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Techne in Affective Posthumanism and AI Artefacts: More (or Less) than Human?

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Abstract

In affective neuroscience, constructivist models are acutely influenced by the modern technological evolution, which underwrites an ongoing epistemological substitution of techne for episteme. Evidenced symptomatically in the influence of artificial intelligence (AI), affective artefacts, these models inform an ontological incursion of techne seen to coincide with posthumanist aspirations and anthropology. It is from the perspective of this neuroscientific techne that posthumanism views the human being as increasingly ill adapted to the modern technological civilization, which, conversely, is understood to require a technical governance of the sort envisioned through AI. Among the projects thought necessary for implementing this framework is a recasting of the human emotional spectrum. Revealed through its techne recasting, however, are explanatory commitments to a metaphysic of extrinsic and contiguous causes, where malleability is ontologically constitutive. Aligned with posthumanist assertions malleability is invoked to argue for a rapid advance of the human form, normatively driven by enlightenment ideals. The ontological claim, however, dispenses with the stability of an a priori, intersubjective and interrelational metaphysical form that undergirds the emotions, leading to the collapse of a definitional anthropos. This paper will argue that techne models of the emotions selectively endorse philosophy of science commitments, thereby introducing a normative inversion that deconstructs the notion of anthropology pursued in posthumanist aspirations.

Keywords

Affective AI, Techne Constructivism, Posthumanism, Causation Explanans, Substance Ontology, Process Ontology, Biological Autonomy

1. Introduction

Constructivist epistemology is traditionally understood to be a philosophy of

science, which maintains that scientific knowledge is constructed through models of the natural world. For behavior, such models currently derive from neuroscience, where they are employed to understand the ontological and anthropological status of the human being through the discipline's epistemological structure. In affective neuroscience, however, constructivist modeling is acutely influenced by the technological evolution that accompanies neuroscientific conceptions, and that now underwrites an epistemological substitution of techne for episteme. Evidenced symptomatically in the influence of artificial intelligence (AI), affective artefacts, these constructivist models inform an ontological incursion of techne seen to coincide with posthumanist aspirations and anthropology (Rae, 2014; Onishi, 2011).

Emblematic of the ontological incursion is the appropriation of novel, widely endorsed, neuroscientific conceptions of the emotions. Affective neuroscience proposes, notably, that emotions serve behavioral functions promoting environmental adaptations (Panksepp, 1998). Their response is shaped in terms of habituating mechanisms like Hebbian conditioning, which enables their stabilization and operation at increasingly hierarchical levels. Modeled by an affective techne, emotions are thereby understood to be evolutionarily designed behavioral circuits assisting in the structuring of inclinations (Davidson, 2003). As taken up in AI affective devices, for example, the circuit based model underwrites its purported simulation of human responsivity.

It is from the perspective of this neuroscientific techne that the human being is seen as increasingly ill adapted to the modern technological civilization, which, conversely, is understood to require a technical governance of the sort envisioned through AI (Bostrom, 2014). These complementary perspectives, together with the adaptive possibilities thought possible through neuromodulation, has prompted a re-envisioning of the human being as a novel creation, the post-human (Bostrum, 2005). Theoretical features of this re-envisioning, in fact, have prompted considerable scholarly discourse that has drawn from evolutionary observations, philosophy of science, and social theory, among many others, and which, collectively, has been designated posthumanist theory (Onishi, 2011; Seaman, 2007). Conclusions from its interpretive analysis propose a revised and, it is tacitly assumed, advanced anthropology that is less static and capable of heightened adaptation to rapid techno evolution. Among the projects seen to be required for the implementation of this framework is a recasting of the human emotional spectrum (Laughlin, 1997; Pin-Fat, 2013).

This paper critically explores the endorsement of techne as a constructivist interpretation of human emotions. Revealed through its techne recasting are explanatory commitments to a metaphysics of efficient causes; hence, it invokes a functionalist conception of emotions in which malleability is an ontological feature of the techne model. Aligned with posthumanist assertions the invocation of malleability is used to argue for a rapid advance of the human form toward enlightenment ideals of emancipation, egalitarianism, and rationality. The claim of malleability, however, dispenses with the stability of an a priori, intersubjec-

tive and interrelational form that undergirds the emotions and leads to the collapse of a definitional anthropos. This paper will argue that recourse to techne in constructivist models of emotions selectively endorses philosophy of science commitments, thereby introducing a normative inversion that deconstructs the notion of anthropology as a stable ontological telos pursued in posthumanist aspirations.

2. Metaphysical Origins of Techne in Cognition

Tracing Techne to Causal Redaction

While the recent development of sophisticated neurotechnologies employing AI strongly motivates post humanist philosophy, techne models of cognition trace their lineage to earlier discourse over metaphysical divisions on the grounding of material reality. Exemplified in Julian de La Mettrie's best known philosophical work L'Homme Machine, which appeared in 1748 (de La Mettrie, 2019), de La Mettrie's mechanistic conception of the human being drew its inferences on the basis of apparent causal influences by the body on mental events during illness. As a foreshadowing de La Mettrie's techne anthropology resonates today in an empiricist era that has seen a metaphorical explosion of knowledge about neural processes (Popper, 1978), as noted by Karl Popper[1]. Though de La Mettrie's historically constrained conclusions are faulted today, they nonetheless share common metaphysical and philosophy of science frameworks that he himself was heir to. Bequeathed to de La Mettrie more than a century earlier, Roger Bacon's and Rene Descartes' intended redaction of scholastic explanans to a posteriori, efficient causes, remains the preeminent explanatory mode for interpreting cognition. Combined with Bacon's relegation of formal explanation to an immutable, metaphysical "magic"[2], the effect of this redaction has been that of eliminating a priori explanans in neural operation and the nearly exclusive recourse to efficient causal explanations (Machamer, Darden, & Craver, 2000; Bechtel, 2017; Kalkman, 2015).

