

Abstract

For Jerry Fodor, Hume's *Treatise of Human Nature* is "the foundational document of cognitive science" whose significance transcends mere historical interest: it is a source of theoretical inspiration in cognitive psychology. Here I am going to argue that those reading Hume along Fodor's lines rely on a problematic, albeit inspiring, construction of Hume's science of mind. My strategy in this paper is to contrast Fodor's understanding of the Humean mind (consonant with the widely received view of Hume in both cognitive science and much of Hume scholarship) with an alternative understanding that I propose. I thereby intend to show that the received view of Hume's science of mind can be fruitfully revised while critically engaging with Fodor's contemporary appropriation. Consequently, I use this occasion to put forward a rather unorthodox interpretation of Hume's theory in dialogue with Fodor as my guide.

1. Introduction

For Jerry Fodor (2003, 134), Hume's *Treatise of Human Nature* is "the foundational document of cognitive science" whose significance transcends mere historical interest: it is a source of theoretical inspiration in cognitive psychology. Here I am going to argue that those reading Hume along Fodor's lines rely on a problematic, albeit inspiring, construction of Hume's science of mind. The problems arise from what I call 'the received view' of the Humean mind that finds its way into the theoretical imagination of contemporary cognitive psychologists. While I challenge the received view, I do not mean to cast doubt on the potential of Hume's *Treatise* to inspire contemporary research. I think the *Treatise* has an important role to play not only in the prehistory of cognitive science, but also in contemporary empirical and conceptual work.¹ But I also think that it can better play this well-deserved role if the received view is supplemented by viable alternatives. In this paper, I attempt to outline one such critical alternative.

According to the received view, Hume's theory of mind is characterised by the following central tenets: a) *naturalism* claiming that the proper methods of a science of mind are identical, and its findings congruent, with those of the experimental natural sciences; b) *mental realism* claiming that psychological processes consist in the manipulation of particulars having mental content; and c) *imagism* about mental content, where contents are images and complex contents have simple parts that are also images. In Hume's terminology, these contents are labelled as 'perceptions' that come in two kinds, 'impressions' and 'ideas'; a suitable contemporary appropriation is to translate these terms as 'percepts' and 'concepts', respectively.

While I am going to leave these tenets unchallenged here, I intend to challenge others, namely: d) *empiricism* about the content of mental representations, i.e. a commitment to the thesis that mental content derives *exclusively* from experience; e) *associationism* claiming that *all* the operations of the mind can be explained by the three principles of association (resemblance,

¹ More recently, Prinz's (2016) and Collier's (2019) overviews support the same conclusion.

contiguity, cause/effect); f) *mental dynamism* claiming that atomistic mental contents connected by the principles of association provide an image of mind congruent with Newtonian physics of external forces acting on particulate, homogeneous inert matter; and g) *the bundle theory* of the mind claiming that it is nothing but a heap of perceptions.

For challenging points d) to f), I will rely on Fodor's works, and in doing so, I will undermine g) only indirectly: if the image of the Humean mind unfolding in my challenge is plausible, then the bundle theory cannot be the full story. My strategy is to contrast Fodor's understanding of the Humean mind (consonant with the widely received view of Hume in both cognitive science and much of Hume scholarship) with my alternative offering. Fodor's evaluation changes over time, and he comes to see Hume's contributions in an increasingly positive light, but his reconstruction of Hume's theory does not change along with his evaluation. My undertaking here is not to blame Fodor for misconstruing Hume.² It is important that Hume is still put to theoretical use after some 300 years – and for Hume, whose “ruling passion” was for “literary fame” (E xl), this should be a great source of satisfaction. Instead, I intend to show that while engaging Fodor's contemporary appropriation critically, the received view of Hume's science of mind can be fruitfully revised. As such, I use this occasion to put forward a rather unorthodox interpretation of Hume's theory, using a dialogue with Fodor as my guide.

2. *Phenomenal versus constructive empiricism*

As Fodor sees it, the central problems of Hume's theory arise from its joint commitment to empiricism and associationism. Empiricism in the presently relevant sense is a semantic thesis: the content of ideas (concepts conceived as imagistic and non-discursive, see Fodor 2008, 58) can be traced back to experience. Complex ideas have their content due to their constituent simple ideas, and simple ideas have content because they represent simple impressions. Experience consists exhaustively of impressions, and “the mind doesn't *add* anything to impressions in the course of getting from sensation to perception” (Fodor 2003, 41). As a result, complex ideas (structured concepts) must be traced back either to complex impressions (complex percepts) that they represent as their direct copies, or to their constituent simple ideas (primitive concepts). Complex impressions must be traced back to their constituent simple impressions (simple percepts); simple ideas must be traced back, again, to simple impressions that they represent as their copies. If no such reduction is possible, then we have a semantically empty representation.

For Fodor (1983, 123-124), a central unwelcome consequence of empiricism is that it significantly restricts “the class of accessible beliefs”, since the concepts available for belief (and theory) formation are limited by what is given in experience. And indeed, this commitment to *phenomenal empiricism* is frequently read into Hume's dictum that in our inquiries “we cannot go beyond experience” (T I.8, see also I.10, 3.1.1.22).³ This reading thus prohibits inquiry beyond the phenomenal level because the concepts required for exploring the underlying entities or processes cannot have the required empirical content. But there is evidence, both in his methodological pronouncements and philosophical practice, that Hume's empiricism allows for more than contents available at the phenomenal level.

² For discussions of Fodor's reading of Hume, see Biro (2005) and Balari and Lorenzo (2018).

³ Some more recent examples include de Pierris (2015), Owen (2009) and Winkler (2016).

Right after issuing the above-quoted dictum, Hume specifies what “not going beyond” requires: the “principles” we establish must be “founded on” the authority of experience (T 1.9). Thus understood, the dictum is consistent with concept formation that is “founded on”, for example, an analysis of experience. And this is exactly what Hume does from the very beginning of his inquiry: he introduces the theoretical concept of a “simple impression” of sensation (T 1.1.1.2, see Landy 2017, ch. 1). Simple impressions and ideas of sensation are not observable as such, only distinguishable (e.g. by a “distinction of reason” T 1.1.7.17-18) as aspects of complex impressions and ideas by drawing on different resemblance relations. As Hume’s own entry-level example points out, “colour, taste, and smell are qualities all united together in this apple, ’tis easy to perceive they are not the same, but are at least distinguishable from each other” (T 1.1.1.2). In other words, here we have a concept of something unobservable, yet foundational in Hume’s theory of mental content. No interpretation of Hume’s dictum “not to go beyond experience” should be as uncharitable as to present him as violating it on the next page.

Not only do his theoretical concepts “go beyond experience”, but this is also a general feature of our causal reasoning. In the first *Enquiry*, for example, Hume introduces causal reasoning as the cognitive mechanism, common to science and everyday thinking, that “assures us of any real existence and matter of fact, beyond the present testimony of our senses, or the records of our memory” (EHU 4.3). Causal reasoning leads us to belief about things that we have not observed, and this is possible only if we can form concepts about something unobserved on the basis of our inferences. I find that bread provides nourishment, an effect that is not connected to any sensible qualities because an identical collection of qualities (colour, smell, taste, consistency, etc.) could turn out to be lethal. Consequently, I naturally infer to the best explanation, namely that the sensible qualities of bread entail “secret powers” producing these effects (see EHU 4.16, 20-21). These powers are not observable (only their effects are), yet Hume thinks that we clearly form beliefs and *a fortiori* concepts about them.

