemical events at specified locales and, increasingly, the genetic substrates for those events. This general project is not without problems:

- (1) The research literature commonly mixes explanatory and descriptive categories, e.g. talk of ‘top-down’ and ‘bottom-up’ controls (i.e. downward and upward causality) and of ‘levels’ of reality.¹²
- (2) Psychological categories appear with some frequency in supposed explanations of neural processes, e.g. talk of neurons communicating with one another, sending messages along neural pathways, even making decisions about what to single out for attention.¹³
- (3) Explicit claims that psychological acts are reducible to neurochemical events are not infrequent.

Addressing each type of problem is a task for comparative interpreters (dialecticians) doing FS4. Yet how is a functional specialist in interpretation to proceed without taking a stand on these issues? Perhaps my task is to present my own heuristic framework and then proceed without debating the relative merits of alternatives but leaving it to dialecticians to sort out and evaluate the alternatives. The practical wisdom here reflects what Paul Samuelson had in mind when he supposedly said that no one destroys a theory by arguments but by producing a better theory. In that case, my task is to provide an explanatory heuristic that promises a ‘way forward’ beyond debates over current assumptions and practices. Lonergan sketched a broad outline of such a way forward.

¹¹ What does it take to be ‘adequately informed’? Remarks below on functional specialization will respond to this question.

¹² Presumably this mixture of categories is symptomatic of the neurosciences being in what Lonergan called the “intermediate scientific stage.” See *The Triune God: Systematics. Collected Works of Bernard Lonergan* 12 [CWL 12], translated from *De Deo Trino: Pars Systematica* (1964) by Michael Shields, edited by Robert Doran and H. Daniel Monsour, (Toronto: University of Toronto Press, 2007), 725.

¹³ A vigorous debate about this mixture of categories is recorded in Maxwell Bennett et al. *Neuroscience and Philosophy: Brain, Mind and Language* (New York: Columbia University Press, 2007).

The interpreter's differentiation of the protean notion of being must be not descriptive but explanatory. It will aim at relating, not to us, but to one another, the contents and contexts of the totality of documents and interpretations. As long as interpretation remains on the descriptive level, it may happen to be correct [,] but it cannot escape the relativity of a manifold of interpretations to a manifold of audiences; in turn, this relativity excludes the possibility of scientific collaboration, scientific control, and scientific advance towards commonly accepted results.¹⁴

To date there is some evidence of 'scientific advance' in explanatory understanding. For example, the neuroscience of attention correlates psychological acts with brain locales and neurochemical events. The following diagram cites a few of those correlations.

<i>Acts of Attention</i>	<i>Brain Locales</i>	<i>Main Chemical Regulators</i>
Orientation/Orienting	Right Parietal and Frontal Hemispheres	Norepinephrine (NE)
Arousal/Alerting	Superior Parietal Lobe, Frontal Eye	Acetylcholine (Ach)

¹⁴ CWL 3, 609-610. Lonergan goes on in the next paragraph with comments that anticipate his later, more developed insights into functional specialization.

The explanatory differentiation of the protean notion of being involves three elements. First, there is the genetic sequence in which insights gradually are accumulated by man. Secondly, there are the dialectical alternatives in which accumulated insights are formulated, with positions inviting further development and counterpositions shifting their ground to avoid the reversal they demand. Thirdly, with the advance of culture and of effective education, there arises the possibility of the differentiation and specialization of modes of expression; and since this development conditions not only the exact communication of insights but also the discoverer's own grasp of his discovery, since such grasp and its exact communication intimately are connected with the advance of positions and the reversal of counterpositions, the three elements in the explanatory differentiation of the protean notion of being fuse into a single explanation.

Is the brief historical survey at the beginning of this section a thin sketch of the first 'element'? The shift from talk of motions and powers to differentiated and related intentional operations is, however, not complete. The recurrent problems noted above with muddled categories and reductionistic assumptions reflect the presence of the second element in the neuroscientific literature.

	Fields, Superior Colliculus, Nuclei in Thalamus, Temporo- Parietal Junction	
Focus/Focusing	Lateral Prefrontal Regions, Anterior Cingulate Cortex, Basal Ganglia	Dopamine (DA)

Such an initial achievement signals how to conduct further inquiries. Inquirers will begin with the ‘thing for us,’ e.g. with familiar experiences of paying attention to, focusing on, some sight or sound. Waiting for a traffic light to change and scanning shelves in an antique bookstore are common enough experiences. But they can go on to ask: How are we able to attend to objects? How does any object become something ‘in focus’?¹⁵ What are your expectations in asking these questions? As hinted above, some minimal training in the sciences should orientate you to search for key variables, identify likely candidates, work out promising correlations among them and investigate how well those patterns make sense of available data.¹⁶

So far so good, but is such a trained response to further questions at all self-luminous or does it, do you, remain opaque? The broader issue is whether competent performance in inquiry requires more than mimicry of what your teachers prescribed and proscribed. Apparently, it may not. Years of class work and postgraduate research can proceed without you reflecting on or having much understanding of why you are doing what you are doing.¹⁷ So a further step, could, for example, be your paying

¹⁵ Preliminary answers to these questions are slowly worked out in Chapters One and Two of this author’s *A Theory of Ordered Liberty* (Austin: Forty Acres Press, 2011). Those chapters identified but did not answer harder questions about how acts of attending arise from but are not reducible to biological or organic functions that, in turn, arise from but are not reducible to neurochemical processes. These are challenging questions for this new century’s neuroscientists, biologists and psychologists.

¹⁶ A question of whether such correlations are descriptive or explanatory is worth noting. Explanatory correlations are responses to further why-questions that demand more than identifying conjunctions among variables. Descriptive correlations are common in the social sciences when, for example, voting results reveal patterns among variables of age, education level and average income.

¹⁷ Evidence from the undergraduate years turns up when collegians are at a loss to explain why multiplying a positive number by a negative number yields a negative product or why it is impossible to draw a Euclidean circle. Evidence from more advanced audiences shows up in the puzzled looks that follow a claim about Newton first inventing the law of gravity or a claim that

attention to your paying attention, i.e. to take yourself as a specimen of ‘being attentive’ and so bringing objects into focus. Briefly put, the challenge is to adopt generalized empirical method.

[It] operates on a combination of both the data of sense and the data of consciousness: it does not treat of objects without considering the corresponding operations of the subject; it does not treat of the subject’s operations without taking into account the corresponding objects.¹⁸

What should you expect to discover from this oscillating attention to both your intentional acts and their objects?¹⁹ If you assume that any known object is a correlate of the operations originally intending its intelligibility and facticity, then relations among those operations will have their parallels in the intelligible relations that comprise the object as known. As a result, a basic heuristic framework for exploring both operations and objects will take the form of a series of analogous proportions between objects and operations.²⁰ Thus, as images are to the insights that make sense of them, so neural impulses are to the organic processes that order them; as aggregates of data are to formulated statistical frequencies so organic processes are to psychological states or acts. The relevant similarities here are found in the reciprocal relations between multiple operations and the materials they unify.²¹

How useful might the preceding heuristic framework prove for studying the binding problem?²² Acts of understanding are further

what makes a business an ongoing enterprise is an ongoing series of invisible acts of meaning.

¹⁸ Bernard Lonergan. *A Third Collection* (New York: Paulist Press, 1985), 141. Evidence that Lonergan employed this method shows up repeatedly when he takes patterns among intentional acts as the models for understanding chemical and biological processes. You will find examples of the same methodical control in the rest of this essay.

¹⁹ Here by ‘object’ I mean anything whatsoever that can be a term or end of an intentional act.

²⁰ The analogies presuppose that without differentiated and related operations there are no differentiated objects; hence, differences among the former will have corresponding differences among the latter.

²¹ The to-be-ordered materials are preconditions for the occurrence of the operations (e.g. without puzzling images there is nothing to investigate and understand); but the operations are distinct and irreducible to their prior conditions. Hence, neural impulses make thinking possible, but neurons do not first invent and then discover themselves. Inventing and discovering neurons depend on the intellectual and critical operations of neuroscientists.

