

# Thomistic Hylomorphism, Self-Determination, Neuroplasticity, and Grace: The Case of Addiction

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*Abstract:* This paper presents a Thomistic analysis of addiction that incorporates scientific, philosophical, and theological features of addiction. I will argue first, that a Thomistic hylomorphic anthropology provides a cogent explanation of the causal interactions between human action and neuroplasticity. I will employ Karol Wojtyła's account of self-determination to further clarify the kind of neuroplasticity involved in addiction. Next, I will elucidate how a Thomistic anthropology can accommodate, without reductionism, both the neurophysiological and psychological elements of addiction, and finally, I will make clear how Thomism can provide an ethics and a theology of grace that can be integrated with these ontological and scientific considerations into a holistic theory of addiction.

*“Psychological motives and bodily occasions may overlap because there is not a single impulse in a living body which is entirely fortuitous in relation to psychic intentions, not a single mental act which has not found at least its germ or its general outline in physiological tendencies”<sup>1</sup>*

—Maurice Merleau-Ponty

The theme of this year's *ACPA* conference, “Science, Reason, and Religion” provides an opportunity to engage a problem which demands an integrated answer, that is, an answer which requires a consideration of what science, philosophy, and religion can contribute to a particular problem. Addiction is just this sort of problem. This paper will adopt a unified psychosomatic approach to addiction and will attempt to articulate some of the diverse ways in which addictions involve neurological, psychological, moral, and spiritual aspects of the human person.<sup>2</sup> This holistic approach to addiction in terms of science, philosophy, and theology will be developed within the context of a Thomistic philosophical anthropology.

This paper will argue that a Thomistic hylomorphic anthropology provides a cogent explanation of the causal interactions between human action and neuroplasticity, can accommodate, without reductionism, both the neurophysiological and psychological elements of addiction, and is also able to show how ethics and a theology of grace can be integrated along with these ontological and scientific considerations into a holistic theory of addiction. This is an ambitious task for such a short space, and so many important details have been omitted for the sake of a holistic and unified account of addiction.

The paper is divided into four parts. The first part of this paper will show how a Thomistic doctrine of self-determination applies beyond the order of the psychological and can account for various alterations of our neurophysiology. We argue that by acting, persons not only become psychically inclined to good or evil activities, they also become *physiologically* ordered to these activities. This is because, on a hylomorphic view of man, a human person can be psychosomatically altered through acts of self-determination. In the second section we will contend that some instances of neuroplasticity are the neurophysiological results of human action as self-determination, which is made especially clear in the case of addictions. In short, addiction provides a clear case of what happens to the nervous system and psychological faculties of a human person who partakes in acts that are often deprived of moral goodness. The results are the numerous psychosomatic operational privations that are acquired by the addicted person. In the third part we will provide a holistic account of addiction within a Thomistic anthropology. We will present a sketch of how Thomism can provide a robust descriptive and explanatory philosophical anthropology that can give unity and clarity to the numerous ways that addictions introduce different operational privations within the human person. After suggesting a few of the ways in which addictions can be treated through pharmacology, moral formation and the solidarity of community, the final part of this paper will address the role that grace can play in the life of an addict.

### I. Self-Determination and Thomistic Philosophical Anthropology

Thomism is committed to the incarnate dimension of the person as a psychosomatic hylomorphic unity. The intellectual soul is the substantial form of the organic body with the potentiality for life. But to what degree do the accidental formal determinations of human action really alter our material substrate? A central topic in Karol Wojtyła's *The Acting Person* is the nature of *self-determination*.<sup>3</sup> The horizontal transcendence proper to the intentionality of conscious voluntary human action is well established in the Thomistic tradition. Consciously acting is always oriented towards some object; human persons transcend their own subjectivity in virtue of such intentional objects. In the *Acting Person*, Wojtyła seeks to emphasize and articulate more clearly the nature of vertical transcendence as well.<sup>4</sup> Through the efficacy of the will, the person transcends the natural determinations of the physical order and *becomes* the sort of person who chooses and performs certain axiologically specified activities. In acting, the person is self-determining. A person

is able to determine himself because he is able to act beyond the determinations of nature and become responsible for the activities he wills. One becomes good by doing good, and one becomes evil by doing evil.

The engagement in freedom is objectified—because of its lastingly repetitive effects, and conformably to the structure of self-determination—in the person and not only in the action, which is the transitive effect. It is in the modality of morality that this objectification becomes clearly apparent, when through an action that is either morally good or morally bad, man, as the person, himself becomes either morally good or morally evil. . . . [H]uman actions once performed do not vanish without a trace: they leave their moral value, which constitutes an objective reality intrinsically cohesive with the person, and thus a reality also profoundly subjective. Being a person, man is “somebody,” and being somebody, he may be either *good* or *bad*.<sup>5</sup>

The axiological character of the objects and activities that we determine ourselves to become through the efficacy of our free choices make us into what we are. But in what way do we become the activities we choose? How far down does the psychosomatic integration of the person through self-determination extend? Obviously there is a determination of the human person at the spiritual, moral and psychological order, but what about the body? Is it really reasonable to suppose that through our ordinary acts of free choice we are not only laying down tracks of a psychological character, but also of a physiological character?

It seems that anyone committed to a Thomistic anthropology must take seriously the penetrating dynamism of human action, that is, the transformative efficacy of self-determination that occurs in a human person who is consciously acting.<sup>6</sup> This integrated dynamism of the whole person finds its core in the Thomistic doctrine of the existential unification of form and matter as well as accidents and subject within the essential order of being.<sup>7</sup>

“To be” is to be cause, that is, both immanent cause of its own being and transitive cause of other beings through efficient causality. Matter itself is no longer here as a mere obstacle, blindly aspiring to form; it is also a help. Actively engaged in it, the soul is giving itself the body which it needs; it progressively builds it up through physiological operations which pave the way for intellectual operations.<sup>8</sup>

If our accidental acts did not formally alter and determine our substance, that is both our form and matter, then there would be a real vitiation of the hylomorphic unity of the person. All moral acts would involve nothing more than a purely formal alteration of the spiritual and psychic order of man. Such a thesis has more in common with dualism than Thomism. The human person in Aquinas’s anthropology is an almost completely integrated form and matter composite substance. That is, we are psychically incarnate, and all of our psychological activities—except acts

that essentially occur without matter and so have their being entirely separate from matter—have some physiological substrate and manifestation.<sup>9</sup>

But if this is true, then we should expect to find some manifestation of formal determinations within the material substrate. Indeed we do. Disciplined activities (intentionally and unintentionally developed dispositions and *habitus*) bestow proficiency and increased capacities at both the physiological and psychological levels. Those who exercise various muscle groups gain superior endurance, flexibility and dexterity in these muscles. Various activities can also heighten our sensory attention to the more subtle details present in different sensibilia, for instance, in musicians with audition and sommeliers in olfaction and gustation. These are all putative instances of psychosomatic sensory plasticity, that is, cases of physiological development or deterioration as the result of decisions to participate or not in various sorts of activities that involve the adaptation of our peripheral as well as of our central nervous system. But what provides our brain with the efficacy and formal unity to adapt in these ways? Do our self-determining human acts also significantly alter central features of our neurophysiology?