This is what we do in science and everyday life alike, and this is also what we do in a Humean science of mind. Hume (T 1.3.8.8-14) concludes that the cognitive mechanisms that lead to empirical beliefs are subject to the principles of *associative imagination*, specifically custom. Reasoning cannot take place here: although reason also “exerts itself without producing any sensible emotion” (T 2.3.3.8), reasoning consists in reflective comparison of ideas (T 1.3.2.2). Associative imagination is unreflective: we are not aware of any comparison of ideas taking place, but our “imagination can draw inferences from past experience, without reflecting on it”, simply by getting used to regularities. This process takes place “without forming any principle concerning it, or reasoning upon that principle” (T 1.3.8.13) – that is, as Fodor (1990, 23) would put it, without its rules being explicitly represented. But not forming and following any principle does not mean that there is no such principle directing the process in the background without our being aware of it. For Hume, this only means that the principle is not introspectable: we cannot observe it during or as a result of the process, but we can formulate it as a result of experimental *reasoning*, i.e. as a result of an analogical analysis of relevant cases.

In those cases where we form beliefs “merely by one experiment”, which may happen in both everyday life and in science (e.g. as an *experimentum crucis*), causal *reasoning* is responsible for the belief in question. But this reasoning is also founded on the “habitual” principle of the imagination “*that like objects, plac’d in like circumstances, will always produce like effects*” (T 1.3.8.14, emphasis in the original). And when we find this principle violated, then “philosophical” (i.e. scientific)

reasoning ascribes it to the “secret operation of contrary causes” as opposed to the “vulgar” (i.e. manifest) view that ascribes it to “uncertainty in the causes”.⁴ This “philosophical” way of seeing things opens up the possibility for further inquiry into the “vast variety of springs and principles, which are hid, by reason of their minuteness or remoteness” (T 1.3.12.5).

Therefore, Hume does not put a ban on invoking unobservable processes and entities in our explanations, but only on hypotheses not properly founded on experience – those not produced by experimental reasoning, i.e. by an analysis of observations and experiments. Had he put a ban on them, the above account of empirical reasoning would be possible only by introspection – but that has already been excluded because, as Hume pointed out, no introspectable principle has been formed during the process. In fact, his claim goes further: introspection is worse than useless (except as a heuristic tool) in exploring these cases, since “reflection and premeditation would so disturb the operation of my natural principles, as must render it impossible to form any just conclusion from the phænomenon” (T I.10). Introspection is not only an observation of but also an intervention in the normal processes that, if introspected, could not exhibit the rules by which they normally function. That is why it takes an empirical science of mind – “from a cautious observation of human life”, of “the common course of the world”, and of “men’s behaviour in company, in affairs, and in their pleasures” (*ibid.*) – to reveal these rules.

As a result, Fodor misconstrues Hume when he claims that “it is the [empiricist] ontogeny of our concepts that precludes our having a science in which reference to unobservables figures ineliminably”. Neither is it a correct diagnosis to claim that by Hume’s standards, talk about unobservables (“electrons, triangles, faculties, etc.”) is “semantically empty”, and that beliefs about them “are ipso facto nontruth-valuable” (Fodor 1983, 123-124). As David Landy has argued, Humean concepts of unobservable entities can gain their content via an analogical extension of “perceptible models” (i.e. observable objects and their familiar behaviour) by “specifying the determinate ways that the theoretical entity posited both differs from and resembles this model” (Landy 2018, 4).⁵ As such, simple impressions and ideas of sensation can have their complex impressions as their models: they are alike in being imagistic, and they differ with respect to simplicity (Landy 2018, 41). Such perceptible models are legitimately “founded on” a comparative and analogical analysis of experience. By Humean standards they are permissible representations with sufficient empirical (and thereby also legitimate semantic) content of unobservable entities and processes.

Against this background, I suggest reading Hume as a *constructive empiricist* with respect to both his own science of mind and many of our inferential activities.⁶ Hume’s empiricism relies crucially on inferences to the best explanation in order to provide an empirically adequate account of the mind, and his best explanations invoke semantically evaluable concepts of unobservable theoretical entities. Instead of being strictly committed to phenomenal empiricism, he allows the content of theoretical concepts to go beyond what is given in experience while providing an

⁴ Sellars’ (1963) famous contrast between the manifest and the scientific image best explains this distinction.

⁵ Relying on Carnap’s (1966, 225-226) classic conditions, only those entities are observable that are available for direct perception unaided by technical equipment and inferences. If seen in this light, Hume’s simple impressions and ideas are indeed theoretical entities, as their observation requires either technical equipment (consider the inkspot experiment in T 1.2.2.4, which for Landy (2018, 35) can only produce complex impressions), or inferences (an analysis of experience). By these standards, simple impressions and ideas can convincingly be interpreted as theoretical entities.

⁶ The classic exposition is, of course, that offered in van Fraassen (1980).

explanation of what is available through experience – i.e. phenomena. And Hume is aware of the epistemic limits of theories formed this way: “we must distinguish exactly betwixt the phænomenon itself, and the causes, which I shall assign for it; and must not imagine from any uncertainty in the latter, that the former is also uncertain. The phænomenon may be real, tho’ my explication be chimerical.” (T 1.2.5.19) Of course, there would be no way for the explication to be chimerical if it did not go beyond what is given in experience. But it does.

Hume’s frequently expressed modesty with respect to his knowledge claims is thus indeed in order: he aspires only to a “satisfactory” account of the mind (T I.8-10, 1.1.7.11, 1.4.7.14, Abs.1). It is almost natural to read “empirically adequate” for “satisfactory” in these passages, a point on which Fodor (2003, 8) would probably concur. Hume aspires only “to establish a system or set of opinions, which if not true (for that, perhaps, is too much to be hop’d for) might at least be satisfactory to the human mind, and might stand the test of the most critical examination” (T 1.4.7.14). By strict empiricist standards, Hume’s theory cannot be accepted as true, but only as empirically adequate precisely because it cannot be accepted on the grounds of phenomenal empiricism: it goes beyond what is given in experience and may therefore be chimerical. As experimental reasoning can produce only empirically adequate explanations but no truths, Hume must be – and indeed is – independently committed to experimental reasoning as the best form of reasoning that human beings can possibly deploy in empirical matters, despite its limitations.⁷

3. *Associationism versus faculty psychology*

3.1 Two kinds of association

The core of Hume’s associationism, as Fodor (2003, 92) sees it, is the causal thesis that “there is a relation between the two ideas such that tokens of the second are reliably among the effects of tokens of the first”, and the laws of this causal transition are the three laws of association. Fodor, invoking Kant and Frege, points out that Hume “fails to distinguish the thesis that association is what determines the (causal) succession of ideas in thought from the thesis that association is, as one might say, the glue that holds complex ideas” together (Fodor 2003, 93). Fodor and Pylyshyn (1988, 27) advance this complaint with explicit reference to Kant’s Transcendental Deduction B142: “in accordance with laws of association [...] I could only say ‘If I carry a body, I feel a pressure of weight’, but not ‘It, the body, is heavy’ which would be to say that these two representations are combined in the object” (Kant 1998, 252).

