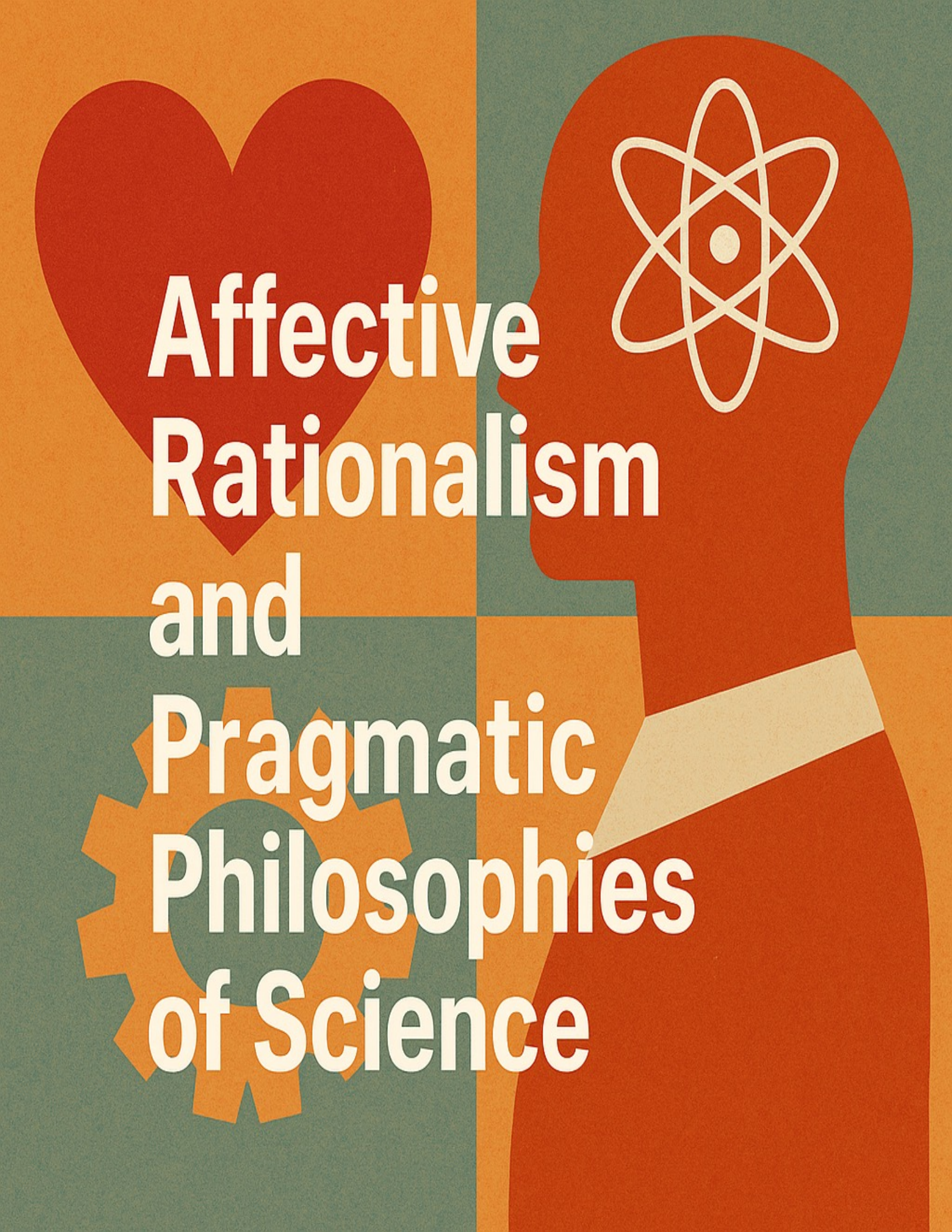

Affective
Rationalism
and
Pragmatic
Philosophies
of Science

Affective Rationalism and Pragmatic Philosophies of Science

Introduction

Because James called himself a "radical empiricist" and the Anglo-American tradition tends to resist rationalism, one might suppose James shared this hostility. Yet he openly sided on some issues with post-Kantian rationalists or what he called "apriorists," while directing some of his toughest critiques at British empiricists. James (1880, p. 622) specifically targeted Herbert Spencer, charging that he reduced mind to a passive recipient of the environment that's molded by "direct pressure, much as a seal presses ... wax into harmony with itself." James not only challenged the validity of this view but also demonstrated how it leads to hopelessly skeptical epistemology. In this chapter, I place James's philosophy within the history of science, exploring how it led to his belief that interests and emotions mold our experiences and thoughts, a stance that could be seen—somewhat oxymoronically—as an affective variety of rationalism. I examine how this perspective informs James's pragmatism, which adopts scientific standards for decision-making. Intriguingly, these criteria are fundamentally interest-driven. Certain metaphysical assumptions that scientists knowingly or unknowingly adopt and which James defends are similarly value-laden. Though my main focus is on James, I explore extensions of his ideas through Dewey's constructivist articulation of how appearances and realities—here not in opposition—are generated by human activity.

