Received: 26 March 2024
Accepted: 10 June 2025
Published: 28 August 2025

Constituting Emotional Phenomena — A Mach-Influenced Empiricist Perspective

Peter Zachar – Auburn University Montgomery, USA, pzachar@aum.edu

Abstract

Using the philosophical writings of Ernst Mach as a backdrop, I explore how concepts and classifications partly constitute the phenomena studied in the science of emotion by selecting features from a larger population of features. This process of selection is a matter of decision and is not inevitable, but it promotes populating concepts with empirical content. The openness of empirical concepts suggests that this selectionist constituting does not characterise only the early stages in the development of a science because background and foreground shifts are potentially ongoing. The theory of psychological construction, which contends that emotional episodes are constructed on the fly out of shifting sets of components, exemplifies this selectionist sense of constituting to the extent that it advocates for a resemblance nominalism, similar to that of Locke, in which selection is involved in naming kinds. Examples of constituting can be seen in changing definitions of whether animals experience emotion and in the choice of causal models.

Keywords: essentialism, nominalism, open concepts, operational definition, psychological construction, scientific conventionalism

1. Introduction

Those perspectives that adopt a more or less constructionist account of emotional phenomena have several features in common. First, according to constructionism, the way in which phenomena are conceptualised and classified is not inevitable. A second feature, following from the first, is that alternative descriptions of phenomena are possible. A third feature, inspired by the first two, is that some choice, decision, or selection is involved in describing phenomena.

Although constructionist analyses are usefully contrasted with views that construe emotional phenomena as mind-independent, natural kinds, there are accounts of natural kinds that can accommodate all three features just enumerated. This has somewhat deflated the constructed kind versus natural kind contrast. With respect to mind-independence, a more contemporary question focuses on the extent to which our concepts and classifications in some way constitute emotional phenomena.

Stronger versions of constituting, often labelled neo-Kantian, hold that concepts and classifications actively structure phenomena—imparting structure that is not already inherently there. A milder version of constituting, typically more aligned with empiricist perspectives, takes constituting to be a matter of actively selecting relevant features from a wider population of features.

In this article, I will elaborate on an empiricist-selectionist approach to constituting, drawing on the work of Ernst Mach. Mach is interesting because, alongside the pragmatists, he articulated one of the first post-Darwinian approaches to empiricism, and did so in opposition to neo-Kantian philosophies. He anticipated many features of the scientific conventionalism that was central to the empiricism of the logical positivists, but did not go so far as to claim that scientific conventions are definitions disguised as descriptions of facts. Finally, of interest to psychological scientists, Mach pondered the constituting role of measurement, thus anticipating operationalism.

2. The Philosophy of Ernst Mach

The physicist and psychologist Ernst Mach's (1914) philosophical writings are not as well known as they once were, but his perspective was a basic assumption of most of the early work in the philosophy of science. The spirit of Mach's views was ably summarised by Einstein ([1916] 1996, 142):

> Concepts that have proven useful in ordering things can easily attain an authority over us such that we forget their [worldly][1] origin and take them as immutably given. … Therefore, it is not at all idle play when we are trained to analyze the entrenched concepts, and point out the circumstances that promoted their justification and usefulness and how they evolved from the experience at hand. This breaks their all too powerful authority.

Mach is frequently described as having incorrectly disputed the reality of atoms, construing them as theoretical posits not supported by sensory evidence. He rejected atoms, but his reasons for doing so were more nuanced than claiming that atoms are not real because we cannot see them. His doubts seemed to derive from his view that believing in atoms involved being too literal about abstract and simplifying scientific models. His scepticism about atoms, however, by itself, does not justify relegating Mach to a footnote in the philosophy of science. He remains relevant for articulating an empiricist alternative to trendy neo-Kantian ideas. This type of empiricism lives on in both pragmatism and various deflationary views on metaphysics.