If Fodor’s point would be that Hume does not distinguish with *sufficient* clarity between “constituency *and* connectivity” (Fodor 1987, 166), i.e. between non-causal and causal unions of perceptions, then the point should be granted. But Fodor claims there is no such distinction in Hume, hence he reads him as reducing constituency to connectivity (Fodor 2003, 93). Yet, this distinction is far from impossible to read into the *Treatise*: not only does Hume have the resources for this distinction, but he also relies on it in his explanatory practice. Fodor is right in that association for Hume is *primarily* about the causal connectivity of mental processes. As a consequence, association must be diachronic because for Hume, temporal succession is “essential to causes and effects” (T 1.3.2.9, also T 1.3.14.1). In this sense, Hume’s theory of association is a

⁷ See, for example, his critique of induction in EHU Sections 4 and 5. Beside empirical adequacy, Hume also emphasises “usefulness” in the first *Enquiry* (EHU 1.9-10) as a chief virtue of this kind of investigation. This instrumentalism also serves as a suitable motivation for constructive empiricism.

theory of how ideas (and Fodor would add impressions of reflection) “change *over time*” (Fodor 2003, 119); or more strongly put, of how “ideas became associated as a function of the temporal contiguity of their tokenings” (Fodor 2008, 103).

The problem is that Fodor’s emphasis on association as a causal relation is one-sided. He overlooks that for Hume (again, to Fodor’s credit, without emphasising the distinction sufficiently), it is also an associative union of ideas when the mind apprehends perceptions in atemporal synthesis: “extension consists of a number of co-existent parts dispos’d in a certain order, and capable of being at once present to the sight or feeling. [...] These qualities of the objects have a suitable effect on the imagination. The parts of extension being susceptible of an union to the senses, acquire an union in the fancy” (T 2.3.7.5). This union cannot be causal in character, just as the relation of the simple ideas of “a particular colour, taste, and smell [...] all united together” in the complex idea of this apple cannot be causal either (T 1.1.1.2).

In this case, the union of simple ideas is supported by the spatial contiguity of ideas, and this indeed facilitates causal inferences: “as the appearance of one part excludes not another, the transition or passage of the thought thro’ the contiguous parts is by that means render’d more smooth and easy” (T 2.3.7.5). Similarly, complex ideas of substances are ascribed to a “principle of union [...] regarded as the chief part of the complex idea” (T 1.1.6.2). The union of the constituent simple ideas in this case is not only founded on their spatial contiguity, but also on their resemblance in being “comprehended by” the same principle of union. Consequently, the principles of union in these cases are not causal, and this account of unification can be easily extended into the realm of abstract ideas by invoking demonstrative reasoning through, say, ‘logical contiguities’, i.e. intuitive steps of demonstrative inference.

3.2 The problem of productivity

Associative unification of ideas through both constituency and connectivity requires that the resulting complex ideas be reducible to simple ideas and eventually to impressions in order to be contentful. This makes association a semantically transparent process, and as such it cannot explain the “semantic productivity” of complex concepts, i.e. the surplus content that complex ideas have over and above the content of their constituents – e.g. their structure, as when the ideas of MRJAMES and BITES are combined into the complex idea MRJAMES BITES (Fodor 2003, 90-96). Seemingly, non-causal unification could explain structure: the structure of a complex impression simply provides the structure of the corresponding complex idea. As we will see shortly, this is not so straightforward an option for (Fodor’s) Hume, because there is indeed a greater distance between impressions and ideas than it is customary to suppose. But let us turn first to Fodor’s central complaint against Hume’s associationism, namely that it cannot do justice to the mind’s apparent contribution to mental processes.

In a rather combative passage, Fodor and Pylyshyn accuse Hume of “cheating” because he invokes a productive faculty in the midst of his associationist festivity in order to explain some mental processes. Hume’s appeal to the imagination as an “active’ faculty”, to which “qua associationist Hume had, of course, no right”, is presented here as an anomaly in his theory. This move shows that “if you’ve got structured representations, the temptation to postulate structure sensitive operations and an executive to apply them is practically irresistible” (Fodor and Pylyshyn 1988, 49n29). And we have seen another (ill-founded) reason why Fodor might consider Hume’s

appeals to the faculty of imagination to be cheating: in Fodor's construal, Hume's empiricist semantics excludes the possibility of invoking unobservable theoretical entities – among which Fodor (1983, 123-124) explicitly mentions faculties.

Later, Fodor would become friendlier towards the idea of a Humean faculty psychology. He eventually acknowledges that Hume's associationism cannot be as "exiguous" as to forgo faculty psychology altogether (Fodor 2003, 29). He then goes on to say that even Hume had "understood that learning presupposes a lot of innate endowment" because "blank slates learn nothing", so that Hume also "has to be a nativist about something; out of nothing, nothing comes" (Fodor 2008, 11, 131, 167; also Fodor 1981, 276-278). But he would not consider the idea that one might find a more detailed faculty psychology in Hume; he only pays attention to *imagination qua productive faculty*.

Fodor posits an important distinction between a "narrow" and a "broad" construal of imagination that is indeed operative in the *Treatise*, but without Hume introducing it with sufficient clarity (as in the case of association by constituency and connectivity). On the narrow construal, imagination "supplements", and on the broad construal it "implements" association (Fodor 2003, 116). On the narrow construal, next to association, imagination is therefore free to transpose, change, compound, etc. ideas, to create fictions "as it pleases" (T 1.3.5.3, see also 1.1.4.4, EHU 2.5); on the broad construal, imagination also includes the principles of association as the principles of its normal functioning (e.g. T 1.1.5.1., 1.1.4.1-2).

Hume describes the normal functioning of imagination as a result of experimental reasoning: he infers to the existence and the productive powers of the imaginative *faculty* from observations and experiments. He invokes the nature of this faculty thus inferred as the best explanation for a range of psychological and behavioural phenomena, on the basis of the explanatory power of this inferential construct. This is how the faculty of imagination, a theoretical entity, enters the broader context of Hume's similarly construed network of faculties with their distinctive functioning, and their nature is likewise explored in terms of powers and principles (as we can see with respect to imagination in T 1.3.8.8-14). This yields the "mental geography, or delineation of the distinct parts and powers of the mind" (EHU 1.13), or more frequently, the "anatomy of mind" that Hume recurrently aspires to offer.

3.3 Anatomy as productive architecture

Fodor finds the problem of semantic productivity so pressing because he does not acknowledge the significance of a mental anatomy in Hume's project. According to Fodor, "On Hume's view, the mind has no intrinsic architecture whatever (Hume says that the play of Ideas is like a play in a theater except that there is no theater). There are no faculties; mental structure is reduced to parameters of association" (Fodor 1983, 123). The network of associations among perceptions is due to "statistical processes" that "filter out mental representations" of the regularities in experience and leave out the noise. These "statistical processes are implemented by mechanisms for forming associative connections between mental representations" (Fodor 1998, 149).

Hume (T 2.1.12.2, see also EHU 9.1) meanwhile explicitly claims that anatomy and physiology proper are indeed the models of his attempt at a mental anatomy, and he takes this more seriously than many of his contemporaries.⁸ He makes clear that anatomical inquiry means an inquiry into

⁸ For an overview of seventeenth- and eighteenth-century "physiologies of understanding", see Wolfe (2016).

hidden composition and underlying causes of manifest functioning (T 1.4.6.23, 2.1.1.2, 2.1.12.2, 3.3.6.6, A.2 see also EHU 1.8, 1.13, 4.4, D 1.12, NHR 3.1): the delineation of the mind's parts is achieved through the study of their normal functioning, i.e. their physiology.