To appreciate how James responded to Spencer, it's important to recognize a few things. One is that Spencer wasn't only a British empiricist. He was also an evolutionary theorist committed to the neo-Lamarckian notion of direct adaptation that holds that environmental pressures elicit adaptive variations, as opposed to merely reinforcing them. A second point is that James regarded direct adaptation as an analogue to the British empiricist claim that

environmental stimuli mold the mind. Because the Darwinian theory of "indirect adaptation" was an obvious alternative to neo-Lamarckism, and because James equated neo-Lamarckism to British empiricism, he saw Darwinism as a useful weapon in his lifelong fight to remediate empiricism. He co-opted the Darwinian idea that the environment reinforces adaptive variations that arise independently of the pressures it exerts. He used the idea to explain how certain psychological proclivities emerge independently of environmental stimuli. By doing so, he established grounds upon which he could justify his conviction that we don't passively receive a world that we come upon already existing, but rather experience a world that we help make.

James's approach not only reflected the post-Kantian insistence on the mind's active role in manipulating external information for coherent perception but also draws inspiration from experimental sciences. The position and especially Dewey's extensions of it emphasized that knowledge is gained through systematically manipulating things or altering conditions under which they are observed—for instance, bending light through telescope mirrors to enhance stellar observations. This connection to science underpins why James's and Dewey's pragmatism integrates scientific notions that resonate with quantum mechanics, where observation itself modifies the observed phenomena. Another way in which pragmatism—especially James's—function as a de facto philosophy of science relates to the fallibilistic conviction that data always underdetermine beliefs. This leads to the conclusion that choices between different viewpoints are not made purely because evidence. Instead, James suggests that criteria such as simplicity, elegance, explanatory power and consistency with existing knowledge have historically guided our decision-making.

This ties back to the experimentally-inspired epistemologies of classical pragmatism. James believed the strength of a belief is measured by one's willingness to act on it; such actions

test the belief and yield empirical results. For James, acting on a belief focuses our attention, bringing out certain phenomena and generating observable evidence that either confirms or disproves the belief. Dewey emphasized the importance of concrete manipulations in producing evidence, arguing that perception and knowledge are results of action. This applies to simple actions like hand palpations revealing the shape of an object, and to more complex scenarios like psychology experiments, which channel behaviors into discrete options that can be mathematically analyzable. This results in evidence. Though many of James's pragmatic criteria for choosing between beliefs are not evidential, empirical support is obviously crucial from his and most other perspectives, so that a position that is inconsistent with data is not a good one.

Rationalism, Empiricism and Neo-Lamarckism

As stated at the beginning, James's saw neo-Lamarckism as an updated variant of British empiricism, and challenged both by importing Darwinian insights into his theories of mind and knowledge. My aim in this section is to sketch these points out and begin articulating how James's criticisms of empiricism result in an anti-skeptical epistemology.

Now, the idea of evolution dates to antiquity. But when James (1880) discussed pre-Darwinian views, he almost exclusively talked about Spencer's interpretation of Jean Baptiste Lamarck, which stressed that environmental pressures that preserve adaptive variations also elicit them. In other words, tall trees actually make necks "long by the constant striving they arouse in the animal to reach up to them." In contrast, James (1890ii, p. 636) stated that Darwinism posits that the role of the trees is is "much more that of *selecting* forms . . . than *producing* [them]." If giraffes that happen to have longer necks—which arise independently of the environment—enjoy higher survival and reproduction rates, then, assuming a strong principle of inheritance, as Darwin (e.g., 1859, Ch. 4) termed it, the variation will propagate. Comparing this process to the

agricultural practice of selective breeding for desired traits, Darwin (1872, pp. 129-130) remarked: “When man is the selecting agent, we see that the two elements of change are distinct: variability is somehow excited, but it is the will of man that accumulates the variations in certain directions; and this latter agency corresponds to the survival of the fittest under nature.”

James (1880, p. 622) said that it was “Darwin’s triumphant originality” to distinguish between causes that generate variations and those that sustain them. He adapted this insight into his psychology to explain how cognition can align with the environment without directly being elicited by stimuli from it, akin to a giraffe’s neck. He proposed this both phylogenetically and ontogenetically, positioning himself against conventional empiricism (p. 688). He stated: “Overall, the explanation offered by apriorists is the one I uphold” (1890ii, p. 618). However, James did not fully side with one view over the other; instead, he leveraged Darwin’s concept of “selection,” and in a Kantian move, tried to integrate empiricism with rationalist theories of mind and knowledge.

According to James (1890ii), rationalists believe the mind inherently grasps universal truths independently of sensory experience (p. 661), using this innate knowledge to shape the phenomenal world (p. 619). Conversely, he described empiricists as asserting that simple ideas enter the mind through sensation; these mechanically combine into complex ideas in ways reflecting patterns of external impressions (p. 619). James (1878b, p. 929, 1890i, p. 403) specifically linked this view to British empiricists like Spencer, whom he critiqued for portraying the sentient organism as passive clay, shaped by environmental forces.

Friends with both Wallace and T.H. Huxley, it was Spencer who coined the term “survival of the fittest.” Some of Spencer’s evolutionary writings predated Darwin’s and loosely anticipated natural selection. However, his thought—even his so-called social Darwinism—more closely resembled neo-Lamarckism. That is, it contributed to a late 19th-century reworking of

Lamarck. This view, as Stephen Jay Gould (1979, p. 77) summarizes, overemphasized Lamarck's principle of "inheritance of acquired characters." It abandoned his "cardinal idea that evolution is an active, creative response by organisms to their felt needs." Neo-Lamarckism also framed evolution as an outcome of "direct impositions by impressing environments on the passive organism."