Mach's abiding concern was that scientists took notions drawn from what Einstein called experience at hand and converted them into absolute realties. Especially disagreeable to Mach's "anti-metaphysical" view would be to make a distinction between appearance (understood as what we can experience on the surface) versus reality (understood as what is behind those appearances). Like William James, Mach rejected the claim that, to understand experience, we have look at what is *behind* experience, or *underlies* it, or is transcendentally *prior* to it. We can apply metaphors to distinguish between shallow and deeper features of experience and between more or less penetrating accounts of experience, but such metaphors do not get us outside of experience to an absolute thing-in-itself.

Another important feature of Mach's philosophy is his claim that knowledge generation is analogous to a Darwinian process of selection in which potential experience contains a wide variety of features. We selectively attend to some of these variations and ignore or minimise others—always working to put things into an orderly arrangement under the guidance of our current goals and purposes. Mach refers to this as the principle of economy. Economy is partly psychological. We cannot represent all the details potentially available to us

1 The English translation had this as wordly not worldly. Worldly is more consistent with the original German. Thanks to Emma Bolton for tracking this down.

and so need to work with summaries, rules of thumb, and generalisations. More recent philosophers refer to these summaries as "models" (van Fraassen 2002; Giere 1999).

3. Scientific Conventionalism

The selection process discussed by Mach, which can be more or less conscious, involves decisions. In the early 20th century, the importance of decisions in the generation of scientific knowledge was placed at the forefront of the philosophy of science, under the rubric of scientific conventionalism. Three features of the conventionalist analysis can be highlighted.

First, scientific conventions result from choices that are made and which are not inevitable, but once in place they may become taken for granted and assumed. For example, it is not inevitable that longitude and latitude are oriented west to east and north to south, but that orientation is so standardised that it seems inevitable.

Second, the choice of a scientific convention has an extra-empirical dimension. Such choices are not arbitrary, but neither are they necessitated by the facts. In the philosophy of science this feature is associated with *under-determination*, which holds that a plurality of concepts, theories, and classifications can be adequate to the facts (or to experience). For example, the metre is a convention. However useful it may be, no spatial facts make the metre the true measure of length any more than they make the 12-inch foot the true measure of length.

Third, scientific conventions are chosen because they promote the discovery of facts, or, in the language of the logical positivists, because they are bridges that help populate theoretical concepts with empirical content (van Loo and Romejin 2015). Thus, scientific conventions are decisions that facilitate the discovery of facts—or, in Mach's terms, that facilitate the adaptation of thoughts to facts.

For example, Paul Ekman initially proposed that basic emotions such as fear last only seconds because that was how long emotional facial expressions last. He later altered his view and stipulated that basic emotions can last longer than seconds but maintained that the duration of an emotion is still relatively brief—not more than a few minutes (Ekman and Cordaro 2011; Ekman 1993).

Once either of these conventions about duration is adopted, they can guide scientists to populate a basic emotion concept with empirical content. For example, physiological processes that occur on a time scale longer than seconds could not be used to populate a short duration basic emotion concept—in measuring such processes we would be measuring something in addition to basic emotions. Once a convention about duration is adopted, the process of discovering facts about a basic emotion so defined can proceed, but shorter and longer durations will limit the basic emotion concept differently and thus facilitate the discovery of different assortments of facts.

4. Operational Definitions and Open Concepts

Conventionalism in the philosophy of science is closely aligned with operationalism in scientific methodology. In the context of measurement, both conventionalism and operationalism hold that one's choice of a measure makes a non-trivial contribution to what is measured (Tal 2020). One meaning of non-trivial is that the measure (or the concept) in some way constitutes what is measured.

As noted, the extra-empirical considerations utilised in the choice of a scientific convention imply that other choices were possible. In one version of scientific conventionalism, advocated for by Poincaré ([1905] 2001), a convention is not subject to correction by the facts. According to this interpretation, conventions are definitions, like "A bachelor is an unmarried man." This definition prescribes the meaning of the term "bachelor." We could decide to change the meaning of the term, but there is no fact that we can discover that would force us to change the meaning of the term.

The "not subject to correction by the discovery of facts" feature of scientific conventionalism is called into question by the notion of open concepts. This notion undermined the view of scientific conventions as a priori, pre-empirical assertions that are true by definition only.