Thus understood, Hume's anatomy metaphor is *constitutive* of his entire project:⁹ it expresses a commitment to a science of mind consciously modelled on anatomy proper. It is again helpful to invoke Landy's (2018) suggestion on the crucial role of "perceptible models" in Hume's science: anatomy proper is a perceptible model of Hume's "anatomy of mind". The latter is similar to the former in that it provides a map of functionally distinct parts, and it differs in being directed not at the body but at the mind. Adopting anatomy in this sense as the model for his science of mind is consonant with the view that Hume is indeed in the business of searching for the causes underlying the regularities in our mental functioning.

The aim of Hume's anatomy, *pace* Fodor, is to identify components of the mental architecture in terms of the powers of *mental faculties*, the "organs of the human mind" (T 2.1.5.6, see also T 2.1.5.8, 2.2.11.6, EHU 7.9) that contribute actively and productively to psychological processes. The chart of Humean faculties that contain, for example, sensation, reflection, imagination, reason, sympathy, etc., is the product of inferences drawn from their observable effects on our mental functioning and behaviour.¹⁰ As Garrett (2006, 156) puts it, Hume "regards faculties and abilities as causes *through* the effects of their exercises". Faculties thus conceived are not intuitively accessible causal sources or postulates of some preconceived hypothesis in the framework of which experience is to be interpreted;¹¹ they are conclusions of experimental reasoning, and their identity depends on whether the analysis of relevant observations is correct (T 1.2.5.19). Instead of arguing *from* faculties, Hume argues *to* them; they are not the beginning but the aim of proper, experimental inquiry that reveals the characteristic activity of faculties.

If we take the anatomy metaphor seriously, the problem of productivity can be solved: Hume's faculties are components of the mind that perform specific tasks on perceptions, and interact in cognitive and affective processes – just as bodily organs do in a healthy physiology. The Humean mind is an organic (and not a mechanical) unity whose identity is "of a like kind with that which we ascribe to vegetables and animal bodies" (T 1.4.6.15). This organisation

is still more remarkable, when we add a *sympathy* of parts to their *common end*, and suppose that they bear to each other, the reciprocal relation of cause and effect in all their actions and operations. This is the case with all animals and vegetables; where not only the several parts have a reference to some general purpose, but also a mutual dependence on, and connexion with each other. (T 1.4.6.12, emphasis in the original)

⁹ For a more detailed discussion of the metaphor see Demeter 2016, chapters 7 and 8.

¹⁰ One version of such a chart is presented by Millican (2009). However, Millican's reading of 'faculty' in Hume is closer to that of scholars inclined to translate Hume's language of the faculties into 'process' talk. This tendency is represented, for example, in book-length discussions by Owen (1999) with respect to reason, by Cohon (2008) with respect to moral sense, and by Costelloe (2018) with respect to imagination.

¹¹ Malebranche's and Descartes's 'faculty' are examples of this approach; see for instance Schmid (2015) who also provides an interpretation of Humean 'faculty' consonant with those mentioned in the previous footnote. For an overview of early modern conceptions of faculties, see Hatfield (1997).

As in living bodies, the transition of perceptions is guided by “a reference of the parts to each other, and a combination to some *common end* or purpose” (T 1.4.6.11, emphasis in the original) – namely to sustain balanced functioning by the harmonious concert of faculties in a healthy mind.¹²

3.4 The productivity of faculties: illustrations

The capacity to receive impressions is probably the best candidate for a passive faculty in Hume. If one only takes Hume’s initial approach, then it might seem fair to characterise Humean experience as exhausted by “a mere passive admission of the impressions thro’ the organs of sensation” (T 1.3.2.2). But the passivity of perception is quickly relativised if sensation is put in the context of interacting faculties. It then transpires that “[t]hose who are acquainted with the metaphysical part of optics [...] know how we transfer the judgements and conclusions of the understanding to the senses” (T 2.2.8.6), allowing us to judge the distance and relative size of the objects.¹³ As such, *pace* Fodor, there is indeed something that the Humean mind contributes already “in the course of getting from sensation to perception” (Fodor 2003, 41).

Taking one step further, the mind’s productive contribution is even more visible in the process of copying ideas from impressions. For Fodor, Hume’s association cannot explain the emergence of complex ideas from complex impressions, given that complex ideas exhibit “canonical decomposition” (i.e. “its parts have content under some *but not all* of the ways of carving it up”) to simple ideas, while complex impressions do not have the same “canonical” structure: they can be “decomposed in all sorts of ways” (Fodor 2003, 37). I think Fodor is right in the first half of his diagnosis (albeit maybe for the wrong reason)¹⁴ in that “the distance between impressions and ideas must be much greater”, but not in the second half, where he states that it must be greater “than Hume supposes, or than he would prefer” (Fodor 2003, 41); instead, it is greater than the received view would prefer because Hume spots the difference between ideas and impressions, and he relies on this insight in his explanations:

Ideas may be compar’d to the extension and solidity of matter, and impressions, especially reflective ones, to colours, tastes, smells and other sensible qualities. Ideas never admit of a total union, but are endow’d with a kind of impenetrability, by which they exclude each other, and are capable of forming a compound by their conjunction, not by their mixture. On the other hand, impressions and passions are susceptible of an entire union; and like colours, may be blended so perfectly together, that each of them may lose itself, and contribute only to vary

¹² This introduces an element of teleology into Hume’s account, and this may seem problematic in light of Hume’s well-known letter to Hutcheson in which he rejects final causes (L 1:33). Hume seems to be less hostile to teleology in living bodies, and given that he conceives the science of man as analogous with anatomy, this biological teleology cannot be problematic in his account of the mental world either.

¹³ The phrase “metaphysical part of optics” plausibly refers to physiological discussions; see Wright (1990).

¹⁴ Fodor (1981, 259) thinks that while Hume’s ideas are images, they should not be. Images do not have canonical decompositions, and it is the possibility of canonical decomposition that differentiates discursive and iconic representations (Fodor 2003, 37). This is why Hume cannot put forward “the image theory of impressions *together with the copy theory of concept formation*” (Fodor 2003, 55). However, it is possible to argue that images can have canonical decompositions, and can stand in logical and computational relations, so that Fodor’s challenge might be met. For possible resources, see Westerhoff (2005), for alternative resources, see Crane (2009).

that uniform impression, which arises from the whole. Some of the most curious phaenomena of the human mind are deriv'd from this property of the passions.¹⁵ (T 2.2.6.1)

So, Humean perceptions can take different phases: ideas are like solids; impressions are like liquids and gases. The different phases entail different properties. Ideas are like chemically stable and impenetrable atoms of matter: they are capable of combination and rearrangement, but at the end of this process the same elements will be present without qualitative change. Whatever reactions ideas enter into, their identity is preserved, and consequently the constitutive simple ideas of a complex idea can always be reclaimed by analysis. However, the identity of impressions over psychological reactions is unstable. As a result of psychological processes impressions can lose their identity and contribute to the emergence of a qualitatively different new impression in which they cannot be recognized as constituents.