²² The heuristic framework is relevant to a far broader set of questions: (1) How is it that part of Being became self-conscious? (2) How did this part become a questioning of the whole? (3) Even more perplexing, how did this part become capable of fantasizing about possibilities better than what is? (4) In contrast to fantasy, why does this part so readily become inert in its questioning

integrations of the rudimentary objects of acts of attention. Attentional acts have their neural and organic conditions, and the same is true of any object-as-attended to.²³ For example, there is evidence that the unitary representation of objects is dependent upon an emergent set of neural and organic conditions. At around eight months the infant brain has developed enough to meet the neural-electrical preconditions for object recognition.²⁴ This suggests that both the apprehension of objects takes time and that the act of object recognition has preconditions beyond psychological states and acts.²⁵ Yet, once in place, how do these conditions become further ‘organized’ such that object recognition occurs?

Using analogies to relations between images and insights is not an explanation but a heuristic pattern guiding further searches for explanations. Empirical evidence of ‘organizing’ abounds. Reading these ink marks provides you with a first-hand experience. Teachers organize the neural impulses of students by teaching them new words. Patients detecting the onset of certain seizures can learn to block the electrochemical ‘storms’ by deliberately doing mathematical calculations. Sensory feedback experiments and meditation techniques provide evidence of psychological acts producing changes in organic states and neurochemical processes. But how is any of this possible?

One hypothesis using the findings of current neurosciences offers some clues.

The average human brain consists of about 100 billion neurons (or nerve cells). However, it is more concrete to think of the brain not as an assembly of bodies – nerve cells - but rather as a collection of events – nerve impulses. Nerve impulses are essentially waves of electromagnetic potentials that vary in complicated ways and surge along the pathways of our nerve cells. Most nerve cells are capable of 1000 electrical impulses

and fantasizing? Here I am anticipating questions about the repressive functions of the superego as well as the ineffective routines of conventional thinking and practice.

²³ The second half of this claim may be troubling to some readers. Are not objects of attention independent of the neural processing of an observer? But where are the objects or images of attentional acts? Where are the words formulating these questions? Are they the ink marks your eyeballs are scanning?

²⁴ G. Csibra et al. “Gamma Oscillations and Object Processing in the Infant Brain.” *Science* 290 (November 24, 2000): 1582-1585.

²⁵ One way of resolving Libet’s Puzzle is to recognize that we do not have an explanatory understanding of conscious apprehension. This author has argued that the source of the famous but avoidable puzzle is an unnoticed mixing of descriptive reports of ‘conscious decisions’ and calibrated measurements of neural activities. See *A Theory of Ordered Liberty*, Chapter One, Part VI.

per second. Not every nerve cell fires this frequently, and estimates of how often they do fire on average vary widely. Still, an average of about 100 impulses per cell per second is frequently used in the literature. This would mean that there are something like 10 trillion nerve impulses per second in the active adult brain.²⁶

Suppose this vast number of potential impulses is initially disorganized, but, as the brain develops, ‘impulses across nerve synapses forge links so that previously disconnected impulses combine to form recurring sequences.’²⁷ Thus, neural patterns are formed that are the basis for memories, expectations, routine skills. Next, suppose that (a) the entire range of potential nerve impulses “never becomes completely organized” into a single system or complex series of patterns. (What begins as a vast number of disorganized events becomes a lesser but still vast number of disorganized events.) Therefore (b), there are ‘materials’ available for further patterning by future psychological acts.

Suggestive as this hypothesis is, it does not explain how psychological acts organize neural ‘resources.’ The questions remain how conscious acts emerge from more basic neural processes and how the former, in turn, organize as yet unpatterned neural materials.

Exploiting the benefits of generalized empirical method allows some control over how we handle these questions. As insights emerge from intentional acts operating on materials, e.g. puzzling sights and sounds, so more complex patterns develop among initially less developed substrates. As insights accumulate and sometimes lead to novel and more complex solutions to problems, so new chemical and organic integrations appear that exhibit more complex and differentiated patterns of organization. When the model is that of the unifying moment of insight and not logical deduction from premises to conclusions, the parallel development in the intended object can be one of “a series of leaps” from “the order of one integration to that of the next.”²⁸

To this point, what have these remarks on a set of methodological issues yielded? First, I have assumed that an adequate interpretive framework must be theoretical and not descriptive. Additionally, I have

²⁶ Patrick Byrne. "Neuroscience, Consciousness, Freedom and Lonergan," unpublished paper given at the Lonergan Philosophical Society session at the American Catholic Philosophical Association (November 2007): 8.

²⁷ *Ibid.* 9.

²⁸ *CWL* 3, 502. This essay began with an initial puzzle about Lonergan’s musing. I am proceeding to act upon the given text with the expectation of developing a series of insights that will be more complex and differentiated integrations of the initial clues and guesses regarding the text. The emergent interpretation, i.e. the new text about the initial text, will then represent a corresponding development in the materials for subsequent interpreters. See *CWL* 3, 494. Will it also mark a development in me? And what might be the effect on you? See the next footnote.

taken seriously Lonergan's claim that the complete data of any inquiry include the data of the inquirer.²⁹ Finally, I suspect that his theory of development is key to understanding the various integrations occurring among operations and objects.

Perhaps you have detected a background problem about integration. How is any inquirer sufficiently competent to integrate the findings of neurosciences, biology, psychology and the latter's subset, intentionality theory, in response to the cited 'musing' and the binding problem? Recognizing this problem facing his own inquiries, Lonergan spent decades searching for a solution. Eventually he sketched how functional specialization was a practical and effective answer to the difficulty.³⁰ Why might it be a promising way forward? Suppose that the division of labor functional specialization demands is an adaptation of human inquiry to the evolving cosmos. A further bit of historical musing by McShane suggests why this is the case.

Inquiry presupposes a capacity for a variety of intentional acts. That capacity presupposes "complex patternings of molecules with a history."³¹ Part of that history is incompletely recorded in organic evolution. Another part of that history includes the biographical variables of particular human specimens of such patternings. Among those specimens with a capacity for intentional acts will be some who attend to both their own histories and fantasies about what yet may be. Such 'neurodynamic bundlings of chemicals' raise questions about themselves and a broader universe; and, since what is and what has been are less than satisfactory, their questions push beyond both to envision better times. So, the human organism not only sustains itself, it reaches for an understanding of the cosmos and goes on to invent new realities. In time the reaching and the inventing have expanded exponentially, and the results are beyond the capacity of any single person to comprehend; thus, appears the need to divide up the labor and to impose a new framework on the flood of inputs into history.

You can think of this division of labor as a new and more efficient way of reaching and inventing. If you do, then your expectations of future inquiries may change. For example, expectations that inquiry should

²⁹ "The data of physics in its fullness, of course, includes the physicist: that is the claim of my full expression of the meaning of generalized empirical method." Philip McShane. "Lonergan's Meaning of *Complete* in the Fifth Canon of Scientific Method" in *Journal of Macrodynamic Analysis*, vol. 4 (2004): 57.

³⁰ Philip McShane's extensive writings on functional specialization are available at his website: philipmcshane.ca. Michael Shute has provided helpful overviews in two journal articles: "Functional Collaboration as the Implementation of Lonergan's Method." "Part I: For What Problem is Functional Collaboration the Solution?" and "Part II: How Might We Implement Functional Collaboration?" *Journal of Macrodynamic Analysis* 8 (2015): 67-92, 93-116.

³¹ The phrases in quotation marks in the following two paragraphs are borrowed from various texts by Philip McShane.

pursue explanatory correlations will alter what neural patterns are ‘laid down’ in brains. Functional specialization, like any method, amounts to a new set of expectations, a new intelligent and intelligible design, for ordering intelligible ‘objects.’ But those objects in this case are the structured intentional acts of functional specialists who eventually will more efficiently integrate an indefinite range of objects and events. As ‘complex patternings of molecules’ conditioning new intentional acts, those methodically controlled acts can increase the probability that our story will be better than it has been.

