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PROOF

Mixtures and Mass Terms

DAVID NICOLAS

In this article, I show that the semantics one adopts for mass terms constrains the metaphysical claims one can make about mixtures. I first expose why mixtures challenge a singularist approach based on mereological sums. After discussing an alternative, non-singularist approach, I take chemistry into account and explain how it changes our perspective on these issues.

Let me prepare my favorite drink. I pour lemon juice, water, and sugar in a glass, and mix them with a spoon. I soon obtain some refreshing lemonade. (Better and more complicated recipes are easy to find.) Have I thereby created something new? Before answering the question, notice that I have used mass terms such as *water* and *lemonade* in order to describe what happened. A central aim of this article is to show that the semantics one adopts for mass terms constrains the metaphysical claims one can make about mixtures like lemonade.

So, in section 1, I present the two main accounts that have been proposed of their semantics. The singularist approach treats them as singular terms referring to mereological sums (e.g. [Link 1983](#)). The non-singularist approach is based on the idea that, together with plurals, mass terms have the ability to refer to one or several entities at once (e.g. [Nicolas 2008](#)).

In section 2, I present Barnett's (2004) case for arguing that mereological sums are inadequate to capture our intuitions concerning the identity of mixtures over time. His conclusion is that a mixture is indeed something new, a "rigid embodiment". In section 3, I discuss how the non-singularist approach can deal with mixtures. I show that it must treat nouns of mixtures as collective, temporary predicates. On this approach, a mixture is not something new; it is just the plurality of its constituents when they stand in the appropriate relation.

Then, in section 4, I turn to chemistry, the science of matter and its transformations. My guide is the work of Needham (2010). Once his perspective

31 on chemistry is adopted, the metaphysical issues raised by Barnett concern-
 32 ing mixtures appear in a very different light. This leads me to compare, in
 33 section 5, two approaches according to which all portions of matter are nuclei
 34 and electrons, or sums thereof.

35 **Two approaches to the semantics of mass terms**

36 Two types of account have been proposed for the semantics of mass terms,
 37 such as *water*, *gold*, *lemonade*, and *succotash*: the singularist and the non-
 38 singularist approaches (see [Nicolas 2018](#) for an overview).

1391 *The singularist approach*

40 The singularist approach is very popular in linguistics and philosophy (e.g.
 41 [Link 1983](#); [Zimmerman 1995](#)). The key idea is that a mass term is a singular
 42 term: whenever it is used to refer, it refers to a single entity, since it is used
 43 in the singular. This entity is usually identified with a mereological sum (see
 44 [Steen 2022](#) for discussion of alternatives).

45 The notion of sum belongs to mereology, the study of relations between
 46 parts and wholes ([Cotnoir and Varzi 2021](#)). It can be characterized in different
 47 ways, for instance as a least upper bound with respect to the relation of part:

48 SUM. s is the sum of some entities $\equiv s$ is part of anything that has
 49 these entities as parts.

50 A well-known set of axioms yields *classical mereology*, with in particular:

51 UNRESTRICTED SUMS. Any entities have a sum.¹

52 Now, let M be a mass term and P a predicate. If there is some M that P , then
 53 the definite description *the M that P* designates something, namely the sum
 54 of the M that P . Thus, *the water in the two bottles* refers to an entity, the sum of
 55 everything which is water in the two bottles. And *the gold in the safe* designates
 56 the sum of the gold in the safe—for instance, the sum of three gold nuggets.

1 Classical mereology is often formulated in first-order logic, using axiom schemas. Here, for ease of exposition, plural logic is implicitly used. Compare sections 2.1 and 6.1.2 from Cotnoir and Varzi (2021).

1.5.2 The non-singularist approach

58 The non-singularist approach is put forward by Nicolas (2008), drawing in-
59 spiration from Laycock (2006). Mass terms do not admit the grammatical
60 contrast between singular and plural, so one may argue that their use in the
61 singular has no semantic significance. Mass terms are not singular terms, but
62 non-singular terms: just like plurals, they may refer to one or several entities
63 at once.²

64 Let M be a mass term and P a predicate. The definite description *the M that*
65 *P* refers collectively to the entities that are some M that P . Thus, *the water in*
66 *the two bottles* refers collectively to two entities, the water in the first bottle
67 and the water in the second one. And *the gold in the safe* refers collectively to
68 three gold nuggets if this is what the safe contains.

69 Nicolas proposes a semantics of mass terms based on this idea. This se-
70 mantics is developed in non-singular or plural logic. In usual logics, such as
71 predicate logic, terms are singular in the following sense. Under any interpre-
72 tation, a constant is interpreted as one entity, and under any assignment, a
73 variable is interpreted as one entity. By contrast, plural logic has both singular
74 and non-singular terms (Florio and Linnebo 2021). Under any interpretation
75 and assignment, a non-singular term (a constant or a variable) can be inter-
76 preted as one or several entities in the domain of interpretation. In particular,
77 a formula consisting of a predicate whose argument is a non-singular term
78 is true if and only if the term is interpreted as one or more entities which
79 collectively satisfy the predicate.

80 Two things should be stressed. First, the claim is not that mass terms are
81 plurals. It is that mass terms and plurals share a common property, namely
82 the ability to refer non-singularly. Second, in this approach, one does not need
83 to postulate that any entities have a sum, since one can directly refer to these
84 entities themselves.

8.2 Mixtures and the singularist approach

86 A mixture is obtained by mixing portions of different types of matter, without
87 creating a new chemical bond between elements. Thus, one obtains lemonade
88 by mixing lemon juice, water, and sugar.

2 By contrast, according to Laycock (2006) and McKay (2015), mass terms come with their own primitive form of non-singular reference.

As we shall now see, Barnett (2004) argues that the identity of mixtures over time presents a problem for a singularist approach based solely on mereological sums. Indeed, according to him, a portion of a mixture cannot be a sum.

Barnett adopts the following definitions:

PORTION. p is a portion of a type of matter M : \equiv p is some M .

SUBPORTION. q is a subportion of p of type M : \equiv p is some M , q is some M , and q is part of p .

LEAST PORTION. p is a least portion of M : \equiv p is some M and p has no proper part which is also some M .

Thus, the water in a bottle is some water (a portion of water), and the water in the lower half of the bottle is a subportion of water. Like many authors, Barnett supposes that a least portion of water is a molecule.

Barnett holds that sums exist unrestrictedly, and moreover, that they are mereologically constant:

MEREOLOGICAL CONSTANCY. A sum of entities exists when, and only when, these entities exist.³ Thus, the sum of all the molecules exists when, and only when, these molecules exist. If one molecule ceases to exist, so does the sum.

Now, according to Zimmerman (1995, sec. 8), a portion of a type of matter M is the sum of its subportions, so it should satisfy a more specific property:

SUBPORTION CONSTANCY. A portion of a type of matter M exists when, and only when, its subportions exist.

Barnett disagrees, distinguishing two types of matter, discrete and non-discrete:

³ While **MEREOLOGICAL CONSTANCY** is a popular thesis, it remains controversial. For instance, van Inwagen (2006) argues vigorously that sums can change their parts. Consequently, one might prefer to adopt a weak mereology which says little about what happens to sums over time (Donnelly and Bittner 2009).

114 DISCRETE MATTER. Least portions have no part in common. Dis-
115 crete matter satisfies **SUBPORTION CONSTANCY**. Thus, take a portion
116 of water. It is the sum of a great many least portions (molecules),
117 which have no part in common. This portion of water exists when,
118 and only when, these molecules exist. This portion has always
119 the same subportions, each subportion being the sum of certain
120 molecules.

121 NON-DISCRETE MATTER. Least portions can share parts. Non-
122 discrete matter does not satisfy **SUBPORTION CONSTANCY**. Thus,
123 take a portion of lemonade in a glass. Its subportions contain lemon
124 juice, water, and sugar, and two least portions can share, for instance,
125 some lemon. When one stirs the lemonade in a glass, at least one of
126 its subportions will disappear because its own constituents (certain
127 portions of lemon juice, water, and sugar) are separated and do not
128 form lemonade together anymore.

129 For non-discrete matter, Barnett proposes to use the notion of rigid embodi-
130 ment from Fine (1999, sec. 3):

131 RIGID EMBODIMENT. An entity o is a rigid embodiment of a relation
132 R in some constituents $p, q, \dots : \equiv o$ exists when, and only when, $p, q,$
133 \dots stand in the relation R . Thus, a portion of lemonade exists when,
134 and only when, its constituents (lemon juice, water, and sugar) stand
135 in the relation Appropriately Mixed.

136 Overall, according to Barnett, the ontology of matter involves entities of two
137 different kinds: mereological sums *and* rigid embodiments. This may be worri-
138 some if one wants to minimize ontological commitments or if one is suspicious
139 of rigid embodiments.

140 At this point, let's reflect about the relation between metaphysics and lan-
141 guage in this discussion. Barnett's hypotheses about mixtures and matter are
142 metaphysical claims which are expressed using mass terms. In particular, the
143 notions of portion and subportion of M are defined using the mass expression
144 *some* M . Moreover, these hypotheses are motivated by a particular under-
145 standing of general features of our use of mass terms. As Zimmerman (1995,
146 55) puts it: "Attention to the presuppositions of our ordinary use of mass
147 terms reveals a 'proto-theory' of masses", involving "central proto-theoretical

148 assumptions about the referents of mass expressions of the form “*the M* and
 149 *some M*. The “proto-theory” in question is an instance of the singularist ap-
 150 proach; it presupposes in particular that, for many nouns of matter, a definite
 151 description of the form *the M* denotes a mereological sum. In the next section,
 152 I turn to the non-singularist approach, which makes different presuppositions.
 153 As we shall see, it offers a different view on mixtures, one that incurs simpler
 154 ontological commitments.

153 **Mixtures and the non-singularist approach**

156 Two broad conceptions concerning the relation between mixtures and their
 157 constituents can be distinguished:

158 **NOVELTY.** A mixture is something *new* compared to its
 159 constituents—e.g. a rigid embodiment for Barnett.

160 **MERE RELATEDNESS.** A mixture is *just* the sum or plurality of
 161 its constituents *when* they stand in the appropriate relation—cf.
 162 Burge (1977, 109–112), for whom a mixture is a temporal phase of
 163 an “aggregate”.

164 Thus, when one mixes lemon juice, water, and sugar appropriately:

- 165 • According to **NOVELTY**, one creates something new (some lemonade),
 166 which did not exist before.
- 167 • According to **MERE RELATEDNESS**, one does not create anything new;
 168 one merely puts certain constituents in an appropriate relation with
 169 one another.

170 As explained below, the non-singularist approach, as developed by Nicolas
 171 (2008), is incompatible with **NOVELTY**, given the following, extremely plausi-
 172 ble assumption about pluralities (Florio and Linnebo 2021, chap. 10):

173 **PLURAL CONSTANCY.** A plurality of entities exists when, and only
 174 when, these entities exist. Relatedly, two pluralities are identical if
 175 and only if they have the same members. Thus, the chairs that are
 176 in the office are the same as the chairs that were in the living-room
 177 if and only if these two pluralities of chairs have the same members.

178 Following Sharvy (1979), let's consider the case of succotash (idealized below),
 179 an American dish made of Lima beans and kernels of green corn cooked and
 180 served together. Imagine the following scenario:

- 181 • At t_0 , beans b_1 and b_2 and kernels of corn k_1 and k_2 are cooked together.
- 182 • At t_1 , b_1 and k_1 are served in one cup, b_2 and k_2 in another. So, each cup
 183 contains succotash.
- 184 • At t_2 , b_1 and k_2 are served in a bowl, b_2 and k_1 in another. So, each bowl
 185 contains succotash.

186 Given this, the following statement of identity over time seems true:

187 *The succotash (which was in the cups) at t_1 is identical to the succotash*
 188 *(which was in the bowls) at t_2 .*

189 Can we explain this intuition if we combine the non-singularist approach
 190 with the first or the second conception above?

191 If we combine the non-singularist approach with **NOVELTY**, we get this:

- 192 • The term *the succotash at t_1* denotes the succotash s_1 (made of b_1 and
 193 k_1) and the succotash s_2 (made of b_2 and k_2).
- 194 • The term *the succotash at t_2* denotes the succotash s_3 (made of b_1 and
 195 k_2) and the succotash s_4 (made of b_2 and k_1).
- 196 • s_3 is distinct both from s_1 and s_2 , and s_4 is distinct both from s_1 and s_2 .

197 If we combine the non-singularist approach with **MERE RELATEDNESS**, we
 198 get that:

- 199 • The term *the succotash at t_1* directly denotes b_1 , k_1 , b_2 and k_2 ; there are
 200 no new entities s_1 and s_2 .
- 201 • The term *the succotash at t_2* directly denotes b_1 , k_1 , b_2 and k_2 ; there are
 202 no new entities s_3 and s_4 .

203 Given **PLURAL CONSTANCY**, the non-singularist approach is actually incom-
 204 compatible with **NOVELTY**. Indeed, the identity of succotash over time would
 205 correspond to the fact that s_1 and s_2 are identical to s_3 and s_4 , and so that
 206 s_1 is identical to s_3 or s_4 (and likewise for s_2), contrary to the scenario. The
 207 non-singularist approach must therefore adopt **MERE RELATEDNESS**.