As a scientific convention, a duration criterion such as "Basic emotions last less than 10 seconds" is definitional of basic emotions—or what Poincare called a definition disguised as a description. For Poincare, definitions in disguise are neither true nor false, rather, they stipulate the boundaries and limits of our concepts. In contrast, Pap (1953) argued that there is a malleable relationship between the defining features and the more contingent features of a concept. In Pap's view, new information can lead us to revise what we take to be the defining features of a concept.

With open concepts there can potentially be foreground–background shifts, in which something that was relegated to the background is brought forward and given prominence, or something formerly in the foreground is backgrounded and seen as more contingent. Described in this way, when Ekman altered the duration criteria for a basic emotion, he moved facial expressions more into the background and brought appraisals a bit more into the foreground.

This process is more than a reshuffling of already known features. The importance of openness is found in encounters with something new and unexpected that suggests possibilities for taxonomic change. This is a more active form of constituting, similar to the way that selecting a sample based on specific features (e.g., college-educated Asian females) more actively constitutes the sample than does random selection from a population.

In psychology, Paul Meehl used open concepts to criticise operationalism as a theory about the meaning of concepts (MacCorquodale and Meehl 1948; Cronbach and Meehl 1955). As a theory of meaning, operationalism holds that the concept is synonymous with the measurement instrument. In Bridgman's (1927) terms: "If we have more than one set of operations, we have more than one concept," and "strictly there should be a separate name to correspond to each different set of operations" (10). Bridgman's (1945) views were more nuanced than these quotes indicate, but they do express how psychologists understood operationalism in the 1930s and 1940s, often illustrated by referring to Boring's (1923) definition of intelligence as the capacity to do well on intelligence tests.[2]

Meehl thought that this was simply incorrect. For example, one way to begin measuring intelligence is to rely on teachers' evaluations of children's cognitive abilities. A teacher's concepts, however, would doubtlessly include implicit meanings such as "brighter kids retain more information" and "learn this information quicker." In philosophical terms, these implicit meanings are surplus meanings of the teacher's concepts.

2 One of Boring's points was that we should not confuse what we know about the measure of intelligence (a narrow concept) with an everyday common sense notion of intelligence.

By systematically elaborating on surplus meanings and explicitly incorporating them into one's measure of intelligence, Meehl claimed that we can, over time, iterate our way to a more valid measure/concept of intelligence. Eventually, as very few improvements can be made, the concept can even be closed.

With respect to openness, a related perspective was articulated by Waismann (1945), who asserted that scientific conventions and operational definitions are inescapable in science. Nor are they limited to the early stages of scientific research programmes. Rather than open concepts, Waismann wrote about open textures, by which he meant that no description of a phenomenon can cover all the possible facts and circumstances that may be relevant to characterising that phenomenon (Makovec and Shapiro 2019; Makovec 2019). What he means is illustrated by the following quote.

> We can never be quite sure that we have included in our definition everything that should be included, and thus the process of defining and refining an idea will go on without ever reaching a final stage. In other words, every definition stretches into an open horizon. (Mackinnon, Waismann, and Kneale 1945, 125)

As noted by Makovec (2025), one implication of this view is that future meanings, concepts, and classifications are indeterminate and, in some cases, not predictable from past meanings.

5. *Construction* in psychological construction is different than *construction* in social construction

Psychological constructionist perspectives are useful for illustrating how conventions can constitute phenomena, but illustrating this requires elaborating on what is meant by psychological "construction." For example, a psychological constructionist would not dispute that how we understand and experience emotions is influenced by cultural and social processes, thus psychological construction can readily incorporate social constructionist insights. Does this mean that psychological and social construction are examples of the same process of construction? An article by Kurth (2019) articulates such a view. According to Kurth, the psychological constructionists James Russell and Lisa Barrett claim that an essential feature of emotion is a state of core affect labelled with a folk emotion concept, i.e., that distinguishing between emotions involves projecting culturally-fashioned concepts onto felt affective episodes.