Epistemologically, Bacon's redaction has left the scientific method to draw its conclusions solely through the lens of a posteriori presuppositions, which were already latent in its investigative approach. Restricted by design praxis, a posteriori efficient causal influences, accordingly, are not invoked as complementary

[1]"Yet the doctrine that **man is a machine** was argued most forcefully in 1751, long before the theory of evolution became generally accepted, by de La Mettrie; and the theory of evolution gave the problem an even sharper edge, by suggesting there may be no clear distinction between living matter and dead matter. And, in spite of the victory of the new quantum theory, and the conversion of so many physicists to indeterminism de La Mettrie's doctrine that man is a machine has perhaps more defenders than before among physicists, biologists and philosophers; especially in the form of the thesis that man is a computer" (Popper, 1978).

[2]"From the two kinds of axioms which have been spoken of arises a just division of philosophy and the sciences, taking the received terms in a sense agreeable to my own views. Thus let the investigation of forms, which are (in the eye of reason at least) eternal and immutable, constitute Metaphysics; and **let the investigation of the efficient cause, and of matter, and of the latent process constitute physics**. And to these let there be subordinate two practical divisions: to physics, Mechanics; to metaphysics, what I call Magic, on account of the broadness of the ways it moves in, and its greater command over nature". Francis Bacon, The New Organon (Fuchs, 2018).

explananda for extrinsic interactions between category entities, but are instead used to explain the categories themselves; i.e., categories are not regarded as sui generis. In modern physics, for example, this is evidenced in the search for ever more elementary particles of matter, a position philosophically premised on an infinitely regressing causal prior, often contrasted with neo-Aristotelian notions of form (Laughlin, 2004). For cognition, the effect of this redaction is to remove a domain of explanans for non contiguous interactions, which are characterized by a priori form and autonomy of telos (Maturana & Varela, 1979), and which has traditionally been used to explain properties of a unique class of material entities, living organisms (Moreno & Mossio, 2015).

Confined to a posteriori, explanations de La Mettrie notably deduced its mechanical ontology, enshrined in his work's titling. As de La Mettrie himself noted, this reconception of human ontology is specifically linked to its a posteriori grounding[3] (de La Mettrie, 2019): The bridge to a techne anthropology in de La Mettrie's conception, therefore, was configured by a redaction of a former multi modal explanatory account intended to address supplementary features of causal relations; that is, explanations originally conceived as interdependent. Characterized as compositional, mechanistic, and deterministic the adoption of this feature trio has been widely regarded as advancing an antithesis to the three property states traditionally accorded to human nature: 1) the absence of its unity, that is, as a holism, entity, or single substance; 2) the absence of self, that is, as a center of action origin; and 3) the absence of freedom, that is, as in the undertaking of action, here understood as the implementation of agency, subject to rational decision making.

Invoking Techne in Higher Order Cognition

Heir to these redactions, modern philosophy of science accounts similarly invokes a posteriori, efficient causal explanations in modeling cognition. The explanatory success of a variety of basic empirical discoveries has, in fact, reinforced this conception, including such elementary neural features as action potential generation, coding spike trains, vesicular neurotransmitter release, and the like, all of which illustrate the contiguous and extrinsic nature of associations that yield successive neural events.

The confirmation of efficient causal influences in basic processes of neuroscientific operation, however, has also been upwardly extended in the assertion that large scale neural events are themselves mechanistically confined. This is illustrated, for example, in the understanding used to explicate the somatic integrity thesis, which advances a mechanistic claim on the body's unification and has generally served as the philosophical linchpin for brain death assessments (Swedish Committee on Defining Death, 1984). As applied by Craver and Tabery's approach to neural function (Craver & Tabery, 2017), generally conceded to be a retrieval of the Cartesian, machine based, inertial contact paradigm—neuronal

[3]Experience and observation should here be our only guides ... **only a posteriori** can we reach the highest probability concerning man's own nature... Man is such a complicated machine... (Julian de la Mettrie, 2019).

mechanisms do something, that is, they are productive of some event. Bechtel and Abrahamsen's definition[4] (Abrahamsen & Bechtel, 2012) specifically links this generative dimension to the succession of causal priors said to achieve this end. Mechanistic models of neural operation, accordingly, have been noted for their asymmetric and extrinsic understanding of causal flow (Machamer, Darden, & Craver, 2000). The archetypal model, for example, the action potential mechanism, is posited to induce synaptic vesicle release. This induction is underpinned by the notion of continuity between cause and effect, since gaps would require additional factors as explanans (Bunge, 1979); hence, causal interactions are here seen to be extrinsic associations and to necessarily entail contiguity and temporal succession, features characteristic of efficient causal interactions.

Applied to large-scale neuronal events, neural phenomena are similarly understood to flow from a causal nexus constituted, typically, by a suite of cognitive regulatory processes. For somatic integrity, the body is thereby depicted as a cluster of organized systems that are unified by the brain's regulation (Bernat, 2002). In this reading, the coherency and coordination of the body's operation are regarded as indicative of unity, because coherency and coordination are understood to be effects precipitated from a causal nexus; that is, integration of the body is understood, as a matter of explanation, to require an asymmetric, causal succession in bodily events. Anatomically and physiologically the source of this integration is explicitly referenced to neural processes confined to the cranium.