208 For the non-singularist approach, mass terms designating mixtures turn
 209 out to be temporary, collective predicates: they hold collectively of certain

210 entities when, and only when, certain conditions are satisfied. (Similarly, the
 211 temporary predicate *child* holds of a person when, and only when, certain
 212 conditions of age are satisfied.)

213 Here, it seems fair to recognize that, according to common sense, when
 214 one mixes lemon juice, water, and sugar, one *does make* something new, some
 215 lemonade which did not exist before, and which one can now drink, give, or
 216 sell. Being at odds with common sense may appear as a disadvantage for the
 217 non-singularist approach.

218 At the same time, as we saw, Barnett is led to distinguish two kinds of matter,
 219 mereological sums and rigid embodiments. The ontological commitments
 220 of the singularist approach, on Barnett's analysis, are thus more costly than
 221 those of the non-singularist approach, which is only committed to pluralities.

222 In order to make progress, in the next section, I present the conception of
 223 chemistry put forward by Needham (2010). As I explain, this conception has
 224 important consequences for the issues just discussed.

224 4 The perspective from chemistry

426 4.1 *Constancy of matter*

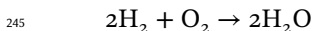
227 In a chemical reaction, the mass of the reactants before reaction is identical to
 228 the mass of the products after reaction. Chemists think that constancy of mass
 229 is due to something deeper, namely constancy of matter. Thus, according to
 230 19th century chemistry:

- 231 • Elements (like oxygen and hydrogen) are permanent.
- 232 • When put together, they form compounds (like water) and solutions
 233 (like lemonade), in which they are actually present. Compounds and
 234 solutions are impermanent. The constancy of elements in chemical
 235 reactions explains the constancy of mass.

236 And according to 20th century chemistry:

- 237 • In a chemical reaction, electrons are gained, lost, or shared by elements
 238 and compounds (cf. ions, metals, etc.).
- 239 • So, what remains constant is nuclei (not atoms) and the overall number
 240 of electrons.

241 This leads Needham (2010, sec. 2) to defend the idea that all nouns of matter
 242 are temporary predicates, which apply to portions of matter when, and only
 243 when, they have certain properties. For instance, let's consider the combustion
 244 of hydrogen in oxygen, which gives water:

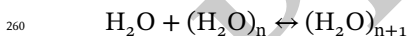
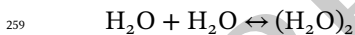


246 Before reaction, at time t_1 , there are two portions of matter, p and q , and their
 247 sum, $p + q$. The temporary predicates *hydrogen* and *oxygen* apply to p and q ,
 248 respectively: $\text{hydrogen}(p, t_1) \wedge \text{oxygen}(q, t_1)$. After reaction, at time t_2 , we still
 249 have the same portions of matter.⁴ The temporary predicate *water* now applies
 250 to their sum: $\text{water}(p + q, t_2)$. The common-sense preconception spelled out
 251 as **NOVELTY** in the previous section is thus rejected, not only for mixtures,
 252 but for matter of any kind.

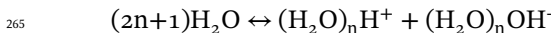
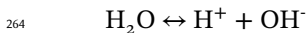
4.3.2 *Liquid water in constant reaction*

254 A liquid portion of water undergoes constant chemical reactions, and this
 255 explains important properties of water.

256 Thus, there is a continual association of molecules into larger polymeric
 257 species (due to hydrogen bonding), and a continual dissociation (Needham
 258 2010, sec. 6):



261 And there is also a continual dissociation of molecules into hydrogen and
 262 hydroxide ions, and a continual recombination, together with the hydrogen-
 263 bonded clusters:



266 The conductivity of water is due to this: a hydrogen ion attaches at one point
 267 of a polymeric cluster, this induces a transfer of charge across the cluster, and

4 For Needham, a given portion of matter is the constant sum of certain nuclei and electrons.

ultimately a hydrogen ion is released. Other properties of water (boiling at a given temperature, for instance) are also due to such reactions and hydrogen bonding.

So, the microstructure of water cannot be simply characterized as a collection of molecules. And the subportions of a liquid portion of water constantly change, similarly to what happens in the case of a mixture like lemonade.

5 Conclusion

I have examined three approaches about mixtures and mass terms. For two of them, mass terms are singular terms; for one, they are non-singular terms which may refer to one or several entities at once. As explained:

- Barnett distinguishes between discrete matter (a portion of water for instance), which is the sum of its subportions; and non-discrete matter (a portion of lemonade for instance), which is not a sum but something new, a rigid embodiment.
- According to the non-singularist approach, a mixture is not something new; it is just the plurality of its constituents when they stand in the appropriate relation. Nouns of mixtures are temporary predicates.
- From the perspective of chemistry, according to Needham, any portion of matter is the sum of some nuclei and electrons. All nouns of matter are temporary predicates, not just nouns of mixtures.

The non-singularist approach can readily accommodate Needham's perspective. It suffices to take a portion of matter to be the plurality of some nuclei and electrons. The two views then end up being similar. However, their ideologies differ, as do the formal apparatus they use: classical mereology for the former, plural logic for the latter. Are there reasons to prefer one approach over the other? Five come to mind, but none seems decisive.

First, plural logic is a form of higher-order logic, which in its simplest form is similar to monadic second-order logic. So, the fact that mereology can remain first-order may be taken as an advantage: being incomplete, such a theory would be less demanding than plural logic. But this is disputable, since such a theory lacks the resources to say everything a mereologist would like to say. For instance, it cannot say that any entities have a sum. Consequently, several philosophers prefer to characterize mereology using second-order or

301 plural logic (Cotnoir and Varzi 2021, sec. 6.1). Indeed, this is what was done
302 in section 1.1 for ease of exposition.

303 Second, the non-singularist approach requires one to identify which entities
304 are non-singularly quantified over. Given what we know about chemistry, it is
305 natural to identify these entities with nuclei and electrons. The mereological
306 approach is consistent with this kind of identification, but at the same time,
307 it does not necessarily force one to make an identification. In this respect, the
308 mereological approach may appear as ontologically less restricting. However,
309 Needham's argumentation, summarized earlier, *does* rely crucially on an
310 identification of this kind, namely, to sums of nuclei and electrons. So, both
311 approaches are on a par with respect to the assumptions they make about
312 chemistry.

313 Third, and relatedly, what about the possibility of "gunk", i.e. indefinitely
314 divisible matter? It is in fact easily accommodated by both approaches (putting
315 aside assumptions about chemistry for the purpose of discussion). Say that a
316 predicate *M* is "gunky" if, whenever it is true of something, it is also true of a
317 proper part of it. Using sets, there is no difficulty in specifying its denotation:
318 it is the set of entities the predicate *M* is true of. *Mutatis mutandis*, the same is
319 true in plural logic. The denotation of the predicate *M* is just those entities it is
320 true of. This can then be combined with an independently motivated relation
321 of part without assuming [UNRESTRICTED SUMS](#) (Nicolas 2008, sec. 5).

322 Fourth, one may wonder whether questions concerning the determinacy
323 of electrons are particularly pressing for the non-singularist approach. If, as
324 argued by French, S. and Krause (2006), electrons are not subject to the law of
325 identity, how could one refer plurally to some electrons? However, this would
326 also be a difficulty for the mereological approach as articulated by Needham.
327 According to him, a portion of matter is the sum of some nuclei and some
328 electrons. In classical mereology, a sum of entities requires these entities to
329 be determinate. So, the indeterminacy of electrons seems inconsistent with
330 both approaches.

331 Fifth, while classical mereology postulates that any entities have a sum,
332 plural logic is, by itself, silent about this. A thirst for ontological simplicity may
333 then lead one to the non-singularist approach. There is no need to postulate
334 that any entities have a sum when it is possible to refer directly to these entities

335 themselves. But of course, this is unlikely to convince a friend of classical
 336 mereology.⁵

337 Overall, it remains hard to adjudicate between the two approaches. A related
 338 way to consider this debate is the following. One-sorted plural logic and
 339 atomistic, classical mereology are mutually interpretable (Florio and Linnebo
 340 2021, sec. 5.3): each theory can be interpreted in terms of the other. How, then,
 341 should one understand their ideological differences?

342 What is the relationship between these metaphysical issues and language?
 343 The scientific knowledge of chemistry and the theoretical considerations
 344 that have been invoked are largely foreign to ordinary speakers. They are the
 345 concern of metaphysicians. Still, metaphysicians routinely *use mass terms*
 346 when making theoretical claims about mixtures and matter. According to
 347 semanticists, mass terms are either singular terms that refer to mereological
 348 sums; or they are non-singular terms that can refer to one or several entities
 349 at once. As we have seen, notably in section 2 and section 3, adopting either
 350 of these approaches constrains the metaphysical claims one can make about
 351 mixtures.*

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5 See Cotnoir and Varzi (2021, sec. 5.2.1) for a short survey of arguments about UNRESTRICTED SUMS.

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PROOF

An Analysis of Fink’s Argument in Favour of Normative Process-Requirements

LEONHARD SCHNEIDER

This paper analyses and (tentatively) rejects Julian Fink’s argument for the existence of normative process-requirements. According to Fink, only process-requirements allow us to give appropriate normative credit to a subject *S* who violates certain state-requirements but is undergoing a process that will eventually lead to their satisfaction. I will show that Fink’s argument applies, at best, only to a restricted set of cases—namely, when *S*’s undergoing a process has not resulted in the formation of new mental states. In these remaining cases, however, it is implausible to give *S* normative credit for undergoing the relevant process. Thus, we can assign the correct degree of the corresponding normative property solely in terms of state-requirements. To the extent that this holds, Fink’s argument does not entail that there are normative process-requirements.

Normative requirements play an important role in our understanding of normativity (see e.g. Broome 2007). That there are different types of normative requirements (e.g. rational, moral, prudential) is commonly accepted. It remains an open question, however, whether there are such things as normative process-requirements.

This paper takes a closer look at and (tentatively) rejects Julian Fink’s (2012) argument for the existence of normative process-requirements. In short, Fink (2012, 132) claims that process-requirements are necessary if we are to “assign fine-grained degrees of a normative property to a subject.” To show this, Fink uses the case of two subjects, Jack and Jim, who both violate a certain state-requirement that requires them to have a certain intention. Jack is deliberately undergoing the process of forming this intention, whereas Jim is not undergoing any such process. Fink (2012, 134) argues that the only way

440 to give Jack normative credit for “moving in the right direction” is to refer to
 441 process-requirements.

442 The central claim of my essay is that if there is a “normative difference”¹
 443 between Jack and Jim, this difference can be explained in terms of state-
 444 requirements. Hence, there is no need to assume the existence of process-
 445 requirements. Before I come to my claim, I will explain Fink’s argument in
 446 more detail (sections 1, 2). Afterwards (section 3), I will show that Fink’s
 447 argument applies, at best, only to a restricted set of cases—namely, when
 448 Jack’s undergoing a process has not resulted in the formation of new mental
 449 states. In these remaining cases, however, it is implausible to give Jack any
 450 additional normative credit and, hence, there is no need to invoke normative
 451 process-requirements (section 4).

452 Whether normative process-requirements exist has important implica-
 453 tions. Kolodny (2005), for example, argues that not all rational requirements
 454 are reason-giving. That is, he argues, the following is not necessarily the
 455 case: You have a normative reason to do *X* if rationality requires you to
 456 *X*. Kolodny’s argument presupposes that there are (at least some) rational
 457 process-requirements.² If there are no normative process-requirements, his
 458 argumentation is therefore unsound.

459 1 Definitions

460 Fink’s argument is supposed to prove the existence of normative process-
 461 requirements. But what are process-requirements?

462 First, Fink (2012, 118) defines the “general-requirement schema”:

463 GRS. The GRS obtains if and only if, “at *t*, a normative source *N*
 464 requires of a subject *S* that *S* ‘*Xs*.’”

465 On this basis, Fink (2012, 118) defines process-requirements in terms of their
 466 content:

467 The GRS represents a process-requirement if and only if the propo-
 468 sition “*S Xs*” signifies a positive relation between *S* and a process.

1 I will use the term “normative difference” as a synonym for “a difference between Jack and Jim regarding their ‘deserved’ normative credit.”

2 Fink (2012) analyses Kolodny’s (2005) two arguments in favour of (rational) process-requirements and rejects them before he develops his own argument.

469 Fink (2012, 118) takes “change [to be] [...] a necessary and sufficient as-
470 pect of processes.” Additionally, the proposition “ $S Xs$ ” signifies a positive
471 relation. This means that “ $S Xs$ ” is true only if S really undergoes a process
472 at t . Therefore, process-requirements require subjects to change in certain
473 ways. Conversely, a requirement *not* to undergo a certain process signifies
474 a negative relation. Being required not to undergo a certain process entails,
475 ceteris paribus, that a subject should remain as she is. Such a requirement is
476 a state-requirement.

477 We can define state-requirements along the following lines:

478 The GRS represents a state-requirement if and only if the proposition
479 “ $S Xs$ ” signifies a relation between a subject S and a state.

480 A normative state-requirement therefore requires you to be or remain in a
481 certain state.³

482 In his defence of process-requirements, Fink (2012, 130ff) focuses on a
483 particular type of process-requirement: those that require you to undergo a
484 process that “aims at ending in a particular attitudinal state.” He refers to
485 these as “teleological process-requirements.” Further, he refines his account
486 of teleological process-requirements by stating the satisfaction conditions for
487 such requirements. According to his account, if S is under a certain teleolog-
488 ical process-requirement R at a given time t , S satisfies R if and only if S is
489 (successfully) undergoing the process of getting to the required attitudinal
490 state.