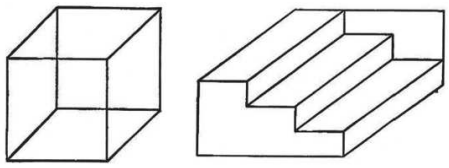
Recognizing the resonance between the neo-Lamarckian vision of direct adaptation and standard empiricist accounts of cognition, Spencer merged the two into what James thought of as evolutionary empiricism. Early British empiricists believed that ideas "in" the mind mirror the "outer" environment. Spencer (1855) extended this to encompass not only human intelligence but everything from simple nervous responses to a tree's seasonal leaf changes, describing all as an "adjustment of inner to outer relations… initiated by the actions of things outside the organism" (p. 498). He also incorporated the Lamarckian principle that acquired traits can be inherited, suggesting that features psychologically and physically impressed upon an organism during its lifetime can be passed to its progeny. He thereby abandoned the traditional empiricist tenet that each mind starts as a blank slate. Nevertheless, Spencer's psychology stayed fundamentally empiricist. As James (1890ii, p. 620), it preserved the basic empiricist idea that each "mind owes its present shape to experience," yet now including both individual and ancestral experiences.

James (1878b) criticized the inheritance of acquired traits, especially in human psychology. He contended, "we do not observe that children of great travelers learn geography with unusual ease, or that a baby whose ancestors spoke German will learn Italian any more easily" (p. 948). In the final chapter of his *Principles of Psychology* (1890ii), following biologist August Weismann's critiques of Lamarck, James again challenged that "we have perhaps not one

single unequivocal item of positive proof" of the Lamarckian mechanism (p. 688). He concluded that if humans possess adaptive psychological traits, they likely arise from "congenital variations, 'accidental' at first, but then transmitted as a fixed feature of the race" (p. 618).

Even more than inheritance of acquired traits, James objected to direct adaptation and the empiricist idea that experience—seen as environmental impositions—shapes the mind. Take Necker Cubes: most people see one plane pushed forward at a time, but never both simultaneously (which would amount to a logically impossible form). If our encounters with objects were, in James's (1978b) words, "equivalent to the mere presence to the senses of an outward order," then we ought to see Necker Cubes in many ways at once. Such a scenario, he argued, would turn experience into "utter chaos" and make consciousness "a gray chaotic indiscriminateness, impossible for us even to conceive." Since this isn't the case, the mind must use organizing principles to focus on certain relationships while ignoring others.

Necker Illustrations



In the image on the left, the top or bottom square may appear in the front or back position depending on how the observer focuses attention. The image to the right inverts with either the top shape or bottom shape popping forward depending on whether one focuses on the upper or lower non-oblique plane. Adapted from Woodworth 1921.

James, then, did not reject British empiricists' stress on experience, but rather their concept of it. Whereas British empiricists tended to conceive of experience as the world imposed through the senses, James (1878b, p. 929) regarded it chiefly as that to which the mind consciously attends. "Millions of items," he wrote, greet the senses, and yet do not "properly enter … experience." They do not, James (1890i, p. 139) elaborated, because "consciousness is at all times primarily *a selecting agency*"; it chooses "one out of several of the materials so presented to its notice, emphasizing and accentuating that and suppressing as far as possible all

the rest." James, in fact, agreed that experience of the world significantly shapes each mind, but with the proviso that each mind is empowered to select what it experiences.

James accordingly merged the empiricist idea that the world shapes the mind with the rationalist view that the mind shapes the world—yet with a caveat. While rationalists believed that cognition uses innate knowledge of necessary relations as a framework to organize content into coherent forms, James (1878a, p. 897) highlighted another mechanism: selective interest—by most accounts an affectively oriented faculty—that James called "the real a *priori* element in cognition."[1] If placed in the same environment, different people will "select, out of the same mass of presented objects, those which suited his private interest." When examining how each "proceeds rationally to connect [objects]," James (1879a, p. 12) added, selection is again found to be "omnipotent." Interests "cooperate with the environment in molding intelligence," supporting both the empiricist focus on the environment and "justify the refusal of a priori schools to admit that mind [is] pure, passive receptivity" (James, 1878c, in Perry, 1935ii, p. 35).

Thus, the key overlap between James's view of consciousness and the rationalist's *a priori* theory was not that the mind has certain innate logical ways of synthesizing the world. It was rather that factors independent of experience shape how the world appears to the mind. These factors, again, are interests. The reason James holds that there must be at least some interested tendency prior to experience is straightforward: without something to narrow attention, contact with the world would be incoherent and therefore not count as experience. This merging of affective psychology and post-Kantian apriorist rationalism forms the basis of the pragmatic decision-making calculus that James later developed: an interest-based criteria similar to those scientists regularly employ when choosing between competing theories that fit the data. His

[1] I don't think it needs to be argued for that interests are affective, but for conceptual and biological arguments for this position, see Crippen (2018) and Pessoa (2013), respectively.

challenge to correspondence theories of truth—which he regarded as hopelessly skeptical for reasons to be explained—also hinged on the argument that without selective interest, we can't coherently encounter anything in the first place. We require the narrowing and, in this sense, the chiseling influence of selective interests, which also affect how both scientists and people in everyday life rationally connect things together.