One direct consequence of these properties of perceptions is precisely that complex ideas do – and that complex impressions do not – exhibit “canonical decomposition”, i.e. they have a structure that complex impressions do not possess. This structure must be bestowed upon impressions from the outside: unstructured impressions cannot turn themselves into structured ideas. It is thus simply not true that Hume “held that all mental content comes from experience” (Fodor 2003, 81) – structure must come from the activity of the mind.¹⁶

Still, the consequences of T 2.2.6.1 are perhaps the most clearly visible in the case of the passions. Passions are simple impressions (see e.g. T 2.2.1.1), and their interaction also results in simple “uniform” impressions – and never in perceptions that have “canonical decomposition”.¹⁷ It is revealing that Hume, in consonance with the general characterisation just quoted, finds chemical examples, rather than corpuscular ones, suitable for elucidating how passions may interact (e.g. 2.3.9.16-17, to be discussed below). The mixture of two passions can produce a third whose qualities are very different from those of its components, “as in certain chemical preparations, where the mixture of two clear and transparent liquids produces a third, which is opaque and colour'd” (T 2.3.10.9). This is how passions can form a “total union”, blending “perfectly together”, so that each of the interacting passions “may lose itself” – while ideas, due to their “solidity”, can never mingle, which also explains why complex ideas can have canonical decomposition.

The different reactivities of impressions and ideas cannot be revealed from their phenomenology, yet they are constitutive of the identity of perceptions. Hume is explicit in this regard: what “determines the character of any passion” is not primarily its phenomenology, but the

¹⁵ Fodor (1981, 300) cites Hartley as reaching a similar conclusion, with the difference that Hartley claims that complex ideas may “not appear to bear any relation” to simple ideas because “each simple idea is overpowered by the sum of all the rest, as soon as they are all intimately united together”. This phenomenology can be applied in Hume’s case, too. As the properties ascribed to impressions and ideas are the result of experimental inquiry and not introspection, analysis can reveal that many seemingly simple ideas are, in fact, complex. Arguably, this is the case with all simple sensory and abstract ideas: as they arise from distinctions of reason and resemblance relations, they may seem but cannot be properly simple (see Landy 2018, ch. 1).

¹⁶ And there are other reasons to think that not all ideas derive from *corresponding* experience, which means that there must be an active contribution on the mind’s part. The idea of necessary connection is derived from the impression of expectation based on custom. Arguably, this is a core case where an idea is derived from a non-corresponding impression.

¹⁷ For useful discussions on the simplicity of the passions, see Qu (2012) and Radcliffe (2015). Merivale (2009) argues that in *A Dissertation on the Passions*, Hume gives up the simplicity of the passions and treats them as complexes.

“whole bent or tendency of it from the beginning to the end” (T 2.2.9.2), i.e. its causal-functional role.¹⁸ This is particularly significant, for example, in the case of calm passions that “are more known by their effects than by the immediate feeling or sensation” (T 2.3.3.8). Due to their phenomenology, calm passions are easily mistaken for ideas, and as moral motivation is frequently due to calm passions, this mistake may quickly lead to the conclusion that moral distinctions belong to the realm of reason. Yet, calm passions are still impressions, and their membership in this class of perceptions is due to their causal properties (i.e. the transformations they are liable to, and the interactions they can enter into), and not to their phenomenology.

As a result, impressions and ideas have different, phenomenologically inaccessible compositional properties, while their phenomenology only reflects their differences in degree and not in kind. Yet, they constitute two different psychological kinds – and they figure differently in psychological processes precisely for this reason. The distance between them is thus greater indeed than the received view is willing to acknowledge: it is not exhausted by their difference in temporal order, causal/representational properties, and their force, liveliness and vivacity, because an impression turning into an idea (Hume’s copying), or *vice versa* (Hume’s sympathy), results in *substantial* change. This process bestows different compositional properties on perceptions (not readily accessible in their phenomenology), and thereby constrains the role they can play in mental processes.

This transformation is a productive process whose causal origins cannot be found in the perceptions themselves, and the principles of association cannot explain substantial changes in perceptions either. Consider sympathy: When we form an idea of a mental state someone else is experiencing, this idea can turn into an impression, enabling us to entertain the same mental state as the other entertains. Were it not for the active and selective influence of sympathy on *some* ideas, then it would be impossible to explain why *only* ideas about others’ mental states are turned into the corresponding impressions,¹⁹ and why this cannot happen with ideas in general. Accordingly, the causal origin of this selection and transformation must reside in the faculties, i.e. somewhere in the Humean mental architecture, as it does indeed: the task of turning impressions into ideas is left to the principles of memory (e.g. T 1.4.6.18), whereby sympathy, a non-associative principle of the imagination, is credited with the task of *converting* some ideas back into their corresponding impressions (e.g. T 2.1.11.3, 2.3.6.8, 3.3.1.7).²⁰

Fodor is thus right in at least this much: the principles of association cannot describe all the work that the Humean mind is required to do. Hume merely claims that “all the operations of the mind must, in a great measure, depend on them” (T A.35) – but the operations of the mind are not exhaustively described by them. Other principles of faculties must be, and are indeed, invoked. And while Fodor thinks that Hume has to acknowledge only imagination as an active faculty, it is clear that Humean faculties must be active and productive on a much wider scale. I have already

¹⁸ Here I focus on passions, but this applies to Humean perceptions in general, and not only to passions. As Garrett (2015, 51-52, 57, 71-73) argues in various contexts: causal, functional and inferential roles are constitutive of the identity of impressions and ideas.

¹⁹ Not only passions can be communicated through sympathy, but also beliefs and judgments. For a general summary see e.g. Taylor 2015, 59-65. Demeter 2019a offers a case study on the role of sympathy in the generation of mathematical knowledge.

²⁰ Observe Hume’s distinctive language of sympathy “converting” ideas into their corresponding impressions in these passages. Hume also frequently speaks the language of conversion with respect to psychological processes involving the passions.

drawn attention to the features of sensation, copying and sympathy, and the list can be extended. The faculty of reflection, for instance, is responsible for the production of secondary impressions, including passions in particular, which are “derived from nothing but the original constitution of the human mind” (T A.6). Similarly, taste, i.e. aesthetic and moral sense, is “a productive faculty, and gilding or staining all natural objects with the colours, borrowed from internal sentiment, raises, in a manner, a new creation” (EPM App.1.21, for a discussion of this matter, see Boehm 2020).

Reason is also a faculty that “must be consider’d as a kind of cause, of which truth is the natural effect” (T 1.4.1.1). In this capacity, reason plays an active (causal) role in creating ideas not given in (but founded on) experience by drawing “distinctions of reason” (T 1.1.7.17-18); it is active in entertaining ideas in “philosophical relations”, and this activity is even more conspicuous in those philosophical relations that do not depend on the content of the ideas themselves (T 1.1.5, 1.3.1.1). Given the activity of reason, “*the sole end of logic is to explain the principles and operation of our reasoning faculty, and the nature of ideas*” (T A.3, emphasis in the original). This means that a theory of reasoning cannot be based exclusively on the nature of ideas; the full story also requires an account of the nature of reason.