This claim is a bit off target. Rather than claiming that fear is psychologically constructed by projecting an emotion concept onto a state of core affect, the theory of psychological construction is about the construction of complex psychological states out of a variety of components. It is a different kind of "construction" than what is meant by "social construction." In psychological construction, emotions are not manifestations of ready-made dispositions, they are psychological episodes put together on the fly—out of components. For Russell (2012), these components include core affect, cognitive appraisal, and self-categorisation.

6. Abundant Variation

Mach's principle of economy is contingent on variation being ample and abundant. The notion of abundant variation, as used in both biology and psychometrics, refers to the proliferation of individual differences,

many of which lie outside the boundaries of our concepts for biological species, emotions, personality traits, and so on. Concepts remain open because different groupings of abundant variation can be foregrounded.

Likewise, the theory of psychological construction is predicated on viewing an emotion, such as fear, as a population of episodes replete with variation, and which has no core essence that is equally present across all of those variants. Any specific kind of emotion has the structure of a radial category composed of prototypical instances, variations from the prototype, and boundary cases (Russell 1991).

One useful way to understand this feature of psychological construction is to view it as a form of resemblance nominalism similar to that of Locke (Zachar 2022). For Locke, naming something is the workmanship of human understanding, which guides us to recognise the variety of features co-occurring across episodes as going together to form a *kind*. One of Locke's ([1689] 1997) examples of nominalism was the naming of different kinds of killing, e.g., genocide, herbicide, infanticide, parricide, and suicide. Locke says we have specific names for certain kinds of killing, but not all. For example, parricide refers to the killing of one's parent, but we do not have a specific name for the killing of a second female cousin. Likewise, in psychological construction, if the patterning of components resembles a pattern encoded in some emotion concept (e.g., fear), we will identify that pattern as being that *kind* of emotion. However, many patterns of components occur that are not classified and named (as kinds).

One way to elaborate on resemblance nominalism is to contrast psychological construction with essentialist forms of basic emotion theory. According to an essentialist perspective on basic emotion, affect programmes are innate features that are hard wired into the brain during development. When activated, affect programmes are said to automatically produce the coordinated affective, cognitive, and behavioural responses that characterise specific basic emotions such as fear. Thus, all valid episodes of basic fear are supposed to share the affect programme for fear. In contrast, the nominalist theory of psychological construction claims that different episodes of fear share many things in common, but the only one thing they all share in common is the name "fear."

7. Constituting Emotion Concepts (and Phenomena)

Scientific conventions and operational definitions specify (more-or-less) what is to be included within the boundaries of a concept and what is to be excluded. For a definition such as "A bachelor is an unmarried man," this is relatively straightforward. A 30-year-old unmarried man is a bachelor, a 13-year-old boy and a 30-year-old woman are not. But what about a widower, or someone who is living with a romantic partner but not married? Certain definitions of bachelor exclude them—so there is potentially some selection. When it occurs, selecting plays a constituting role.

Let's look at some examples of constituting in the domain of emotion. When my little dog retreats to the safety of the laundry room during a thunderstorm or meets me at the door when I come home if it is storming, does he experience fear? Joseph LeDoux, who did pioneering work on studying the role of the amygdala in the classical conditioning of emotional responses, would say no, he does not.

LeDoux's groundbreaking work consisted in mapping the pathway from the pairing of an unconditioned stimulus (e.g., a light shock) and a conditioned stimulus (e.g., a tone) to a conditioned "fear response" involving the amygdala (LeDoux 1996). Several years later, after realising that this system works independently

of any conscious awareness, LeDoux (2014) decided that what he was actually mapping was the behavioural and physiological responses to threat. LeDoux argued that the defining feature of fear for humans, namely the self-conscious experience of fear that occurs when one is in danger, is generated by cortical machinery that is not conserved across species, as the threat response circuitry is. In this redefinition, the conditioned response to threat, rather than being described as fear, was shifted into a broader conceptual background for fear.