But this new practice is not yet common practice. As a result, an adequate ‘framing’ of future research into the binding problem is more a vague possibility than a detailed project. So, I turn to the interpretation of the original ‘musing’ anticipating the needed tools but not having them ready-to-hand. What I begin the interpretation with are: (1) an expectation that the long-term goal is to work out sets of explanatory correlations among neurochemical processes, specific brain locales, psychological acts and the ‘bound’ objects of acts of preconceptual apprehension and evaluation; (2) a willingness to experiment with generalized empirical method in tracking both acts and the objects operated on by those acts; (3) a sketch of Lonergan’s theory of development that provides clues for understanding emerging complexity in intentional acts and their objects; (4) a rudimentary understanding of the second functional specialty, its objectives and limits.³²

IV an Interpretation of Lonergan’s ‘Musing’

This essay began with a puzzle about why Lonergan linked the *vis cogitativa* with the Freudian superego. Some initial guesses are possible. For instance, I can assume that Lonergan followed Aquinas in holding that the animal’s *vis aestimativa* was replaced in humans by the *vis cogitativa*.³³ Thus, his reference to the *cogitativa* and children’s estimates of good and bad is not all that surprising. What comes first is primitive in comparison to later understanding. Second, his linking of that primitive understanding to ‘what papa and mama say is good or bad’ is in line with commonsensical beliefs about parental influence over a child’s thinking. But why did he or any of us believe this? So, we have two questions about why parental influence is so decisive and about how a child

³² To adopt Heidegger’s terms, what is present-at-hand methodologically ‘stands out’ as inadequate to meet the four listed tasks. Most noticeably *in absentia* are adequately developed insights into and practice with the second functional specialty of interpretation, not to mention the other seven functional specialties. All the same, I describe how to take on the tasks in my recently published *Rescuing Ethics from Philosophers* (Austin: Forty Acres Press, 2018). Chapter Two (“Sketch of the Innovation”) and Chapter Three (“Fantasy of a Science of Interpretation”) outline a methodical approach to interpretation.

³³ *Summa Theologica*, Ia, q.78. a.4.

preconceptually apprehends and evaluates objects. In pursuing answers to these questions, I begin with descriptive examples.

Our earliest operations are on commonplace objects.³⁴ Flat on our backs in our cribs, we reach for bright shiny objects, respond to sounds, grow anxious over digestive upsets or dirty diapers and only slowly begin to recognize our own flailing limbs. Such early experiences are relevant data for the initial puzzle of why Lonergan linked Aquinas' *vis cogitativa* with the Freudian superego. What did he understand about each that led him to make this unconventional connection?

Some clues lie in remarks he made about the *cogitativa*. What you minimally understood at first as a puzzling sight may in time have become an object you recognize. Further intentional acts can transform the initial object, so that, for example, you learned that not only is the object a knife, but also that it is sharp, dangerous and a 'bad' thing to touch. With further experiences of similar objects, you gained a minimal prereflective understanding of a class of objects called 'knives.' This is the basic and first grasp of a universal mentioned by Lonergan in *Verbum*:

[T]he man of experience knows that such and such medicine cured such and such patients in such and such circumstances; but the technician knows that such a kind of medicine cures such a kind of disease. Like the senses, the man of experience merely knows *quia*; but the technician knows the abstract universal, which is an inner word consequent to insight. But the man of experience merely knows the *universale in particulari*, and that knowledge is not intellectual knowledge but exists in a sensitive potency variously named the *ratio particularis*, *cogitativa*, *intellectus passivus*. It carries on comparisons of particulars in virtue of the influence of intellect, and it knows Socrates and Callias, not merely as Socrates and Callias, but also as *hi homines*, and without this sensitive apprehension of the universal in the particular it would be impossible for intellect to reach the abstract universal.³⁵

³⁴ Recall the earlier note that by 'object' is meant anything whatsoever that can be the term or focus of an intentional act.

³⁵ *Verbum: Word and Idea in Aquinas. Collected Works of Bernard Lonergan 2 [CWL 2]*, edited by Frederick E. Crowe and Robert M. Doran (Toronto: University of Toronto Press, 1997), 43. In commenting on the requirements for providing "an object in act for the possible intellect" (183), Lonergan went on to write: "The third requirement is connected with the work of the *cogitativa* which operates under the influence of intellect and prepares suitable phantasms; the significance of this preparation appears from the statement that different intelligible species result from different arrangements of phantasms just as different meanings result from different arrangements of letters." (184) What arranges the phantasm? I take this question to be a precursor to the contemporary puzzle about how intentional objects are bound. I would also point out that Lonergan's use of 'insight' in this passage differs

What do these remarks contribute to solving the original puzzle? We can all cite experiences of recognizing strange sights and sounds as at least sights and sounds. These instances of classifying particular experiences are what Aristotle called experiences of ‘proper sensibles,’ e.g. colors, sounds, feelings. But we go on in experiencing multiple cases to compare and contrast them and so arrive at more specific apprehensions of some object, e.g. as ‘this reddish color’ or ‘the sound of a violin.’ We are apprehending the ‘particular’ objects of our attention with greater specificity. Here you might recall the remark in footnote eight about the conflation of two questions about unity and class membership. ‘Sensitive apprehension’ is presumably the answer to both questions. It presupposes an act of attending that focuses on this object as distinct and, through acts of remembering, comparing and contrasting, recurs as a ‘leap’ to a minimal understanding of this object as belonging to a ‘specific kind.’³⁶

All of this is still far short of an understanding of what makes any object what it is. Lonergan’s distinction between two types of universals reflects an understanding of this distance and implicitly acknowledges the gap between a descriptive and an explanatory understanding of whatever is apprehended.

What leads many astray is the opinion of those who hold that universals are known only through the intellect, and therefore whenever they come to know a universal, they immediately think they have understood something. But there are two universals: one is that which is uttered because a ‘why’ has been grasped; the other is the universal in a particular individual, which is apprehended by some sensory faculty. [What follows in the text is a lengthy quote from Aristotle to which he then adds:] Those, therefore, who claim to understand because somehow or other they perceive a universal are absolutely wrong. Take, for example, the case of the circle: those who know perfectly well the external shape, the Gestalt, of a circle yet have never thought about why a circle is necessarily round have really not progressed beyond the operations of their senses.³⁷

This distinction between sensitive apprehension and intellectual grasp of distinct types of universals is relevant to the question about the objects of preconceptual apprehension and evaluation. Those objects are the first type of universal since the intentional acts required for the second

from his broader usage in his later *Insight*. Here he seems to limit it to intellectual apprehension (i.e. a grasp of why something is the way it is). Why he expanded the meaning would be a suitable dissertation topic.

³⁶ Is this as far as Hume got in understanding apprehension? It reflects the second stage (“Perception”) of Hegel’s dialectic of consciousness.

³⁷ *CWL* 12, 587.

type have yet to occur. For example, a child's earliest moral integrations are instances of particular 'leapings' or recognitions of objects and actions as good and bad requiring little, if any, reflection. The range of such integrations is quite broad, individually and culturally. While common experiences of eating, playing, observing others and hearing commands depend on relatively similar and stable neural 'manifolds,' cultural responses to demands for food, play and approval are quite variable. For example, hungry children in one culture may fantasize about wild boar roasting on a spit while in a different culture a Golden Arch may evoke delight. To generalize, within limits decidedly different integrations can correspond to similar neural substrates.³⁸ A relatively common neural base may be one reason that differences in cuisine, music and laws are not complete barriers to mutual understanding across cultural boundaries. In many cases, they are but different paths to the same ends.

What other commonalities undergird the child's earliest experiences of objects and events? Among the earliest observable variables in evaluating objects are: (1) experiences of pleasure and pain, and (2) the presence of authoritative figures in a child's life. The link between the two is social. The child's recognition of authoritative figures presupposes a prior estimate of their status, and initially that estimate may derive from the demonstrated power of those figures to produce experiences of pleasure and pain.