And this is how Hume views his enterprise not only in the Abstract (i.e. after finishing Book I and II) of the *Treatise* but already in the Introduction, where he claims that the cognitive prospects and limits of other sciences can be understood only if we “cou’d explain the nature of the ideas we employ, *and* of the operations we perform in our reasonings” (T I.4, emphasis added). This is the crux of Hume’s science of mind: to explain *both* the nature of our perceptions *and* the nature of our faculties, so that it can aspire to provide the foundation of all the sciences (see Boehm 2016).

4. *Mental dynamics versus mental chemistry*

Hume is frequently ascribed the aspiration to be “the Newton of the moral sciences” – an ambition he never expressed unequivocally.²¹ The most common allegedly Newtonian element in Hume is found in his theory of association: it is almost unanimously taken to be inspired by, sometimes to be “explicitly” modelled on (e.g. Morris and Brown 2019), Newton’s theory of gravity in the *Principia*, whereby Hume’s perceptions are particulate building blocks of the mental universe held together by association in a way that is analogous with Newton’s gravity.²² Thus conceived, Newton’s system of the world founded on the theory of gravity serves as the *model* of Hume’s mental universe, and it becomes natural to talk about the Newtonian “mechanics” (e.g. Owen 2009) or “dynamics” (e.g. Stroud 1977, 9; Buckle 2001, 133–137, Collier 2019, 435) of the Humean mind.

Much depends on where one finds a place for Hume in the aftermath of Newton.²³ Fodor, like many others, is captured by the idea of association being modelled on gravity. Fodor’s Hume

²¹ For references on the origins of this topos in Hume scholarship, see Russell (2008, 7; 2016, 112). Recent scholarship has made great efforts to place this topos in context, see, for example, Schliesser (2009), Slavov (2016), Demeter (2019b), Schliesser and Demeter (2020).

²² The classic statement of this interpretation is provided in Kemp Smith (1941, 71-72). For more recent formulations, see, for instance, Garrett (2015, 50), Harris (2015, 85) and de Pierris (2015, 17). Dennett (1981, 101) refers to Humean association as “pseudo-chemical bonding”, but he does not further exploit this insight.

²³ As the present discussion testifies, I am inclined to agree with Capaldi (1975, 4) that “an understanding of the exact nature of Newton’s influence on Hume can serve as the key to understanding Hume’s philosophy as a whole”.

initiates a “tradition of push-pull talk in associationism”, which is “not mere unreflective metaphor”: it is at the heart of “the associationist’s rejection of mental architecture – of psychological mechanisms whose function it is to ‘process’ mental contents”. This amounts to the rejection of faculty psychology, i.e. the idea of an “unreduced mental structure that real associationists wanted very much to do without”. As Fodor puts it,

Right at the heart of associationism is the idea that you can dispense with such mechanisms in favor of intrinsic, dynamic relations (attraction, repulsion, assimilation and so forth) among the psychological elements themselves. This is, in its way, a brilliant – if doomed – idea (influenced, beyond any doubt, by the successes of Newtonian dynamics in physics). (Fodor 1983, 31-32)

In Fodor’s (1990, 24) associationist network, the “proximity” of perceptions carries most of the explanatory work, and “association by proximity may emerge from dynamical properties of ideas”. This proximity may be due to close resemblances, contiguities and causal connections between perceptions. The closer the proximities between perceptions, the stronger their associative attractions: as is the case with the inverse square law of gravity, the strength of associative attractions declines with the increase in the associative distance between perceptions. Furthermore, the rules of association need not be explicitly represented in order to exert their influence – we have already seen this in the case of imagination (T 1.3.8.13). Only ideas must be explicitly represented (Fodor 1990, 23-24): the observation of their regular succession will provide us with inductively established principles, the principles of association.

I challenge two suppositions of Fodor’s *Principia*-model of the Humean mind. First, association should not be understood as analogous with gravity; secondly and relatedly, perceptions are not inert constituents of associative relations. The analogy with gravity relies on a much-quoted *single* sentence: “Here is a kind of ATTRACTION, which in the mental world will be found to have as extraordinary effects as in the natural, and to show itself in as many and as various forms.” (T 1.1.4.6) Fodor even tendentiously inserts “gravitational attraction” into this passage while quoting Hume (Fodor 1983, 28; but he does not commit the same mistake in Fodor 1981, 278 and 2003, 113), yet it is implausible to think that Hume has gravitational attraction in mind.

“Gravity” occurs in the *Treatise* only once in relation to mental processes, and even then only as a property of ideas that *inhibits* associative transition (T 2.3.8.8). And as Fodor points out, it is not even a good analogy for the associative transition of ideas, because gravity is atemporal, while association is temporal:

(Newtonian) gravity determines how forces are distributed among a population of individuals (point masses or whatever) *at a time*, as a function of their distances from one another. Association, by contrast, determines how ideas change *over time* as a function of their history of causal interactions. In particular, associationism is a theory about how the causal powers of mental representation tokens vary as a function of the mind’s experience with other tokens of the same type. Looked at this way, it’s more like a theory of evolution than a theory of gravitation. (Fodor 2003, 119-120)

As a result, the only context in which a fruitful analogy could be drawn between gravity and association is the atemporal synthesis of perceptions – a function of association in Hume that, as we have seen (in 3.1 above), Fodor overlooks.

As a model of how the causal powers of perceptions vary, theories of *elective attraction* are

more promising for the interpretation of T 1.1.4.6. The idea of elective attractions or affinities, and the resulting “affinity tables”, started to gain currency in chemistry during the early eighteenth century under the influence of the *Opticks* (Kim 2003). Elective attractions do indeed exhibit “extraordinary effects” in “various forms” – unlike gravity, which has a uniform effect on all bodies throughout the universe. The principles of association do not hold universally among all ideas, only between some; there are ideas that do not stand in associative relations at all; and the relation of resemblance is sensitive to the content, i.e. the particular and intrinsic properties of perceptions. Fodor excludes the possibility of a mental chemistry (albeit not in direct connection with Hume but with Mill) because one cannot “predict the properties of compounds from the properties of their elements” (Fodor 1981, 306).

On the one hand, this lack of predictability is due to the lack of compositionality in the case of the passions. We have seen while discussing T 2.2.6.1 (in 3.4 above) that passions can combine with each other so that the resulting passion is not predictable from its ingredients because they lose their identity during the act of combination (recall T 2.3.10.9 quoted above). The chemistry analogy that Fodor excludes works fine in Hume’s account of the passions. On the other hand, it does not take too much effort to entertain the idea of an empirical Humean “affinity table of perceptions”, charting the possible associations and their relative strength among various perceptions – on the basis of which such predictions are in principle conceivable, albeit impracticable.

Association by resemblance best illustrates the existence of a principle of elective attraction among perceptions, and this is the only principle that can connect not only ideas but also impressions (T 2.1.4.3). Resemblance for Hume partly supervenes on content, but not on the frequency of co-occurrence (as opposed to contiguity and cause/effect, and *pace* Fodor 2003, 128-129). This is why resemblance can be among those “philosophical relations” (i.e. a relation guiding reasoning) that “depend entirely on the ideas, which we compare together” (T 1.3.1.1-2). But Hume is also aware that resemblance as a “natural relation” (i.e. a relation guiding associative transitions of the imagination on Fodor’s “broad construal”) does not supervene *exclusively* on content, because in some respects every idea resembles every other. Aspects that are all too general deprive the principle of resemblance of its explanatory power, because when a quality “is common to a great many individuals, it leads not the mind directly to any one of them; but by presenting at once too great a choice, does thereby prevent the imagination from fixing on any single object” (T 1.1.5.3).