Importantly, this definitional shift was more than an arbitrary stipulation. According to LeDoux and Pine (2016), treatments developed for anxiety disorders on the basis of animal models of fear and anxiety have had limited success with humans. This, they believe, is because those treatments target behaviour and physiological responses to threat, not conscious fear and anxiety. Indeed, this new definition of fear potentially supports some empirical progress regarding treatment targets, differentiating between when to target the process of attention to threat and when to target cognitive appraisal. For example, one might target attention to threat when treating phobias in children and target cognitive appraisal when treating bereavement-related depression in adults.

A more ontologically weighted perspective on constituting is advocated in Lisa Barrett's (2017) constructed theory of emotion. According to the constructed theory, an instance of an emotion such as fear is constructed when conceptual knowledge about fear is actively brought to bear on an occurrence of unpleasant affect being changed in response to an event in the environment. This process, however, is more involved than a projection of a concept onto an episode of core affect.

An important background theory to Barrett's notion of constituting is that conscious experience does not contain a literal representation of the world; rather it is a simulation of a world, based on how incoming information is interpreted. The incoming information lacks structure. According to the constructed theory of emotion, many concepts are available to structure incoming information, but when the incoming information is actively augmented by an emotion concept such as fear, the brain changes its own pattern of activity (its simulation) and *generates* fear on the spot.

This view is more neo-Kantian, arguing that emotion concepts constitute emotional phenomena by structuring them. In Barrett's view, emotions are not ready-made phenomena that we recognise and classify, but rather in some sense emotions are generated when they are classified.

For psychological construction in an empiricist-selectionist framework, the psyche is like a chess board with many pieces that can be arranged in multiple ways. Some of these arrangements are given specific names, such as the Sicilian Defence. For the more neo-Kantian-framed constructed theory, emotions are generated in being conceptualised. In the chess example, this would be more like the act of bringing conceptual knowledge to bear resulting in the pieces then moving into the pattern named. The moving of the pieces sounds like magic in the chess example, but less so when the example is the neural simulation of the body–world relationship.

The constructed theory includes a selectionist form of constituting as well because it makes a "conceptual act" a defining feature of emotions, thus limiting it in specific ways. It is still a nominalist perspective because the emotion of fear refers to a family of fear episodes (or population of specific varieties of fear) with no shared essence. These variations are embedded in a linguistic network of other concepts, such as existential loss and death, none of which are available to my dog, and so his brain cannot construct an instance of fear. Whatever he experiences when he retreats to the laundry room when it is thundering has been relegated by Barrett to a background feature of fear.

These revised definitions are scientific conventions. They are freely chosen and not forced on us by the facts themselves. Each one is a possible way of framing an emotion such as fear—guiding us on how to populate the concept with empirical content—but neither corresponds to what fear really is in some privileged sense. If we adopted a different convention, my dog could likely be described as experiencing fear. For instance, Scarantino and Griffiths (2011) demarcate three kinds of basicness: conceptual, biological, and psychological. Biologically basic emotions are homologous across species and evolved to rapidly adapt to fundamental life tasks—and do not incorporate everything that a folk concept would classify as fear. Under their description of "biologically basic," my dog could reasonably be said to experience fear.

8. Mind-Framed, Not Mind-Controlled

An informative perspective on the constituting role of conceptualising and naming is articulated by Hasok Chang (2022). In Chang's terms, phenomena are not pre-figured. Put another way, rather than already being specified independent of conceptualisation, phenomena are non-specific, i.e., phenomena do not exist already classified in some correct, privileged way. A classification cannot be pre-correct, independent of one's purposes for classifying. For example, a map of the London underground accurately shows one how to travel from Paddington Station to Baker Street Station via the subway, but if your goal is to walk from Paddington Station to Baker Street, that "tube" map would be a terrible guide (Kitcher 2001). You need a street map. The correctness of any map depends on what you want to use it for.

As an alternative to Locke's workmanship of human understanding, Chang labels the act of identifying and naming as mind-framing. The notion of "mind-framed" rather than "pre-figured" is nicely illustrated by Putnam's (1996) claim that language cannot be divided into a part that describes our conceptual contributions and a part that describes the world as it is anyway. Putnam's views shared important similarities with Carnap's ([1956] 1991) claim that metaphysical assertions can be legitimate internal to a conceptual system once some assumptions are in place, but not legitimate external to all conceptual systems in an absolute sense.