Why should these two variables be so important? A primordial condition of infants is their sensitivity to pleasure and pain. Since they are also primordially social beings, their early development will depend in part on mimicry of other human beings. Why is this the case? If developmental processes within the infant's psyche are initially an indeterminate orientation toward growth or greater being,³⁹ then available models of purported growth supply determinate content or objects for that orientation.⁴⁰ Through early acts of apprehension and mimicry, the child

³⁸ I assume this is an example of what Lonergan meant by a 'principle of correspondence.' As will be stated again below, he was responding to a two-part puzzle about how different manifolds could be the basis for quite similar integrations while quite similar manifolds could support quite different integrations. Regarding the latter possibility, he wrote: "[Persons who later exhibit] widely different temperament and character began, as infants, from instances of sensitive consciousness that not only were remarkably similar but also remarkably undifferentiated; there were sensations, but perceptiveness was undeveloped; there was nothing to remember, and powers of imagination were latent; affects were global affairs of elementary types; and skills were limited to wailing" (*CWL* 3, 478).

³⁹ This reference to 'greater being' as an objective of psychic orientation may make more sense after the principle of finality and its role in development receive some attention below.

⁴⁰ What Lonergan understood as finality's "universal striving toward being," René Girard located more narrowly in human subjects having a spontaneous desire for greater being that evoked mimetic desire and so

internalizes images of the model's actions and reactions as its expectations. Let 'expectation' here refer to an understanding of how orientation slowly takes on specific content. For example, the human psyche, in responding to the demand for images and feelings, gradually integrates specific objects and estimates of them as 'interesting' or 'uninteresting,' 'good' or 'bad.' Such evaluations become the basis for how one's psyche is consciously but prereflectively orientated toward further instances of similar images. As noted above, comparing and contrasting particular instances yields a sensitive apprehension of something as belonging to a class, e.g. being a good kind or a bad kind of thing.

Such durable recognition and evaluation of similar objects must have preconditions in stable neural patternings. One of the major puzzles in psychology is how we make this connection between conscious evaluation and neural patternings.⁴¹ This is not just a puzzle for neuropsychologists since it is part of the broader puzzle of how mental operations emerge from but also affect changes in neurobiological conditions.⁴² To exemplify the latter changes, emotions (and so evaluative responses to intentional objects) have neurochemical and organic correlates such that specific images can evoke emotions that instigate chemical cascades effecting changes in neural activity and muscular fibers.⁴³

While there is abundant experimental data supporting correlations among emotions, images and neurochemical activities at specific brain locales (e.g. the amygdala), explaining the relations among them is far from a finished task. You might wonder how much progress has been made between the medievals' positing of a *vis aestimativa* and contemporary understanding of how objects and affects are related.⁴⁴ They are related, but how much development has there been in explaining the relations?

provoked dynamic and often violent relations in human history. See his *Violence and the Sacred* (Baltimore: The Johns Hopkins University Press, 1977).

⁴¹ The medieval *vis memoriae* was an early speculative response to this puzzle.

⁴² Antonio R. Damasio acknowledged that the neurosciences have not closed the gap between neural patterns and images. That is, the latter depend on the former, but it is unclear how mental experiences emerge from their biological preconditions. See his *The Feeling of What Happens* (New York: Harcourt, Brace and Company, 1999), 322.

⁴³ For examples, see Rita Carter, *Exploring Consciousness* (Berkeley: University of California Press, 2002), 196-199.

⁴⁴ A recent study that, in my judgment, marks a significant advance is Darcia Narvaez's work correlating missed opportunities for development in early childhood and subsequent deficiencies in emotional responses exhibited in hypersensitivity to perceived threats. *Neurobiology and the Development of Human Morality: Evolution, Culture, and Wisdom* (New York: W.W. Norton and Company, 2014).

But what do any of us mean by ‘development’? Already in Section I, a text from *Insight* offered some clues. The first clue was Lonergan’s remark that ‘our definition of development serves to supply a single scheme that unites otherwise unrelated principles.’⁴⁵ Perhaps this remark will suggest how to connect the usually unrelated terms of the *cogitativa* and the *superego*.

Again, what is Lonergan’s theoretical meaning of development? He wrote of “a flexible, linked sequence of dynamic and increasingly differentiated higher integrations that meet the tension of successively transformed underlying manifolds through successive applications of the principles of correspondence and emergence.”⁴⁶ This compact definition has at least four parts: (1) ‘higher integrations of underlying manifolds,’ (2) occurring in a flexible sequence, (3) with later integrations being increasingly more complex and differentiated than those that preceded them, and (4) with the attendant transformations of manifolds occurring through successive applications of the principles of correspondence and emergence.

This complex definition presupposes a sequence of increasingly differentiated but related insights into underlying puzzles.⁴⁷ What are those puzzles? I suppose that Lonergan had a series of questions about evolution, about recurrent (‘static’) patterns of development in plants and animals and about discontinuous (‘dynamic’) patterns of development found in the emergence of new genera and species.⁴⁸ His model for understanding ‘higher integrations of underlying manifolds’ was the relation of insights to puzzling sensitive presentations or psychic representations. Insights occur within a flexible and dynamic pattern of (1) distinct but related intentional acts, (2) responding to the demands (3) of the different types of intentional operators (4) reaching for their proper objects.⁴⁹ I surmise that this pattern of relations among demands, operators, intentional acts and objects can serve as a four-part heuristic pattern for understanding generic sequences of physical, chemical, biological and neural integrations of ‘coincidental manifolds’ of ‘lower order’ materials.⁵⁰ For example:

⁴⁵ *CWL* 3, 482.

⁴⁶ *CWL* 3, 479.

⁴⁷ Do you detect the background model here for this meaning of ‘development’?

⁴⁸ For Lonergan’s distinction between static and dynamic patterns of development, see *CWL* 3, 477-478.

⁴⁹ For more specific comments on the differences and relations among demands, acts, operators and their objects, see *A Theory of Ordered Liberty*, Chapter III, Part III.

⁵⁰ Recall the claim above that, since a known object is a correlate of intentional acts, patterns of relations among the latter will be paralleled in the intelligible relations comprising the former.

[C]hemical elements and compounds are higher integrations of otherwise coincidental manifolds of subatomic events; organisms are higher integrations of otherwise coincidental manifolds of chemical processes; sensitive consciousness is a higher integration of otherwise coincidental manifolds of changes in neural tissues; and accumulating insights are higher integrations of otherwise coincidental manifolds of images or data.⁵¹

One of Lonergan's basic questions may have been why such 'higher integrations' occur. The heuristic pattern with its four categories can guide efforts to explain such sequences of integrations. In interpreting Lonergan's theory of development, I have found it useful to impose this framework on the various principles of that theory. Descriptive examples will support each of the four categories, but my goal is to understand how the resulting theory of development provides some clues as to what is occurring in the child's earliest recognition and evaluation of objects.

The sequences cited in the last quotation are instances of what Lonergan intended to explain in part by the principle of emergence. It is part of his explanatory answer to questions about the origins of increasingly more complex and differentiated integrations. But to understand how the heuristic pattern of demand, operator, act and object may help track his understanding of emergence, I need to understand what he meant by the two principles of correspondence and emergence.

So, what did he mean by a principle of correspondence? Presumably it was part of his response to the question of why there were so many diverse but recurrent patterns in the cosmos, ranging from types of stars to species of plants and animals. The 'static' or recurrent processes presuppose limits or boundaries. Some of his key insights were into the flexibility of both the materials open to integration and the limited range of possible forms of integration. Again, his examples are helpful.

Significantly different underlying manifolds require⁵² different higher integrations. Thus, the chemical elements differ by atomic numbers and atomic weights, and these differences are grounded in the underlying manifold. Different aggregates of aggregates of chemical processes involve different organisms. Neural events in the eye and in the ear call forth different conscious experiences. Different data lead to different theories. It is true, of course, that not every difference in the underlying manifold demands a different integration; the same kind of atom can have subatomic components at different energy levels; the same kind of organism admits differences of size, shape, weight;

⁵¹ *CWL* 3, 477.