Addictions suggest an interesting case because they do not appear to fall clearly on the side of free choice or neuro-chemically determined compulsive behavior. It seems obvious in the majority of cases that addictions are initiated by non-compulsive decisions, yet they seem to result in motivations and cravings that undermine the person's ability to rationally deliberate and freely decide how to act. Addiction involves a kind of dialectic between initially voluntary choices and the whittling down of free choice to apparently compulsive behavior, which in extreme cases can even undermine choice. Even after years of treatment and abstinence, why is it that many "former" addicts can relapse following an encounter with a single evocative cue?<sup>10</sup> The choices we make that bring about our addictions to various activities or substances do alter us in very significant psychosomatic ways, but it is not entirely clear how this should be understood. If it is merely a matter of choice, why are addictive activities so difficult to avoid and overcome? The addict no longer appears to be in control of their behavior. This is why many theorists on addiction are inclined to conclude that for many addicts the causal gravity has shifted entirely to the central nervous system. On such an account, the person is no longer a causal actor; the brain alone seems to be the causal origin of the addict's behavior. But this cannot be the whole story. How is the nervous system so altered? Addictive behavior is acquired; it is not native to human persons from birth, let alone to their nervous system. We are not born with addictions to Internet browsing, pornography, drugs or gambling. Just as there are psychic alterations, there also seem to be some adaptations in the nervous system *because* and *in response to* the activities and decisions of the person.<sup>11</sup>

What we have articulated thus far should suggest the importance of the metaphysical axiom: an object is received into a recipient according to the mode of the recipient.<sup>12</sup> For instance, human action not only inculcates the inclinations of our practical reason and will; it also affects the inclinations of our emotions with respect to the objects of our actions. Our self-determining activities instill within our psychological faculties dispositions or *habitus* that lead to disciplines

and virtues or vices in our concupiscible and irascible powers.<sup>13</sup> Furthermore, on the physiological dimension, just as on the psychological dimension, these human actions of self-determination are received into the underlying material substrate of these powers, and there follows the alteration of various neural networks. In the next section we will clarify the nature of these neurological adaptations by turning to the phenomenon of neuroplasticity.

## II. Neuroplasticity, Hylomorphism, and Addiction

We have just presented a number of theses about the nature of self-determination in human persons and argued that, even in cases of addictive human behavior, human action alters significant features of the whole person as a hylomorphic entity, including the brain. In this section of the paper we will examine the empirical evidence on neuroplasticity, which, we argue, supports our claims about hylomorphism and self-determination, and is also resistant to reductionistic interpretations, especially in the case of addiction.

Our nervous system's capacity to be altered in virtue of human experience through actions and activations results in various neurophysiological adaptations. This phenomenon is commonly referred to as *neuroplasticity* or Hebbian learning, named after Donald Hebb, one of the earliest theorists on neurological adaptation. His theory is summarized in the often-quoted paraphrase, "neurons that fire together, wire together."<sup>14</sup> In what follows I will briefly summarize a number of the characteristics of neuroplasticity as it is presented by contemporary neuroscientists.

Empirical evidence has shown that the central and peripheral nervous system is able to adapt, not only to endogenous stimulation, but also to the exogenous stimulations of ordinary human experiences and behaviors. Early studies in the neurophysiology undergirding memory, such as inquiries about the hippocampus, motivated theoretical postulates about neural adaptation. Not only has this been confirmed, but numerous empirical investigations have also discovered other kinds of neural adaptation. The field of research dedicated to neuroplasticity has focused on uncovering the electrochemical mechanisms that underlie the transformative abilities of our nervous system to respond to experience. Neuroplasticity is found in such phenomena as the strengthening and growth of synaptic connections and the genesis of new neurons.<sup>15</sup> Furthermore, in some experimental cases with primates and ferrets, neuroscientists have even discovered rather surprising instances of cortical substitutions.<sup>16</sup> In short, the brain is not an isolated, predetermined structure; it is significantly altered by a myriad of extra-neural stimuli that determine the brain in a variety of different ways.

Empirical research on neuroplasticity is, like neuroscience itself, still very much in its infancy. The majority of positive empirical confirmations for studies on human beings are limited, although there is a considerable amount of evidence drawn from other mammalian brains.<sup>17</sup> Some neuroscientists have postulated that certain mechanisms of plasticity might be ubiquitous to the nervous system in all mammals.<sup>18</sup> What is especially significant for the purposes of our hylomorphic proposal

are the interlocking schemes of recurrence and inter-organizational manifestations of plasticity found within the biological hierarchical of any animal.

Given the . . . mutuality of feedback between levels, alterations at the genetic level can ultimately propagate up to the behavioral level. . . . In the same way, responses to the sensory environment and experience can percolate back down through the various levels to impact ultimately on the genetic level, leading, potentially, to changes in gene expression. . . . [E]ach level is acted upon directly by those above and below, and indirectly by all the others. This is true even at the two ends of the continuum, at both the gene and the behavioral level: the gene level is affected by the molecular/synapse level above it in the web, and by free radicals, toxins, radiation, and other energies at the 'extra'-gene level. By the same token, the behavioral level is directly affected by the whole [central nervous system] level below and the effects of the environment above. Since the whole system is nested, in some sense behavioral and environmental events must make their ways down through the levels to the genome . . . to affect genetic expression in at least some fraction of genes, perhaps as a function of age.<sup>19</sup>

Thomas Aquinas would not be surprised to see such a manifest instance of his favorite hylomorphically interpreted Dionysian principle.<sup>20</sup> There is a form matter causal order found within any physical hierarchy. The activities of the highest in a lower genus will be ordered to the formal principle that is lowest in the immediately higher genus. The neural substrate of our psychological faculties materially conditions the potential range of formal activities carried out by our faculties. But these activities also formally determine the whole central nervous system as the substrate these activities organize and pattern. By seeing, perceiving, desiring and acting towards some object, our psychic faculties cooperatively enlist the coordination and integration of different neural systems, e.g., the visual cortex, limbic system, sensorimotor cortex, etc. These latter systems are nested within networks of plastic neural circuitry that are variably patterned by the variable patterning of intramodal and intermodal systems interactions. "Interactions within a neural circuit also include cell to cell feedforward and feedback excitation and inhibition, lateral inhibition, etc. Alterations in the activity of any neuron in the circuit impacts circuit activity as a whole and, as a result, the activity of other component neurons."<sup>21</sup> These interlocking patterns of formally ordering and materially ordered causal principles continue to cascade down beyond the neuronal level to synaptic, genetic, molecular and further chemical and physical levels of interaction.<sup>22</sup>

We have just offered a brief account of how the phenomenon of neuroplasticity relates to hylomorphism. Let us now turn to the problem of how addiction fits into our account of human self-determination and neuroplasticity.

Among the different fields of neurophysiological inquiry, neuroscientists have dedicated a great deal of research into the mechanisms of neuroplasticity involved in drug addictions. Addiction, like memory, is a clear instance of acquired capacities

or appetites, and so offers promising avenues for investigating neuroplasticity.<sup>23</sup> The evidence in support of neuroplasticity in the case of drug addictions is extensive. It has been shown that “Addictive drugs induce long-term neuroadaptations at the structural, cellular, molecular, and genomic levels.”<sup>24</sup>

Empirical evidence has even recently challenged the predominant theoretical position that addiction is essentially a brain disease.<sup>25</sup> The problem with the brain disease theory is that the reward centers of the brain that are stimulated and modified through prolonged uses of addictive substances function in many of the same ways as reward centers function for all other pleasurable activities. The neural genesis and plasticity that takes place in response to a person who regularly participates in pleasurable activities like exercise, eating and drinking, reading, sex, gambling, shopping, browsing the internet, etc. is often indiscernible *in kind* from the similar phenomena found in substance addictions.<sup>26</sup> Such evidence goes a long way in supporting both that there are similar neurophysiological mechanisms involved in non-substance addictions (like pornography, gambling and video games), and that addictions must be approached in a holistic way that recognizes various addictions as phenomena that are not reducible to the brain.