491 Put generally, then, Fink wants to prove the existence of “in-the-process
492 satisfaction process-requirements.” I will now show how his argument for the
493 existence of these process-requirements is meant to work.

492 **Fink's argument for the existence of process-requirements**

495 Fink (2012, 132) states that “in-the-process satisfaction process-requirements
496 are necessary to assign fine-grained degrees of a normative property to a
497 subject.” To argue for his claim, Fink uses the example of Jack and Jim:

3 The requirement to maintain a state is also a state-requirement, even if the subject “has to do something” to stay in that state. This is because change is a necessary condition of something's being a process, and remaining in a certain state is not a species of changing (Fink 2012, 118).

498 Suppose, at t , a normative source N requires Jack and Jim to intend
 499 to help their neighbours. However, both violate this requirement,
 500 as, at t , Jack and Jim have no intention of helping their neighbours.
 501 Suppose further that, at t , Jack and Jim are identical in every
 502 aspect save one: at t , Jack is deliberately undergoing a process
 503 of (successfully) forming an intention to help their neighbours,
 504 whereas Jim is not. (2012, 132f)

505 Jack and Jim are almost identical. They both fail to be as they are normatively
 506 required to be. Indeed, they violate the same state-requirement: Both are
 507 morally required to have an intention to help their neighbours. Let us call
 508 this intention I_{final} . There is only one descriptive difference between them:
 509 Jack is deliberately undergoing a process that will (eventually) lead him to
 510 be as he is required (by the state-requirement) to be—let us call this process
 511 “ F .” What does this descriptive difference imply? According to Fink, there is a
 512 normative source N that assigns a higher degree of its corresponding property
 513 to Jack. The normative source is morality. Hence, Jack seems to be “more
 514 moral” than Jim (2012, 133).

515 Fink assumes that Jack and Jim are subject to the same normative require-
 516 ments. He therefore argues that we can give Jack more “normative credit”
 517 only if he satisfies at least one normative requirement more than Jim. This
 518 is because Fink (2012, 133) assumes that there is “a [strictly monotonically
 519 increasing] function from requirement satisfaction/violation to the degree
 520 of a normative property.” The only descriptive difference between Jack and
 521 Jim is that Jack is deliberately undergoing a *process* which Jim does not un-
 522 dergo. Hence, Fink concludes that the resulting normative difference must
 523 be explained in terms of the satisfaction/violation of *process*-requirements.
 524 The *only* possible way to account for the difference regarding their normative
 525 credit is to refer to process-requirements.⁴

526 Therefore, according to Fink, we must assume that at least one process-
 527 requirement applies to Jack and Jim if we want to assign different degrees of
 528 the relevant moral property to them. Fink (2012, 134) proposes the following

4 It is crucial to understand that Fink regards the use of process-requirements as the *only* way to express the normative difference between Jack and Jim. Referring to a process-requirement is necessary only if the fact that Jack is deliberately undergoing process F does not lead to the satisfaction of any state-requirement. Thus, Fink must assume that Jack does not satisfy any state-requirements that Jim fails to satisfy. Otherwise, there would be no need to assume process-requirements to capture the normative difference in the first place. (See section 3 for further explications.)

529 process-requirement: “[A]t t , morality requires of both Jack and Jim that
530 each deliberately forms an intention to help his neighbours.” Jack satisfies
531 the proposed process-requirement because he is deliberately undergoing the
532 required process of forming the intention while Jim does not (and, hence,
533 violates the process-requirement). Hence, Jack is “more moral.”

534 Fink concludes that it is necessary to assume the existence of process-
535 requirements as they have a unique, essential function—that is, “to assign
536 the correct degree of a normative property to those subjects who violate a set
537 of normative state-requirements, yet who are undergoing a process to redeem
538 this failure” (2012, 135).

539 **3 Restricting the scope of Fink's argument**

540 In this section, I show how narrow the scope of Fink's argument, if it
541 succeeded, would be. This is because most of the cases we naturally think
542 about when saying “Jack is undergoing process F ” can be captured by
543 state-requirements. Roughly, this is the case if Jack is undergoing a complex
544 process in which “on his way towards I_{final} ” he completes several “sub-tasks.”
545 That is, by getting towards I_{final} , Jack forms several mental states on the way.

546 More generally, I assume that we can divide all such complex processes of
547 arriving at an intention into basic steps. Of course, such basic steps can be
548 decomposed further—but not into “mental subprocesses” that are referred
549 to at the personal, folk-psychological level of explanation. Instead, further
550 decomposition to a sub-personal level of explanation yields sub-personal
551 processes. These sub-personal processes are not constituted by mental states
552 anymore, but only by sub-mental states of a subject's cognitive system. Hence,
553 the “input” and “output” of sub-personal processes are not mental states, such
554 as beliefs or intentions.⁵

555 Now, if Jack has already undergone at least one of the basic steps that he
556 needs to perform to complete the whole complex process F , he has formed at
557 least one mental state that Jim has not formed. Thus, they have different sets

5 This account draws on Wedgwood's (2006) account of reasoning (as a causal step-by-step process) and his notion of “basic step of reasoning.” Further, an analogy can be drawn with complex actions (say, making pizza) achieved by means of performing more basic actions (rolling out the dough, cutting tomatoes, etc.).

558 of mental states.⁶ In this case, you can assign a higher degree of the relevant
 559 normative property to Jack by referring to state-requirements.

560 It will be helpful to provide an example of a complex process that Jack
 561 could be undergoing to (eventually) reach I_{final} . Using “i” for “Jack intends
 562 that” and “b” for “Jack believes that,” the basic steps that Jack, in the current
 563 example, would have to undergo to reach I_{final} can be described as follows:

564 First basic step (BS_1):

- 565 (i) (Jack will promote happiness)
- 566 (b) (helping people who are in danger promotes happiness)
- 567 (i) (Jack will help those in danger)

568 Second basic step:

- 569 (i) (Jack will help those in danger)
- 570 (b) (Jack’s neighbours are in danger)
- 571 (i) (Jack will help his neighbours)

572 We can imagine that Jack has already completed the first basic step of F
 573 (and has therefore formed the intention to help those in danger) but not the
 574 second step. Thus, Jack is undergoing the process of forming I_{final} but has not
 575 completed this process. To capture the normative difference between Jack and
 576 Jim, we can now simply postulate the state-requirement to have the intention
 577 to help those in danger. Jim does not satisfy this state-requirement. Due to
 578 Jack’s satisfaction of this further normative *state*-requirement we can give
 579 him more normative credit than Jim.⁷

580 This rough sketch is sufficient to indicate the narrow scope where Fink’s
 581 argument applies. Jack’s undergoing process F is most likely to be constituted
 582 or achieved by undergoing more basic processes. If undergoing these processes
 583 already led to the formation of mental states, state-requirements suffice to

6 Fink assumes, and must assume, that Jack and Jim are in the same mental states *before* Jack starts to undergo process F . If this were not so, there would be no need to assume process-requirements in the first place. This is because the normative difference between Jack and Jim could easily be captured in terms of state-requirements (see footnote 4).

7 In the current example, we are interested in Jack’s *moral* credit. Hence, the postulated state-requirement that Jack (but not Jim) satisfies is a *moral* state-requirement. There might be, given certain background assumptions, other requirements that apply to the reasoning process in the first basic step, such as some (wide-scope) rational state-requirement. However, we can still stipulate that there is a moral state-requirement to form the intention to help those in danger. (I would like to thank an anonymous referee for pressing this issue.)

584 give Jack normative credit. Hence, in assessing Fink's argument we only have
585 to look at the restricted set of cases where Jack and Jim still have—even
586 though Jack is undergoing process F —the same set of mental states. That
587 is, we need to consider cases where Jack is currently undergoing the first or
588 only basic step that (partly) constitutes his undergoing process F . In this case,
589 however, I will argue in the next section, it is implausible that Jack deserves
590 more normative credit than Jim.

594 **4 Against process-requirements**

592 Basic steps of undergoing F cannot be decomposed into further mental
593 subprocesses—they can only be broken down into sub-personal processes
594 (see section 3). I assume that such sub-personal processes are *subconscious*,
595 i.e. (as understood here) we do not and cannot realise that we are currently
596 undergoing them.⁸ The rationale behind this assumption is that sub-personal
597 processes (as defined in section 3) are not constituted by mental states
598 anymore—only by sub-mental states. And, we do not have, I assume,
599 conscious access to these sub-mental states.⁹

600 Given my assumptions, it would be highly problematic to give normative
601 credit for Jack's being in subconscious processes and states—the only differ-
602 ence between Jack and Jim.¹⁰ First, it would involve an appeal to a problematic
603 kind of (moral) luck. Given Fink's own assumption, Jack and Jim are identical

8 An elaborate machine monitoring your brain could perhaps tell you that (and hence make you realise that) you are undergoing such processes. But you are not able to realise that you are undergoing a subconscious process via introspection or in the absence of any other extraordinary assumptions.

9 This assumption can be supported by the following consideration. If we had conscious access to sub-mental states (and, thereby, to the corresponding sub-personal processes), I think it is quite reasonable to assume that state-requirements could apply to these sub-mental states. In this case, the argument laid out in section 3 applies. We could (if it seems appropriate) give Jack extra normative credit for undergoing the process F solely in terms of state-requirements. These state-requirements would require Jack (and Jim) to be in some consciously accessible sub-mental state that is reached while undergoing the (first) basic step of F . Hence, if (contrary to my assumption) we have conscious access to sub-mental states and the corresponding sub-personal processes, no process-requirements are needed. In the following, I argue that if (in line with my assumption) sub-personal processes and sub-mental states are subconscious, there is no need for process-requirement as well.

10 One might argue that this set-up conflicts with Fink's description "Jack is deliberately undergoing a process" (see section 2). That is, one might argue that Jack is not undergoing this process *deliberately*. If this holds true, Fink's example would have to be reformulated (without the notion of "deliberately") to include the current case of Jack's undergoing process F .

604 save that Jack is undergoing process *F*. Hence, they have the same capacities,
 605 dispositions, etc. Further, Jack and Jim are in the same mental states. Hence,
 606 whether or not they undergo process *F* is “beyond their control.” It is not due
 607 to their agency that they are descriptively different. It is therefore difficult
 608 to see how we can hold Jack (morally) responsible for being different than
 609 Jim and give him additional normative credit. Of course, Jack could be held
 610 (morally) responsible for something. For example, he can be responsible for
 611 his mental states, capacities, dispositions, etc. that lead to his undergoing
 612 *F*. But the point is that Jim has the same set of mental states and the same
 613 capacities, dispositions, etc. Thus, Jack is not (morally) responsible *for being*
 614 *different from Jim*. If you still want to hold Jack “more moral,” then the nor-
 615 mative difference between Jack and Jim must be the result of a problematic
 616 kind of luck.¹¹

617 Moreover, Jack cannot decide to stop undergoing *F*, because he is not aware
 618 of the sub-personal processes that constitute the fact that he is undergoing *F*.
 619 He does not know that he is currently really undergoing *F*. Hence, he cannot
 620 even deliberately try to reverse the facts (processes) that are supposed to make
 621 him “more moral” than Jim.

622 Because of these considerations, it seems very implausible that there is a
 623 normative difference between Jack and Jim in the current case and, hence, a
 624 need to assume normative process-requirements. Where this leaves us will be
 625 indicated in the conclusion.

625 5 Conclusion

627 According to Fink, only process-requirements allow us to explain the norma-
 628 tive difference between Jack and Jim, where both violate a state-requirement
 629 but Jack is undergoing a process that will (eventually) lead to its satisfaction
 630 and Jim is not. Since it is plausible to give Jack normative credit for under-
 631 going this process, process-requirements seem to have a unique, distinctive
 632 function.

11 Moral luck occurs if “a significant aspect of what someone does depends on factors beyond his control, yet we continue to treat him in that aspect as an object of moral judgment” (Nagel 1979, 26). Jack and Jim’s case would be a case of resultant moral luck, i.e. “luck in the way things [e.g. (mental) actions] turn out” (Nelkin 2019, 5). According to Nagel (1979, 25), moral luck poses a problem because it conflicts with the idea that agents are morally assessable only for what depends on factors under their control. To what extent there can be (certain types of) moral luck is a matter of much debate and cannot be discussed here. See Nelkin (2019) for a helpful overview.

633 I have argued against this notion. My argument appealed to considerations
634 related to (moral) responsibility and (moral) luck. Given the scope of this
635 essay, I cannot address these issues here in detail. I believe, however, that the
636 burden is on Fink to provide further details in order to defend his argument.
637 In any case, I have shown that the set of cases where we would need normative
638 process-requirements, *if* Fink's argument succeeded, is much smaller than
639 one might at first think. We would need them only when one's undergoing
640 a process has not resulted in the formation of new (mental) states to which
641 state-requirements could be applied. To the extent that my argument holds,
642 however, the following claim is true: If there is a difference regarding the
643 normative credit due to Jack and Jim, then this normative difference can
644 be explained in terms of state-requirements. It follows, there is no need to
645 assume process-requirements, at least not on the basis of Fink's argument.*

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PROOF

Perceptual Learning, Categorical Perception, and Cognitive Permeation

DANIEL C. BURNSTON

Proponents of cognitive penetration often argue for the thesis on the basis of combined intuitions about *categorical perception* and *perceptual learning*. The claim is that beliefs penetrate perceptions in the course of learning to perceive categories. I argue that this “diachronic” penetration thesis is false. In order to substantiate a robust notion of penetration, the beliefs that enable learning must describe the particular ability that subjects learn. However, they cannot do so, since in order to help with learning they must instruct learners to employ previously existing abilities. I argue that a better approach recognizes that we can have sophisticated *causal precursors* to perceptual learning, but that the learning process itself must operate outside of cognitive influence.