Analogously, other higher order neural operations are also seen as mechanistic outputs tracing their regulation to causal nexi within the brain. To avoid the explanatory circularity implicit in efficient, contiguous associations—neural feedbacks, for instance—such operations are typically parceled into discrete functional categories, which are then investigated independent of their relation to global behavior. As a matter of praxis, mechanistic models are thus constructed by segregating higher order behaviors from the brain's global operation, the latter conceived as having extrinsic oversight.

Perception, for example, has been widely understood as an extrinsic operation by which the brain independently generates representations of the world; that is, such representations are regarded as causally and extrinsically constructed by the brain, a posteriori. While evidence of top down influences on the awareness of perception have been shown to occur, e.g., attentional regulation (Posner, 2012), top down influences are here claimed to extend to a manipulation of the nature of such representations to yield loosely or even unrelated representations of the external world. This is also to say that what is perceived to be 'out there' in the external world is understood to be interpretively managed solely by the brain, a position endorsed not only in modern neuroscience but one also inherited as a historical legacy from the Idealist philosophers who succeeded Bacon

[4]"A mechanism is a structure performing a function in virtue of its component parts, component operations, and their organization, where the interaction between parts and the orchestrated functioning of the mechanism is responsible for one or more phenomena".

and Descartes.

Francis Crick, for example, is unequivocal (Fuchs, 2018)[5] Given the supposition that the brain regulates perceived events independent of their external reality, this has the deductive consequence of laying perception open to an unknown and highly variable account of reality. Metzinger extends this notion to its logical extreme (Fuchs, 2018)[6], where the brain is completely independent of exterior influence, a deductive position expressed with even greater clarity by Kant centuries earlier[7]

Despite the inherent variability of perceptual observations, nonetheless, by carefully circumscribing the processes of perception, a constellation of studies are used to demonstrate the grounding of perception in mechanistic accounts; that is, as a top down, extrinsically modulated brain function. Beginning with George Wald's discovery of the light receptive protein rhodopsin (Wald & Brown, 1958), and the molecular events of signal transduction (Pak & Leung, 2003), that sequentially evoke sensory receptor potentials and population coding; these studies are used to show the presence of consecutive steps resulting in neural activity patterns that precede perceptual awareness. These populations are, further, shown to be controlled by modality specific evoked receptor potentials, or oscillations, which then lead to the imagery retrieved in linear declassification technology from regional neural activity (Haynes, 2013). Reprised from global brain operation, therefore, such studies claim to illustrate the presence of contiguous and extrinsic causal relations alone in perceptual processes; hence, they are stated to demonstrate the grounding of perception solely in a posteriori causal relations.

By extension, emotions—arguably equally complex—are also classed within mechanistic paradigms, a claim reinforced by, among other observations, the demonstration of binding shifts between emotional responses and particular memories by neuromodulation (Redondo et al., 2014). The lesson taken from these studies is that emotions recapitulate the techne model. Distinctions that may be laid claim to in their subjective and emotive dimensions, therefore, are explained on the basis of degree and not of kind. This message is amplified in the general claim that humans share through their neural activity in the same sorts of neural processes underwriting similar emotional events observed in animals and neurotechnological devices. Advocates of posthumanist "advances" routinely cite, for example, the blurring of the line between human and animal or human and machine in neurotechnological and genetic manipulations. Hence, the techne model has bearing on human ontological status, and is claimed to demonstrate the lack of a clear "exceptionalness" criterion by which the human

[5]"What you see is not what is really there, it is what your brain believes is there".

[6]"Concious experience is like a tunnel … first our brains generate a world simulation, so perfect that we do not recognize it … and then a construct of ourselves interacting with it, a selective and extreme representation of information".

[7]"appearances are only representations of things that exist without cognition of what they might be in themselves. **A mere representation, however, they stand under no law of connection at all except that which the connecting faculty prescribes**".

can be distinguished from the material world. Conversely, the absence of distinction has led to the conclusion that the human being, and the behavioral features and emotional inclinations to which he is privy, is exceptionless.

3. Techne Modeling and the Elimination of Ontological Distinction

Posthumanist inferences thereby conceive of behavioral properties within frameworks of comparable materialist ontology, governed by similar causal principles and subject to a similar mechanist pliability. By extension, mechanist claims introduce the novel nature of the human-techne construct in relations, e.g., emotional relations, with the material world, and, hence, the manner and participation of the human in the exterior world as a technical agent. In the human, centered perspective relationships with the exterior world have traditionally been structured by manifest subject/object distinctions. The techne model, by contrast, denies such ontological differences.

Crucially, conclusions about ontology drawn from either perspective emerge from their understandings of the "causal structure of the world", to use Machamer, Darden, and Craver's mechanist terminology (Machamer, Darden, & Craver, 2000; Kalkman, 2015). In the techne conception, the distinction between the brain, as a causal nexus, and the neural events that give rise to the emotions, as an extrinsic target of regulation, emerge from the redaction in causal explanations inherited by the hypothetico-deductive scientific method, which eliminated other explanatory modes. Hempel and Oppenheim[8] describe these additional modes in their deductive-nomological model as varied "explanans" that contextualize efficient and extrinsic causal interactions and that generally seek to explain the why question implicit in contiguous and successive events (Hempel & Oppenheim, 1948); that is, why such contiguous events may, for example, be structured as they are. The necessity for seeking additional explanatory modes, in their reasoning, arises by virtue of antecedent conditions and laws that structure efficient causal occurrences. As they point out such antecedent conditions encompass, among others, notions like design principle (Braillard, 2010), which has been invoked to explain the formal architectural order within which efficient causal interactions are operative. The invocation of these alternative explanations, accordingly, is reminiscent of notions redacted in the Bacon explanatory scheme that was seen to appeal to more fundamental metaphysical features that served to orient and contextualize efficient causal associations. Invoking design principle, for instance, Braillard has recently argued that causal asymmetry is distinct from and subordinate to organizational form in explanatory power. Using the example of the chemotactic molecular motor of certain bacteria, he points to two separate aspects that reveal both the influence and the explanatory precedence of holistic form for efficient causal associations. The first is seen in