Despite the fact that such evidence suggests that more is involved in neuroplasticity than the internal electrochemistry of the brain, many thinkers continue to interpret the phenomenon of neuroplasticity in a reductionist way. Joseph LeDoux concludes his impressive study on the synaptic self with the astonishingly reductionist assertion: “You are your synapses. They are who you are.”<sup>27</sup> Of course, there are exceptions to this reductionist interpretation of neuroplasticity. Richard Davidson, of the Laboratory for Affective Neuroscience, has stated otherwise:

[T]he fact of biological differences among individuals says nothing about the origins of those differences. A large corpus of neuroscience research over the past decade has underscored the importance of experiential determinants of the structure and function of the circuitry that has been featured here. Social influences on brain structure, activation patterns, neurogenesis, and even gene expression have all been demonstrated. . . . Although heritable influences surely occur, environmental influences, particularly when they occur repetitively over time, can be extremely powerful and produce lasting changes in the brain. The fact that such experiential influences occur provides an impetus for the development of neurally inspired training programs to transform dysfunctional affective styles into ones that may be more adaptive. . . . This is only a promissory note at the present time and requires much additional study and validation.<sup>28</sup>

It is surprising that those manifestations of neuroplasticity that occur as the *result* of addictive behaviors could be interpreted in any other way.<sup>29</sup> But this is not a recent philosophical mistake. And since the reductionistic objections have remained largely the same over the more than two thousand years of philosophical history, it is not surprising that the response of Socrates is still as formidable as any.

If someone said that without bones and sinews and all such things, I should not be able to do what I decided, he would be right, but surely to say that they are the cause of what I do, and not that I have chosen the best course, even though I act with my mind, is to speak very lazily and carelessly. Imagine not being able to distinguish the real cause from that without which the cause would not be able to act as a cause. It is what the majority appear to do, like people groping in the dark; they call it a cause, thus giving it a name that does not belong to it.<sup>30</sup>

Substituting the more known with the less known remains the spirit of materialism. Such thinkers continue to refuse to be *informed* by the insights found outside the caverns of the cranium. We should instead take seriously the advice that was given to us by Socrates in his last attempt to bring us outside the labyrinth of philosophical perplexity about the soul. I hope to show that our efforts at neurospelunking will not be in vain if we also allow our inquiries to be conducted under the light of formal causality.<sup>31</sup>

Thus far we have illustrated how many neural systems in the brain are plastic; i.e., they are able to be modified and to develop according to both intrinsic and extrinsic formal determinations. An overwhelming body of empirical evidence has substantiated the Hebbian theoretical axiom, “neurons that fire together, wire together.” But how and why they fire together remains a disputed point. How is the unusual synchrony of diverse cerebral parts causally coordinated? The nature of addiction presents us with a case of neuroplasticity that is resistant to reductionist interpretations. This resistance motivates our non-reductionist hylomorphic interpretation. What is involved in such an interpretation?

If we take seriously the phenomenon of addiction, we cannot accept proposals that entail its theoretical reduction or elimination. To capture the complex nature of addiction, we must adopt a holistic understanding of the integrated structure of the human person’s psychosomatic unity. We must have an ontology of the human person that is able to account for the complex but unified interaction that occurs within our psychosomatic constitution. The putative character of the neuroplasticity that is caused by addictions reveals that these physiological adaptations are determined, in the majority of cases, by the decisions and activities performed by human persons. The causal gravity does not find its source in the brain, but in the activities of the person, which require the brain, but also can transcend and determine it. I could not agree more with Eric LaRock that

The relationship between body and soul on Aquinas’s composite view may better be understood as the soul’s capacity to organize neurons (and other physical parts of the body) into definite living structures. The higher cognitive functions of the soul inform the brain to be definite neural patterns in acts of cognition. If living organization is a metaphysical feature of soul exhibited, at least in part, by the activities of neurons, then it is a feature associated with but not identical to neurons. The neural machinery

of the brain has living organization through the soul, not vice versa. The soul holds genuine causal control over the material parts of the material component of human nature and hence the rational soul of the human composite cannot be a supervenient or derivative, epiphenomenal effect of neural activity. Matter depends on form for its actuality, i.e., structure, organizing activities, and causal powers. From Aquinas's perspective, the human body exhibits many levels of organization—from elementary constituents of the brain's nucleons and electrons on up to atoms, molecular structures, neurons, and the cerebral excitation associated with higher cognition—because of the causal activity of form.<sup>32</sup>

Interpreting the scientific discoveries of neuroplasticity in terms of formal and material causality provides a promising answer to our initial question concerning self-determination. But we must also ask, to what extent do human activities determine the material substrate? How does the activity of formal action, in particular, through the operations of our powers, affect our neurophysiology?

Human action is able to determine a number of aspects of our psychosomatic constitution, including the re-organization of our nervous system in a variety of significant and empirically measurable ways. Likewise, just as this latter line of philosophical reasoning is complemented by scientific discoveries, so also Karol Wojtyła's account of self-determination, set, as it is, within a Thomistic philosophical anthropology, can provide explanations to these questions about the cause of the neurological adaptations manifested in the phenomenon of addiction.

A formal act is always received into the recipient according to the mode of the recipient, and when that recipient is the brain, it involves the neurological adaptation known as neuroplasticity. The repetitious activities that constitute the repertoire of human actions also determine the adaptation of different neurological pathways, which, in their own way, as material recipients, reinforce the physiological dimension of the actions of a human person, who is a psychosomatic whole. Addictions as disordered, acquired, autonomic drives are the result of psychic *habitus* of behavior that have also become dense physiologically inlaid neural systems. The outcome is that our material body comes to be appetitively inclined towards the same objects and actions that we have persistently chosen to perform over an extended period of time. Like our natural appetites for food and water, our body comes to depend upon the objects of the acquired autonomic drives. Appetition for such objects becomes a constitutional part of a complete human person, who has engrafted certain psychosomatic activities or behaviors into their hylomorphic constitution.

A lot more work needs to be done in order to show how hylomorphism would account for all the available empirical evidence, as well as how it would respond to various scientific and philosophical objections. These important questions and problems cannot be taken up here. This paper only aims to show how a Thomistic hylomorphism provides a fruitful way for understanding neuroplasticity in general, but especially with respect to particular cases of neuroplasticity, like addiction, that clearly result from human acts of self-determination.

Thus far, our analysis has left two important questions untouched. Why do addictions seem to be compulsive, and why are they so difficult to overcome? Can philosophy and science offer an integrated answer to why rationally chosen activities can become apparently compulsive and irreversible behaviors? This paper cannot give a complete answer to these crucial questions, but it will suggest the outline of an answer to both of them in the next section. This will require first clarifying what an addiction is.

### III. Addiction, Self-Determination, and Thomistic Philosophical Anthropology

There are a number of competing theories on addiction. This paper's holistic account integrates a number of features found in these different theories of addiction, but it has more in common with the visceral factor perspective of addiction than strong emotions, weak-willed, erroneous belief, or brain disease models of addiction.<sup>33</sup> Attempting to define and defend our notion of addiction in such a brief space would add more confusions than clarification. Instead, we will begin with a tentative account of addiction and an explanation of our terms; we will then proceed to show how this account fits within a Thomistic philosophical anthropology. For the purposes of this paper, *addiction* will be taken as an *acquired disordered drive*; this will require a brief explanation.<sup>34</sup>

Aquinas distinguishes three *appetitus* or affective appetites, (1) natural concupiscence, what we will call *drives*,<sup>35</sup> (2) somatic affections (*passio corporalis*),<sup>36</sup> and (3) passions or emotions (*passio animalis*), what we will often call *psychic affections*.<sup>37</sup> While Aquinas provides us with a detailed account of passions, his treatment of drives and somatic affections is not developed at length. The underdeveloped treatment of the Thomistic doctrine of drives and somatic affections requires a further articulation of how these distinct orders are integrated into each other, as well as how they are related to practical reason and addiction.