Therefore, beside content, there must be a faculty that is active in picking out some resemblances as salient enough for associative transition from among the infinite number of possible resemblances. And Hume does indeed identify that faculty: it is memory that is effective in “*producing* the relation of resemblance among the perceptions” (T 1.4.6.18, emphasis added). Therefore, with respect to resemblance relations, it does not hold that “there’s no general reason why associative relations should preserve parameters of content” (Fodor 2003, 50n33), and this means that associative relations cannot be like the external force of gravity acting on any object irrespective of its intrinsic properties – they are more like elective attractions sensitive to “some associating quality” of ideas (T 1.1.4.1).

While discussing T 2.2.6.1., we have already seen the significance of the chemical imagery lurking behind Hume’s account of the passions. There are further passages in which they are characterised in a way that makes them suitable agents in “chemical” reactions. While exploring the reaction of two different passions, Hume concludes that “hope and fear arise from the different

mixture of these opposite passions of grief and joy, and from their imperfect union and conjunction” (T 2.3.9.16), analogous to the imperfect union of “oil and vinegar” (T 2.3.9.17). He also couches his account of the possible interactions among contrary passions in terms of the encounter between alkalis and acids (T 2.3.9.17). Again, it is natural to read these passages as implicitly invoking elective affinities: the difference and interaction of passions are understood in terms of chemical combinations that depend on the particular characteristics of the passions.

Chemical imagery is also present in Hume’s account of those perceptions that have intrinsic activity, and whose transformation does not arise from associative proximity due to extrinsic relations such as contiguity or frequency of co-occurrence. Some passions are liable to undergo directional change over time: they are intrinsically active and inclined to transform even without being exposed to external influences. As these passions are characterised by their internal disposition to develop in certain directions, it is not surprising that the identity of a passion does not consist exclusively in “the present sensation alone or momentary pain or pleasure”, but at least as much in its inherent “appetite” or intrinsic “tendency to action”. (This is consonant with Hume’s claim that the identity of a passion depends on its causal role, not its phenomenology.) Consequently, the relevant resemblances due to which the association of the passions is possible arise “not only when their sensations are resembling [...] but also when their impulses or directions are similar and correspondent” (T 2.2.9.2). Therefore, the appetite and the resulting elective affinities of a passion are themselves constitutive of the passion’s nature: it is not exhausted by the mere “sensation”, the phenomenological character, of a passion, meaning it is not introspectable; its nature can only be revealed by the “experimental method of reasoning”. The unfolding chemical outlook (i.e. the qualitative distinction between ideas and impressions, the theory of association, and of the passions) fits neatly with the project of an organic “anatomy of the mind”.

5. Conclusion

The way Fodor couches Hume’s significance in contemporary terms is inspiring: the elements of his interpretation provide an excellent guide for a radical revision of the received view of Hume’s science of mind. According to this revision, Hume’s science of mind requires an account of the nature of *both* perceptions and faculties. What I have suggested in this paper is that Hume’s project is precisely such an attempt to provide a notion of the place – and its materials – where mental processes occur. Unfortunately, neither is directly observable, because the phenomenology of perceptions is not a good guide to their nature, and faculties are not introspectable (nor are their principles). Given that this is an inquiry into matters of fact about the mind, there is no better prospect for epistemic benefit than applying the experimental method of reasoning characterised by constructive empiricism, perceptible models, analogical-comparative analyses, and inferences to the best explanation – as well as to fallibility: the product of experimental reasoning can aspire at most to a “satisfactory” account, and there is a chance that it proves to be “chimerical”. Taking this route, Hume’s argument starts from commonly accessible phenomena toward the hidden principles governing them, which taken together provide an organic anatomy of the mind and a predominantly chemical account of its contents.

Attentive readers may have noticed that the revisionary aspects of my account rely overwhelmingly on material drawn from Book II of the *Treatise* discussing passions. David Owen

(2009, 72-73, 76) rightly warns us that Hume's initial characterisations of psychological entities and processes in Book I are indeed *initial* that are refined during the course of the argument. Yet, along with the overwhelming majority of Hume scholars, he also reads Book II as a theory of passions, thereby overlooking its significance for Hume's general theory of perceptions.²⁴ We should take more seriously, as James Harris (2009) suggests, Hume's notice in the Advertisement of the *Treatise* that the first two books "make a compleat chain of reasoning" – in other words, that Hume's theory of the nature of perceptions is not complete by the end of Book I.

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References

Hume's works

- D *Dialogues Concerning Natural Religion and Other Writings Dialogues*, ed. D. Coleman, Cambridge: Cambridge University Press, 2007.
- E *Essays, Moral, Political, and Literary*, ed. E.F. Miller, Indianapolis: Hackett, 1987.
- EHU *An Enquiry concerning Human Understanding*, ed. T. Beauchamp, Oxford: Clarendon Press, 2000.
- EPM *An Enquiry concerning the Principles of Morals*, ed. T. Beauchamp, Oxford: Clarendon Press, 1998.
- L *The Letters of David Hume*, 2 vols., ed. J.Y.T. Greig, Oxford: Oxford University Press, 1932.
- NHR *A Dissertation on the Passions; The Natural History of Religion*, ed. T. Beauchamp, Oxford: Clarendon Press, 2007.
- T *A Treatise of Human Nature*, 2 vols., eds. D.F. Norton and M.J. Norton, Oxford: Clarendon Press, 2007.

Secondary sources

Alanen, L. (2014). Personal identity, passions, and "the true idea of the human mind". *Hume Studies*, 40(1), 3-28.

²⁴ While the spirit of T 2.2.6.1 is already there in the much-discussed case of the missing shade of blue, it is important to note that this problem would not even emerge if the compositional properties of ideas and impressions were not different. If ideas did not possess "solidity", they could be blended so as to "form a total union" by losing their identity just like impressions, and then the mind could easily produce the idea of the missing shade simply by mixing the ideas of the two neighbouring shades.