Assimilating Indirect Adaptation

As intimated, natural selection provided James (1878b) with a model for explaining the separation between that which generates mental content and that which leads to its persistence. One way that James (1878b) said this occurs is by the environment producing varieties of sensory content, which selective interests either suppress or enhance. It can accordingly happen that perceptually rare phenomena exert disproportionate influence on our outlooks, even "as to give the least frequent [varieties] far more power to shape our forms of thought than the most frequent ones possess" (p. 930). Additionally, James (1880, p. 641) proposed that "accidental out-births of spontaneous variation in ... the exceedingly unstable human brain" can generate new ideas independently of experience. James (1890ii) added that many of these new ideas "perish through their worthlessness" (p. 636), while others that forge useful connections in the world are preserved. Here, the observable world causes their preservation, not their creation (p. 636).

James's account doesn't just appropriate the Darwinian idea that generating and preserving causes can be independent of one another. It also reiterates active sides of the theory. To see why, consider an example that Gould (1979) discusses involving species of birds that learned to pilfer milk bottles. Gould says that we can well imagine a subsequent evolution of bill

shape to make the pilferage easier. Here, the important thing to note is that the milk bottles can only shape the birds if a capacity and desire to open bottles has already been produced. Along very similar lines, James (1878b, p. 930) joked that if the environment exclusively and directly shaped the mind, then dogs bred amongst sculptures would become refined connoisseurs of that artform He rejected this as unlikely due to "the lack of an original interest to knit … discriminations onto." Put another way, dogs could acquire artistic taste, but not solely as a result of environmental stimuli, for the artistic objects can only reach dogs on an aesthetic level if dogs already possess sensitivities—or what James calls selective interests—that make them receptive to aesthetic stimulation. Therefore, their interests must change before the environment can reinforce an aesthetic appreciation. "Interests," wrote James (1878a, p. 897), "are an all-essential factor which no writer pretending to give an account of mental evolution has a right to neglect.

Together, these views place pressure on an epistemology that contends that the "outer" world fully or even mostly shapes our "inner" life. As James (1878a, p. 897) argues, interests steer our focus and shape our interactions, implying that "interests precede the outer relations noticed." James (1980i, p. 403) elaborates that the mind accordingly processes sensory data "very much as a sculptor works on stone," actively 'making experience' of the world. Similarly, new ideas endure not so much because they correspond to anything observable, but because they usefully connect phenomena. Cases in point are some of Galileo's and Newton's mathematical formulations of nature, which are extrapolations from thoughts about non-existent ideals—like frictionless surfaces and point-like objects. Here, James (1890ii, p. 638) would say that "inner relations" engender experiences. A further and obvious point is that human interests and beliefs influence actions that transform both the social and physical world, demonstrating the mind's capacity to shape even material conditions. James (1878a, p. 908) insists, "the knower is not

simply a mirror ... passively reflecting an order that he comes upon ... [already] existing. The knower is an actor," who registers "that which he helps to create."

Long before quantum mechanics showed that observing a system changes it, James was advocating a similar and perhaps obvious notion, inspired not by subatomic particles but by the Darwinian revolution: that we generate or at least modify the realities we observe. James' fellow pragmatist Dewey would develop this idea further, noting that scientific observations are usually carried out with the aid of instruments or tools; tools are means by which we work upon things; when workings are skillful and intelligent, directed towards an end and efficacious at producing some result, they fall within the scope of what we call "art," which recalls James's assertion that we sculpt experience. Dewey (1920) elaborated that scientists study an object by doing something to it, by bringing "some energy to bear upon [it] to see how it reacts" (p. 113); or as Dewey (1929) added elsewhere, we know a thing by "deliberately alter[ing] the conditions under which we observe [it]" (1929, p. 85). Scientists, in short, use instruments to introduce "changes which will elicit some previously unperceived qualities" (p. 87), for example, revealing a microscopic structure by bombarding it with electrons or redirecting light from a distant galaxy onto an imaging device.

What do classical pragmatists have to say about metaphysical principles that scientists adopt but which are beyond empirical verification? Consider the premise that nature is lawful, so that things behave according to the same rules regardless of time or place. To begin with, purported verifications of the tenet are amplified because journals usually reject null (random) results in favor of ones with mathematically predictive value. Further, while the data plots from physics are usually tight and highly consistent, the predictive capacity even of physical laws is not absolute: we have the n-body problem and the earlier mentioned fact that Galileo and

Newton developed their laws by extrapolating how physical objects would behave in non-existent ideal conditions. Furthermore, when we move to more complex phenomenon like human behavior, the premise that it all ultimately traces to laws is assumed and not shown.