[8]"the event under discussion is explained by subsuming it under general laws, i.e., by showing that it occurred in accordance with those laws, by virtue of the realization of certain specified antecedent conditions" (Hempel and Oppenheim, 1948).

the manner by which the motor achieves its effects, for example, its thrust and direction. Termed the how question it entails the causal succession that results in the motors effects. The second is the necessary dependence on a design principle that actually enables this causal succession, which is termed the why question. This dependence on organizational form is an essential feature to the causal realization of chemotaxis, as revealed by Yi et al.'s study of integral feedback (Yi et al., 2000). In their wording, the operational form is not arbitrary, indeed cannot be otherwise. In a direct application of Hempel and Oppenheim's understanding of antecedent conditions, the succession of causal priors can be elicited only by the presence of the design principle, which is realized in the unique organizational architecture of the motor. Significantly, no single step can be regarded as the point of initiation. In other words, in the unredacted understanding, form acts as a causal antecedent needed to structure the conditions from which efficient causes can be elicited.

For emotions, analogously, a critical consequence of redacting formal causal notions in higher order cognition is an inability to account for how the brain can exert extrinsic causal influences on the neural processes needed for emotions; that is, the absence of such antecedent conditions cannot explain extrinsic influences in global systems like cognition. In this regard, Winning and Bechtel (2018) notably point out that for a closed and deterministic, fully dynamic system influences on network relations occurring at one end must be canalized toward the other resulting in a resonating series of constraints throughout the system networks (Ruiz-Mirazo & Moreno, 2004). Self-regulation, accordingly, might alter the configuration of constraints within a locus but must do so at the expense of constraints elsewhere in the system. In other words, internal constraints impose "intrinsic" causal influences that universally modify the internal neural network. Such canalization is in fact observed in various externalized behaviors that entail motor planning and execution and that require the functional unity of central and peripheral nervous systems (Lashley, 1951). In motor planning and execution sensory feedback is used to create a tightly coupled loop with forward models generated from the motor commands of the motor and premotor cortices. In the absence of these resonating influences, motor events lack coordination and direction. In other words, the functional unity observed in dynamic motor actions emerges from a reciprocating series of constraints imposed in global cognition. Behavioral properties exhibited by the individual thereby predicate holistically, that is, they are non-localized and distributed, emerging from the whole nervous system. The impact of sensory input on the shaping of brain structure and function, in fact, is a well-established observation and appears to be critical to the establishment of a stable and holistic self/bodily image that is required for coordinated motor planning (Smith, 2009).

The notion of dynamic unity in actions, which emerges from these observations and which is required for the individual to interact with the environment, is explanatorily consistent with Hempel and Oppenheim's antecedent conditions that formally structure intrinsic resonating constraints. This is also to say that

the notion of a dynamically configured, operationally closed entity can be explained only by recourse to formal causal notions, such as, for example, design principle. By extension, ontological inferences about the human that are deduced from these additional explanations necessarily differ from the mechanist ontology of the techne model, which is deduced solely from a posteriori explanatory accounts (Popper, 1978).

How these ontological differences actually distinguish themselves relate again to "non-causal" explanations that seek to address the question of why a particular dynamical form is configured in the way that it is; in other words, they address the antecedent conditions for the selection of particular behaviors and their trajectories through time. For behavioral selection, such antecedents necessarily presuppose a constituent action origin; which is to say they entail questions concerning the nature of a structure that enables an entity to be an action source and the motivations for pursuing a particular objective.

Explanatory accounts for such goal-directed behavior identify in the action origin a latent capacity that is resident only in living systems and that is expressive of a particular telos (Maturana & Varela, 1979). A dominant account of this capacity is the autonomy proposal of Moreno and Mossio (2015), which defines autonomy as the innate organismal ability to structure the circumstances necessary for survival. Unlike physical systems, which are incapable of modulating their environment to advantage, autonomy constitutes an internal capacity of living systems for persistence. The presence of this capacity thus implies an ability to shape the complex material order responsible for its mediation with the performance conditions for which it is structured; in other words, to shape the organism's internal recursive self-ordering through its self-directed and dynamical interaction with the exterior world.

Accordingly, in ascribing autonomy only to living systems, Moreno and Mossio propose to explicate organismal ontology; that is, to explain what is ontologically characteristic of living systems and so also what unifies the whole range of internal processes subsumed in behavioral performance. As a predicable property of the whole organism, that is, through processes that increasingly unify and promote its individuality (Christensen & Bickhard, 2002), autonomy constitutes the dominant principle placing subtle constraints on internal organization to yield ontologically constitutive performance. The amplification and increasing sophistication of these capacities, impelled by an evolutionarily open-ended and ever-broadening interactive range (Ruiz-Mirazo & Moreno, 2012), progressively improves integration, shaping an increasingly diverse ontological range; hence, there is an explicit relationship between the activities that an organism performs and how it is constitutionally defined. These have intrinsic relevance for the whole organism, molding its organizational and functional relationships into a cohesive whole (Barndiaran & Moreno, 2008) through body wide internal constraints that mutually inform and integrate goal-directed performance. Purposeful behaviors thereby link self-circuitries to subordinate processes that cumulatively improve pursuit of organismal goals and mold how organisms inte-

ract with their environment; which is to say that as an entity, the various multicellular parts and processes must be properly shaped to work in unison to achieve these behaviours. Indeed, if the behaviors were not ontologically ordered, the organism would cease to exist (Jonas, 1966; Hooker, 2008).