⁵² Does Lonergan's use of 'require' suggest the primacy of the principle of finality in his understanding of the other two principles of development?

similarities of character and temperament are compatible...with neural differences; and the same theory can be reached from different data. Accordingly, the principle of correspondence enjoys a measure of flexibility; within limits the same integration will systematize differing manifolds; the point to the principle is that these limits exist and that to transgress them is to eliminate the higher integration.⁵³

Extinctions are presumably instances of what follows upon major transgressions of limits. Within those limits flexibility is in evidence when different chemical environments give rise to similar types of plants; different types of plants support the same herbivores; and, regarding child development, “similarities of character and temperament are compatible...with neural differences.” So, while it is true that a “higher systematization is limited by the manifolds which it systematizes,”⁵⁴ different manifolds may allow a limited range of similar integrations. In other words, the principle of correspondence formulates the intelligibility of a relative stability and uniformity observed in both physical processes and the human psyche. Whence, then, the instability and variability observable in both?

Lonergan’s definition of development referred to a sequence of dynamic integrations meeting a tension generated by ‘successive applications of the principles of correspondence and emergence.’ What sense do you make of the latter principle? His prior insights were possibly into how puzzling over some data may yield an initial surmise, but further questioning and new insights may radically depart from that first integration or surmise. For example, the skilled detective has hunches about suspects but professionally requires more than guesses. Sometimes the hunches are on target; at other times a dramatically different understanding of the case emerges. The ‘tension’ here is presumably between a demand for what is familiar (and so for stability) and a further demand for a more complete understanding of a problem (hence the need in a theory of development for more than the principle of correspondence).⁵⁵ Let the principle of emergence be a first response to this experience of ‘tension.’

But why should a series of integrations be subject to instability and so be either at risk of extinction or open to a dramatic ‘leap’ to greater complexity? Besides principles of correspondence and emergence, Lonergan mentions a principle of finality. Again, I think an analogy between intentional acts and their objects may be the basis for this third principle.

⁵³ *CWL* 3, 477.

⁵⁴ *CWL* 3, 468.

⁵⁵ For the scientist, this demand can take the form of the canon of complete explanation. See *CWL* 3, 107-109.

Just as cognitional activity does not know in advance what being is and so has to define it heuristically as whatever is to be known by intelligent grasp and reasonable affirmation, so objective process is not the realization of some blueprint but the cumulation of a conditioned series of things and schemes of recurrence in accord with successive schedules of probabilities. Just as cognitional activity is the becoming known of being, so objective process is the becoming of proportionate being. Indeed, since cognitional activity is itself but a part of this universe, so its heading to being is but the particular instance in which universal striving towards being becomes conscious and intelligent and reasonable.⁵⁶

Let this reference to ‘universal striving toward being’ be a first approximation to the general meaning of ‘demand’ in the four-part heuristic pattern. Ask yourself if your implicit demand is for a complete understanding of being?⁵⁷ If you go on to generalize about cosmic process, is the demand for ever more complex and differentiated integrations of whatever materials are available? Lonergan thought so; every “determinacy is limitation, and every limitation is to finality a barrier to be transcended.”⁵⁸ The principle of finality, then, refers to an understanding of how a demand for development in understanding and in cosmic evolution manifests itself. Let this principle of finality be a second approximation to the meaning of ‘demand.’

In regard to intentional ‘operators,’ just as a what-question responds to the demand of intelligent consciousness by moving from fragmentary data to intelligible order, so sensitive consciousness, responding to a psychic demand for images and feelings, operates on ‘otherwise coincidental manifolds’ of neural impulses to yield experiences of recognized objects. But how does any of this occur? This was the question that led Aristotle to talk of the *sensus communis*, the medievals to write about a variety of inner senses and contemporary neuroscientists to investigate the binding problem. At this point in the essay the question is

⁵⁶ *CWL* 3, 470. Further texts making use of this analogy between intentional acts and ‘objective process’ are abundant. One of them is particularly succinct. “As what is to be known becomes determinate only through knowing, so what is to be becomes determinate only through its own becoming. But as present knowing is not just present knowing but also a moment in process toward fuller knowing, so also present reality is not just present reality but also a moment in process to fuller reality” (*CWL* 3, 471). Do you think of yourself as a “particular instance in which universal striving towards being becomes conscious and intelligent and reasonable”?

⁵⁷ This demand has competitors. One basic ‘tension’ in living is between the imperative of common-sense living, Be practical! and the imperative of theoretical inquiry, Be comprehensive!

⁵⁸ *CWL* 3, 477.

what are the intentional operators for such integrations? Presumably they are to be known by, inferred from, their acts.

Most of the readers of this essay will already be familiar with Lonergan's use of distinct question types to differentiate intentional acts and their objects. The following diagram formulates the relevant distinctions and parallels among acts, questions and their objects.

<i>Intentional Acts</i>	<i>Question Types</i>	<i>Objects</i>
Normative Acts	Questions of Decision	Best Option
Deliberative Acts	Questions for Deliberation	Possibilities/Options
Critical Acts	Questions of Judgment	Fact/Truth
Intellectual Acts	Questions for Understanding	Guess/Hypothesis
Empirical Acts	(Acts of Attending)	Clues/Data

What types of operators can we infer from these distinct but dynamically related types of intentional acts? Again, most of the readers will already be familiar with the types of intentional operators even if the terminology in the following diagram is new to some.

<i>Operators</i>	<i>Intentional Acts</i>	<i>Mediating Questions</i>
Normative Operator	Acts of Deciding	Question of Decision
Deliberative Operator	Acts of Deliberating	Question for Deliberation
Critical Operator	Acts of Judging	Question of Judgment
Intellectual Operator	Acts of Understanding	Question for Understanding
Psychic Operator	Empirical Acts	(Preconceptual Apprehension)

The vagueness of the term 'operator' may diminish if you understand how question types represent movement or development toward anticipated ends. For example, suppose a demand for understanding is what moves you to anticipate answers by asking questions of the first type. Or let a demand for knowing what is the case be what moves you to anticipate settling issues of fact by asking questions of the second type. The meaning of 'intentional operator' is descriptively what moves you to pay attention or to inquire. To shift this term into an explanatory context, I need to fix its meaning by its relation to a correlate. Doing so requires talk of multiple operators evoking types of intentional acts that mediate

between the demands of the operators and their ‘proper objects’ or ideal integrations. For example, the operator for intellectual acts is a spontaneous demand (aka curiosity) for an intelligible integration of clues, puzzling images or fragmentary data, but the integration is the answer that meets the demand. The operator for critical acts is a demand of rational consciousness for what is true, factual or genuinely good and so evokes questions of judging with the ideal integration being a correct answer that meets the demand. The operator for deliberative acts is a demand for new goals or new solutions to problems, and the integration is the creative option that responds to that demand. Your questions mediate between demands and responses, between operators and integrations, as means both for expressing demands and for reaching their ends or proper objects. Furthermore, suppose your new questions represent the principle of finality. This is part of the answer to the question of why operators can challenge previously achieved integrations and anticipate further developments in understanding, i.e. newer and more complete integrations.

How do the preceding distinctions help answer the question about developments in both understanding and ‘objective process’? The four-part scheme of categories can serve as an analogy in which the relevant similarity is in relationships among the terms. To repeat previous examples, as images are to answers so neurochemical processes are to organic systems; as aggregates of data are to formulated statistical frequencies so neurobiological systems are to psychological states. While the operator impelling development from images to answers is the demand for understanding (expressed in questioning), the operators promoting transitions from chemical functions to organic functions and from biological processes to psychological states are to be discovered through empirical research. What the categorical framework offers is a heuristic pattern for exploring how more differentiated and complex integrations emerge, endure and develop.⁵⁹

To return to the limited focus of this essay: How do basic or ‘primitive’ intentional integrations and evaluations of apprehended objects occur? Using the previous diagrams, we can locate such rudimentary objects as the proper ends of acts of attending that mediate the demand of the psychic operator for images and feelings. The

⁵⁹ “Clearly, though this specification of the operator is extremely general, it offers some determination of the direction of development. Its application to concrete instances may not only confirm it but also give rise to further questions. The further questions will lead to further insights and so to still further questions. In this fashion, one’s understanding of the operator begins to be an instance of higher system on the move in the development of scientific knowledge of development” (CWL 3, 492). The envisioned scientific knowledge remains a remote achievement, at least in regard to the specific operators effecting transitions from chemical to biological systems and on to psychological states and acts.

medievals posited the *cogitativa* in response to the question of how objects could be apprehended as particular kinds of things. Some of them went on to posit a *vis aestimativa* to account for how evaluations of such apprehended objects were possible. In terms of the heuristic pattern employed above, just as an act of attending occurs with a minimal understanding of its object and anticipates a more complete understanding through the questions and intentional acts that follow, so an act of attending may contain a minimal and undeveloped evaluation of its object and anticipate a more developed estimate through the questions and acts that follow upon it.