For such reasons, James (1890ii), wrote that is principle that nature is lawfulness "has to be sought under and in spite of the most rebellious appearances" (p. 636). After all, for every phenomenon accounted for by an established rule or law, untold others are not. Moreover, it's profoundly unempirical to take utterly for granted that haphazard outcomes appear random and inexplicable because their connection to underlying laws is yet undiscovered. After all, on the very basis of what it asserts, the contention cannot be based on observation, on what actually appears, for it specifically claims things are other than they appear. Hence James considered belief in lawfulness to be "far more like a religious faith than like assent to a demonstration" (p. 637). He reached a similar conclusion about the principle that all changes have causes. Again, what one concretely perceives are successions of phenomena, with some types consistently preceded and hence "caused" by others. But what the principle and indeed the concept of "cause" inspire is a "demand for some deeper sort of inward connection between phenomena than their merely habitual time-sequence […]. The word 'cause' is, in short, an altar to an unknown god; an empty pedestal still marking the place of a hoped-for statue."

Now, readers of philosophers like Hume will be familiar with some of the just-made assertions, but James takes them in a much less skeptical direction. This relates back to his idea that the brain can generate ways of thinking that are independent of anything experienced. But while aforementioned metaphysical standpoints like the principles and uniformity of causality are not, properly speaking, supported by observations, they provide conceptual schemes that

have been essential for getting certain modes of scientific inquiry going and making discoveries that have proved enormously valuable, both in their theoretical and applied import.

In short, the assumptions about lawfulness and about every event having a cause are examples of beliefs arising independently of sense experience. Still, they persist because of their usefulness within some domains, in this case particular fields in science, though not necessarily all of them, with quantum mechanics placing pressure on the principle of causality. James accordingly proposes that the given metaphysical outlooks are practically warranted, at least within some circumscribed spheres. A reason is that scientific inquiry is hard, and if researchers didn't assume that events are lawful or caused, then it would often be the better part of reason just to accept that phenomena under investigation are haphazard since statistically random results are in many cases the norm. One might say that metaphysical faith keeps scientists moving forward in the face of failures and that this has been enormously productive in both theoretical and applied arenas. James therefore concludes that metaphysical convictions about lawfulness and causality are good tools for doing certain kinds of work—that experience has proven them productive and in this sense true within particular domains of activity.

Copernican and Darwinian Revolutions

Unlike pragmatists, such as C. S. Peirce, C. I. Lewis, and Nelson Goodman, James little appreciated Immanuel Kant's famous "Copernican revolution," and was at times flippantly dismissive of it (e.g., James, 1890ii, p. 275; James, 1898, p. 1096). However, his knowledge of Kant was scant. Consequently, his remarks about Kant should be taken lightly. While his assimilation of Darwinian evolution did, at times, depart decisively from Kant's Copernican revolution, the two philosophical projects had noteworthy parallels. These breaks and parallels

are worth considering, especially if, as Goodman (1978, p. x) suggested, Kant pioneered a movement that set the stage for pragmatic philosophies of world-making. For current purposes, the parallels are all the more worth pondering for another reason: Kant and James tried to merge the empiricist and rationalist philosophies of their eras; they both drew inspiration from the scientific breakthroughs of their days; and the two of them developed outlooks that have contributed to the philosophy of science.

An initial point to note is that British empiricists provoked both Kant and James. Kant was spurred by David Hume's skepticism, which he took seriously rather than dismissing outright. Instead of merely adopting rationalism, Kant sought a middle ground between empiricism and rationalism. Similarly, James agreed with empiricists that warranted beliefs need experiential justification; yet his concept of experience was broader; he also accepted the rationalist assertion that beliefs can initially originate beyond experience.

Put in the terms of Kant (1781/1787, Bxvi), James questioned the premise that knowledge requires our cognition to conform to objects. (James's assertion that "inner relations" sometimes precede the "outer relation" noticed and that knowers are actors who registers things they help create can be seen as variations on Kant's position.) James accordingly arrived at something close to the conclusion that Kant advanced and stated as follows: "that we can cognize of things *a priori* only what we ourselves have put into them" (Bxviii). In short, we only know what matches our cognition, reversing conventional suppositions. And whereas James was inspired by Darwinian evolution, Kant described his approach as analogous to the revolutionary ideas of Nicolaus Copernicus. Specifically, Kant (Bxvi) claimed that when Copernicus didn't make adequate progress by assuming that the solar system revolves around the Earth, he proposed a hypothetical alternative: that the Sun is the center. Out of this, there arose something

analogous to a Necker Cube flip. The solar system ceased to have multiple centers of motion, with neatly organized concentric orbits coming forth into appearance.

For Kant, the Copernican revolution suggested a novel way of doing metaphysics—metaphysics here defined as a field concerned with the conditions under which anything can be said to have "reality" at all. Like pragmatists after him, Kant (1781/1787) took a cue from the burgeoning experimental sciences and maintained that reality can only be registered through some sort of active manipulation of it (Bxii-Bxiv). In other words, he asserted that the mind must impose form on reality to coherently register anything as reality at all. For Kant, the mind does so by operating within *a priori* limits that dictate how reality—which here means the phenomenal world—is put together, and thus how it shows up to the perceiving, experiencing and thinking mind (B161-B166). Kant's approach to metaphysics, then, began with the assertion that the human mind is limited to making certain kinds of judgments, and from there developed a theory about how reality must be for the mind—a theory, in other words, about the structures to which reality must be made to conform if it is to be registered at all. His approach, therefore, to legitimating metaphysical judgments like the principle of causality was not to show that the principle is a fact observed in reality, but that it is a necessary condition of humans experiencing reality as they do.