*Drives* are pre-conscious powers that serve our vegetative powers by activating other sensitive powers that bring into consciousness various vital needs for nourishment, sleep, and reproduction. Plants do not have vital drives, but many animals do. Drives have the distinctive function of placing *telic demands* of vital appetites into consciousness.<sup>38</sup> Drives are the psychological pivot between the nonconscious vegetative powers—which formally pattern the autonomic nervous system—and the activities of sentient consciousness—which also pattern, and yet are conditioned by, various features of our nervous system. Unlike the vegetative powers of growth, nutrition, metabolism, and reproduction, which are all ordered towards organic vital ends, drives are teleologically ordered towards conscious manifestations via various activation channels that bring to the conscious attention of the animal some telic demand or need for satiation. The telic specification of a drive does not presuppose the animal's cognition, and it is underdetermined with respect to the means of satiation. That is, drives indicate a vital appetitive need, but do not specify unconditionally the objects or activities that will satiate the vital appetite.

Drives are teleologically connected to different activation channels of conscious emergence, i.e., they have different avenues for being presented into our conscious life. There are two generic spheres of sentient consciousness that are principally activated by drives: interoceptive somatic affections and non-observational perceptions by the cogitative power. Somatic affections are as various as aches, pains, tickles, and other hedonic bodily affects, many of which pertain to the viscera. Cogitative perception involves spontaneous, non-introspective, aspectual, actional, and affectional apprehensions and judgments that in turn activate *psychic affections* (e.g., love, concupiscence, aversion, fear). The activation of both somatic affections and cogitative apprehensions by drives, make present unspecified telic demands to satiate some vital physiological needs. The telic demands communicated through visceral affections and cogitative apprehensions are often ambiguous and require a hermeneutical investigation before any pragmatic solution can be enacted.<sup>39</sup> In other cases there is no apparent ambiguity, and the telic demands are non-inferentially identified and cogitatively associated with the behavioral activities ordered to nourishment, sleep or sexual reproduction, because these activities normatively satiate the vital drive. This cogitative association of objects and activities with certain vital drives is a learned developmental association and specification of a multi-specifiable and poly-satisfied telic demand. Normatively, abdominal somatic affections are cogitatively associated with a vital drive for hunger, grogginess and fatigue are cogitatively associated with a vital drive for sleep, and cutaneous somatic affections in erogenous zones are cogitatively associated with reproductive drives. Again, because these cogitative associations are learned specifications of vital drives, they can be mistaken. For example, not all abdominal affections are activated by a drive for nourishment: some are caused by illness or organ malfunctions like appendicitis.

Vegetative powers and the vital drives they activate are autonomic; i.e., they are self-regulating and can function without any exogenous or other direct interjections by conscious human action.<sup>40</sup> However, most of them do require maintenance by activities carried out through conscious interactions with the environment, like acquiring nourishment or reproductive mates. Activated drives are acts of a human (*actus hominis*) that episodically recur in various degrees of intensity and are normatively satiated by actions that fulfill the specified vital drive. The intensity of a vital drive is often proportionate to the somatic affections it activates. When one prolongs the satiation of a vital appetite, it often increases the intensity of a drive and the activation channels it is teleologically connected with. A protracted vital drive for nourishment increases the intensity of the telic demand and activates further somatic affections beyond the visceral, like dizziness, headaches, fatigue, etc.

There are natural and acquired drives; some acquired drives are addictions because they are *dysordered*. They are *dysordered* because they are acquired autonomic drives that are both 1) contrary to the ends and proper order of the psychosomatic unity of the human person of which they perform a functional *part*, and 2) upon *acquisition*, they are difficult or arduous to overcome and reform. Addictions should be understood according to the psychological model of drives connected with our

vegetative powers for nourishment, sleep, and sex. There is also neurophysiological evidence to support that addictions co-opt the same behavior reinforcement centers that are involved in motivating the activities which satisfy our vital physiological needs for nourishment, sleep, and sex.<sup>41</sup>

This categorization of addiction preserves the truth that we can be morally culpable for our addictions and proto-addictions insofar as they deprive us of the goods proper to human persons. This account rejects the reductionist theory that addictions are brain diseases, although it recognizes and is able to account for why many addictions can cause biological and psychological diseases. It also allows us to identify a wide variety of activities as addictions, thus going beyond the conception that we can only be addicted to chemical substances.<sup>42</sup> Further, addictions are not vices, even though in most cases they are introduced into our psychosomatic constitution due to incontinent and vicious activities, especially when the latter become psychological *habitus* of our will and other cognitive or affective faculties. By denying that addiction is a vice, we are also contending that addiction falls outside of the psychological faculties where we might at first glance believe it is to be found, like as an emotion in the concupiscible power.<sup>43</sup>

Nonetheless it is important to see how this account of addiction preserves the fact that most addictions are the result of vice. Recall that our nutritive-reproductive drives, the seat of addiction, are the causal sources for many of our somatic affections and emotions. Hunger, thirst, and somatic exhaustion are all the results of our natural autonomic vital drives. These drives are able to cause or activate somatic affections and/or the cogitative power's activation of emotions that attract our conscious attention to some telic need for satiation. Natural drives for nourishment and sleep are not themselves conscious, but by evoking, say, somatic affections in one's stomach, we become consciously aware of such visceral factors. The activation of somatic affections alone, such as aches, pains, itches, vasomotor alterations, etc., however, is not sufficient for the conscious identification of them as hunger, thirst, etc. This is a further apprehension achieved by the cogitative power, which first aspectually or categorically perceives such visceral affections as "hunger," "thirst," "sexual arousal," and then evaluates or estimates such affections within a repertoire of actional-cum-affectual or axiological judgments as an object to be pragmatically sought or avoided by such-and-such an activity.<sup>44</sup> Only after the actional and affectual judgment of the cogitative power is there any activation on the part of the emotions.<sup>45</sup> The emotions react to the evaluation of the actional-cum-affectual percept, and this reaction often results in further somatic affections and an emotively affected fixation of our cogitative awareness upon our visceral feelings.

This point is important because the cogitative power is also able to participate in practical reasoning. In fact, in his treatments of practical reason, Aquinas often calls it the particular reason, because it provides the singular operable object, which is the term of practical reason.<sup>46</sup> In this way the cogitative power participates in and is integrated within consciousness by apprehending our somatic affections and providing the object of our emotions, and, also, through its subordination to universal reason, provides us with the minor premise of the practical syllogism. If

this subordination is inverted, as occurs in instances where our conscious cogitative awareness is distracted by, if not bound to, somatic aches or pains, then the person will begin subordinating universal and particular reason to the end of satiating such irrepressible visceral factors. Many will recognize this inverted subordination of intellect and will to the cogitative judgment and passions of the inner senses as the phenomenon of incontinence or *akrasia*. But what is characteristic of the peculiar kind of incontinence found in addictions?

Addictions, as dysordered acquired drives, can, like natural drives, act on our visceral affections. Yet they do so without a natural limit. Addictive appetites can become so dysordered that they activate vehement somatic affections that significantly reduce, if not eliminate, our ability to reason truthfully about practical matters. Drew Leder has written especially well on the variety of ways in which the body is present or absent. With respect to vehement somatic and visceral affections he writes:

When normal physiology reaches certain functional limits it seizes our attention. We remember the body at times of hunger, thirst, strong excretory needs, and the like. It is biologically adaptive that we recall our situation at such moments and that their unpleasantness exert a telic demand for removal. Cases of weakness, dizziness, or fatigue operate similarly.<sup>47</sup>

This paper contends that addictions co-opt the system of autonomic drives and their activation channels for somatic affections. The vehement presence of a somatic affection that one instinctually, or, more precisely, cogitatively associates with addictive cravings for certain substances or activities will narrow our conscious attention by imperatively directing us towards considering means for satiation. Vehement somatic affections are unpleasant, if not unbearable. Addictions that activate somatic affections of this kind involve reductions in the sphere of human action to a limited scope of attention, often dedicated to considering possible satiating behaviors. One's addictive cravings for the associated vicious activities are often manifested dynamically at the somatic level as nearly irrepressible visceral affections that seem to unconditionally demand satiation. The cogitative evaluation of these pains becomes so spontaneous and compulsive that the vehement antecedent passions restrict any further cognitive estimation, and there is limited fixation of awareness upon a particular object and the means by which to remove it.<sup>48</sup> By bringing into relief how the dynamism of our cognitive and affective powers of action and activation are etiologically related, we find a more amplified context for analyzing such problems as the apparent, if not real, compulsive character of addictive cravings, continence and incontinence, and antecedent and consequent passions.