- Balari, S. and Lorenzo, G. (2018). Complex ideas: Fodor's Hume revisited. *Biolinguistics*, 12, 1-13.
- Biro, J. (2005). Review of Jerry Fodor, *Hume variations*. *Hume Studies*, 31(1), 173-176.
- Biro, J. (2009). Hume's new science of the mind. In D. Norton, J. Taylor (Eds.), *The Cambridge Companion to Hume*. 2nd ed. Cambridge: Cambridge University Press, 40-69.
- Boehm, M. (2016). Hume's foundational project in the *Treatise*. *European Journal of Philosophy*, 24(1), 55-77.
- Boehm, M. (2020). Hume's projectivism explained. *Synthese*, DOI: 10.1007/s11229-020-02718-9
- Buckle, S. (2002). *Hume's Enlightenment tract*. Oxford: Clarendon Press.
- Capaldi, N. (1975). *David Hume: The Newtonian philosopher*. Boston: Twayne.
- Carnap, R. (1966). *Philosophical foundations of physics*. New York: Basic Books.
- Cohon, R. (2008). *Hume's morality: Feeling and fabrication*. Oxford: Clarendon Press.
- Collier, M. (2019). Hume's legacy: A cognitive science perspective. In A. Coventry, A. Sager (Eds.), *The Humean Mind*. London: Routledge, 434-445.
- Costelloe, T.M. (2018). *The imagination in Hume's philosophy. The canvas of the mind*. Edinburgh: Edinburgh University Press.
- Crane, T. (2009). Is perception a propositional attitude? *Philosophical Quarterly*, 59(236), 452-469.
- Demeter, T. (2016). *David Hume and the culture of Scottish Newtonianism. Methodology and ideology in enlightenment inquiry*. Leiden: Brill.
- Demeter, T. (2019a). Hume on the social construction of mathematical knowledge. *Synthese* 196(9), 3615-3631.
- Demeter, T. (2019b). Hume's science of mind and Newtonianism. In E. Schliesser and C. Smeenk (Eds.), *The Oxford handbook of Newton*, Oxford: Oxford University Press. DOI: 10.1093/oxfordhb/9780199930418.013.19.
- Dennett, D. (1981). *Brainstorms*. Cambridge, MA: MIT Press.
- de Pierris, G. (2015). *Ideas, evidence, and method: Hume's skepticism and naturalism concerning knowledge and causation*. Oxford: Oxford University Press.
- Dixon, T. (2003). *From passions to emotions: The creation of a secular psychological category*. Cambridge: Cambridge University Press.
- Garrett, D. (2006). Hume's conclusions in "Conclusion of this Book". In S. Traiger (Ed.), *The Blackwell guide to Hume's Treatise*. Oxford: Blackwell, 151-176.
- Garrett, D. (2015). *Hume*. London: Routledge.
- Fodor, J. (1981). *Representations: Philosophical essays on the foundations of cognitive science*. Brighton: Harvester Press.
- Fodor, J. (1983). *The modularity of mind*. Cambridge, MA: MIT Press.
- Fodor, J. (1987). *Psychosemantics*. Cambridge, MA: MIT Press.

- Fodor, J., Pylyshyn, Z. (1988). Connectionism and cognitive architecture: A critical analysis. *Cognition*, 28(1), 3-71.
- Fodor, J. (1990). Fodor's guide to mental representation. In J. Fodor, *A theory of content and other essays*. Cambridge, MA: MIT Press.
- Fodor, J. (1998). *In critical condition: Polemical essays on cognitive science and the philosophy of mind*. Cambridge, MA.: MIT Press.
- Fodor, J. (2003). *Hume variations*. Oxford: Clarendon Press.
- Fodor, J. (2008). *LOT 2: The language of thought revisited*. Oxford: Clarendon Press.
- Hatfield, G. (1997). The workings of the intellect: mind and psychology. In P. Easton (Ed.), *Logic and the workings of the mind. The logic of ideas and faculty psychology in early modern philosophy*. Atascadero: Ridgeview, 21-45.
- Harris, J. (2015). *Hume: An intellectual biography*. Cambridge: Cambridge University Press.
- Harris, J. (2009). A compleat chain of reasoning: Hume's project in *A Treatise of Human Nature*, Books One and Two. *Proceedings of the Aristotelian Society*, 109(2), 129-148.
- Kant, I. (1998). *Critique of pure reason*. Cambridge: Cambridge University Press.
- Kim, M.G. (2003). *Affinity, that elusive dream: A genealogy of the chemical revolution*. Cambridge, MA: MIT Press.
- Landy, D. (2018). *Hume's science of human nature: Scientific realism, reason, and substantial explanation*. London: Routledge.
- Merivale, A. (2009). Hume's mature account of the indirect passions. *Hume Studies* 35(1), 185–210.
- Millican, P. (2009). Hume on induction and the faculties.
<https://davidhume.org/scholarship/papers/millican/2009%20Hume%20Induction%20Faculties.pdf>
- McIntyre, J.L. (2006). Hume's 'new and extraordinary' account of the passions. In S. Traiger (Ed.), *The Blackwell guide to Hume's Treatise (199-215)*. Oxford: Blackwell.
- Morris, W.E, Brown C.R. (2019). David Hume. E. Zalta (Ed.), *Stanford encyclopedia of philosophy* (Spring 2020 Edition). <https://plato.stanford.edu/archives/spr2020/entries/hume/>
- Owen, D. (1999). *Hume's reason*. Oxford: Clarendon.
- Owen, D. (2009). Hume and the mechanics of mind: Impressions, ideas, and association. In D. Norton, J. Taylor (Eds.), *The Cambridge companion to Hume*. 2nd ed. Cambridge: Cambridge University Press, 70-104.
- Prinz, J. (2016). Hume and cognitive science. In P. Russell (Ed.), *The Oxford handbook of Hume*. Oxford: Oxford University Press, 777-791.
- Qu, H. (2012). The simple duality: Humean passions. *Canadian Journal of Philosophy*, 42(S1), 98-116.
- Radcliffe, E. (2015). Hume's psychology of the passions. The literature and future directions. *Journal of the History of Philosophy*, 53(4), 565-605.
- Russell, P. (2008). *The riddle of Hume's Treatise: Skepticism, naturalism, and irreligion*, Oxford: Oxford University Press.

- Russell, P. (2016). Hume's philosophy of irreligion and the myth of British empiricism. In P. Russell (Ed.), *The Oxford handbook of Hume*. Oxford: Oxford University Press, 109-137.
- Schliesser, E. (2009). Hume's attack on Newton's philosophy. *Enlightenment and Dissent* 26, 167–203.
- Schliesser, E. and Demeter, T. (2020). Hume's Newtonianism and Anti-Newtonianism. E. Zalta (Ed.), *Stanford encyclopedia of philosophy* (Spring 2020 Edition). <https://plato.stanford.edu/entries/hume-newton/>
- Schmid, S. (2015). Faculties in early modern philosophy. In D. Perler (Ed.), *The faculties. A history*. New York: Oxford University Press, 150-197.
- Slavov, M. (2016). Newtonian and Non-Newtonian elements in Hume. *Journal of Scottish Philosophy* 16(3), 275-296.
- Sellars, W. (1963). Philosophy and the scientific image of man. In W. Sellars, *Science, perception, and reality*. London: Routledge and Kegan Paul, 1-40.
- Stroud, B. (1977). *Hume*. London: Routledge.
- Stroud, B. (2016). Naturalism and skepticism in the philosophy of Hume. In P. Russell (Ed.), *The Oxford handbook of Hume*. Oxford: Oxford University Press, 21-31.
- Taylor, J. (2015). *Reflecting subjects. Passions, sympathy, and society in Hume's philosophy*. Oxford: Oxford University Press.
- van Fraassen, B. (1980). *The scientific image*. Oxford: Clarendon.
- Westerhoff, J. (2005). Logical relations between pictures. *Journal of Philosophy*, 102(12), 603-623.
- Winkler, K. (2016). Hume's skeptical logic of induction. In P. Russell (Ed.), *The Oxford handbook of Hume*. Oxford: Oxford University Press, 191-227.
- Wolfe, C. (2016). The 'physiology of the understanding' and the 'mechanics of the soul'. Reflections on some phantom philosophical projects. *Quaestio*, 16, 3-25.
- Wright, J. (1990). Metaphysics and physiology. Mind, body, and the animal economy in eighteenth-century Scotland. In M.A. Stewart (Ed.), *Studies in the philosophy of the Scottish Enlightenment*. Oxford: Oxford University Press, 251-301.