Mentioning that a human has two legs is useful for differentiating a person from a goat or a toaster, but it is hard to think up further specification that does not degenerate into a long disjunction of special cases. Even if such an expansion were successful, the resulting tome would no longer serve the purposes of efficient communication or [...] instruction. (Brooks and Hannah 2006)

If cognitive penetration occurs, then perceptual experience is affected by the content of cognitive states. This entails that perceptual processes are modified by interaction with cognition.¹ Recently, a number of theorists have argued in favor of the *diachronic cognitive penetration thesis* (dCPT), the view that perception is permeated by cognition in the course of perceptual learning

¹ There are a variety of ways of describing this relationship: perceptual representations must bear a “logical relationship” to knowledge (Pylyshyn 1999); perception uses cognition as an “informational resource” (Wu 2013); there is an “inferential” relationship between cognitive states and the outputs of perception (Brogaard and Chomanski 2015). These characterizations are highly ambiguous (Burnston 2017a), but I will take them as read here.

(Cecchi 2014; Siegel 2013; Stokes 2021; Stokes and Bergeron 2015). The argument for the dCPT is abductive, and is based on an *enabling* claim. The idea is that there are certain kinds of contents, particularly those corresponding to kinds of objects, that perception on its own lacks the capacity to represent, but that interaction with cognition eventually enables them to do so.

It has recently been pointed out that the notion of “penetration” has generated connotations (Ransom 2020). In what follows, I will use “permeation” instead, but I mean to reference the same thesis philosophers have investigated (so, the thesis under consideration is the diachronic *permeation* thesis, with the same acronym). My aims in this paper are to articulate the commitments of the dCPT, to raise problems for the view, and to propose an alternative for the possible role of beliefs in perceptual learning. In particular I argue that, if the dCPT is true, then category-specific beliefs must be held *prior* to perceptual learning and must *specify* the learned perceptual content. If these conditions are not met, then another thesis is more plausible, namely that cognitive states serve as *causal precursors* to a purely internal process of perceptual learning. I will argue for the second position, enlisting current perspectives from the psychology of perceptual learning.

In section 1, I’ll flesh out the dCPT in more detail, and articulate the priority and specificity conditions. In section 2 I’ll discuss perceptual learning, and argue for the minimal claim that category-relevant perceptual learning *can* occur without cognitive permeation. Section 3 then raises objections against the dCPT, the key move being to question whether the enabling role posited for beliefs posited by the dCPT is in fact incompatible with their fulfilling the specificity condition. In order to guide learning, I argue, beliefs must describe contents that subjects can *already perceive*. But if that is so, then they cannot describe the novel contents learned. Section 4 considers and rejects ways of weakening the dCPT to avoid this argument. Section 5 concludes.

7201 The dCPT

1.1 The dCPT

Cognitive permeation is an *explanatory* thesis. The idea is that there are perceptual differences amongst perceivers, or within a perceiver over time, and the best explanation for those differences is that the contents of cognitive states have modified perceptual processing. While the thesis itself is internal to the philosophy of psychology, its ramifications are potentially widespread.

727 One reason for these widespread ramifications is the thought that cognitive
728 permeation might be one way in which perception can be *enriched*. If our
729 percepts come to reflect our beliefs or theoretical assumptions, then they rep-
730 resent more about the world than just what they can glean from sensory input.
731 In turn, cognitive permeation has been proposed as one potential explanation
732 for how perception comes to represent higher-level properties, i.e. categories
733 beyond simple perceptual features like shape and color (Siegel 2013). It has
734 been used as one way of explaining the kinds of dispositions developed by
735 skilled performers (Fridland 2015), to account for moral perception (Cowan
736 2014) and, more recently, for a wider range of expertise effects (Ransom 2020;
737 Stokes 2021).² Theorists have gone on to consider the epistemic upshot of
738 enriched perception, arguing both for its potential benefits and its potential
739 detriments for perceptual justification (Siegel 2012, 2017; Stokes 2021).

740 So, the issue of whether cognitive permeation occurs is important for a
741 range of philosophical enterprises. Unfortunately, the extensive debate about
742 cognitive permeation has failed to produce even an agreed-upon definition
743 of the thesis. Theorists disagree on, amongst other things: whether cognitive
744 influence on perception must be direct (Macpherson 2012; Raftopoulos 2015);
745 whether causal interactions between them are sufficient, or whether stronger
746 semantic and computational relationships are required (Burnston 2017a;
747 Stokes 2013; Wu 2017); whether cognitive permeation results in representation
748 of higher-level contents or in changes to lower-level properties (Briscoe 2015;
749 Siegel 2013; Stokes and Bergeron 2015); and, importantly, whether attentional
750 effects count as instances of permeation (Gross 2017; Marchi 2017; Mole 2015;
751 Stokes 2018). Some have even suggested that cognitive permeation should be
752 characterized purely according to its *consequences* for relevant philosophical
753 debates (Stokes 2015).

754 While there are different characterizations of cognitive permeation, one
755 thing should not be up for debate, namely that the truth of the cognitive
756 permeation thesis would be a *surprising* and *transformative* result for our
757 understanding of the mind. The idea is that certain empirical and theoretical
758 considerations force us to give up the intuitive view that changing our beliefs
759 does not change what we perceive (Firestone and Scholl 2016). So, when
760 considering the cognitive permeation thesis, we should ask whether the kind

2 The papers by Ransom (2020) and Stokes (2021) were published while this paper was in sub-
mission. There is considerable commonality between my conclusion and Ransom's. That said, I
focus on slightly different phenomena in perceptual learning than Ransom does, and provide
distinct (if compatible) arguments against the dCPT.

761 of relations discovered between cognition and perception prompt this sort
762 of foundational change to our understanding, or whether more mundane
763 notions can capture the evidence at hand. It is in this spirit that the present
764 paper attempts to assess the issue.

765 One thread of the argument that has been present since early discussion
766 of cognitive permeation is whether it occurs through perceptual *learning*.
767 Churchland (1988) classically argued that, to the extent that perceptual sys-
768 tems were plastic, they were likely to be infiltrated by knowledge, and hence
769 that perception is likely theory-laden. Recent interest in learning has picked
770 back up, as it is one potential explanation for the existence of higher-level
771 content and for perceptual expertise. And there is strong reason to focus
772 on perceptual learning as a test case. For one thing, learning often involves
773 changes in one's beliefs, and therefore is one possible case in which a change
774 in belief could eventuate a change in perception. Moreover, expertise often
775 involves *training*, wherein one intentionally focuses on certain features of
776 examples in order to develop one's abilities. If perception is changed during
777 this process, then it seems a likely case for cognitive permeation.

778 Here as well, however, we find a diversity of views. Perceptual learning
779 itself is defined in different ways, sometimes in terms of generated percep-
780 tual *abilities*—e.g. of discrimination or generalization—and sometimes in
781 terms of changes in perceptual *contents* (Connolly 2014, 2019; Prettyman
782 2019). Some have advanced the position that, for certain instances of percep-
783 tual learning, learning effects are evidence that cognitive permeation occurs.
784 Stokes and Bergeron (2015), for example, cite cases of *categorical perception*,
785 on which learned categories modify perception, as proof that cognitive per-
786 meation occurs during perceptual learning, while Firestone and Scholl (2016;
787 cf. Valenti and Firestone 2019) challenge this view. Others, as mentioned,
788 only take cognitive permeation as one *possible* explanation for perceptual
789 learning (Siegel 2013), or consider that some instances of learning may be
790 instances of permeation and others not (Stokes 2021). And some, indeed,
791 propose that perceptual learning is an *alternative* to cognitive permeation
792 (Arstila 2016; Connolly 2014), i.e. that learning within the perceptual system
793 is an alternative explanation to the permeation thesis.

794 This is a tangled, almost bewildering set of considerations, and I want
795 to remain neutral to as many of them as possible. I assume that genuine
796 perceptual learning occurs, which modifies perceptual representations and
797 results in novel perceptual abilities. I will further discuss evidence that such
798 changes occur at several “levels” of perception, although I will remain neutral

799 on whether the higher levels constitute higher-level contents. (For an extended
800 discussion of the relationship between these representations and the debate
801 on higher-level contents, see [Burnston 2023](#)). The question then is whether,
802 in any of these cases, cognitive permeation is the right explanation of effects
803 in perceptual learning. I will use the language of perceptual representation
804 and perceptual content, but I do not commit in this paper to any particular
805 way of typing contents. Instead, I will try to describe the representations at
806 work as directly as possible.

807 I will assume a broadly semantic conception of cognitive permeation at the
808 outset, and I will consider later whether one can abandon this conception.
809 According to the semantic conception, a specific change occurs within percep-
810 tion and is *explained* by the content of the permeating state. This entails that
811 perception has access to or processes the content of cognitive states ([Wu 2017](#);
812 [Ransom 2020](#)). Further, it entails that the contents of cognition can explain the
813 changes in the contents of perception. That is, perception operates differently
814 after learning, and the reason for *that specific change* is that it has taken the
815 contents of cognitive states into account in modifying its processing. I further
816 presume that attentional mediation is one good candidate for a mechanism
817 that might bring that change about. That is, cognitive instruction to attend to
818 a stimulus in such-and-such a way is one plausible way in which cognitive
819 permeation could occur. The question I will consider is whether, given the
820 empirical data on perceptual learning, cognitive permeation of this sort is a
821 good explanation for that learning.

822 This focus on explanation fits well with the abductive nature of arguments
823 that many proponents of cognitive permeation espouse. After looking at a
824 range of effects, these theorists argue, the best account of changes to percep-
825 tual experience is permeation ([Stokes 2021](#); [Stokes and Bergeron 2015](#)). In
826 particular, I am interested in a variety of *enabling* claim. The idea here is that
827 cognitive permeation—i.e. the resources provided by cognitive contents—
828 allows perception to work in a way that it could not on its own. So, for instance,
829 Stokes and Bergeron argue that, while perception may have evolved a capacity
830 to represent faces, “there is no account to be given about the evolution or
831 plasticity of perception for the Pink Panther or the Coca-Cola icon” ([2015, 16](#);
832 cf. [2015, 325](#)). If perception *itself* lacks the resources to discriminate these
833 categories, then perhaps processing cognitive contents is how perception
834 comes to do so. Similarly, Cecchi suggests that, when perceptual learning
835 occurs during intentional practice at a task, it is because “cognitively induced

836 architectural modulations enable [...] the visual system to perform the [...] task” (2014, 91).

837
838 So, finally, my construal of the dCPT is this. Perception develops novel
839 abilities during the course of perceptual learning, and the explanation for how
840 it does so is that it processes cognitive contents. In the next section I explore
841 the commitments of this kind of view, and articulate an alternative, namely
842 that the role of cognition in perceptual learning is merely to serve as a more-or-
843 less sophisticated *causal precursor* to a purely internal process of perceptual
844 learning. An effect that can be explained as a causal precursor to a change in
845 perception is not sufficient to compel the transformative consequences that
846 cognitive permeation is supposed to have. The position I will argue for is that,
847 although causal precursors can be quite important and specific, the learning
848 that perception does is based solely on interaction with a stimulus-set, not on
849 processing cognitive contents (cf. Ransom 2020).

1502 *Candidates and conditions*

851 Given the enabling role in perceptual learning that is posited for beliefs by
852 the dCPT, the first condition that any potential permeator should meet is
853 what I’ll call the *priority* condition. Since it is the presence of beliefs that is
854 supposed to enable perceptual learning, those beliefs must be ones that the
855 subject plausibly possesses before the content is learned. Meeting the priority
856 condition, though, is insufficient, since there are many kinds of beliefs that
857 could meet the condition but fail to be good candidate permeators. Here are
858 three kinds of beliefs that are poor candidates for implementing diachronic
859 permeation.

860 The first is *essentialist* beliefs. Suppose that you know something about the
861 respective chemical structures of jadeite and nephrite, or the facts about phylo-
862 genetic history that distinguish whales from fish. While the propositions that
863 are the contents of these beliefs are (at least if you’re an essentialist) definitive
864 of the categories to which they apply, the contents of the beliefs themselves
865 have no upshot for how the categories should be *perceived*. Knowledge of
866 chemical structure doesn’t help you perceptually discriminate jadeite from
867 nephrite. Similarly, knowledge about cladistics doesn’t suggest modifying
868 your percepts of whales or fish in any particular way. This is true even if you
869 hold the beliefs prior to learning to perceive the kind.

870 A second poor set of candidates is *demonstrative* beliefs. Suppose I hand
871 you an object of a type you’ve never seen before, and say “this is a glunk.”

872 You might reasonably form the belief that the object you are now holding is a
873 glunk. It is true that the demonstrative “this” *refers* to a particular glunk, but
874 the simple content of the term doesn’t contain the resources to help you learn
875 what’s *perceptually* characteristic of glunks. Indeed, the belief would play the
876 same role *no matter what* glunks in fact look like. Hence, the demonstrative
877 belief doesn’t have the right kind of content to inform perceptual learning.
878 (I’ll discuss this example further in the next section.)