Before exploring what the neurosciences have discovered about processes of object recognition and evaluation, we end this section by asking how Lonergan understood the superego and its relation to estimates of apprehended objects.

In the opening musing from 1955, Lonergan seems to understand the superego to be little more than the child's borrowed understanding of "what papa and mama say is good or bad," an early understanding that, if left undeveloped, "in adult life... can cause a hell of a lot of trouble." Four years later he offered a more detailed commentary.

In the frontal lobes are located the controls and the integration of nervous activity, and there is a correspondence between this part of the brain and Freud's superego. The account of the superego, the ego, and the id in terms of their neural foundations in the brain removes some of the mythical thinking connected with Freud's theories, and at the same time enables us to draw on what is useful in his distinctions.

Now the formation of the superego, which on its neural side entails the development of the frontal lobes of the brain, keeps occurring through childhood with the world of 'do' and 'don't.' And the intellectual crisis of adolescence is the period in which adolescents reject the set of precepts and evaluations that were imposed externally through precepts at a time when they were not able to think for themselves.⁶⁰

In these brief remarks Lonergan links normative intentional acts (the prescriptions and proscriptions of the superego), brain locales (the frontal lobes), neural activities and the development of all three. The Freudian superego thus loses some of its 'mythical' status by being transposed into an explanatory correlation. One shift is from Freud's likening the superego to "a garrison in a conquered city"⁶¹ to understanding it as a series of basic normative acts and meanings (integrations) in relation to a

⁶⁰ *Topics in Education* [CWL 10]. *Collected Works of Bernard Lonergan* 3 [CWL 3], edited by Frederick E. Crowe and Robert M. Doran (Toronto: University of Toronto Press, 1993), 101.

⁶¹ *Civilization and Its Discontents* (New York: W.W. Norton, 1962), 71.

neural base, organic sites and psychosocial conditions. This is evidence of how comfortably Lonergan operated within the horizon of theory.

Earlier in *Insight* he had translated the Freudian superego into the terms of his complex theory of development. To repeat part of one of the opening quotations in this essay:

[The] unconscious neural basis is an upwardly directed dynamism seeking fuller realization, first, on the proximate sensitive level, and secondly, beyond its limitations, on higher artistic, dramatic, philosophic, cultural, and religious levels. Hence it is that insight into dream symbols and associated images and affects reveals to the psychologist a grasp of the anticipations and virtualities of higher activities immanent in the underlying unconscious manifold.

A similar phenomenon on a different level is offered by Freud's superego: within consciousness, it is a compound of preceptive symbols and submissive affects; by its finality it anticipates, by its subordination it reflects, by its obsessive and expansive tendencies it caricatures, the judgments of rational consciousness on the conduct of a rational being.⁶²

Here Lonergan alludes to examples of dynamic patterns of development in neural, biological, psychological, artistic, intellectual and spiritual growth. In slightly greater detail he refers to the demands ('anticipations') of the psychic operator that can be inferred from 'dream symbols and associated images and affects.' More directly relevant to this essay is his understanding of the superego as an integration of 'preceptive' images and feelings or, in other words, an early recognition of and submission to normative meanings. But he identifies it as an incomplete development subject to the principle of finality. From his understanding of the critical operator and its demands, the submissiveness of the superego to precepts and its insistence on ruling over and evaluating all conduct are early anticipations of 'rational consciousness' and its judgments on what is true and good.

Fundamental to Lonergan's reading of the superego is his principle of finality, i.e. his understanding of what impels development not only in the psyche but across the cosmos. Revisiting that principle will afford an opportunity to summarize this section of the essay and link it to the review of neuroscientific literature that follows.

In the general case, [the operator] is the upwardly directed dynamism of proportionate being that we have named finality. It is conditioned by instability in the underlying manifold, by incompleteness in the higher integration, by imperfection in the correspondence between the two. It is constituted inasmuch as

⁶² *CWL* 3, 482.

the higher system not merely suffers but provokes the underlying instability; inasmuch as the incompleteness of the higher system consists in a generic, rudimentary, undifferentiated character that can become differentiated, effective, specific; inasmuch as the imperfection of the correspondence is, so to speak, under control and moving towards a limit where the principles of correspondence and emergence result in the replacement of the prior integration by a more developed successor; inasmuch as such operators form a flexible series along which the organism advances from the generic functioning of the initial cell to the flexible circle of ranges of schemes of the mature type.⁶³

While attempting no more than a sketch of Lonergan's theory of development, I have identified some of its key components. Doing that much serves my purpose of linking acts of preconceptual apprehension and evaluation to the superego. Exploring this linkage relied on a four-part heuristic pattern grounded in intentionality analysis. It was such an analysis that allowed Lonergan to distinguish two types of universals and two corresponding acts: sensitive apprehension (the work of the *cogitativa*) and intellectual apprehension, i.e. a grasp of what makes something what it is. What the child apprehends and evaluates belongs to the first types of objects and acts. Sensitivity to pleasure and pain and exposure to parental models are proximately the sources of the child's determinate estimates of objects as good and bad. Remotely the demand of the psychic operator grounds the acts of attending to and preconceptually evaluating images and feelings. Intermediately neurochemical integrations at specific brain locales (discussed in the next section) are correlates of such intentional acts and psychosocial conditions.

But how do chemical, biological and psychological systems work together to give rise to increasingly more differentiated and complex intentional acts and their correspondingly more differentiated and complex objects? Lonergan's theory of development provided guidance in trying to understand what is occurring. The principle of correspondence reflects insights into how neural and organic manifolds can support relatively stable integrations. Still, in both biological evolution and intellectual development, there are recurrent examples of instability, of radical shifts away from prior integrations in species and in patterns of thought. A principle of finality reflects some insights into why dynamic processes of development surpass prior integrations.

There is much more to understand about the principles of correspondence, emergence and finality and the empirical data from which they are inferred. However, I used Lonergan's theory of development only to supply a context for applying the heuristic pattern of demands, operators, acts and objects. With 'demands' understood as

⁶³ CWL 3, 490-91.

specifications of the principle of finality, the focus narrowed to the demands of intentional ‘operators,’ their corresponding ‘acts’ and ‘proper objects.’ In mediating the demands of operators, new questions express one way the principle of finality challenges determinate and limited integrations of meaning.

What, then, have I learned about Lonergan’s understanding of the superego? He seems to have understood it to be a series of preconceptual apprehensions and evaluations relative to the neural, organic and psychosocial development of the child. Since it too is a phenomenon subject to the principle of finality, it anticipates, is preliminary to, more complex intentional acts and their intended objects.⁶⁴ As sensitive apprehension is to intellectual grasp, so the content of the superego is to the proper objects of mature moral judgment.

V What the Neurosciences Have to Contribute

Assuming that Lonergan understood the *cogitativa* as at work in the preconceptual apprehension and evaluation of objects and that he understood the superego as one term in a pattern of relations among acts of apprehension, borrowed normative meanings, brain locales and a neural base, all of which were ‘contextualized’ by his theory of development, I can ask whether new discoveries in the neurosciences over the past fifty years have added further specificity to his views about the apprehending (binding) and evaluating of objects?