By extension, the manifest subjectivity that is ontologically characteristic of humans explicates the why question for the selection of human, goal directed behaviors. In other words, in explanations of action origin, subjectivity is a necessary antecedent. Conversely, mechanistic explanations fail to address questions for why and how entities structure trajectories toward particular objectives. That is, they fail to explain the contribution of ontology to the selection of goals. Indeed, techne models constrain inferences about ontology that contextualize human affectivity, eliminating distinctions between the human being and the external world.

4. Techne Models of Emotions Are Processual and Indiscriminate

Processual Metaphysics in Relational Structure

In the absence of subject/object distinctions the mechanical man of the techne construct is ontologically identified with and so understood to be embedded within, rather than opposed to, a broader and more dynamic world that is cognitively and multidimensionally diverse. Accordingly, relations with this world are structured by parity rather than hierarchy and characterized by a greatly expanded scope. Key here is thus the deployment of a techne conception appealing to a much broader, more connected relationality, which is opposed to the external and hierarchical associations structured by the ontological centrality of the human being (Chandler, 2013). Indeed, the conception of a binary, anthropocentric world is fully incongruent with the mutual and reciprocal structure of such network relations.

The ascription of the emotions in this connected world, made, for example, by proponents like actor network theorists, thus functionalizes their purpose to semantic and orienting behaviors (Davidson, 2003). Characterized by ontological diversity, however, relations structured by emotional capacities are no longer conceived as intersubjectively determined. Lacking this determination, such relations are increasingly shallow, fluid, and transient, deprived of adhesion and persistence. In the techne world the human emotional repertoire is thus unsuitable for the distributed and embedded relations that define extended networks of entities, prompting a recognition of the need for human adaptation.

This need for fitting has been the subject, for example, of direct reference in material vitalist philosophies (Latour, 2009). Consistent with the ontological identification shared with the exterior world, for instance, Bruno Latour notably argues that the embedded space is normatively conditioned by ethical parity[9]. Implicitly this statement means that network relations structured on a subject

[9]"the ecological crisis presents itself above all as a generalized revolt of means … each (participant) demands to be taken as an end".

object divide are inadequate to guide orienting behaviors dictated by emotions. Hence, posthumanists assert a normative claim on the human being to a process of becoming.

To comport with such evolutionary regimes, accordingly, the techne model is explantorily aligned with the malleable prospects for cognitive change; which is to say that change, as a metaphysical state of the world, is directly deduced from the techne model (Meineke, 2018). In fact, this alignment is deduced by default in the absence of explanatory accounts that address Hempel and Oppenheim's criterion of antecedent conditions for goal directed behavior, which is characteristic of explanatory grounding commitments for the techne construct. However, posthumanists further claim that the empirical discoveries of neuroscience demonstrate an intrinsic processual nature, where an appeal to technology is also made for its perceived advantages of speed and scope.

Evidence is typically recruited from two sources. The first is the observation that the brain, and its emotional repertoire, is the product of a slow and lengthy evolutionary heritage, a claim echoed by affective neuroscience and evolutionary psychology (Downey & Lende, 2012). Change, according to such advocates, in the large and global sense made reference to in evolutionary scenarios, represents a constitutive property of the human brain, which is known to have evolved over many millenia. This metaphysical conclusion is typically reinforced by a second, by now generally conceded observation of neuroplasticity, wherein information processing via brain activity, of the sort associated with learning and habit formation, incurs rapid transitions in brain microanatomy and microphysiology (Merzenich, 2013; Benfenati, 2007). Habits that may constrain emotions are thus interpreted to be the products of biophysical events occurring at a neuronal level. This has led to the conclusion that the brain in its currently evolved form is itself dynamic and plastic, undergoing a continual remolding throughout the life of the individual.

These neuroscientific observations have been the basis for concluding that malleability is constitutive for cognition. Its manifestation is adduced from the evolutionary paradigm stated to govern human development, with its tripartite staging of Darwinian origin, cultural present, and techno future. Accordingly, it is understood that the human brain is malleable by nature and it is this malleability that governs the shaping of relational engagements [20]; in other words, that malleability is not only metaphysically but also ontologically characteristic of human cognition.

Motivationally, techno interventions, as for example through neurotechnology, are pragmatic, but their occurrence is nonetheless premised on the constitutive character of cognitive change. For example, the evolutionary endowment is pragmatically understood to be a patrimony that precedes the paleolithic. The age of the body's design, and the extraordinary lethargy of naturally adaptive mechanisms is accordingly assumed to preclude adjustment to much more rapidly developing cultural and technological landscapes that operate on ever more restricted time scales. Passions, in particular, are referred to as ancient

baggage no longer suited to a global politicized framework required for civilized intercourse. Veronique Pin-Fat (2013), for example, argues against an emotional constitution that constrains the rational faculty through the passions[10] There is also the stated dichotomy between the mechanisms driving the body's evolution and the increasing technical mastery enabling increasingly improved intervention in body and brain. This dichotomy and the ontological parity with the material world deduced from the techne construct has evoked the claim that the proposed interventions retain their ontological character, while yet securing the advantages of speed and effectiveness (Sabonovic, 2014).