It is important to clarify that we cannot frame and fit things together in whatever way we want. Wanting or preferring something to be true or correct does not make it so. There are constraints. Chang's terms are helpful here as well—what we name is mind-framed but not mind-controlled. Whether it be atoms or patricide or fear, the patterns that occur are more than things we make up.

9. Causation, Convention, and Kinds

One of the most counter-intuitive features of Mach's philosophy was his view that causation is a metaphysical notion that can be minimised in science. In Mach's view, if one understands the functional relationships between variables (e.g., f = ma), labelling one variable the cause (f, or force) and the other the effect (a, or acceleration), does not tell us anything new about these relationships. Mach would supplant the simplified analyses of one cause, one effect, with an analysis of functional relationships.

The psychological constructionist criticism of the essentialist version of basic emotions is grounded in a particular model of causation, namely a mechanistic model based on decomposition and localisation. In this model, to causally explain a psychological process involves decomposing it into parts and understanding how those parts are organised to produce or sustain an outcome (Craver and Darden 2013).

For instance, a complex psychological state such as fear could be decomposed into a rapid heartbeat, pupil dilation, and attention to threat. Attention to threat can be further decomposed, and so on, until the parts are simple enough to be explained mechanistically. In Russell's (2003) view, once scientists demarcate causal mechanisms for the components, there will be no role for a causal mechanism of fear in addition to these component mechanisms.

Ironically, this mechanistic model of causation is much the same as the model of causation utilised by basic emotion theories in which affect programmes are identity-determining causal mechanisms. In the affect programme model, the affect programmes mediate between external events and the coordination of subjective feeling, cognitive appraisals, action tendencies, etc. Psychological constructionists such as Russell, however, argue that there are no emotion-specific mechanisms that can be described as affect programmes.

Russell (2003) illustrates his alternative to the affect programme model of emotions by making an analogy with constellations and emotions. In astronomy, stars are points of light in the night sky that, unlike planets, do not change their positions relative to each other (because they are very far away). Just as people can see faces in clouds, they can see patterns in the relative positions of the stars. Historically, the most important of these patterns were the constellations of the zodiac. Examples include the constellations of Leo and Pisces.

The point of the analogy is that just as constellations are happenstance configurations of stars, for Russell discrete emotions like fear are happenstance configurations of components. Stars are important phenomena in the science of astronomy, but astrological constellations are not. Likewise, according to Russell, components such as core affect, cognitive appraisal, and action tendencies are important phenomena in the science of psychology, but configurations of those components that happen to resemble folk concepts such as fear are not.

For scientific research programmes, however, a mechanistic model is not the only causal model available. Other causal models include interventionist models, causal cascade models, pathway models, and the causal network models used in systems theory (Ross and Woodward 2023). Mach's functionalist perspectives shared some similarities to the network model. Any one of these models could also be applied to the scientific study of emotions. The choice of a causal model would foreground the selection of specific causal features and would thus partly constitute the phenomena that scientists study.

For example, using a cascade model of causation, ruminating on negative emotions such as fear and anger can increase the intensity of those emotions, increasing the probability of behaviours such as avoidance and aggression. These behaviours influence the environment and how it is experienced. Such behaviour and environment pairings can initiate a positive feedback loop that amplifies the emotions, and—if ongoing—potentially alters the developmental trajectories of self-concept formation and relationship patterns in the long term (Selby and Joiner 2009). With this alternative model, emotions would have a role to play in causation-based science of psychology.

One difference between basic emotions and constellations is that the constellations are fully constituted as kinds by projections of concepts onto a random pattern in the night sky. Emotional episodes, however, may possess more internal coherence than constellations.

The theory of psychological construction can be taken to imply that the components independently co-occur, and some of those clusters of co-occurring events resemble folk emotion concepts. However, the relationships between the components are not necessarily arbitrary and random, even if the patterning of components is not the outcome of an identity-determining causal mechanism (or essence).