It would take a book to review the massive literature of the past five decades on the binding problem. The first diagram in this essay was a synopsis of some of what scientists have learned about neurochemical and organic correlates of acts of attending. The first two chapters of *A Theory of Ordered Liberty* offered far more details, but even there the literature review was thin. Again, the need for functional specialization becomes increasingly obvious.

The ideal situation would be for a group of researchers to have assembled all the relevant findings about the genetic, neurochemical and biological antecedents to each type of intentional act. To date that research is more extensive in regard to acts of attending and deciding than it is in regard to acts of judging and fantasizing. The limited research I have done in regard to acts of attention appears below to the degree it is relevant to the question of this section.

⁶⁴ Resistance to further insights and to changes in both understanding and doing supplies evidence for the repressive function of the superego. Failure to develop more complex moral integrations provides evidence for Freud’s complaints about infantile patterns of thinking lingering into adulthood. Might the Jungian archetype of *puer aeternus* have similar origins in a failure to develop?

An earlier note about the problem of reductive analyses in much of the neuroscientific literature requires further comments.⁶⁵ Currently much of neuropsychology is a sustained inquiry into the precognitive antecedents to basic intentional acts. Studies of the dependency of conscious acts on organic functions and of the latter on chemical transmitters and genetic substrates are attempts to understand the more complex in terms of the simpler. However, might these relations of dependency also go in the other direction? That is, might deliberate acts of attending and understanding exercise an ‘executive function’⁶⁶ over ‘simpler’ conditions?

The literature on such ‘top-down’ ordering is sparse. Posner and Synder detected the problem in 1975. Decades ago they speculated about the future of attention studies and predicted a “kind of research schizophrenia” with one focus being on “mechanisms that subserve” neural processing and conscious attention and the other being on conscious strategies that “modify and build upon ‘automatic processes.’”⁶⁷ Most of the current literature reflects an opting for the first focus, so their original question remains largely unanswered.⁶⁸

To what extent are our conscious intentions and strategies in control of the way information is processed in our minds? This seems to be a question of importance to us both as psychologists and as human beings. Yet... most theorists in psychology have

⁶⁵ Criticism of the assumptions of such analyses is a task for the fourth functional specialty, so the following comments are more informative than evaluative.

⁶⁶ Various definitions of executive control are offered in the literature. For example, Gruber and Goschke propose “a neurocognitive model of executive control according to which the human ability to flexibly adapt to changing behavioral requirements, i.e. executive control, depends on dynamic and context-sensitive interactions between... brain systems.” (105) Regardless of the definition, most subsequent research into executive functioning focuses on brain locales and neural activities. For example: “The involvement of the prefrontal cortex in the ability to engage executive control constitutes one of the fundamental results of cognitive neuroscience. Current research focuses on the respective roles of frontal lobe structures such as anterior cingulate cortex (ACC), dorso-lateral prefrontal cortex (DLPFC), or orbito-frontal cortex (OFC) in this general process of control.” Lionel Naccache et al. “Effortless Control: Executive Attention and Conscious Feeling of Mental Effort are Dissociable” in *Neuropsychologia*, Vol. 43, No. 9 (2005): 1318. Here we have evidence of further insights into frontal lobe development noted by Lonergan some forty-five years ago.

⁶⁷ “Attention and Cognitive Control” (1975), reprinted in *Cognitive Psychology: Key Readings*, A. Balota and Elizabeth J. Marsh, eds. (New York: Psychology Press, 2004), 221-222.

⁶⁸ Narvaez’s previously cited work is an exception in that she adopts both foci.

avoided consideration of the relationship between conscious and unconscious mental events.⁶⁹

In taking the relation between image and insight as a model for understanding relations among mental acts and their precognitive variables, this essay has tried to have it both ways. To identify neural and biological antecedents to intentional acts (1) is not the same as explaining the latter but (2) does provide some evidence of what intentional operators are possibly doing in integrating ‘coincidental manifolds.’⁷⁰ Still, how mental acts emerge from and how they, in turn, organize neural-biological materials are the enduring questions.

Descriptive examples of ‘executive functions’ are easy to cite. Deliberate interventions in brain disorders through pharmacological means are evidence that conscious acts can indirectly alter neurobiological conditions. Experiments in biofeedback produce evidence of test subjects deliberately altering patterns among neural activities. There are similar results associated with meditation techniques and hypnotism.⁷¹

What grounds talk of an ‘executive function’ if not experiences of conscious and deliberate acts controlling performance?⁷² Consider how the following assumes such experiences: “The *executive network* plays its main role when processing and/or responding requires any kind of control. For example, control is necessary when...a wrong response has been emitted and the subject has noticed it.”⁷³ Now, if you detect a wrong response, this presupposes you have made a judgment, i.e. a type of intentional act which follows upon and is more complex than acts of

⁶⁹ CWL 3, 205.

⁷⁰ The hypothesis here is that as images are a patterning of neural impulses by the psychic operator, so meanings are a patterning of images by the intellectual operator and, in the case of the child’s superego, by emergent but undeveloped critical and normative operators.

⁷¹ “A number of human practices, including ingestion of drugs, meditation, and hypnotism, are known to alter attention.” Michael I. Posner, “Progress in Attention Research” in *Cognitive Psychology: Key Readings*, 7.

⁷² Perhaps the following quote manages to reflect both the implicit model of executive control and the explicit focus on organic and neurochemical conditions for it. “Flexible cognitive control over our behavior is a key part of human intelligence. In what we call here the top-down excitatory biasing (TEB) model of cognitive control ... the prefrontal cortex (PFC) is viewed as maintaining representations that guide control of tasks. These PFC representations provide an excitatory top-down bias to groups of neurons processing task-relevant information.” Seth A. Herd et al. “Neural Mechanisms of Cognitive Control: An Integrative Model of Stroop Task Performance and fMRI Data” in *Journal of Cognitive Neuroscience*, Vol. 18, No.1 (2006), 22. What is missing here is equal time for the second half of Posner’s question.

⁷³ Luis J. Funes, “Inhibitory Processing in the Attentional Networks” in Michael J. Posner (ed.) *Cognitive Neuroscience of Attention* (New York: Guilford Press, 2004), 46.

attention which have their own neurobiological preconditions. But once you make the judgment, once the mental operation occurs, you engage in a new series of acts to correct the mistake and so a new set of neurobiological events occurs.

Further examples are plentiful. You and I have experienced sustained attention, i.e. “the volitional maintenance of the current focus of attention. This may mean awaiting the change from red to green in traffic stoplights” or simply waiting for water to boil.⁷⁴ But what does ‘volitional’ control of conscious acts of attention mean?⁷⁵ How can conscious acts effect nonconscious changes in brain activities? Descriptively you can recall how, at some time or other, you deliberately shifted your attention away from disturbing sights or distracted yourself from painful memories by staying busy. You were trying to control your emotional responses by controlling your attention.⁷⁶ In doing so, did your conscious acts have repercussions on your biochemical states?⁷⁷

The general puzzle is explaining how mental acts can effect (i.e. have an executive function in relation to) organic changes. One clue to solving the puzzle may lie in studies of how emotional states (e.g. depression) can have effects on organic systems (e.g. the immune system). With the discovery that the nervous system and the immune system are not separate but ‘interactive,’ it is now reputable to explore how a mental condition (e.g. depression or anxiety) can bring about organic changes. Carter summarizes some of the intriguing findings.

The knock-on effect, from one system to another, of molecular changes explains why a condition such as depression - normally thought of as an illness of the ‘mind’ – may also have profound effects on many other parts of the body. For example, one common bodily change in depression (and dementia) is a drop in the levels of the excitatory neurotransmitter noradrenalin. This manifests as mental sluggishness because noradrenalin stimulates brain cells in the cortex, helping to generate thoughts

⁷⁴ Melinda Beane and Richard Marrocco, “Holinergic and Noradrenergic Inputs to the Posterior Parietal Cortex Modulate the Components of Exogenous Attention” in *ibid.* 318.

⁷⁵ The vocabulary of faculty psychology is surprisingly persistent in the neuroscientific literature. One purpose of *A Theory of Ordered Liberty* was to offer a new way of talking about liberty and intentional acts.