879 A third kind of beliefs, which we might call *denotational* beliefs, have more
880 content than bare demonstratives, but their primary role is still to *pick out the*
881 *category to be learned*. So, suppose you’re about to walk into a room full of
882 objects, and I tell you, “The glunks are on the far left.” This belief might help
883 you figure out which are the glunks, by providing a behavioral instruction to
884 look at some objects rather than others. As in the demonstrative case, however,
885 the content of the belief has no resources to inform the actual perceptual
886 category you might learn. Again, the belief will play the same role no matter
887 what perceptual characteristics actually individuate glunks, and hence cannot
888 inform perception how glunks should be represented.

889 These considerations suggest that another condition is needed, which I will
890 call the *specificity* condition: a candidate permeator must have sufficiently
891 specific content to inform the *particular perceptual content* that is learned.
892 A belief that meets the priority condition but not the specificity condition, I
893 suggest, is best construed as a *causal precursor* to an instance of perceptual
894 learning. A belief or other cognitive state’s being a causal precursor to a
895 percept, nearly everyone acknowledges, is not sufficient to make that belief
896 a permeator of the percept. Suppose you know that a particular bird nests
897 only on sheltered alcoves atop very high mountain ranges. This knowledge,
898 along with some sophisticated knowledge about how to climb mountains,
899 might eventuate in your learning to perceive baby birds of that type. But
900 your knowledge of the location of the birds and how to navigate to a place
901 where you can see them does not tell perception anything much about what
902 it should do to recognize that type of baby bird specifically. This is true even
903 if the knowledge is a *necessary* precursor—i.e. if climbing were the only way
904 you could ever gain access to the birds.

905 Importantly, we now have an alternative interpretation of the “enabling”
906 effect of cognitive states on some perceptual process. On this view, enabling
907 beliefs are only causal precursors—they might point you in the direction of the
908 objects-to-be-perceived, but do not permeate the eventual learned perception.
909 Only beliefs that meet the specificity condition in addition to the priority

condition would force us to read enabling effects in terms of permeation. In section 4, I will consider whether a proponent of the dCPT can reasonably give up on or try to weaken the priority and specificity conditions while still offering an interesting thesis. For now, I will assume that both the priority and specificity conditions must be met by any successful candidate permeator.

Given these considerations, the *prima facie* best candidate for a type of belief that might permeate perceptual learning—and the one that I think most defenders of the dCPT have in mind—is *descriptivist beliefs*. These beliefs have as their content the properties, including the perceptible properties, that members of a kind have. Dachshunds, for instance, are long, brown, and short-legged. Maybe the belief that glunks are (say) *large* and *green* has the right kind of content to permeate perceptual learning, even if demonstrative or denotational beliefs do not. This view has some backing: Leslie (2008) has argued that “generic” beliefs about kinds are fundamental to cognition and learning, and generics often have descriptivist content—e.g. “Tigers have stripes.” Reliance on descriptivist beliefs is perhaps the way to interpret Siegel’s claim that we learn to recognize pine trees by coming to believe that they have “certain kinds of leaves and structure” (2013, 715), or Stokes’ claim that we learn to recognize Mondrian’s paintings in virtue of forming beliefs about their “organizational features” (2014, 17). The question is, can these kinds of beliefs meet the priority and specificity conditions?

In the next section I will outline the relevant psychological results on perceptual learning. I’ll argue that in certain instances, perceptual learning of categorical content occurs without cognitive permeation. This will then provide the framework for asking whether descriptivist beliefs in general have the right kind of content to implement the dCPT.

2 Perceptual Learning

In this section, I will describe a current perspective on perceptual category learning.³ The core idea behind the framework is what is called a “morphspace.” Perceptual learning, the story goes, forms categories by differentiating and accentuating *dimensions of perceptual difference* between kinds of objects. According to the morphspace view, each perceptual category corresponds to a “space” defined along relevant dimensions. Dimensions

³ See, e.g. Folstein, Gauthier and Palmeri (2010); Folstein, Gauthier and Palmeri (2012); Gauthier and Tarr (2002); Goldstone (1994); Goldstone and Hendrickson (2010); Goldstone, Lippa and Shiffrin (2001); Goldstone and Steyvers (2001); Gureckis and Goldstone (2008).

943 can either correspond to low-level perceptual features (size, luminance,
944 etc.) or to higher-order relationships between these features. Important
945 higher-order relationships involve configural (arrangement in space) and
946 associational (correlation) relations between lower-order dimension values.
947 Perceptual learning, on this perspective, can both learn novel dimensions
948 and modify extant dimensions. As categories are learned, dimensions can
949 be “morphed” so that intra-category members are seen as closer along the
950 relevant dimensions.⁴

951 While I will not make any explicit claims about higher-level content, the
952 distinction between lower- and higher-order dimensions does show that per-
953 ceptual learning operates at several distinct “levels,” which correspond to
954 novel categories. I do suggest that this kind of learning underlies the kinds
955 of recognitional dispositions that some take to be indicative of higher-level
956 content. My purpose in this section is to argue that this kind of learning *can*
957 operate to develop and modify morphspaces in category-specific ways without
958 cognitive influence. This will allow us to then question whether the dCPT is
959 the best explanation of perceptual learning in *some* cases. For the remainder
960 of the paper, I will refer to novel or modified representations, at whatever
961 level, that underlie category discriminations as “categorical contents,” where
962 this is meant (for now) to be neutral on the higher-level contents debate (but
963 see [Burnston 2023](#)).

964 Studies in categorical perception rely on training with exemplars, either
965 with or without feedback. Studies without feedback show that subjects can
966 form higher-order dimensions through *mere exposure*. Folstein, Gauthier and
967 Palmeri (2010) showed subjects a range of cartoon creatures (see Figure 1),
968 where in the training set there were correlations between different lower-level
969 features—for instance, particular wing shapes and head shapes, as well as
970 particular body and arm shapes, might be correlated with each other, where
971 there was no such relation between (e.g.) wings and legs. Having multiple
972 correlations present in the same stimuli set was done to prevent subjects from
973 forming unprompted, specific beliefs about category-membership. Subjects
974 also performed a distractor task (judging how centered the stimulus was
975 on the screen), which was intended to prevent them from forming category
976 beliefs.

4 This can sometimes correspond to a *loss* of discriminatory capacity *within* a category. In general, perceptual category learning is a generalization and discrimination tradeoff.

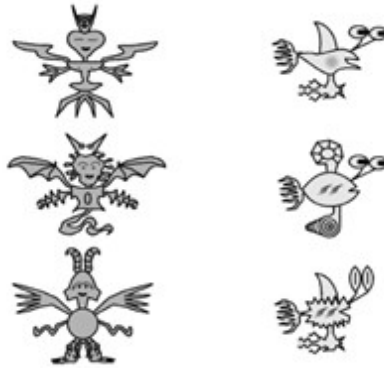


Figure 1: Stimuli from Folstein, Gauthier and Palmeri (2010)

977 In the experiment, subjects were capable of picking up on the higher-order
 978 correlations in the stimuli. This was shown by a secondary task, in which
 979 subjects had to categorize novel examples. If categories in the second task
 980 matched the correlations in the exposure set, subjects learned them more
 981 quickly than if the categories did not match those correlations. If the controls
 982 worked, then subjects were capable of this kind of learning even if they
 983 formed no category-specific beliefs. Folstein, Gauthier, and Palmeri's (2012)
 984 interpretation is that it is possible for perception to form novel higher-order
 985 dimensions purely through "statistical perceptual learning," without influence
 986 from beliefs. Similar results have been shown for other kinds of stimuli (Fiser
 987 and Aslin 2001; Burnston 2020).

988 Importantly for what follows, there are cases where category-specific feed-
 989 back is provided to perceivers, and this feedback plays a role in learning, but
 990 where, I will argue, the feedback does not meet the specificity condition.
 991 Figure 2 is an example from a wide range of studies in which subjects learn
 992 to differentiate objects along *arbitrary* dimensions (Folstein, Gauthier and
 993 Palmeri 2012; Goldstone and Steyvers 2001; Gureckis and Goldstone 2008;
 994 Jones and Goldstone 2013). The experimenters created a morphspace of faces
 995 by taking four distinct faces, and creating exemplars (each square in Figure 2)
 996 that continuously blended each of their features. Subjects in these studies
 997 were shown exemplar pictures, and told whether each was an "A" face or a

998 “B” face, where As and Bs were defined according to the arbitrary vertical line
 999 in the center of the space.

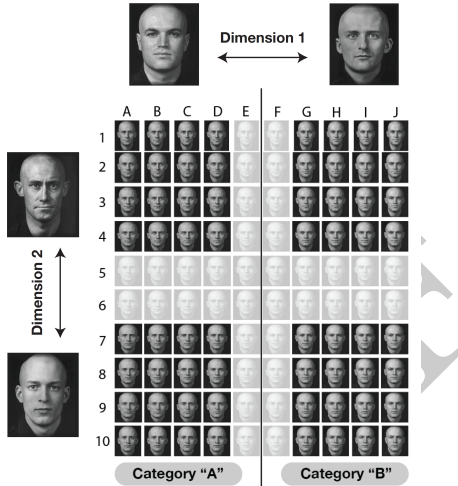


Figure 2: From Gureckis and Goldstone (2008).⁵

1000 A variety of results from this kind of paradigm suggest that subjects learn
 1001 to differentiate the novel dimensions of the space. For instance, after learn-
 1002 ing to make the discrimination, the dimensions transfer to new stimuli and
 1003 categorizations (Goldstone and Steyvers 2001), such that subsequent discrim-
 1004 inations along the previously learned dimension are easier than along other
 1005 dimensions. Moreover, these learned representation affect *similarity judg-*
 1006 *ments*. Across a range of types of similarity judgment, subjects tend to treat
 1007 within-category members as more similar to each other after training than
 1008 they did before training. In the example from Figure 2, this involves differenti-
 1009 ating and then morphing the category-distinguishing horizontal “Dimension
 1010 1.”

1011 Hence, in this and other cases, perceptual learning both forms novel dimen-
 1012 sions and stretches the morphspace along those dimensions to accentuate the
 1013 difference between categories. But this kind of learning also modifies repre-
 1014 sentations of lower-level features. Consider two cases. On one, subjects might

5 Image courtesy of Rob Goldstone.

1015 learn to accentuate discriminations made along already differentiable lower-
 1016 level dimensions. On the other, subjects might learn to differentiate *between*
 1017 lower-level dimensions that they could not previously tell apart. Goldstone
 1018 (1994) investigated both types of changes.

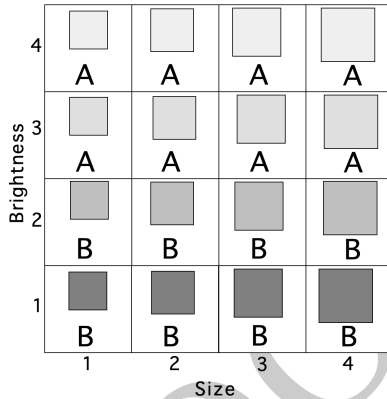


Figure 3: A morphspace for lower-level properties. From Goldstone (1994).⁶

1019 As shown in Figure 3, Goldstone (1994) constructed a simple morphspace
 1020 of squares comprising two lower-level dimensions, brightness and size. He
 1021 then tested a variety of different categories defined in the space. For instance,
 1022 size might be relevant and brightness irrelevant (i.e. drawing the categorical
 1023 line between 2 and 3 on the x-axis) or vice versa (i.e. drawing the categorical
 1024 line between 2 and 3 on the y-axis). Take just the brightness-relevant, size-
 1025 irrelevant case. In this case, subjects learned, through feedback of the type
 1026 discussed above, which squares belonged to which category. After training,
 1027 their discriminations along the brightness dimension were *heightened* while
 1028 their discriminations along the size dimension were *diminished*. That is, they
 1029 became more sensitive to differences between levels of brightness and less
 1030 sensitive to differences between sizes.

1031 Goldstone (1994) also created a morphspace of squares based on levels of
 1032 brightness and *saturation*, rather than size. What is interesting about this case
 1033 is that, while brightness and saturation can be independently manipulated
 1034 by an experimenter, subjects do not normally perceive them independently.

6 Image published with permission from author.

1035 That is, they cannot selectively attend to one rather than another, or make
1036 discriminations along one independently of variation in the other. Goldstone
1037 trained subjects in a similar way on these stimuli, separating them into cat-
1038 egories based on either brightness or saturation, and training subjects on
1039 exemplars with feedback. Somewhat amazingly, subjects *do* in fact begin to
1040 differentiate the dimensions, showing similar (although smaller magnitude)
1041 learning effects as in the brightness and size case.

1042 So, learning can both differentiate new dimensions, and modify existing
1043 dimensions to notice and accentuate category differences. There are now two
1044 questions to pursue. The first is whether the subjects' new representations
1045 can be considered genuinely perceptual, and then the second is whether they
1046 are cognitively permeated.

1047 I suggest that there are two sets of interlocking reasons to consider the
1048 learned abilities here as due to changes in perceptual representation. First,
1049 notice that it is possible to form these representations *absent* category-specific
1050 beliefs. In the mere exposure case of Folstein, Gauthier and Palmeri (2010),
1051 subjects have no prior beliefs about what will constitute the categories, and the
1052 control task and multi-associational structure are set up specifically to prevent
1053 subjects from forming those beliefs during learning. If these manipulations
1054 work, then perception can learn categorical content even with no relevant
1055 beliefs about the category.