James's outlook more or less here aligns with Kant's. However, he broke with his predecessor by refusing to acknowledge any clear separation between what Kant calls "constitutive" and "regulative" principles. A constitutive principle is one such as the principle of causality, which, for Kant (1781/1787), is a necessary condition of anything appearing coherently to us. Because constitutive principles delimit how things must appear, they also delimit the sorts of objects about which one can have knowledge (B218-B21). A regulative

principle, by contrast, is essentially a pragmatic principle (see Axinn 2006, pp. 84-88); it is a guideline for action, a teleological rule "*for seeking something we desire*" (Axinn 2006, p. 85). A regulative principle does not, on Kant's account, play a role in constituting how reality appears, and consequently does not postulate the existence of objects about which humans can have knowledge.

To the extent that pragmatists (and philosophies of science based on James's and Dewey's outlooks) suggest that actions generate observations, which can be systematic or haphazard depending on the methods used, distinctions between constitutive and regulative principles collapse. One reason is that James and Dewey argue that values determine how the world divides into observable facts, not just because they influence how we categorize things. It's also because they govern actions that reveal properties in the world. Typifying the claim, a carpenter reveals properties of soft- and hardwoods by how she uses materials, effectively constructing non-nominal conceptual classifications in the things she builds (Crippen, 2017). A carpenter's use of wood and thus her categorization scheme is domain-specific. James draws a similar implication for metaphysical tenets: they provide a normative prescription for field-specific enterprises. For example, the principle of causality is practically true in the medical sciences but less so in general psychology. The former, after all, rather successfully seeks causes and cures for diseases. By comparison, the latter struggles more to obtain mathematically predictive results even in highly artificial laboratory settings (remember the bulk of results are null but not published). James, in particular, also wanted to believe in free will, which meant advancing a psychology that at least sometimes lets agents operate independently of causal influences.

Experimentalism and Affective Epistemologies

An additional place where James and Dewey depart from Kant is that they advance affective theories of knowledge. James (1884), for example, observed that "And" and "But" have different feelings and import, despite formally representing the same logical connective (i.e., conjunction). Thus, the statements "I love you and..." and "I love you but..." usually have different implications (Crippen, 2023a). In this last section, I sketch out pragmatic ideas about affective elements in scientific epistemologies.

Let's start by looking at the emotional aspects of what we can call pragmatic experimentalism, defined here as the notion that perceptual properties and knowledge stem from systematic interactions. We've seen that pragmatists embraced scientific methods, both broadly and in specific ways. Like scientists, pragmatists were fallibilists; they understood that evidence is never sufficient to fully settle beliefs. That's why basic research methods classes always emphasize that theories are never completely verified and that usually more than one theory fits the data.

James (1907) claimed in *Pragmatism*—aptly subtitled *A New Name for Some Old Ways of Thinking*—that additional criteria have long been used to adjudicate beliefs. In fact, he listed the same ones scientists usually advocate: economy, elegance, sense-making power, fit with other accepted beliefs and appeal to emotional inclinations. The last criterion might seem unscientific. It indeed irked Peirce, although he recognized a role for affectivity, especially as the irritation of uncertainty motivates inquiry (e.g., Peirce, 1877). However, these decision-making rules of thumb generally align with emotional preferences. We prefer theories that are consistent with our existing beliefs, which in scientific contexts, tend to be more practical, although paradigm shifts occasionally force us to discard outdated beliefs (Kuhn, 1962). Concepts that

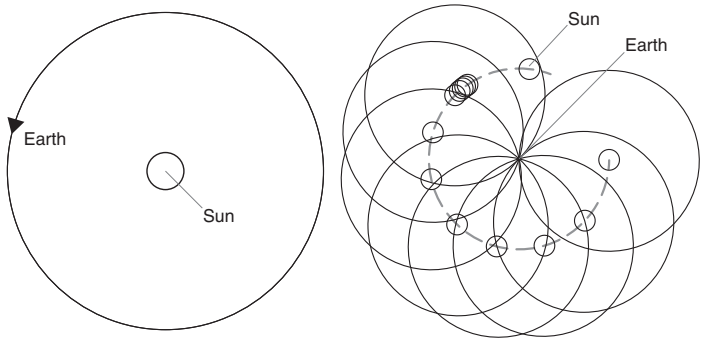
lack the ability to make sense are irritating and tend to repel us (see James 1879a). We are drawn to the aesthetic appeal and emotional satisfaction of elegance. Our emotional tendencies also incline us towards beliefs that correspond with evidence, primarily because it is often more practical, and secondarily because of the inherent human curiosity as highlighted by philosophers since antiquity. Even the choice to reserve judgment until the evidence compels us reflects an emotional predisposition (James, 1896, p. 464). James emphasized that these criteria are not lenient but rather challenging to satisfy, as scientists can attest.