What is distinctive in the post human understanding, therefore, is the identification of an intrinsic metaphysic of change with the material world generally, a deduction that flows from the absence of explantory antecedents in techne models. This is illustrated, for example, in the recourse made to the common element shared by material network elements and also understood to be most capable of plastic variation-information (Onishi, 2011). Recourse to information is seen to benefit the posthumanist vision in two ways. In the first, it maximizes the potential for variability. Computationally organized as strings of numerical matrices the brain's repository of hundreds of billions of neurons is notably conceived to be capable, theoretically, of a virtually inexhaustible number of rearrangements, which can be made and remade to suit virtually any exigency. As a second benefit, information readily comports with the computational and intellectual prowess with which AI technology is perceived to be endowed. The analogy with AI thus furthers the techne model as intrinsic to cognitive function and best suited to its computational embedding (Popper, 1978).

Endorsing Enlightenment Norms in Techne

Paralleling the conception of technical prowess, however, post humanism also discloses normative aspirations that embrace a specifically enlightenment agenda, with its advocacy of human maturation and empowerment, motivated by emancipation, rationality, and universality. Such aspirations are understood to emerge from the malleable propensities of technical, particularly computational, advance; that is, they derive from the ontological understanding of the techne model. Nick Bostrom, director of Oxford's Future of Humanity Institute, for example, cites two phases, transhumanism and posthumanism, that aim at a technical restructuring of the human condition[11]. For the most part, these encompass greatly exalted forms of what is already present, such as improved sensory or motoric abilities and are, therefore, changes in degree rather than in kind, i.e., constituting an ultra(trans)humanist trajectory. More radical is the second stage with proposals for generating the posthuman. The evolution of this state is deemed by Bostrom as completely evolved and distinct ontological entities, which are presumably invested with highly advanced AI computational capacities (Popper, 1978). Prospective movements toward the post human state

[10]"specific dispositions such as passions, emotion, ... and animalistic urges".

[11]"...possible future beings... so radically exceeding those of present humans as to be no longer unambiguously human..." involving "...radical technological transformations to our brains and bodies...".

may be seen, in fact, in two types of proposals, those modifying what are intrinsically bodily boundaries, and those modulating the emotions. In the former, novel technologies increasingly blur the line between the body and its functional extensions. These propose a hybridization of the human being through technology, which builds on the latent techne that is understood to metaphysically ground the human body and brain (de La Mettrie, 2019). Involving an initial transformation in which sensory and motoric capabilities are gradually amplified and extended beyond the corporeal perimeter, a process already substantially underway in therapeutic contexts, the incorporation of such technologies specifically seeks to circumvent the body's biological finitude, with limited ontological repercussion. Proposals to render human emotions transiently, and even permanently modified, on the other hand, seek to take human transformation much further. The explicit association of emotions with objective ends such as fear and preservation of life or love and social communion, a position tacitly acknowledged by affective neuroscience, means that their rewriting through a process of cognitive restructuring is intended to assist in altering the telos of the human being. As Charles Laughlin (1997)[12], for example, expresses, the process is both technical and adaptable.

The transience of the posthuman state, thus, reinforces the notion of change that is a fundamental metaphysic of the techne ontology. In other words, the notion of ontology as distinguished by properties and an enduring anthropos is itself deconstructed in the constructivist techne model. The emergence of this understanding from efficient and extrinsic explanans is in cases graphically illustrated by attempts to modify emotions through an elimination of the body (Pin Fat, 2013). As the body is the locus of emotive expression, and the vehicle of social unity, its elimination intends to render social intercourse immune to the exigencies of unreflective communion; that is, to minimize the influence of a 'narrowly conceived' anthropocentrism characterized by an ontology of subjectivity. The posthuman project sketch of Nick Bostrom, in fact, seeks to create superior creatures, propelled by an unhindered rationality. Veronique Pin-Fat, similarly, links disembodiment and the loss of emotional drives with a freeing of the rational faculty for sovereignty and autonomy. By segregating the emotions from cognition, thus, these proposals conceptually recapitulate the causal explanation grounding the techne construct; here understood as an extrinsic division of the emotional neural repertoire from its regulatory nexus located elsewhere in the brain.

The appeal to enlightenment norms in posthumanist aspirations, however, is indicative of an assertion for stability in the posthumanist destiny. In other words, there is normative claim on a metaphysical premise that the anthropos of human nature is sufficiently stable for determinate and enduring human goods or liberal democratic values to attach. Hence, the evolutionary paradigm that is stated to be accounted for by malleability emerges as an epistemological device

[12]"...fourth stage of the exogenous penetration of the human brain, wherein the brain would be modified by an array of bio-chips mediating emotion".

used to attain a persistent destiny and not as a metaphysical claim on a nature of being.

Metaphysical accounts for a constitutive malleability are found, instead, in German philosophical anthropology. Francois Dagonet notably emphasizes this processual feature (Doucet, 2007)[13]. Such plasticity is not merely a matter of degree, but rather entails a radical openness to material change, as a demonstrative metaphysic, in contrast to the ontological distinctiveness of subject/object dichotomies. The universality that is sought for is thus a oneness and integration with the whole of the natural world, where relation is mediated at the level of material being in cycles of ceaseless change. Wolfe (2010)[14] describes the ultimate destination of the logic of this trajectory. This formless, posthuman being, in fact, continues the trajectory of multiple, fluid, and networked identities begun in Heidegger's reversal of anthropocentrism and being (Rae, 2014) and Whitehead's processual characterization of reality (Byrd, 2005). Absent in such emphases is a conception of broader causal explanation in the face of motion and change. In its absence constitutive change introduces an infinite regress, characterized by the eternal recurrence of Nietzsche's chaos and force. Indeed, in the deconstruction of the human, enlightenment values are thereby inverted, devoid of their contingency: universality without relation, emancipation without freedom, and empowerment without agency.