1056 Moreover, even when subjects are asked to reflect on their category judg-
1057 ments and describe them, their explanations are often coarse grained and
1058 map poorly to the representations that guided their judgments. For example,
1059 Goldstone and Steyvers report that subjects sometimes use abstract language
1060 to describe the categories, including such statements as "Faces in [category
1061 A] were happier" (2001, 135). But this is clearly not specific enough to have
1062 informed their judgments. Subjects presumably can already discriminate happy
1063 from unhappy looking faces, but this is not, prior to training, detailed enough
1064 for them to discriminate *these* categories of faces from each other. Moreover,
1065 Goldstone (personal communication) notes that different subjects sometimes
1066 use similar descriptive language even if they have learned different catego-
1067 rizations, thus proving that their beliefs do not discriminate the categories, or
1068 at least that they are not required to do so in order for subjects to learn the
1069 categories.

1070 The second set of reasons stresses the *structure* of these learned representa-
1071 tions, i.e. their dimensional structure. In these studies, there is a continuous
1072 pattern of variation amongst the conjunction of features that comprise the

1073 examples. What subjects do is learn to represent this pattern of variation,
 1074 suggesting that the representations learned have a kind of *metric* structure
 1075 (Burnston 2017a, 2017b). While it is true that, according to the morphspace
 1076 framework, the dimensions can be morphed to accentuate category difference,
 1077 this morphing is done within the metric structure—that is, what is modified
 1078 is the distance metric between examples along the relevant dimensions, and
 1079 this is what underlies the changes in similarity judgments.

1080 Arguably, representations of this type do not meet some standard conditions
 1081 on concept possession, such as the generality constraint (Beck 2014). If one
 1082 thinks that a way of distinguishing the conceptual from the non-conceptual
 1083 is in terms of the structure of representations, and thinks further that the
 1084 way to distinguish the perceptual from the cognitive is in terms of the concep-
 1085 tual/non-conceptual divide, then one will be strongly motivated to view these
 1086 representations as perceptual.⁷

1087 Moreover, this way of thinking corresponds with some traditional motiva-
 1088 tions in the non-conceptual content literature, which has historically focused
 1089 on perceptual content. Notice that subjects develop the ability to apply new
 1090 categorical concepts demonstratively—e.g. “that’s an A face.” But, this ability
 1091 requires a *previously existing* representation which serves as the ground for
 1092 that demonstrative reference (see further discussion below). This kind of
 1093 point has been used by defenders of non-conceptual content to combat the
 1094 idea that all perceptual content requires demonstrative concepts (Roskies
 1095 2010).

1096 I consider these reasons to be mutually supportive rather than decisive.
 1097 But recall the dialectic here—proponents of the dCPT posit genuinely *per-*
 1098 *ceptual* contents which are the result of cognitive permeation. Hence, there
 1099 should be strong motivation for the dCPT proponent to accept these learned
 1100 representations as perceptual. The question, then, is whether these cases are
 1101 instances of cognitive permeation. I suggest that whatever beliefs subjects
 1102 have are inadequate to meet the specificity and priority conditions.

1103 Consider the mere exposure cases first. If the manipulations and controls
 1104 worked, then in this case subjects simply had no category-relevant beliefs prior
 1105 to learning, and the resulting representations could not be due to permeation.

7 Beck (2014) argues that representations of this type can be *cognitive* but *non-conceptual*. He bases this argument on analogue magnitude representations which, he argues, can be abstracted from any particular instance of magnitude judgment. The kinds of representations I am discussing here, conversely, cannot be so dissociated from their instantiations. I discuss this at length in Burnston (2023).

1106 Next, consider the face case, in which subjects do in fact form beliefs during
 1107 the learning process. In particular, based on the feedback, they are in a position
 1108 to form a series of demonstrative beliefs, such as that a particular example
 1109 was an “A” face. In the last section, I suggested that demonstrative beliefs of
 1110 this sort do not have the right kind of content to meet the specificity condition.
 1111 Let’s consider this a little further.

1112 There are two ways of individuating belief contents, narrow and wide.
 1113 Speaking *very* loosely: narrow contents correspond to what the subject is
 1114 prepared to *do* in virtue of a belief—i.e. the effect that the belief has on
 1115 other psychological processes and behavior. Wide contents correspond to the
 1116 extension of the belief. Neither way of individuating demonstrative belief
 1117 contents supports a reading in terms of cognitive permeation.

1118 The narrow content that the demonstrative belief has is very sparse. It
 1119 can only convey something like “treat this as an A face.” Even a *series* of
 1120 demonstrative beliefs of this sort, corresponding to a set of A faces, can only
 1121 result in something like “treat these all as A faces.” But this content has no
 1122 upshot for the *perceptual* recognition of A faces. Knowing that a set of objects
 1123 should be treated as belonging to the same category doesn’t say anything
 1124 about the perceptual space that they share. Moreover, simply forming a series
 1125 of demonstrative beliefs about already-seen exemplars does not, on its own,
 1126 say anything about how the category should be morphed or extended to novel
 1127 exemplars, but this is precisely what the learned perceptual representation
 1128 does.⁸

1129 So, the narrow individuation for demonstrative beliefs won’t secure a result
 1130 of permeation. Wide individuation fares no better. On the wide individuation,
 1131 we could construe the demonstrative belief as conveying the content that the
 1132 particular face is a member of the set of all A faces, where perhaps one defers to
 1133 the experimenter to determine the extension of the belief. That’s nice enough,
 1134 but again simply referring to the set does nothing to inform the ability that
 1135 subjects actually learn, which is to *recognize* that a novel example is a member
 1136 of the set. So, the demonstrative beliefs that subjects might form on the basis

8 Now, I am not trying to deny the importance of labels in general—it has been shown in many instances that labels can provide powerful perceptual/attentional cues (although they do not have to be semantically specific to the object to do so, cf. Lupyan and Spivey 2010). Simply labeling something, however, does nothing to say how that object should be perceived, hence the purely demonstrative function of these beliefs. *After* one can perceive the category, a label can provide a powerful attentional cue, but the label itself does not instruct perception to modify its processes in any particular way (Burnston 2017a).

1137 of these instructions cannot meet the specificity condition. As discussed in
 1138 the previous section, the best way to describe the role of the beliefs is as causal
 1139 precursors. The demonstrative beliefs provide a behavioral instruction to look
 1140 for commonalities among a set of objects. Perceptual learning then does the
 1141 work of actually forming the discriminating representations.

1142 One objection to this view would argue that subjects rely on *tacit* knowledge.
 1143 One might suggest that, in mere exposure cases, the controls were insufficient
 1144 to rule out the forming of tacit beliefs about what individuates the stimuli.
 1145 And, in the feedback case, perhaps subjects develop tacit knowledge about
 1146 how to apply their new concept of an “A face,” that they fail to articulate when
 1147 asked, but which shapes perceptual learning nonetheless. On this objection,
 1148 subjects’ tacit beliefs might permeate perceptual learning in these cases.

1149 I will consider this objection further in section 4. For now, there are two
 1150 points to be made about it. First, it is non-trivial to articulate the tacit knowl-
 1151 edge objection in a way that is not question begging. Recall that proponents of
 1152 the dCPT *must* admit that there are perceptual learning processes that result
 1153 in novel perceptual content. I have suggested here that, at least in important
 1154 cases, these processes can happen without cognitive permeation. Insisting
 1155 that the process *must* be due to tacit beliefs in spite of the arguments above
 1156 sounds suspiciously like a definitional claim that learning must be due to
 1157 permeation. A definitional claim is out-of-keeping with the kinds of empirical
 1158 causal arguments put forward by the proponents of the dCPT.

1159 Second, invocation of tacit beliefs is often motivated by dispositionalist
 1160 concerns, for instance the fact that people are inclined to assent to many
 1161 more propositions than those for which they are likely to have explicit, stored
 1162 propositional representations [e.g. “Neither cats nor dogs are numbers”; see
 1163 Schwitzgebel (2023)]. But dispositionalists are *not* committed to a particular
 1164 underlying psychological nature of the mechanism that produces the dis-
 1165 position, and thus are not inimical to the possibility that the dispositions
 1166 are underlain by perceptual states. Given that neo-empiricist accounts of
 1167 knowledge are at least on the table in cognitive science, it is illicit to simply
 1168 *assert* that the presence of tacit knowledge means there is an influence of a
 1169 propositional state on a perceptual process.

1170 Neither of these points is decisive. All I hope to have suggested here is that
 1171 an appeal to tacit knowledge can’t just be a trump card in this debate. It has to
 1172 be accompanied by specific claims about the contents of those beliefs and how
 1173 they affect perceptual learning. I will give reasons in the following sections

1174 to suggest that the dCPT proponent has no way of formulating this kind of
1175 proposal that will meet the priority and specificity conditions.

1176 Even if you grant me all this, I have only established that cognitive per-
1177 meation doesn't occur *in these cases*. Proponents of cognitive permeation,
1178 however, generally don't insist that perception is *always* permeated, only that
1179 it is *permeable*. That is, they suggest that in *some* cases perception is cognitively
1180 permeated. Perhaps, even if I am right about these cases, cognition permeates
1181 perceptual learning in other cases. Indeed, proponents of the dCPT often
1182 invoke particular kinds or particular types of learning/expertise for which
1183 permeation is a likely explanation of learned categorical content. The per-
1184 ceptual abilities of arborists or art experts might fall into this category, Siegel
1185 (2012, 2013) and Stokes (2014) propose. And Stokes and Bergeron (2015), as
1186 discussed above, suggest that perception cannot, on its own, learn to represent
1187 particularly novel kinds such as cultural icons.

1188 In the remainder of the paper I will question whether, even in cases of
1189 expertise and highly novel kinds, the dCPT is the correct account of how
1190 perception comes to represent categorical content.

1193 **Against the dCPT**

3₂₁ *Setup*

1193 The dCPT posits that certain instances of perceptual modification cannot be
1194 explained by citing purely internal processes of perceptual learning. This is
1195 what underlies the abductive inference that, in certain instances, cases of
1196 perceptual learning must be due to cognitive permeation. As mentioned, one
1197 of the motivations for this view is that learning processes are often highly
1198 mediated—they involve intentional, knowledge-based learning that requires
1199 explicit belief formation and practice. In the previous sections, I suggested that
1200 there *is* empirical evidence that perception can learn to distinguish categories
1201 of objects, and that this involves changes to perceptual representations at
1202 multiple “levels,” but questioned whether this process *must* be a result of
1203 cognitive permeation. I also offered an alternative, on which beliefs are merely
1204 causal precursors for an independent process of perceptual learning.

1205 In this section, I consider whether the dCPT is likely to be the best explana-
1206 tion of perceptual learning, even in cases of novel, socially mediated kinds,
1207 or kinds requiring expert training. Importantly, the morphspace framework
1208 developed above has been extended to artefactual kinds such as cars (Folstein,

1209 Gauthier and Palmeri 2012) as well as to kinds involving developed expertise,
 1210 such as subspecies of birds (Tanaka, Curran and Sheinberg 2005). We can thus
 1211 ask whether, for these kinds of cases, the processes discussed above require
 1212 cognitive permeation. In section 3.2, I seek to loosen the supposedly close
 1213 connection between category knowledge and categorical perception, by sug-
 1214 gesting that our descriptivist beliefs regarding kinds are very frequently *equiv-*
 1215 *ocal* with regards to perceptual categories. In section 3.3, I make a stronger
 1216 argument that the enabling role posited for descriptivist beliefs by the dCPT
 1217 is in fact *incompatible* with their meeting the specificity condition. If I am
 1218 right, then the causal precursor view is the better interpretation of how prior
 1219 beliefs interact with perceptual learning.

3.2 *Equivocal Descriptions*

1221 The dCPT suggests that perceptually learned representations are due to per-
 1222 meation of perception by descriptivist beliefs. Let's start to assess this claim
 1223 by considering the category "Smurfs," a cultural artefact if ever there was one,
 1224 and one that Stokes and Bergeron list as a good case to be explained by the
 1225 dCPT. What kind of beliefs might one have about Smurfs *prior* to learning how
 1226 to perceive the category? Here's one candidate list: "Smurfs are small cartoon
 1227 people"; "Smurfs wear red hats"; "Some Smurfs have beards". (Perhaps one
 1228 forms these beliefs by talking to a neighbor about their kids' favorite cartoons,
 1229 or something.) Alas, this descriptivist content won't discriminate between
 1230 Smurfs and Gnomes of the sort pictured below.



Figure 4: Small cartoon people in red hats.

1231 Anyone with a modicum of experience with these two different cartoons will
 1232 be able to discriminate Smurfs from Gnomes. But, patently, the list above does
 1233 not make a discrimination between these two kinds, since it applies equally

1234 to either case. Hence, this set of descriptivist beliefs, even if it met priority,
 1235 would fail specificity—the descriptivist belief that the learner has is equivocal
 1236 between the two perceptual categories, but the perceiver precisely learns to
 1237 distinguish between those categories.