For the serious addict, the field of evaluation and practical reason becomes truncated, and the attendance to right reason is diminished, if not omitted, by the telic demands communicated through painful somatic affections.<sup>49</sup> Satiating the telic demand appears as a good next-to-no-other; i.e., practical reason terminates in a judgment that this is good "and nothing else,"<sup>50</sup> and the object of the will is thereby bound by a disordered rationality to affirm or deny without the ability to

attend to alternative goods.<sup>51</sup> In such cases, the human person has been reduced as a moral being. Human persons should seek goods that are truly ordered within the teleological complex of human well-being (*eudaimonia*). Instead, such addicted persons become viciously neurotic, since their ability to reason practically, i.e., to consciously attend to alternative ends and means to these ends, is so impaired that they only seem able to use reason to subordinate other ends to their addiction and to give pseudo-justifications for their narrowing sphere of false goods. In this way, addiction can diminish our ability to form *true* rational evaluations and free-choices. However, addictions *as such* do not *eliminate* these operations, although addiction caused *diseases* can. In such extreme cases, the human person ceases to be an agent of truth and goodness, because the person has become incapable of distinguishing true from only apparently true reasons for action, and all of their behavior is determined without any voluntary choice with respect to some good.

Finally, we must briefly respond to the question, “why are addictions so difficult to overcome?” On the side of material causality, we must take note that despite the flexible range of neuroplasticity, some adaptations are more rigid than others. It may be that some addictions formally and materially determine the psychosomatic constitution of the person in such a way that addictions and their cue-dependent perceptions by the cogitative power reach points of no return. Cue-dependent cravings can be activated years after an addict has been abstinent from their addictive behavior. “Successful quitting is thus likely to require a substantial investment in change of environment and lifestyle because addiction ‘poisons’ person, places and things associated with it in the sense of imparting them with the ability to induce craving.”<sup>52</sup>

Addictions go deep. They infiltrate and affect our basic psychological abilities to categorically and axiologically identify patterns of behavior with respect to various objects in the world, as well as bind these perceptual cues with neurologically seated autonomic drives. These autonomic drives are able to operate independently of conscious interjections and can initiate cravings without exogenous stimulation. In the case of addictions we have manifest instances that display our autonomic drives ability to submit our conscious operations to the telic demands of electrochemical equilibria and recurrent schemes of activity proper to the peripheral and central nervous systems.

Overcoming addictions requires a proper diagnosis of the problem. One must make clear both its etiological root as well as the salient impediments to recovery, which, if not removed, can take the unwary sober addict by surprise, who then, often enough, relapses. Without a holistic approach to addictions, diagnostic omissions will be common, and recovery will only be partial. In other words, there will normally be numerous means of treatment for addictions that are required, so as to target and reform the numerous ways in which addictions affect us. Pharmacological treatments of addictions are often helpful and sometimes essential. Nevertheless, treatment of addiction requires more than pharmacological inhibitions, it also requires re-forming our perceptual repertoire of categorical and actional percepts or cues that stimulate cravings within an addict’s acquired drives. This is difficult because such perceptions are integrated into our very way of life. To reform the matter, we must also reform

the form, and this requires changing one's life by re-ordaining the values and goods that one chooses to seek by placing them within their proper teleological order.<sup>53</sup> In many cases it also requires uncovering and correcting the initial impetus that led to and started their addictive behavior in the first place.

Addicts, like all human persons, are dependent rational animals and the likelihood of recovery is increased through human solidarity in a community that acknowledges a true teleological order of values and goods. Addicts have dug themselves into a pit; without the help of family, friends, and a community who participate in a common set of goods, the addict is unlikely to find the social and psychological resources that are a necessary and essential complement to pharmacological treatments. We repeat, to reform the matter, one must also reform the form. As much as the neurological and psychological mutually condition each other, the psychological and the social also mutually condition one another. Nonetheless, even with the best treatment resources available, recovery is very difficult, and success is rarely achieved in extreme cases of addiction.

#### IV. Addiction and Grace

We hope that this paper has made clear a few of the ways that a Thomistic hylo-morphic ontology of the human person provides a robust and unified philosophical framework for analyzing the complex interlocking causal orders involved in the moral psychology of human action, self-determination, addiction, and neural plasticity, and offers a promising alternative to dualism or reductive physicalism. Nevertheless, this integrated discussion of how Thomistic philosophical anthropology and neuroscience are related to addiction would not be complete without mentioning how the religious sphere offers us some hope in extreme cases of addiction. In addition to philosophical analysis, Thomism also provides us with a powerful theological doctrine on the grace that perfects nature, even in its most deteriorated and dejected forms.<sup>54</sup> The grace of Christ is a free gift, which is needed by us all, but it is needed in a special way for those suffering from addictions. Philosophy and science only bring us so far, and both remain open to theological insight and guidance. Without the intervention of Divine grace, some humans would never be able to achieve even the most minimal natural ends. We cannot expect it, but God can enter in and restore the horizon of human practical reason and action by returning it to its natural course.

We must also recognize that addictions are often the result of sin. Even though not all addictions are caused by evil actions and vice, most are. Inasmuch as addictions are related to sin, they can and do disorder us with respect to our supernatural end. The depravity of the objects and activities which such persons have chosen, have corrupted not only their practical reasoning and emotions; they have also infiltrated their bodies, rendering entire persons deprived of their full natural vitality. It is through their evil choices that their entire being, as psychosomatic, has taken on the characteristic privations that are so many manifestations of evil. This is especially so in the case of addictions that have caused diseases, either physiological, like liver disease, or psychological, like psychosis.

Despite such dire circumstances, we must recognize that not all of these incapacities are absolute. Where human optimism would be foolhardy, one's hope in Christ will not be in vain. Grace is able to give life again to an otherwise operationally diminished practical reason. Where sin has abounded, grace is able to abound even more. Dependent rational animals are able to find solace in suffering and liberty in the grace of Christ, which is most especially given to us through living within the *Ecclesia* and partaking of Her sacraments. Through charity, addicts are able to receive the infused virtues, which, though they do not necessarily remove the acquired inclinations towards objects of evil, they do miraculously give one the ability to avoid such temptations.<sup>55</sup> Even with grace, overcoming an addiction remains an upward battle with a vector well beyond the addict's deficient natural capacities. But such is the vector of Calvary for us all. And sometimes, the way of the cross is only taken up because one has finally come to see that truly it is His yoke that is easy, and that such burdens, by his grace alone, are able to become light.<sup>56</sup>

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### Notes

1. Maurice Merleau-Ponty, *Phenomenology of Perception*, trans. Colin Smith (New York: Routledge, 1962, Reprint 2002), 101.

2. I will not take up refuting the numerous reductionist accounts of addiction, such as the disease theory. A substantial amount of literature exists which has sufficiently addressed the problems with the disease theory of addiction. Cf. Jon Elster, *Strong Feelings: Emotion, Addiction, and Human Behavior* (Cambridge, Mass.: The MIT Press, 1999); George Loewenstein, "A Visceral Account of Addiction" In *Getting Hooked: Rationality and Addiction*, ed. J. Elster and O. J. Skog (Cambridge: Cambridge University Press, 1999), 235–264; Bennett Foddy and Julian Savulescu "A Liberal Account of Addiction" *Philosophy, Psychiatry, and Psychology* 17.1 (March 2010): 1–22.