For example, Scherer's (2009) component process model is also constructionist. It describes emotions as being put together out of components and acknowledges that a near infinite number of arrangements of components are possible across individuals. However, for Scherer, these components, such as subjective feelings, cognitive appraisals, and action tendencies are more than independent events that occasionally co-occur. In his view, somewhat like in causal network models, the components can be synchronised as kinds by entering into recursive causal relationships with each other.

This type of causal coherence among components does not mean there are basic emotions in an essentialist sense, but the patterns may be coherent enough to form a kind that supports some generalisations. Within an emotion category such patterns could also vary and have fuzzy boundaries. In this version of a causation-based science of psychology, basic emotions would not be defined by affect programmes that are homologous across species, but they could be redefined as common variants as opposed to rare variants. That is to say, fear is a basic emotion because it is a frequently occurring pattern that is recognised as highly relevant for understanding ourselves and others.

10. Conclusions: Worldmaking, Mind-Framing, and Constituting

A philosopher who introduced his own notion of the workmanship of human understanding, Nelson Goodman (1978), wrote about "worldmaking." According to Goodman, the world is always going to contain more than can be represented by any of our concepts, thus we should not talk about some neutral world as viewed from what Putnam (1990) called a God's-eye view perspective; rather, what is available to us are multiple world versions.

Less metaphysically, we might say with Goodman that the world versions discovered by scientists are going to involve decisions about how to lump, split, order, and weight things. The decisions need not be arbitrary, but they are decisions, nevertheless.

Goodman's notion of world-making could be taken to imply making-up or inventing, whereas the simple naming of a pattern could imply passive recognition. Constituting, in its Machian selectionist form, potentially splits the difference between world-making and simple naming. It is neither as creative as making-up nor as passive as recognition. A better metaphor for a selectionist approach to constituting might be *engineering*.

References

Barrett, L. F. 2017. *How Emotions Are Made*. Houghton Mifflin.

Boring, E. G. 1923. "Intelligence as the Tests Test It." *New Republic* 36: 35–37.

Bridgman, P. W. 1927. *The Logic of Modern Physics*. Macmillan.

———. 1945. "Some General Principles of Operational Analysis." *Psychological Review* 52 (5): 246–49.

Carnap, R. (1956) 1991. "Empiricism, Semantics, and Ontology." In *The Philosophy of Science*, edited by R. Boyd, P. Gasper, and J. D. Trout, 85–97. MIT Press.

Chang, H. 2022. *Realism for Realistic People*. Cambridge University Press.

Craver, C. F. and L. Darden. 2013. *In Search of Mechanisms: Discoveries across the Life Sciences*. University of Chicago Press.

Cronbach, L. J. and P. E. Meehl. 1955. "Construct Validity in Psychological Tests." *Psychological Bulletin* 52 (4): 281–302.

Einstein, A. (1916) 1996. *The Collected Papers of Albert Einstein*. Volume 6 (English Translation Supplement), translated by A. Engel. Princeton University Press.

Ekman, P. 1993. "Facial Expression and Emotion." *American Psychologist* 48 (4): 384–92.

Ekman, P. and D. Cordaro. 2011. "What Is Meant by Calling Emotions Basic." *Emotion Review* 3 (4): 364–70.

Giere, R. N. 1999. *Science without Laws*. University of Chicago Press.

Goodman, N. 1978. *Ways of Worldmaking*. Hackett.

Kitcher, P. 2001. *Science, Truth, and Democracy*. Oxford University Press.

Kurth, C. 2019. "Are Emotions Psychological Constructions?" *Philosophy of Science* 86 (5): 1227–38.

LeDoux, J. E. 1996. *The Emotional Brain*. Simon & Schuster.

———. 2014. "Coming to Terms with Fear." *Proceedings of the National Academy of Sciences* 111 (8): 2871.

LeDoux, J. E. and D. S. Pine. 2016. "Using Neuroscience to Help Understand Fear and Anxiety: A Two-System Framework." *American Journal of Psychiatry* 173 (11): 1083–1093.

Locke, J. (1689) 1997. *An Essay Concerning Human Understanding*. Penguin Books.