⁷⁶ Such deliberate acts to control attention are evidence that attention is not monolithic but occurs in gradations. Damasio provides support for talking about various levels or gradations of attention by citing cases of epileptic automatism. During seizures patients are awake but exhibit only a low-level attention to the activities they carry out. After the seizure, they have no recollection of their actions during it. *The Feeling of What Happens*, 96-99.

⁷⁷ Cf. Seth D. Pollack and Stephanie Tolley-Schell, “Attention, Emotion, and the Development of Psychopathology” in *Cognitive Neuroscience of Attention*, 359.

and perceptions. However, reduced levels of noradrenalin also cuts [sic] down activity in the nerves which stimulate the tissues that keep certain immune cells circulating. So instead of moving around the body, seeking out and fighting invaders like bacteria and viruses, the immune cells sit around in the body tissues, allowing infections to flourish.⁷⁸

It appears, then, neuroscientists have more than ‘folk psychology’ to rely on in talking about reciprocal effects between mental acts or states and their precognitive conditions. Correlating depression with chemical levels and cellular activity in the brain is a result of the type of research that Posner anticipated would often suffer neglect. The question of selectivity has sometimes prompted similar research.

Asking why one image, out of a field of potential objects of attention, actually comes into ‘focus’ (i.e. is selected) is an avenue of research relevant to questions about mental acts and the deliberate ‘binding’ of objects. The findings of the neurosciences indicate that selectivity occurs in two generic ways. First, out of an indeterminate field of possible objects of attention, a person’s determinate orientation is predisposed to select part of that field for attention. For example, some sights, sounds and smells routinely evoke reflex responses of fight, freeze or flight. But attention may also be ‘automatically’ aroused on a wider basis. “Attention is automatically triggered by more or less anything that stands out against its background either because it is unusual, i.e. emotionally salient (a familiar face, say) or exceptionally ‘noisy’ (e.g. it excites sensory neurons by its colour, motion or size).”⁷⁹ So a variety of types of sensory data can have a priority status when it comes to ‘arousing’ attention. How is this possible? One hypothesis is that ‘memories’ stored in the amygdala allow for quick responses to some types of data, e.g. signs of danger.⁸⁰ Another hypothesis is that ‘sensory learning’ can enhance a person’s ability to detect what others fail to notice.⁸¹

⁷⁸ *Exploring Consciousness*, 198.

⁷⁹ *Ibid.* 150.

⁸⁰ *Mapping the Mind*, 94-95. Aquinas appears to support the idea that sensory data already associated with emotional responses have priority in arousing us. He wrote: “An image or imagined form of an object without some appraisal that it is beneficial or harmful leaves the sensitive appetite unmoved. It is the same with the apprehension of a truth apart from its being good and desirable. Accordingly, Aristotle observes that we are moved, not by the theoretical, but by the practical reason.” *Summa Theologiae* Ia, 2ae, 9,1 ad. 2. (Blackfriars 1970), 67.

⁸¹ Citing E.J. Gibson’s work, Paul V. McGraw et al. list examples of sensory learning: “the lore of the wine connoisseur that can discriminate subtle differences in grape varieties; the musician’s ear that can discriminate fine changes in the temporal structure of a musical piece; the experienced eye of a radiologist that can detect almost imperceptible shadows in an X-ray image.” “Introduction. Sensory learning: from neural mechanisms to rehabilitation.”

Since our narrowed focus is on how deliberate ('executive') acts of attending integrate specific images or objects, the link between emotion and selection is a promising avenue of inquiry. Ruz writes of the selective function as most in evidence in "decision making, error detection, novel or difficult situations, or when overcoming a habitual response is needed."⁸² When you are aware of having made a mistake or of needing to change habits, you usually are not indifferent but experience some emotions. Descriptively put, emotions 'weight' some images or objects thereby increasing their salience. Neuroscientific research detects increases in activity in the limbic system when some images produce stronger emotional responses than others.⁸³ The increased activity occurs "when the process of emotion leads to the secretion of certain chemical substances in nuclei of the basal forebrain, hypothalamus, and brain stem, and to the subsequent delivery of those substances to several other brain regions."⁸⁴ Among the effects of such releases are changes in the speed with which images are produced (either slowing or accelerating the speed) and in the clarity of the images (either blurring or sharpening them).⁸⁵

The processing of inchoate images or objects through the limbic system takes time in at least two senses. Not only does it take time to become conscious of an object (cf. Libet's Puzzle), the integration of an

Philosophical Transactions of the Royal Society B: Biological Sciences. 364(1515). (February 12, 2009): 3.

⁸² The author goes on to link the process of selection with brain parts and chemical substrates. "Research using the Stroop task has shown the relevance of lateral prefrontal regions, the anterior cingulate cortex (ACC) and basal ganglia in mediating executive attention. The neurotransmitter most relevant in this case is dopamine (DA) from the ventral tegmental system, and its imbalances are known to affect executive functions." Maria Ruz. "Let the Brain Explain the Mind: The Case of Attention" in *Philosophical Psychology*. Vol.19, 4 (August 2006): 500.

⁸³ "Emotional reactions are the result of processing along the parallel neural pathway that goes through the limbic system. A familiar face, for example, creates more activity in these regions than an unfamiliar one, and a lover's face, or one that looks threatening, sets the circuitry zinging with excitement. As well as producing instant, specific reactions, such as running or reaching, emotional excitement brings about peripheral changes in the body state which prepares the body generally for 'fight, grab or flight' behaviour. These changes – mediated by hormones and neurotransmitters such as adrenalin and cortisol – feed back to the limbic system and amplify activity there." *Exploring Consciousness*, 196-197.

⁸⁴ *The Feeling of What Happens*, 80.

⁸⁵ Everyday examples of these effects are found in athletic competition when attention to details increases. So, professional tennis players learn to speedily anticipate opponents' moves, but the latter adjust by deliberately feigning moves to deceive the expectations of their opponents. To exemplify the blurring of images, consider how the emotionally 'flat' world of chronic depression conflates the varied details of everyday life, so that there are no moments of elation and none of great sorrow.

object cannot precede but must await development in the underlying manifold (cf. Csibra's study or the child's superego as far less differentiated than the considered moral judgments of the adult). When development does not occur (usually because of biological or psychosocial impediments), "the nonconscious neural base can send up its signals that express its starved affectivity or other demands for fuller living...."⁸⁶ Hallucinating during sensory deprivation experiments provides evidence of both frustrated demands and of a psychic operator inventing alternate ways of meeting them. Fixations at early stages of sexual development provide other signs of incomplete integrations of demands, acts and objects. Lonergan's remark about the superego causing trouble in adult years reflects similar insights into incomplete development.

With this introduction of the question of time, selectivity becomes a much more complex set of issues. Objects that could meet psychic demands may be missing; in their place may be substitutes that frustrate those demands and put the child on a wayward path extending into adult years. What I conclude is that the limbic system is part of the base for 'executive' acts of selecting and evaluating, but it and its neural and psychological correlates take time to develop, and the 'free variables' of any individual biography make multiple lines of integration possible.⁸⁷

To end with another static diagram of acts correlated with brain locales and neurochemical releases is perhaps at odds with my earlier emphasis on development. All the same, what neuroscientists do not know seems to me far greater than what they do know about how these variables interact in any preconceptual apprehending and evaluating of objects. A mapping of some of what they do know is a way of keeping track of the notable but limited distance they have traversed since earlier speculation on the *cogitativa* and other inner senses.

<i>Act of Apprehension</i>	<i>Brain Locales</i>	<i>Main Chemical Releases</i>
executive functions	prefrontal cortex	noradrenalin
(selection)	anterior cingulated cortex basal ganglia dorso-lateral PFC orbito-frontal cortex	dopamine
evaluation	limbic system	adrenalin cortisol

⁸⁶ *CWL* 3, 497.

⁸⁷ Again, I point out Narvaez's work. She focuses on key junctures in a child's development, the quality of caregiving the child receives at those times and the emotional integrations that tend to vary depending on what the child experiences at those junctures.

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