3. Karol Wojtyła *The Acting Person*, definitive ed., trans. Andrzej Potocki, in *Analecta Husserliana: The Yearbook of Phenomenological Research* 10, ed. AnnaTeresa Tymieniecka (Boston: D. Reidel Publishing, 1977), xiii. Translated and revised from *Osoba i czyn* (Krakow: Polskie Towarzystwo Teologiczne, 1969). See also, Norris Clarke, *Person and Being (Aquinas Lecture)* (Marquette University Press, 1993).

4. "The transcendence we are now considering is the fruit of self-determination; the person transcends his structural boundaries through the capacity to exercise freedom; of being free in the process of *acting*, and not only in the intentional direction of willing toward an external object. This kind of transcendence we shall call 'vertical transcendences,' in contrast to the other kind of transcendence that we have called horizontal" *The Acting Person*, 119. Cf. Karol Wojtyła, "The Personal Structure of Self-Determination" in *Person and Community: Selected Essays*, volume 4 of Catholic Thought from Lublin, trans. Theresa Sandok and ed. Andrew N. Woznicki (New York: Peter Lang, 1993), 190–193.

5. Wojtyła, *The Acting Person*, 151. See also, Yves Simon, *Freedom of Choice*, ed. Peter Wolf (New York: Fordham University Press, 1969, 1987).

6. “We find a great wealth of various types of dynamisms at both the somatic and the psychical levels; and it is due to integration that these dynamisms become ‘personal’ and related as well as subordinated to the transcendence of the person in the action. They thus find their place in the integral structure of the self-governance and self-possession of the person. Our analysis of the integration of the acting person on both the psychical and the somatic levels has . . . revealed the complexity in man.” Wojtyła, *The Acting Person*, 256. Cf. Thomas Aquinas, *ST I-II*.17.1; 17.4; 18.6; 20.1–3; *de Malo* 2.2ad5, ad 1.

7. Cf. Wojtyła, *The Acting Person*, 71–85ff. “[T]he human being as the person—seen in its ontological basic structure—is the subject of both existence and acting, though it is important to note that the existence proper to him is *personal* and not merely individual—unlike that of an ontologically founded merely individual type of being. Consequently, the action—whereby is meant all the dynamism of man including his acting as well as what happens in him—is also personal” p. 74. “There is a real difference between the two manifestations of man, ‘man as existing’ and ‘man acting,’ even though it is the same man who exists and who acts. When man acts, his acting also has a kind of derivative existence of its own. The existence of the acting depends indeed on the existence of man, and it is here that there lies the proper moment of their existential causality. The existence of acting flows from and is subsequent to the existence of man; it is its consequence or effect” p. 82.

8. Etienne Gilson, *Being and Some Philosophers*, 2nd ed. (Toronto: PIMS, 1952), 186.

9. Cf. Thomas Aquinas, *Summa theologiae* (=ST) I.75.1, 2; 76.1, 8; 85.7.

10. Cf. Hugh Garavan, et al. “Cue-Induced Cocaine Craving: Neuroanatomical Specificity for Drug Users and Drug Stimuli” *American Journal of Psychiatry* 157 (2000): 1789–1798; Goldstein, et al. “Dopaminergic Response to Drug Words in Cocaine Addiction” *The Journal of Neuroscience* 29.1 (May 6 2009): 6001–6006. More philosophically integrated accounts of cue-dependent cravings can be found in Loewenstein, “A Visceral Account of Addiction”; Foddy and Savulescu “A Liberal Account of Addiction”; and Elster, *Strong Feelings*.

11. These claims are defended at length in Elster, *Strong Feelings*, esp. chap. 5.

12. Cf. Thomas Aquinas, *de Veritate* (=DV) 2.2.ad5; 20.4ad1; *de Malo* 3.13ad 2; *In de Anima* II. It. 24, n.2; *ST I*.79.6; 89.4; I-II.67.2; III.54.2ad1; *In Liber de Causis* 12.

13. Cf. Thomas Aquinas, *ST I*.81.3; I-II.17.7; 17.9; 30.3; 77.1–2.

14. Donald Hebb, *The Organization of Behavior: A Neuropsychological Theory*, (New York: John Wiley and Sons, Reprinted 1961; 1967, Originally published in 1949).

15. Cf. Eric Kandel, et al. *Principles of Neural Science*, 4th ed. (McGraw-Hill Medical, 2000) 34ff.

16. J. Sharma, A. Angelucci, and M. Sur, “Induction of Visual Orientation Modules in Auditory Cortex,” *Nature* 404 (2000): 841–847. For psychological discussions of neuroplasticity see: Jeffrey Schwartz, “A Role for Volition and Attention in the Generation of New Brain Circuitry: Toward A Neurobiology of Mental Force” *Journal of Consciousness Studies* 6.8/9 (1999): 115–142; Jeffrey Schwartz and Sharon Begley, *The Mind and the Brain: Neuroplasticity and the Power of Mental Force* (New York: Regan Books, 2002). Schwartz’s work is significant both for its scientific and philosophical challenges and for its practical results, especially for OCD. However, despite the important practical outcomes of Schwartz’s treatment methods, there are problems with his homunculus interpretations of mindfulness and neural plasticity, and his reliance on William James’s confused accounts of attention and will. For criticism of these approaches to philosophy and cognitive neuroscience, see M. R. Bennett and P. M. S.

Hacker, *The Philosophical Foundations of Neuroscience* (Malden, Mass.: Blackwell, 2003). Even though there are many important parallels between Schwartz's account of "mental force" and our notion of "self-determination," nonetheless, a Thomistic account of self-determination, especially when interpreted through the insights of Anscombe, presents a very different theoretical account of intentional human action from Schwartz's Jamesian-inspired account of volition. For further significant philosophical discussions on neuroplasticity, which also address the results of Sur's studies on ferrets see, Alva Noë, *Out of Our Heads: Why You are Not Your Brain, and Other Lessons from the Biology of Consciousness* (New York: Hill and Wang, 2009); Alva Noë and Evan Thompson, "Are There Neural Correlates of Consciousness?" *Journal of Consciousness Studies* 11.1 (2004): 3–28; Alva Noë and Susan Hurley, "Neural Plasticity and Consciousness" *Biology and Philosophy* 18 (2003): 131–168.

17. Cf. S. F. Cooke and T. V. P. Bliss, "Plasticity In the Human Central Nervous System" *Brain* 129 (2006): 1659–1673; Mark R. Rosenzweig and Edward L. Bennett, "Psychobiology of Plasticity: Effects of Training and Experience on Brain and Behavior" *Behavioural Brain Research* 78 (1996): 57–65. For an attempt to evaluate this research program systematically, see Christopher A. Shaw and Jill McEachern (eds.) *Toward a Theory of Neuroplasticity* (Psychology Press, 2001).

18. "LTP and LTD, the long-term potentiation and depression of excitatory synaptic transmission, are widespread phenomena expressed at possibly every excitatory synapse in the mammalian brain" Robert C. Malenka and Mark F. Bear "LTP and LTD: An Embarrassment of Riches" *Neuron* 44 (September 2004): 5–21, p. 5.

19. Christopher Shaw and Jill McEachern "Traversing Levels of Organization: A Theory of Neuronal Plasticity and Stability" in *Toward a Theory of Neuroplasticity*, chap. 29, 427–447 at 441.

20. "*Supremum infimi ordinis attingit infimum supremi*" Aquinas, *De Spir. Crea.* 2; *In III Sent.*, 25. 1.2; *DV* 15.1; 16. 1; *Summa Contra Gentiles* (=SCG) I. 57. 480; II. 91. 1775; III. 49. 2271; *ST I.* 78.2; *In Divinis Nominibus* VII. 4. 733; *In de Causis* 19, 352. Cf. Fran O'Rourke, *Pseudo-Dionysius and the Metaphysics of Aquinas* (Indiana: University of Notre Dame Press, 2005), 263–274.