By way of illustration, consider again historical debates about the structure of the solar system. Today, the heliocentric view prevails, and many science instructors explain that it overcame the geocentric model because it aligned better with observations. However, this narrative is somewhat deceptive. In reality, the Ptolemaic system predicted planetary movements more accurately than Copernicus's, which used circular instead of elliptical orbits. Moreover, when Galileo favored Copernicus's model over others, he overlooked a third option proposed by Tycho Brahe, Johannes Kepler's mentor. Brahe's model placed Earth at the center, orbited by the Sun, with other planets circling the Sun. This model matched observations of the night sky every bit as well as what Copernicus proposed.

To see why, picture somebody putting her finger of her left hand through a DVD hole, which here represents the Sun. Assume she keeps this finger (the one in the DVD hole) stationary, while moving a finger from her right hand, symbolizing the Earth, around the DVD's exterior. This approximates the motion of the Earth around the Sun, albeit with a circular and not elliptical orbit. But consider what happens if she now keeps her right finger stationary and pushes the DVD around it. Despite the changes in movement, the spatial relationship between the two fingers stays constant—they always maintain the same distance from each other. This

means if we were plotting the movement of celestial bodies by measuring the distance between them, the premise that the Earth orbits the Sun and the assertion that the Sun orbits the Earth would be equally compatible with data. (Crippen 2010a b). The reversibility implied in the just given illustration applies to ellipses and other shapes, (Crippen 2010a b). If updated with appropriate elliptical orbits, either of the models just described would account for observed motions of planets, why Venus appears largest during its crescent phase and so on.

Two possible relationship between the Earth and Sun



For the image to the left, imagine a stationary finger placed through the central hole of a DVD, symbolizing the Sun, while a finger from another hand moves along the DVD's edge, representing the Earth. For the image to the right, the Sun and Earth are represented by the same fingers. But this time, the one standing for the Earth remains fixed, and the one representing the Sun pushes the DVD around the stationary finger in a circular motion. Despite the changes in movement, the spatial relationship between the two fingers stays constant—they always maintain the same distance from each other. Image prepared by Matthew Crippen.

One thing demonstrated here is the hopelessly skeptical nature of correspondence theories of truth, which hold that an idea (inner relations in the mind) is good if it mirrors arrangements (outer relations) in the world. The situation, moreover, is even worse than it appears at first blush, for any stationary point of reference could be chosen, meaning there are an infinite number of models of the solar system that match raw data about spatial relations (Crippen, 2010a b). However, while correspondence theories can't adjudicate which version is true, the geocentric (or any non-heliocentric) model would not fit James's pragmatic criteria, which closely match scientific standards for deciding between beliefs that equally fit data.

With two centers of motion instead of one, the geocentric account is less economical, especially since the model requires background stars to annually sway to-and-fro to account for observations. The geocentric model, with its dual-motion centers, also seems less elegant. It doesn't align with other accepted beliefs in physics and overall, it has less power to make sense

of things. Note that while both models are supported by evidence, the main deciding factors between them are based on values. That said, these value-based interpretations are not at odds with evidence. On the contrary, they can highlight evidence, making it possible to identify facts based on our valuations of the world.

A stock objection to pragmatic, value-based criteria is that they seem to let us pick whatever feels good and right. For example, I knew a smoker (also a professor) who claimed his doctor told him that light tobacco use is actually beneficial because it raises heart rates, eliminating the need for cardiovascular exercise, and critics might assume that pragmatism would justify this conviction. However, James is clear that we can't act on whatever belief we want because our actions have consequences. Consequences are evidence, and evidence is a crucial part of pragmatic criteria. So, while James (1907) said that beliefs are true when they work, he also stressed that this doesn't imply we can act with "capricious impunity" (p. 580). To work "means something extremely difficult" and "the squeeze is so tight that there's little loose play for any hypothesis" (pp. 580-581). James's standards, which include observational evidence and call upon other adjudicating measures when evidence weighs equally, are, in fact, the same benchmarks regularly deployed by scientists. Any working scientist would agree these standards aren't easy.

A little more on the relation between facts and values is instructive here. Thoreau (1842, p. 40), who was friends with James's godfather, warned not to "underrate the value of a fact". The idea is that the fact of the matter and its value can be the same, for instance, when a community encounters a rampaging buffalo as dangerous (Crippen, 2023b). James advanced a similar position and did so without falling into unmitigated subjectivism. Specifically, James (1879b, p. 952) ac argued that an object's "essence"—that is, the key set of features that make an

object what it is—"varies with the end we have in view," so that "one man conceives [oil] as a combustible, another as a lubricator," and still another "as a darkener of wood." For different people, the object—in this case, oil—is valued and thus noted for producing different sensible effects, which are not just subjective projections. Instead, the role of subjective interests is here to direct attention to realities in the experienceable world that are germane to pursuits concerning the conscious agent; and that they hone conceptual instruments so as to handle and negotiate these realities. Instead of reducing conceptual meaning to images in one's head, therefore, James (1907, p. 606) equated it primarily to functions in human activities, writing that "if [concepts] have any use they have that amount of meaning."