5. Superceding Techne: Explanations in a Neuroscience of Emotions

Invoking an evolutionary paradigm is explanatorily problematic, however, in view of the natural reality from which the emotions first emerged. Absent in its formless landscapes is the physical regularity of the natural world, where constraints to change are necessarily ordered, and where evolutionary progression has yielded a human cognitive apparatus that is exceptionally advanced, even with respect to its mammalian forebears. Evolutionary psychologists propose, for example, a rule based progression governing the evolution of the emotions, with their successive and successful integration into motivational circuits (Downey & Lende, 2012). Further, their integration into human psychology, particularly in its social and communitarian aspects, is significant, a point emphasized by social neuroscientist John Cacioppo (Cacioppo and Garner, 1999)[15]:

Such observations challenge not only the premise of malleability as the exclusive factor governing the evolution of the emotions, but also introduce the question of other explanations that may work in tandem with extrinsic causes to shape the emotions in a human ontology. On the one hand, the adoption of a techne understanding for the emotions can be traced to the use of a posteriori

[13]"...what is significant in nature is its plasticity...".

[14]"...wherein an internally disordered, malleable, emergent human self exists in a relation of entwinement with a differential and differentiating external world...".

[15]"Although the obstacles of a civilized world occasionally call forth blind rages, emotions are increasingly recognized for the constructive role they play in higher forms of human experience".

explananda in the initial staging of neuroscientific study. Cajal's exquisite drawings combined with the silver staining technique developed by Golgi that selectively stained single neurons, particularly, led to the conclusion that brain function was built up from neuron units, a thesis designated the neuron doctrine; that is, it provided an a posteriori explanation for the generation of higher order properties from lower level neuron function. For example, the identification of habituation mechanisms with simple behavioral circuits of the sea snail comprises an operational motif that has been used to bridge the perceived mechanistic nature of intracellular molecular events with a similar metaphysical characterization of multi-neuronal processes that guide behaviors.

Nonetheless, as noted, human integration explanatorily emerges from the sort of antecedent conditions described by Hempel and Oppenheim, which dynamically configure human orientation toward the attainment of goods adequate to the whole; which is to say that antecedent conditions are needed to explain the why question underlying goal orientation in action. Among these is a capacity to identify goals and to autonomously select the motor trajectories needed to attain them; that is, they entail explanations for interaction with a spatio-temporal reality beyond the individual. These antecedent conditions remain undisclosed, however, unless physically instantiated as a dynamic reality. Accordingly, extrinsic and efficient causes are factors that both make evident and also enable the manifestation of alternative causal modes in the world. **In other words, they make evident the necessity of explanations that address the why question for human unity and goal directedness and so also instantiate these explanations in externally manifest behavior.** For instance, the drive to global and systemic unity is notably evident in multiple mechanisms, including: the feature abstraction performed by complex and hypercomplex cells of the occipital cortex, which assess movement, direction, and speed; the shaping of cortical synaptic connections by sensory activity during development and experience that synergizes brain and peripheral nervous system operation; the pattern separation and pattern completion abilities of the hippocampus that recreate large scale imagery (Haynes, 2013); and, finally, the global oscillatory activity, like beta oscillations, that unify global brain function (Buzanski, 2006).

In manifesting the need for additional explanatory modes such observations also reveal that ontology is a primary determinant in structuring the relation between a subject and a goal. For example, ontological features like decisional acts have been shown to mold the neural connectivity and activity of the brain during interactions with perceived goals (Corbetta, 2009). In developing infants, particularly, actions intended either to crawl or stand upright are differentially mapped, indicating that intentional task performance determines the relation between a goal and a single individual for whom the goal is intended. The inscription of these intentions in the specific trajectory of motor actions and altered synaptic architecture thereby give evidence that ontological features are antecedent to motor inscription.

Among the key features inscribed, notably, is a neural representation of the

individual as an agent (Jeannerod, 2009). The physical instantiation of the human agent in neural representations has been shown to occur through the appropriation of the body as the source for action emergence, in which somatotopic input from throughout the body is used to generate a three dimensional postural image of the individual (Damasio, 2012). In the absence of this representation, motor planning does not occur and discrete actions are not integrated into a dynamic whole. Toddlers below the age of three, for example, lack this ability, which is reflected in the generation of error classes associated with immature, goal directed motor behavior (Smith, 2009). Accordingly, the instantiation of the individual as the source of intentional acts evidences a metaphysical need to identify an ontological origin as the locus from which actions emerge.

Crucially, ontology is a necessary antecedent for explaining how emotions influence goal directed actions. Social neuroscientist John Caccioppo attributes to their influence the configuring of goal directed relations between two personal subjects; that is, emotions evoke relations chiefly in the context of shared ontological parity. Caccioppo's attribution is notably supported by a number of psychological and neuroscientific observations. In a widely accepted understanding, for instance, normal psychological development proceeds through a self-structuring process that occurs in and through intersubjective relations. Piaget, for instance (Lombo, 2011) proposes a well-known schema for psychological development, in which the self is progressively ordered in and through an externalized referencing, one that ordinarily occurs in familial settings. Infants, for example, are sensitive to contingent maternal movements, responding in kind by mutually, coregulatory interactions (Dumas et al., 2014). Lacan, likewise, also proposes that the rise in self-awareness proceeds through a mirror stage in which the subjective self mirrors the other, generally the maternal caretaker (Webster, 2002), an identification process that extends into adulthood in the context of moral formation. Contemplative actions, for example, recapitulate a normal maturation sequence through identification with a subjective Other (Larrivee & Echarte, 2017).