MacCorquodale, K. and P. E. Meehl. 1948. "On a Distinction between Hypothetical Constructs and Intervening Variables." *Psychological Review* 55 (2): 95–107.

Mach, E. 1914. *The Analysis of Sensations and the Relation of the Physical to the Psychical*. Translated from the 1st German edition by C. M. Williams, and revised and supplemented from the 5th German edition by S. Waterlow. Open Court.

Mackinnon, D. M., F. Waismann, and W. C. Kneale. 1945. "Symposium: Verifiability." *Proceedings of the Aristotelian Society, Supplementary Volumes* 19: 101–164.

Makovec, D. 2019. "Introduction: Waismann's Rocky Strata." In *Friedrich Waismann: The Open Texture of Analytic Philosophy*, edited by D. Makovec and S. Shapiro, 1–25. Springer International.

———. 2025. "Open Texture in Science and Philosophy." In *100 Years of "Tractatus Logico-Philosophicus"—70 Years after Wittgenstein's Death: Proceedings of the 44th International Ludwig Wittgenstein Symposium*, edited by E. Heinrich-Ramharter, A. Pichler, and F. Stadler, 335–46. De Gruyter.

Makovec, D. and S. Shapiro, eds. 2019. *Friedrich Waismann: The Open Texture of Analytic Philosophy*. Palgrave Macmillan.

Pap, A. 1953. "Reduction Sentences and Open Concepts." *Methodos* 5: 3–30.

Poincaré, H. (1905) 2001. "Science and Hypothesis." In *The Value of Science: Essential Writings of Henri Poincaré*, edited by S. J. Gould, 1–178. The Modern Library.

Putnam, H. 1990. *Realism with a Human Face*. Harvard University Press.

———. 1996. "Irrealism and Deconstruction." In *Starmaking: Realism, Anti-realism, and Irrealism*, edited by P. J. McCormick, 179–200. Bradford Books.

Ross, L. N. and J. Woodward. 2023. "Causal Approaches to Scientific Explanation." In *The Stanford Encyclopedia of Philosophy*. Edited by E. N. Zalta. Spring 2023 edition. https://plato.stanford.edu/archives/spr2023/entries/causal-explanation-science/.

Russell, J. A. 1991. "In Defense of a Prototype Approach to Emotion Concepts." *Journal of Personality and Social Psychology* 60 (1): 37–47.

———. 2003. "Core Affect and the Psychological Construction of Emotion." *Psychological Review* 110 (1): 145–72.

———. 2012. "From a Psychological Constructionist Perspective." In *Categorical versus Dimensional Models of Affect: A Seminar of the Theories of Panksepp and Russell*, edited by P. Zachar and R. D. Ellis, 79–118. John Benjamins.

Scarantino, A. and P. Griffiths. 2011. "Don't Give up on Basic Emotions." *Emotion Review* 3 (4): 444–54.

Scherer, K. R. 2009. "The Dynamic Architecture of Emotion: Evidence for the Component Process Model." *Cognition and Emotion* 23 (7): 1307–351.

Selby, E. A. and T. E. Joiner, Jr. 2009. "Cascades of Emotion: The Emergence of Borderline Personality Disorder from Emotional and Behavioral Dysregulation." *Review of General Psychology* 13 (3): 219.

Tal, E. 2020. "Measurement in Science." In *The Stanford Encyclopedia of Philosophy*. Edited by E. N. Zalta. Fall 2020 edition. https://plato.stanford.edu/archives/fall2020/entries/measurement-science/.

van Fraassen, B. C. 2002. *The Empirical Stance*. Yale University Press.

van Loo, H. M. and J.-W. Romejin. 2015. "Psychiatric Comorbidity: Fact or Artifact." *Theoretical Medicine and Bioethics* 36: 41–60.

Waismann, F. 1945. "Verifiability." *Proceedings of the Aristotelian Society, Supplementary Volume* 19: 119–50.

Zachar, P. 2022. "The Psychological Construction of Emotion—A Non-Essentialist Philosophy of Science." *Emotion Review* 14 (1): 3–14.