Scientific facts are also intimately connected to values. James (1890ii, p. 638), in fact, maintained that the "experiences used to prove a scientific truth are mostly artificial experiences of the laboratory gained after the truth itself has been conjectured." By "artificial," however, he didn't mean "unreal." "Artificial" comes from the Latin words *ars* and *facere*. Ars can connote "art," as in "skill," "handicraft," or "manner of acting," and *facere* means "make." By artificial experiences, then, James described experiences made or created through action. Thus, when James (e.g., 1890ii, p. 321) famously declared we can will ourselves into a belief by acting as if the thing in question were real, he didn't just mean we can convince ourselves on a psychological level; he also meant that actions can generate experiences, data, and phenomena that support our belief. In science, this is easy to see. The use of the proton collider to produce exotic particles is just one example of scientists acting to create phenomena that support their beliefs. This occurrence is also easy to see in everyday life. A woman who acts on the belief that she's not, after all, too sick to get out of bed for hockey practice actually eliminates a symptom and therewith part of the experiential basis upon which she judged herself to be so very ill in the

first place. Seen in this light, James's pragmatism and the philosophy of science it implies was not a further slide into the subjectivism that characterized much of Modern era thinking, but a retreat from it.

References

Axinn, Sidney 2006: The First Western Pragmatist, Immanuel Kant. *Journal of Chinese Philosophy, 33*, pp. 83-94.

Crippen, M. (2010a). Art and Pragmatism: James and Dewey on the Reconstructive Presuppositions of Experience, PhD diss., York University, 2010.

Crippen, M. (2010b). William James on belief: Turning Darwinism against empiricistic skepticism. *Transactions of the Charles S. Peirce Society*, 46(3), 477–502.

Crippen, M. (2017). Embodied cognition and perception: Dewey, science and skepticism. *Contemporary Pragmatism*, 14(1), 112–134.

Crippen, M. (2023a). Anticipating and enacting worlds: Moods, illness, and psychobehavioral adaptation. *Phenomenology and the Cognitive Sciences* (online first), 1–25.

Crippen, M. (2023b). Chinese thought and Transcendentalism: Ecology, place, and conservative radicalism. *Religions*, 14(5), 570.

Darwin, C. 1872 [1958 reprint]: *The Origin of Species*, sixth edition. London: J. M. Dent & Sons LTD.

Darwin, Charles 1859 [1964 reprint]: On the Origin of Species, first edition. Cam- bridge: Harvard University Press.

Dewey, J. 1920: Reconstruction in Philosophy. New York: Henry Holt and Company.

Dewey, J. 1929. The Quest for Certainty. New York: Minton, Balch and Company.

Gould, S. J. 1979: "Shades of Lamarck." In S. J. Gould 1980, *The Panda's Thumb*. New York: W. W. Norton & Company, pp. 76-84.

Goodman, Nelson 1978: *Ways of Worldmaking*. Indianapolis: Hackett Publishing Company.

James, W. 1878a: Remarks on Spencer's Definition of Mind as Correspondence. In G. E. Myers, ed. 1992, William James: Writings 1878–1899. New York: Library of America, pp. 893–909.

James, W. 1878b: Brute and Human Intellect. In G. E. Myers, ed., 1992, William James: Writings 1878–1899. New York: Library of America, pp. 910–949.

James. W. 1878c. Letter. In R. B. Perry, ed., 1935, The Thought and Character of William James: As Revealed in Unpublished Correspondence and Notes, Together with his Published Writings, vol. 2, Philosophy and Psychology. Oxford: Little Brown, pp. 34-35.

James, W. 1879a: The Sentiment of Rationality. In G. E. Myers, ed., 1992, Wil- liam James: Writings 1878–1899. New York: Library of America, pp. 950–985.

James, W. 1879b: Are We Automata? Mind, 4, pp. 1–22.

James, W. .1880: Great Men, Great Thoughts, and Their Environment. Reprinted as Great Men and Their Environment in W. James 1897, The Will to Believe and Other Essays in Popular Philosophy. In G. E. Myers, ed., 1992, William James: Writings 1878–1899. New York: Library of America, pp. 618–646.

James, W. 1884. On Some Omissions of Introspective Psychology. In Myers, G.E., ed., 1992, *William James: Writings 1878-1899*. New York: Library of America, pp. 986-1014.

James, W. 1890i: The Principles of Psychology, vol. I. New York: Henry Holt and Company.

James, W. 1890ii: The Principles of Psychology, vol. II. New York: Henry Holt and Company.

James, W. 1896/1992. "The Will to Believe." Reprinted in W. James 1897, *The Will to Believe and Other Essays in Popular Philosophy*. In G. E. Myers, ed., William James: Writings 1878-1899, 457-479. New York: Library of America.

James, W. 1898: Philosophical Conceptions and Practical Results. In G. E. Myers, ed., 1992, *William James: Writings 1878-1899*. New York: Library of America, pp. 1077-1097.

James, W. 1907. *Pragmatism*. In Bruce Kuklick, ed., 1987, *William James: Writings 1902-1910*. New York: Library of America, pp. 479-624.

Kant, I. 1781/1787: *Critique of Pure Reason* [first and second editions]. Paul Guyer and Allen W. Wood, trans., 1998. New York: Cambridge University Press.

Kuhn, T. (1962). The Structure of Scientific Revolutions. University of Chicago Press.

Peirce, C. S. 1877. The Fixation of Belief. *Popular Science Monthly* 12: 1-15.

Spencer, H. (1855). The Principles of Psychology. Longman, Brown, Green & Longmans.

Thoreau, H. D. 1842. Natural history of Massachusetts. *The Dial* 3: 19–41