1238 The natural response here is to posit that learners have more detailed beliefs
 1239 about the categories. One might need the belief that Smurfs are *blue* (although
 1240 one would then need the further clarification that it is their *skin*, and not their
 1241 shirt, that is blue) to pick out the Smurfs rather than the Gnomes. Here is the
 1242 problem with this. The dCPT suggests that perception on its own *cannot* come
 1243 to discriminate the relevant kinds. As such, the view is committed to the idea
 1244 that subjects who do learn the perceptual discrimination have prior beliefs that
 1245 *do* distinguish the categories, since these are what enable the subsequently
 1246 developed perceptual ability. As cases become more fine-grained, this requires
 1247 that the grain of subjects' prior beliefs becomes comparatively more fine-
 1248 grained. The idea that all learners have prior beliefs at the requisite level of
 1249 grain before learning to recognize categories is, empirically speaking, just
 1250 unlikely to be correct. Consider a more-fine grained discrimination between
 1251 “Gnomes” and “Littl’ Bits”:



Figure 5: Gnomes (left) and Littl’ Bits (right).

1252 Despite the significant similarity in terms of their features (they both wear
 1253 pointy hats, the girls wear red dresses, the boys blue shirtsleeves, they both
 1254 have small noses and big cheeks, etc.), anyone who has watched a lot of
 1255 both “David the Gnome” and “The Littl’ Bits” can easily make the perceptual
 1256 discrimination between one and the other. The proponent of the dCPT is
 1257 forced into a pretty awkward stance regarding these categories. They must
 1258 insist that anyone who learns to make this discrimination, *prior to learning to*
 1259 *do so*, has sufficiently fine-grained beliefs to inform the perceptual categories.
 1260 I submit that, in my own case, this is not what happened. At least, it certainly
 1261 wasn’t the case that, when I was four years old, anyone sat me down and gave
 1262 me a thorough list of things to look for before I learned how to recognize

1263 these categories. The proponent of the dCPT is forced into trying to articulate
 1264 a process by which novice perceivers come by very fine-grained perceptual
 1265 beliefs prior to learning, or they must admit that perceptual learning forms
 1266 the discriminating representations on its own, at least in many cases.

1267 If perception *can* learn to discriminate these categories, at least in many
 1268 cases, absent permeation, the inference to the best explanation posited by
 1269 the dCPT is strongly questioned. On the other hand, the view that beliefs
 1270 are important causal precursors to perceptual learning, I suggest, is fully
 1271 compatible with the datum that our descriptive beliefs are often equivocal
 1272 between kinds that we can easily discriminate perceptually, at least after
 1273 some learning. Consider the beliefs one is actually likely to have prior to
 1274 category learning in everyday contexts. Sure, this set may include some beliefs
 1275 describing general perceptual features. But it is also likely to include beliefs
 1276 about when and where to find the objects. One might know, for instance,
 1277 that *The Smurfs* is on Nickelodeon at 4, whereas *David the Gnome* is on at 5.
 1278 This could help you discriminate the objects without requiring fine-grained
 1279 descriptivist beliefs that meet the specificity condition.

1280 What I am ultimately suggesting is that descriptivist beliefs are just *another*
 1281 *variety* of denotational beliefs. Just like I might say, “Glunks are the objects on
 1282 the left,” I might say, “Smurfs are the little cartoon people in red hats that are
 1283 on Nickelodeon at 4.” What each set of beliefs does is help you *locate the set of*
 1284 *objects to be learned*, so that these can be treated as exemplars for the category.
 1285 But to play this role, all descriptivist beliefs have to do is enable you to sort the
 1286 Xs from the non-Xs. And so long as the beliefs are descriptive *enough* to sort
 1287 the exemplars appropriately, they will do the job. That is, they can do the job
 1288 without specifically describing how Xs should be represented perceptually.
 1289 As with the birds-on-top-of-mountains example discussed in section 1, this
 1290 prior knowledge can play an important role in learning, but doesn’t need to
 1291 do so via describing to perception the content it should learn. A similar point
 1292 goes for guided attention. All that one has to do attentively is focus on the
 1293 right objects so that perceptual learning can go to work, and if I am right,
 1294 then that’s all that descriptivist beliefs do. (This is the point of the quote in
 1295 the epigraph from [Brooks and Hannah 2006](#)).

1296 This is true even when descriptivist beliefs are very specific. Return again
 1297 to Figure 5. You may or may not have noticed that Littl’ Bits, but not Gnomes,
 1298 have little red dots on their cheeks. My telling you this might indeed help you
 1299 look at them and say “Ah, ok, these are the Gnomes and these are the Littl’
 1300 Bits.” But notice how far short the content of the dotted-cheeks belief comes

1301 of describing the *perceptual* category learned, at least if the morphspace
 1302 view is correct. If the morphspace view is correct, then what is definitive
 1303 of the *perceptual* category of Littl' Bits is not just their red cheeks—it's a
 1304 complex set of correlations and configural relationships between lower-order
 1305 properties (the shape and spacing of facial and bodily features, etc.). *This*
 1306 content, however, is not described by your knowledge of red cheeks. Again, it
 1307 has served as a (albeit important) causal precursor to perceptual learning.

1308 All I have established so far, however, is that in many quotidian cases we
 1309 can expect descriptive beliefs to fail to be fine-grained enough to describe
 1310 learned perceptual content, and hence to deny the view that perception on its
 1311 own cannot learn to discriminate categories. In many ways, expertise-through-
 1312 training is the best case for the dCPT theorist. In these kinds of examples,
 1313 learners are often specifically encouraged to look for certain features of the
 1314 objects that fall within categories. In the next subsection, I offer an argument
 1315 that even this apparently obvious case is misleading. Indeed, I will suggest
 1316 that the enabling role posited by the dCPT is actually *incompatible* with
 1317 descriptivist beliefs meeting the specificity condition.

3.3 An Incompatibility Argument

1319 The kind of argument I take to most strongly speak against the dCPT suggests
 1320 that, precisely *because* of the enabling role posited for descriptivist beliefs
 1321 by the dCPT, they cannot meet the specificity condition. Put informally, the
 1322 concern is this. Learning requires leveraging *extant* abilities in service of
 1323 developing new ones. Training and expertise indeed involve describing the
 1324 objects to be recognized, but in order to help the trainee, these descriptions
 1325 must tell subjects what to *do*. That is, they must invoke them to focus on certain
 1326 objects or properties they can *already* perceive, on pain of being unhelpful
 1327 for learning. But if descriptions name already-perceivable content, and what
 1328 subjects learn is *novel* perceptual content, then the specificity condition cannot
 1329 be met. (This is, basically, a variety of Meno's paradox for the cognition-
 1330 perception interaction.) Here is the argument in more formal gloss:

- 1331 (1) If the dCPT is true, then prior descriptivist beliefs that meet the speci-
 1332 ficity condition enable perceptual learning.
- 1333 (2) In order to enable learning, descriptivist beliefs must have as their
 1334 content perceptual features that subjects can already perceive.
- 1335 (3) Perceptual learning results in novel perceptual content.

1336 (4) Novel perceptual content is distinct from content that subjects can
1337 already perceive.

1338 Therefore,

1339 (5) The content of the beliefs that enable learning is distinct from the
1340 perceptual content that is learned. (From 2 and 4)

1341 Therefore,

1342 (6) It is not the case that prior descriptivist beliefs that meet the specificity
1343 condition enable learning particular perceptual categories. (From 5)

1344 Therefore,

1345 (7) It is not the case that the dCPT is true. (From 1 and 6 via Modus Tollens)

1346 The argument hangs on premise (2), and the move from (5) to (6). Premise (3)
1347 is granted by all parties, and premise (4) is trivial. Premise (1) is true so long
1348 as the dCPT theorist accepts the priority and specificity conditions. Step (5)
1349 follows from the lack of identity from learned to novel content, (6) from that
1350 claim plus a strong version of specificity, and then (7) is a simple deduction.
1351 This section will focus on premise (2). I will then consider in the next section
1352 whether a dCPT theorist might attempt to challenge (1), or the step from (5)
1353 to (6), by abandoning or weakening the conditions.

1354 Premise (2) is intended to drive a wedge between the enabling thesis and
1355 specificity, and show that the two cannot be maintained together. The idea is
1356 simply that any instruction- or belief-based learning must leverage our extant
1357 abilities in the service of generating new abilities. So, if contents of beliefs are
1358 to enable learning, then they must name and enlist already extant perceptual
1359 abilities—my telling you that Smurfs have red hats, big shoes, beards, etc., will
1360 avail you not at all if you can't already perceptually recognize those features.
1361 But if prior beliefs must name features that a subject can already perceive,
1362 and the content they learn is distinct from that content, then the content of
1363 the beliefs cannot be specific to the content that is learned. Let's take novel
1364 dimensions first, and then modifications to already represented dimensions.

1365 Consider the category of A faces from Gureckis and Goldstone's study. There
1366 are a number of features of these faces that subjects can already perceive—
1367 noses, ears, eyes, etc. But naming any of these features, or even a conjunction
1368 of them, is not the same as naming the dimensions that subjects actually learn,

1369 because these dimensions are higher-order ones that capture the configural
1370 and correlational structure of the space. One cannot describe these dimensions
1371 in terms of simple feature descriptions, of the type that subjects are likely to
1372 already be able to perceive. Indeed, it is hard to describe them in simple terms
1373 at all, as evident by the poor job that subjects do in describing the dimensions
1374 they've learned. Thus, descriptivist beliefs that might actually help learning
1375 aren't going to do so by describing the novel contents that perceivers learn.

1376 Similarly, there is evidence that learned perceptual categories *outstrip* de-
1377 scriptive beliefs. Brooks and Hannah (2006) had subjects learn to recognize
1378 a set of cartoon creatures on the basis of a description. They then had them
1379 perform a transfer task on objects that *equally met the description*, but varied
1380 in their overall similarity with the training set. Subjects performed better
1381 when the similarity was high, which showed that their learning outstripped
1382 the descriptions they had been given.

1383 This dynamic is seen even more clearly in the Goldstone case which distin-
1384 guished brightness from saturation. Given that subjects cannot perceive these
1385 dimensions independently, prior to training, simply telling them, for instance,
1386 that category "A" squares are distinguished by their saturation, cannot help
1387 them learn how to discriminate the squares. What should they look for to
1388 see the difference in saturation? Given that saturation, for them, is bound up
1389 perceptually with the orthogonally varying brightness, the instruction doesn't
1390 help. However, with the demonstrative feedback and training over exemplars,
1391 they can learn to differentiate this dimension. The process doesn't *require*, and
1392 indeed would not be *helped by*, descriptions of the category-relevant features.

1393 This leaves us with the best-case scenario for the dCPT theorist, on which
1394 descriptions name already-perceivable features, *and* these features are defini-
1395 tive of the category. So, in the brightness versus size case from Goldstone
1396 (1994), subjects could easily be told that category As are bigger and Bs smaller,
1397 or that As are bright while Bs dark, etc. But, as I suggested at the time, this
1398 seeming content specificity is misleading. The behaviors that are *novel* are
1399 the ability for increased discrimination along these dimensions. But what the
1400 descriptivist beliefs describe—i.e. to sort by size or brightness, is an ability
1401 that the subjects *already had* before that learning. So, while what is learned
1402 is semantically consistent with the instruction, the instruction doesn't tell
1403 perception *how* to represent the stimulus—the novel ability arises due to
1404 the repeated interaction between perception and the stimulus (cf. Ransom
1405 2020). Hence, the content of the descriptivist belief in fact "runs out" before

1406 perceptual learning takes over. (I mean this semantically, not temporally. It is
1407 likely that we continue to use our beliefs to sort during learning.)

1408 Again, there are empirical cases in which this exact dynamic plays out.
1409 Snowden, Davies and Roling (2000) had inexperienced subjects study radio-
1410 graph images, with the instruction that abnormalities in these images show
1411 up as dots. It is well-established that expert radiographers have more fine-
1412 grained perceptual sensitivities than novices in these kinds of stimuli. After
1413 training with the images, subjects in fact showed increased sensitivity—they
1414 could perceive dots at lower levels of contrast than they had before. However,
1415 *failure of transfer* shows that this ability clearly outstripped the descriptive
1416 belief about dots. Subjects who were trained on positive contrast (brighter
1417 than background) dots did not improve on discriminating negative contrast
1418 (darker than background) dots, and vice-versa. But this is just to say that the
1419 ability they learn is not specified by the beliefs they had, since the same belief
1420 resulted in *distinct* abilities (positive versus negative contrast sensitivity) de-
1421 pending on the stimulus. Again, the content of the descriptivist belief named
1422 an already extant perceptual ability (recognizing dots), and it was perceptual
1423 engagement with the training set that actually produced the learning effect.
1424 These kinds of effects have been posited to be relevant to expertise in general
1425 (Brooks and Hannah 2006).

1426 A last, and famous example, is that of chicken sexing. Biederman and
1427 Shiffrar (1987) showed that one could short-circuit the extensive exemplar
1428 training usually required by chicken sexers by (i) showing subjects *where* to
1429 look for the “genital bulb,” which is the distinguishing feature of males and
1430 females, and (ii) telling them that male genital bulbs were *convex* and female
1431 ones *concave*. The fact that performance improves almost immediately has
1432 been taken as a way of arguing that no perceptual learning *at all* occurs in this
1433 case (Pylyshyn 2003). Indeed, as Biederman and Shiffrar note, it is the fact that
1434 the visual system is *already* well-attuned to convexity and concavity that allows
1435 this immediate improvement. What is generally glossed over in discussion
1436 of this case, however, is that performance improved, but not fully to the
1437 level of experts. This is because there are range of specific concave or convex
1438 shapes that experts can discriminate. Rather than suggesting finer-grained
1439 descriptions, however, Biederman and Shiffrar suggest that the instructions
1440 would have to be *combined* with extensive training on exemplars. That is, the
1441 content of the description, and its aid in learning, is exhausted by describing
1442 features subjects can already perceive.