21. Cf. Shaw and McEachern "Traversing Levels of Organization," 438.

22. *Ibid.*, 438–443. Philosophically we would contend that such causal hierarchies should be understood hylomorphically or in terms of something like Lonergan's systematic and non-systematic causal schemas within different explanatory genera. Lonergan has argued that, "an acknowledgement of the non-systematic leads to an affirmation of successive levels of scientific inquiry. If the non-systematic exists on the level of physics, then on that level there are coincidental manifolds that can be systematized by a higher chemical level without violating any physical law. If the non-systematic exists on the level of chemistry, then on that level there are coincidental manifolds that can be systematized by a higher biological level without violating any chemical law. If the non-systematic exists on the level of biology, then on that level there are coincidental manifolds that can be systematized by a higher psychic level without violating any biological law. If the non-systematic exists on the level of the psyche, then on that level there are coincidental manifolds that can be systematized by a higher level of insight and reflection, deliberation and choice, without violating any law of the psyche. . . . Again, an acknowledgement that the real is the verified makes it possible to affirm the reality no less of the higher system than of the underlying manifold. The chemical is as real as the physical; the biological as real as the chemical; the psychic as real as the biological; and

insight as real as the psychic. At once the psychogenic ceases to be merely a name, for the psychic becomes a real source of organization that controls underlying manifolds in a manner beyond the reach of their laws." Bernard Lonergan, *Insight: A Study of Human Understanding* (Revised 2nd ed., Philosophical Library, 1957), 205–206, cf. chaps. 6, 8, and 15.

23. Cf. Richard J. Davidson, et al., "Emotion, Plasticity, Context, and Regulation: Perspectives From Affective Neuroscience" *Psychological Bulletin* 126.6 (2000): 890–909; Richard J. Davidson, "Affective Neuroscience and Psychophysiology: Toward a Synthesis" (Presidential Address, 2000) *Psychophysiology* 40 (2003): 655–665; Anne-Noël Samaha, et al., "The Rate of Cocaine Administration Alters Gene Regulation and Behavioral Plasticity: Implications for Addiction" *The Journal of Neuroscience* 24, no. 28 (July 14, 2004): 6362–6370; Francis J. White, "A Behavioral/Systems Approach to the Neuroscience of Drug Addiction" *The Journal of Neuroscience* 22.9 (May 1, 2002): 3303–3305; Ann E. Kelley and Kent C. Berridge, "The Neuroscience of Natural Rewards: Relevance to Addictive Drugs" *The Journal of Neuroscience* 22.9 (May 1, 2002): 3306–3311; Steven E. Hyman, "The Neurobiology of Addiction: Implications for Voluntary Control of Behavior," *The American Journal of Bioethics* 7.1 (2007): 8–11.

24. Kelley and Berridge, "The Neuroscience of Natural Rewards: Relevance to Addictive Drugs," 3308.

25. For a series of articles which take up this contention see "Addiction, Adherence, and Awareness," *Philosophy, Psychiatry, and Psychology* 17.1 (2010); especially Foddy and Savulescu "A Liberal Account of Addiction, 1–22.

26. Most studies in substance abuse focus on the mesolimbic dopamine receptors, which are the central neurophysiological systems that regulate the reinforcement of behavior. However, not just addictive substances involve the stimulation of dopamine receptors and reuptakes, "any pleasurable experience [like sex, gambling, consumption of foods, etc.] causes dopamine to be released within the brain, activating these 'reward' pathways" "A Liberal Account of Addiction," 4. Both addictive substances and behaviors, as well as any pleasurable activities, can sensitize receptors and so result in the reinforcement of synaptic connections that are neurologically involved in the biological substrates of our human experiences. Though it remains true that addictive substances, unlike non-substance based behavioral addictions, often introduce foreign or alternative ways for stimulating these neural networks. Cocaine, for example, blocks pre-synaptic reuptake of dopamine causing a flood of dopamine transmitters to remain in the synaptic cleft without being recycled.

27. Joseph LeDoux *The Synaptic Self: How Our Brains Become Who We Are* (Viking, 2002), 324.

28. Richard Davidson, "Toward a Biology of Personality and Emotion" *Annals of the New York Academy of Sciences* 935 (2001):191–207; 206–207.

29. Cf. Alva Noë, *Out of Our Heads*, esp. chap. 3. See also the related critiques of reductionism in Bennett and Hacker, *The Philosophical Foundations of Neuroscience*; David Braine, *The Human Person: Animal and Spirit* (Indiana: Notre Dame University Press, 1992); and David Oderberg, *Real Essentialism* (New York: Routledge, 2007).

30. Plato, *Phaedo*, trans. G. M. A. Grube (Hackett, 1977) 99e.

31. Eric LaRock's recent work also avails Aristotelian formal causality to resolve problems in neuroscience (especially in visual consciousness and human emotions), which cannot be resolved on reductionistic models. Eric LaRock, "Is Consciousness Really a Brain Process?" *International Philosophical Quarterly* 48 (2008): 201–229; eadem, "Intrinsic Perspectives,

Object Feature Binding, and Visual Consciousness” *Theory and Psychology* 17 (2007): 799–809; eadem, “Disambiguation, Binding, and the Unity of Visual Consciousness” *Theory and Psychology* 17 (2007): 747–777; eadem, “Why Neural Synchrony Fails to Explain the Unity of Visual Consciousness” *Behavior and Philosophy* 34 (2006): 39–58; Eric LaRock and Konstantinos Kafetsios, “Cognition and Emotion: Aristotelian Affinities with Contemporary Emotion Research” *Theory and Psychology* 15 (2005): 639–657; eadem, “Against the Functional Reading of Aristotle’s Philosophy of Perception and Emotion” *International Philosophical Quarterly* 42 (2002): 231–258; eadem, “Dualistic Interaction, Neural Dependence, and Aquinas’s Composite View” *Philosophia Christi* 3, (2001): 459–472. See also the recent monograph of William Jaworski, *Philosophy of Mind: A Comprehensive Introduction*. (Malden, Mass.: Wiley-Blackwell, 2011), chaps. 10–11.

32. LaRock, “Dualistic Interaction, Neural Dependence, and Aquinas’s Composite View,” 271–272.

33. Cf. Elster, *Strong Feelings*, chap. 3.3, 58–76; Lowenstein “A Visceral Account of Addiction.” This paper’s Thomistic account of addiction has more in common with Elster’s presentation than with Lowenstein’s. It also resembles, though to a lesser degree, the doctrine presented in Gerald May, *Addiction and Grace: Love and Spirituality in the Healing of Addictions* (San Francisco: HarperOne, Reprint, 2007).

34. The account of addiction adopted in this paper is treated and defended at length in the forthcoming article, “The *Ratio* of Addiction within a Thomistic Philosophical Anthropology: A Proposal.”

35. Cf. *ST* I.78.1 (esp. ad3); I-II.26.1; 30.1ad3; 30.3; 35.2; 35.7.

36. Cf. Aquinas, *DV* 26. 1–3; 9; *ST* I-II. 22.2ad3; 28.5; 35.2; III. 15.4.

37. Aquinas’s most extended treatment of the emotions is found in the treatise on the passion, *ST* I-II. qq. 22–48. Let us also note here that the details and telescopic analysis of psychology faculties and their operations should not cause the reader to overlook the fact that, properly speaking, it is not the cogitative that perceives, the concupiscible power that desires, or the will that acts, but it is the human person that perceives, has desires, and acts, in virtue of such powers. The synecdochical expressions we employ within our discussions of faculties and operations should not be taken as challenges to the integrated unity of the human person and his operations.