Complementary studies from neuroscience, moreover, also evidence a similar developmental paradigm in which self-integration depends progressively on mutual subjective interactions that transpire between child and adult. Early stage infants, for example, have been shown to possess a proto Mirror Neuron System (Lepage & Theoret, 2007) and a mentalizing network (Keysers & Perrett, 2004) that equips them to elicit, anticipate, and synchronize intentions. This system is evident into adulthood and is apparent in the symmetrical and asymmetrical interbrain fMRI patterning that reflects a temporal interplay and self-responding to another's intentions (Dumas et al., 2014). Neuroscientific studies show, further, that self-formation proceeds via two routes, beginning with an intrapersonal domain and proceeding through an interpersonal one, that is, through a stage of self-recognition and one of self-elicitation, which appear to be prototypical of affective encounters in familial surrounds.

6. Implications and Concluding Remarks

A Metaphysics of Emotions

By extension, ontological parity is a manifest antecedent for emotional relations; that is, they can only be explained by the presence of a shared subjectivity. Norris Clark points out that their manifestation reveals, in fact, a contingency on the presence of both individuals, which is to say on their metaphysical reality (Clark, 1993)[16]. While Scheler has challenged such a dual contingency, his siting of emotional relations exclusively within rather than between the individuals is explanatorily inconsistent with their metaphysical structure, which is that of relating two distinct subjective entities (Waldstein, 2006).

Hence, the relations structured between the two individuals, necessarily generates a composite pair, each member of which possesses a similar ontological character. On the other hand, despite the retention of similar individual ontology, this does not mean that the pair is equivalent to the two individuals in isolation. In fact, they comprise a metaphysical reality that is distinct from that of each individual alone.

Neuroscientifically, this distinctive reality can be detected in unique neural activity patterns that are present only in such related individuals. Socialization, for example, proceeds via the synchronization of sensory motor loops, seen even in an infant's very first dyadic interactions (Fogel & Garvey, 2007). Further, in adults, the establishment of intersubjective relations through mutual awareness and communication creates synchronous zones of operative circuits that bind the respective neural centers together. Significantly, this is consistent with cognition theories like enaction and environmental dynamical coupling that postulate similar cognitive mechanisms, as well as broadly utilized mechanisms for establishing relations. Additionally, functional MRI hyperscanning (Dumas, 2011) shows strong anatomical and functional similarities across individuals responding to the same stimulus source, with the corresponding emergence of a collective intelligence that constrains individual information processing (Fusaroli et al., 2014).

Ontological Persistence and the Stabilization of Anthropos

Importantly, the formation of the pair does not alter the unique ontological character of the individuals over time. Since the union depends on the retention of ontological parity, any ontological changes would be expected to diminish its relational structure, weakening or disrupting the union, a point emphasized by Karl Rahner[17] (Rahner, 1992):

Indeed, the significance of the relational structure is underscored in the manifestation of various psychiatric abnormalities that emerge in its absence. Self-isolation, for instance, constitutes a principal feature of most mental dis-

[16]"Thus, a personalized being must obey the basic dyadic ontological structure of all being, that is, presence in itself, and presence to others…".

[17]At first sight one is inclined to say that anything that exists possesses its own distinctiveness in inverse proportion to its unity with what is other than itself; in other words it decreases in selfhood the more it is bound up with something else; ...the more really special a thing is ... the more intimate unity and mutual participation there will be between it and what is other than itself.

orders (Cacioppo et al., 2014) including generalized depression associated with loneliness, a chronic problem in elderly populations (Vrticka & Vuilleumier 2012), and other depressive pathologies, such as major depressive disorder (BD) with a lifetime prevalence of nearly 1 in 5, evidencing a range of social deficits (Phillips et al., 2003). Neuroscience is now revealing that principal cerebral circuits integrating social cognition, such as those relating to theory of mind and facial processing, are disrupted in these cases and are likely to be further damaged in social circumstances that exacerbate negative exposure (Millan et al., 2012).

Significantly, since the pair is structured diachronically, relations between the two manifestly function to stabilize their unity; which is to say, they generate a unique and persistent ontological reality distinct from that of the isolated individuals. Mounier specifically identifies in this persistence a feature unique to this ontological state (Gendreau, 1992). By extension, since a change in the ontology of a member of the pair would be expected to diminish or eliminate relations between them, the presence of the bond manifests a role for emotional relations in stabilizing the ontology of the member individuals. Indeed, the instantiation of emotions makes manifest a metaphysical role, understood here as an antecedent condition, that is ordered to ontological stability and that yields a definitional anthropos, a point underscored by Aquinas[18].

7. Conclusion and Summary

Rapid advances in AI and neurotechnology have been the stimulus for constructivist models of human cognition characterized by technological and computational capacity. These models now embrace human emotions, and are thereby posited to confer on AI affective devices an ontological parity shared with humans. The ontological incursion introduced by such modeling has been taken up in posthumanist anthropology, where techne constructs are invoked to argue for the rapid advance of human cognition. The ontological claim, however, reflects a redaction of causal explanations, which dispenses with the stability of an a priori, intersubjective and interrelational metaphysical form that undergirds the emotions, the human Anthropos, a limitation also deconstructing the notion of anthropologypursued in posthumanism.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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[18]"...the person is the highest, most intense expression of the perfection of being...".

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