38. The notion of a *telic demand* is from Drew Leder, *The Absent Body* (Chicago: University of Chicago, 1990): “Pain exerts a *telic demand* upon us. While calling us to the now, its distasteful quality also establishes a futural goal: to be free of pain. . . . The sensory aversiveness and world disruptions effected by pain cry out for removal” (77). Leder subdivides telic demands into two moments, the hermeneutical and the pragmatic, which I integrate into aspectual and actional intentions formed by the inner sense faculty Aquinas calls the cogitative power. I use telic demands in a way that synthesizes features of both Leder’s idea and Lonergan’s account of *neural demand functions* in *Insight*, chap.6.

39. Cf. Drew Leder, *The Absent Body*, 77–78ff.

40. Though causally coordinated with the autonomic nervous system in a number of respects, these autonomic psychological *powers* should not be identified with the autonomic nervous system.

41. Cf. George Loewenstein, “Out of control: Visceral Influences on Behavior” *Organizational Behavior and Human Decision Processes* 65 (1996): 272–292 and, eadem, “A Visceral Account of Addiction.”

42. Substance based addictions like nicotine, alcohol, and cocaine were thought to be normative, but recently the notion of addiction has been, and I believe should be, extended to include gambling, aberrant sexual behavior, pornography, cutting, exercise, video games, T.V. watching, internet browsing, and perhaps even eating disorders such as anorexia or bulimia. Though the latter are certainly kinds of behavioral disorders, it is not clear if they should be classified as addictions. Concerning the distinction between substance and behavioral addictions, and its potential deficiencies see Elster, *Strong Feelings*, 58; Foddy and Savulescu "A Liberal Account of Addiction," *passim*.

43. There are extreme instances where addictions are involuntarily acquired, such as when the consumption of addictive substances is forced upon victims. This unfortunately occurs too frequently in cases of sex slave prostitution and as a means of torture. Also, many addicts who are trying to quit no longer desire, i.e., have an emotional attraction to the addictive substance or activity, yet the addict still has a strong drive or inclination for it. These are just a few of the many reasons why we have not placed the locus of addiction in the concupiscible power.

44. Cf. *DV* 10.5; *ST* I.78.4; *In DA* II.13. In these passages Aquinas makes it clear that the proper object of the cogitative power is a singular *per accidens* sensible which is neither the colored, moving, shaped magnitude of *per se* proper and common sensibles, but is *this man*, which happens to be *per se* sensible as white, a certain shaped magnitude, and in motion. Essentially speaking, the proper object of the cogitative power is a singular intention. These intentions admit of a division into aspectual, actional, and affectional intentions, which are taken up in detail in the forthcoming paper, "Perception and the *Vis Cogitativa*: A Thomistic Analysis of Aspectual, Actional, and Affectional Percepts."

45. Cf. Thomas Aquinas, *In II Sent.* 24.2.1; ad2; *In III Sent.*, 17.1.1.2ad 2; *In IV Sent.* 49.2.2; *ST* I.81.3 (esp. ad.2); *ST* I-II.22.2; *DSC* 9; *DQVCI* 4. There are a number of recent articles and books that treat this feature of the cogitative power and the object of the passions. My account differs considerably with Robert Miner, but is quite similar to the doctrine expressed by Diana Cates and Michael Stock. See: Diana Cates, *Aquinas on the Emotions: A Religious-Ethical Inquiry* (Georgetown University Press, 2009); Peter King, "Aquinas on the Passions" in *Aquinas's Moral Theory*, ed. Scott MacDonald and Eleonore Stump (Cornell University Press, 1998), 101–132; Robert Miner, *Thomas Aquinas on the Passions* (Cambridge University Press, 2009); Michael Stock, "Sense Consciousness According to St. Thomas" *The Thomist* 21.4 (1958): 415–486.

46. "Ratio autem practica quedam est *uniuersalis* et quedam *particularis* (universalis quidem sicut que *dicit quod oportet talem tale agere*, sicut quod oportet filium honorare parentem; ratio autem particularis, *quod hoc quidem tale et ego talis*, puta quod ego filius hunc honorem nunc debeo exhibere parenti)" *In DA* III. 10 (434a16) (Leonine, 251:128–133); "ut sic fiat quidam syllogismus cuius maior sit *uniuersalis* quae est *sententia mentis*, minor autem singularis quae est *apprehensio particularis rationis*, conclusio vero electio singularis operis, ut patet per id quod habetur in III De anima." *DV* 10.5, (Leonine, 309:94–99). Both in his commentary on this text from the *De Anima* and in *De Veritate*, Aquinas distributes practical reason into the "universal reason" and the "particular reason," which is one of many ways in which Aquinas distinguishes the intellect from the cogitative power. Cf. Aquinas, *ST* I.81.3; 86.1; II-II. 49.2; 5; *In VI Ethics*, lt. 1, n. 1123; lt. 7 nn. 1213–1215; lt. 9, nn. 1247–1256.

47. Drew Leder, *The Absent Body*, 84.

48. Cf. Aquinas, *De Malo* 3.4; *ST* I-II. 77.6.

49. Addictions range in intensity throughout their development just as psychic *habitus* do. Likewise, just as natural appetites for nourishment, sleep and sex can be resisted and ignored by various means, so too with acquired proto-addictions, like excessive acquired drives for exercise, caffeine, and social stimulation or solitude. Just as one can quell hunger or a sexual urge, we can ignore or put out of mind appetitive promptings. We can do this prudently or imprudently. *Dysorder* with respect to these appetites' appropriate function is revealed when we are no longer able to do this with relative ease. It should be noted, however, that moderately intense drives in one's acquired appetites for exercise or hygiene could be rationally ordered and so be signs of virtue, not vice, and especially not of disease.

50. Cf. Steve Jensen, "The Error of the Passions," *The Thomist* 73 (2009): 349–79.

51. Even if an addictive appetite is evaluated as one to be avoided, the somatic affections caused by the addictive appetites might manifest a vehement need and telic demand to overcome the pain, which is often physiologically debilitating, recurrent and sometimes incapacitating if avoided and not satiated. Such extreme cases of addiction can often further result in diseases that are caused by addictions.

52. Elster, *Strong Feelings*, 245.

53. This is difficult to achieve, especially in the absence of the support provided by friends and family. In *Dependent Rational Animals*, Alasdair MacIntyre discusses how solidarity and communities are needed for human beings to practice the virtues and for ordering their lives towards their proper ends. The importance of solidarity has proved to be especially fruitful for treating addictions, as has been demonstrated by the success of groups like AA.

54. For Aquinas's principal treatment of grace, see *ST I-II*. 109–114. He then takes up the nature of grace throughout the rest of the *Summa theologiae*, but especially in his extended treatments of the theological virtues, Christology, and sacramental theology.

55. "Those emotions that incline us towards evil are not completely removed either through acquired or through infused virtue, except, maybe, by a miracle. For the struggle of the flesh against the spirit always remains, even when we possess moral virtue. St Paul says about this in Galatians, 5:17 'The flesh lusts against the spirit, and the spirit against the flesh.' But emotions of this sort are modified both by acquired and by infused virtues, so that we are not stirred by them in an unrestrained way. However, (i) acquired virtue achieves this in one way and (ii) infused virtue in another. (i) For *acquired* virtue is effective to the extent that the struggle is felt less. This comes about from its own particular cause: when someone becomes accustomed to virtue through repeated actions, they then become unaccustomed to obey those emotions, and accustomed to resist them. The consequence of this is that they feel less troubled by them. (ii) *Infused* virtue, by contrast, is effective to the extent that even if emotions of this sort are felt, they do not take control. For infused virtue means that we refrain totally from obeying sinful desires, and as long as it remains in us, we do so unflinchingly. (Acquired virtue can fail in this way, but rarely, in the way that all natural inclinations occasionally let us down.)" Thomas Aquinas, *On the Virtues in Common*, 10 ad14, in *Disputed Questions on the Virtues*, ed., and trans., E. M. Atkins (New York: Cambridge University Press, 2005).

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