1443 So, I suggest that the enabling role posited for descriptivist beliefs by the
 1444 dCPT is in fact incompatible with their meeting the specificity condition. And
 1445 if so, then the dCPT misdescribes the learning process—the better account
 1446 is one that restricts beliefs to causal precursors. I wish to emphasize that
 1447 the arguments in the last two sections have been about the possible roles of
 1448 descriptivist belief contents, and therefore don't rely on whether the beliefs
 1449 are explicit or tacit. In the next section, I will consider several objections.
 1450 First, I will consider whether a more sophisticated view of tacit knowledge
 1451 could save the dCPT here. Then I will consider whether there is a substantive
 1452 version of the dCPT that could weaken or abandon the priority or specificity
 1453 conditions.

1454 4 Objections

1455 4.1 *Sophisticated Tacit Belief*

1456 One might complain that I have oversimplified the contents of the beliefs at
 1457 play here, by taking them as analogous to simple linguistic descriptions. There
 1458 is an informal and a formal way to cash out this objection. The informal way
 1459 involves noting that, at some level, there is a match in content between the
 1460 prior belief and the resulting perceptual state—both represent the category
 1461 “gnomes.” One might suggest that simply by suggesting that the set of objects
 1462 can be grouped together, the specificity condition is met. Or, one might say
 1463 that there is *more* content to the belief than simply to label a set of objects
 1464 as “gnomes.” Perhaps the “gnome” content carries with it a range of deeper
 1465 connotations that perception can use in learning the category.

1466 These informal responses fail because, along the lines given in section 1,
 1467 they fail to explain how the belief's content could instruct perception how to
 1468 represent the category, and it is just this kind of informational relation that
 1469 is posited in the enabling claim. The first version gives no account of how
 1470 the grouping label informs the specific content that constitutes the percep-
 1471 tual category—that is, the morphspace. The second version, which posits a
 1472 richer content to the “gnome” belief than the ones I've listed, is obscure. One
 1473 would have to theorize about what these richer connotations might be, and,
 1474 if what I have said so far is correct, they cannot consist in any of essentialist,
 1475 demonstrative, or descriptivist beliefs.

1476 The more formal way of pushing the objection would appeal to Bayesian
 1477 and other hierarchical generative approaches to perception to push against my

1478 rejection of tacit knowledge in section 2. While proponents of such views don't
1479 agree on their upshot for cognitive permeation (Brössel 2017; Hohwy 2013;
1480 Vance and Stokes 2017), they do suggest that both perception and perceptual
1481 learning are kinds of abductive inferences that take top-down information
1482 into account. Hence, someone might be tempted to claim that, rather than the
1483 lexicalized beliefs I've been discussing, diachronic permeation comes about
1484 due to the role of top-down knowledge in model-based learning.

1485 Still, however, appealing to tacit knowledge of Bayesian priors in support of
1486 the dCPT runs into problems specifying the content of the tacit beliefs that are
1487 supposed to permeate perception. Consider two possibilities. First, the beliefs
1488 involved in perceptual learning might be descriptive beliefs with probabilities
1489 attached to them [although these kinds of contents have also been attributed
1490 to perception itself; see Morrison (2020)]. So, one might believe that if an
1491 object is a glunk then it is green and round with probability P . This kind of
1492 belief pretty clearly will not solve the problem, since the attached probability
1493 does not add any *perceptual* content to the belief. If "green and round" is
1494 not sufficient to describe novel perceptual contents without the probabilistic
1495 modifier, then having the probability attached does not change anything.

1496 Second, the priors might be couched in a representation that *directly de-*
1497 *scribes the feature space*. In Tenenbaum and colleagues' model of face recog-
1498 nition, for instance, the priors are encoded in a feature-space of lower-level
1499 features such as face shape, pose, and lighting conditions, and conditional
1500 probabilities defined over those parameters constitute a probabilistic repre-
1501 sentation in the face space (Yildirim et al. 2015). But the problem is now
1502 apparent: the feature spaces that define categories in the examples above are
1503 not complete until learning has occurred. So, we can't represent the relevant
1504 category via prior knowledge of the categorically relevant dimensions of the
1505 feature space because, prior to learning, the feature space does not distinguish
1506 the relevant categories. And given the result that perceptual learning *does*
1507 generate novel features and dimensions, the prior knowledge will not describe
1508 those dimensions.

1509 It is thus telling that, when Bayesians model perceptual learning, they often
1510 combine generative Bayesian models with more bottom-up deep learning
1511 ones (Salakhutdinov, Tenenbaum and Torralba 2013; Yildirim et al. 2015;
1512 cf. Buckner 2018). According to Tenenbaum and colleagues, this allows for
1513 "a bottom-up latent variable recognition pipeline for our generative model"
1514 (Yildirim et al. 2015, 2). And this is for good reason—Bayesian models are
1515 limited by their need to enlist "a priori" (read, already known) variables to

1516 describe the domain, whereas bottom-up networks are not. And “committing to the a-priori defined feature representations, instead of learning them
1517 from data, can be detrimental” for novel stimuli or tasks (Salakhutdinov,
1518 Tenenbaum and Torralba 2013, 1).
1519

4²2 Weakening Priority?

1521 We can generalize the discussion of Bayesian models above to assess whether
1522 a proponent of the dCPT could attempt to abandon or weaken the priority
1523 condition. I don’t believe that abandonment is an option, since if X enables Y,
1524 then it seems obvious that X must precede Y. One might attempt to weaken
1525 the condition by positing that beliefs and percepts are developed *in tandem*,
1526 for instance by generating new descriptivist beliefs and checking them against
1527 the data in an iterative hypothesis-and-test method.

1528 This can’t work as a way of defending the dCPT, because the same situation
1529 described in the previous sections would arise in terms of the *generation* and
1530 *confirmation* of the hypotheses. Suppose that values along some dimension
1531 X are definitive of a perceptual category. If one can already perceive X, then
1532 one is in a position to both generate and confirm a hypothesis about category
1533 membership. But in this case, both the generation and confirmation of the
1534 hypothesis are being based on already existent perceptual capabilities, and
1535 not on the generation of novel representations.

1536 On the other hand, suppose you can’t already perceive X. If you cannot
1537 perceive it, according to the morphspace framework, that means you can’t
1538 differentiate it from other dimensions. So it would not be available to you as
1539 a distinct hypothesis from your experience. Now, you might know independ-
1540 ently that there is a dimension X, or someone might tell you about it, or you
1541 might guess that there is one. In this case, you could form the hypothesis “I
1542 wonder if it is X that distinguishes these exemplars,” but since you cannot
1543 discriminate X, you are in no position to tell if it is really X that determines
1544 between examples. The only way you could *perceptually* confirm this hypoth-
1545 esis is by coming to discriminate the dimension. And as suggested above, this
1546 learning is not informed by the descriptivist belief.

4⁴3 Weakening Specificity?

1548 One might be tempted to argue that I’ve foisted too strong a specificity condi-
1549 tion on the dCPT. In particular, the step from (5) to (6) in the incompatibility

1550 argument seems to imply a *very* strong notion of specificity. One might con-
1551 tend that the dCPT theorist can reject the argument by abandoning specificity
1552 (thus rejecting premise (1)) or weakening it (thus denying the move from (5)
1553 to (6)).

1554 Proponents of cognitive permeation are often non-committal about how
1555 close a semantic relationship, in addition to a causal relationship, is required
1556 for an interaction between cognition and perception to count as permeation.
1557 Siegel (2013) is satisfied with the idea that cognitive and perceptual states
1558 might have “close” contents. Stokes (2015) has offered a definition of cognitive
1559 permeation that doesn’t define the notion in terms of content relationships at
1560 all, but instead in terms of whether a causal relationship between a cognitive
1561 state and a perceptual process is “internal” and “mental.” Recently, he has
1562 argued that these kinds of internal connections can be mediated by attention
1563 (2018).

1564 So, the question on the table is whether the specificity condition can be
1565 weakened or simply abandoned. The main worry about this move is that it
1566 risks trivializing the dCPT. We often must have *some* relevant beliefs about a
1567 category prior to learning to perceive it—consider the birds-on-a-mountaintop
1568 case again. Without something like a specificity condition, all of the essential-
1569 ist, demonstrative, and denotational beliefs discussed in section 1 will count.
1570 If one really wants to posit that my knowledge that “glunks are on the left”
1571 permeates my eventual learned perceptual category for glunks, it’s hard to
1572 legislate against it—it’s certainly a logically possible move. However, this kind
1573 of influence on perception is neither surprising nor particularly informative
1574 about cognitive architecture.

1575 The situation looks worse when we think about more general knowledge
1576 of categories. Consider my belief that ostriches are flightless. If I have this
1577 belief before I can perceptually discriminate ostriches, it certainly will provide
1578 some general constraints on how I come to learn to perceive them. I will only
1579 bother, for instance, looking at objects on the ground. (And things can get
1580 worse than that; consider “ostriches are objects.”) If *these* instances count as
1581 permeation, then no one would have disagreed with the dCPT in the first
1582 place.

1583 This suggests that some degree of semantic relevance or coherence is re-
1584 quired for the dCPT to hold. If one wanted to weaken the specificity condition
1585 without abandoning it, one would have to posit some degree of semantic
1586 coherence more strict than the cases above, but more permissive than the
1587 specificity condition. One could, for instance, suggest that the prior beliefs

1588 must describe particular perceptible properties. However, it is highly unlikely
1589 that there is a principled way of drawing this distinction. All of the beliefs
1590 I've mentioned have *some* upshot for perceiving categories—for instance, the
1591 belief that baby birds of a certain type live on mountain tops means something
1592 about the kind of perceptual surroundings they're likely to be found in.

1593 One might go further with this, perhaps by saying that descriptivist beliefs
1594 can only name lower-level perceptual properties that adhere to the bodies
1595 of category members. But the only possible justification for restricting the
1596 candidates this way would be an intuition that these contents are *more specific*
1597 to the perceptual content that's learned. And, given that weakening specificity
1598 is what the dCPT proponent is purportedly trying to do here, that is an odd
1599 move at best.

1600 Lastly, consider purely causal construals, and in particular causal construals
1601 that posit attentional mediation between cognition and perception. I suggest
1602 that the trivialization worry holds in these cases as well. In particular, the
1603 worry about semantic specificity is replaced by a worry about causal specificity.
1604 Suppose that you are going to sit stock-still while I present you a lineup of
1605 objects, and I tell you that the glunks are on the left. You will likely covertly
1606 attend to the objects on the left. And this cognitively-mediated process will
1607 contribute to your ability, with enough practice, to recognize glunks. But if
1608 this is not a sufficiently close relationship in the semantic case, it's hard to see
1609 why it is on a purely causal story either. Similarly, many loosely connected
1610 beliefs might be causally prior to perceptual learning. The causal version
1611 of the dCPT would, similar to the semantic version, have to posit a way of
1612 constricting candidate permeators, or risk trivializing the thesis.

1613 On the contrary, the position that I've defended, on which cognitive states
1614 are causal precursors to purely perceptual learning, need make no arbitrary
1615 distinctions of this sort. There is nothing wrong with causal precursors being
1616 more or less specific, and thus focusing us on more or less particular char-
1617 acteristics and more or less constricted sets of objects. Indeed, our doing so
1618 might play an important role in perceptual learning. It just needn't be done
1619 via permeation.

1620 5 Conclusion

1621 A correct view of perceptual learning should recognize that we do in fact
1622 sometimes have descriptive, demonstrative, and denotational beliefs about
1623 objects prior to learning to perceive them. I'm not entirely sure, as I sit here,

1624 what broccoli rabe looks like. But I am pretty sure that it's green, that it's
 1625 the kind of thing I can find at the grocery store, and moreover that there
 1626 will be a label there to help me fix the demonstrative belief that a particular
 1627 object is an exemplar of that vegetable. However, rather than implementing
 1628 cognitive permeation, employing these beliefs *puts us in a position* to learn
 1629 certain perceptual abilities, by getting us to focus on the right objects, and thus
 1630 provides causal precursors to perceptual learning. Recognizing the capabilities
 1631 of perceptual learning, independent of cognitive influence, shows us that
 1632 we don't need anything more than these precursors to explain the role of
 1633 cognition in in generating new perceptual representations.*

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1815

PROOF

PROOF

The Dis-Unity of Humean Space

RUTH WEINTRAUB

My aim in this paper is to explore some metaphysical and psychological implications of the (contentious) idealist interpretation of the belief in external objects (“bodies”) Hume ascribes to us in the *Treatise*. More specifically, I will argue that the interpretation commits Hume to the claim that space is spatially fragmented, both synchronically and (even more so) diachronically, and renders Hume incapable of allowing for all the spatial thoughts we think we can have. But (perhaps surprisingly) it does not impugn Hume’s view of causation.

The idealist interpretation of Hume is defended, *inter alia*, by Laird (1932, 150), Cook (1968), Bennett (1971, 321, 349), Penelhum (1975, 64), Stroud (1977, 111), Fogelin (1985, 67), Dicker (1998, chap. 5), Noonan (1999, 164), Wilson (2008) and Weintraub (2011). Here, I only explain it.

The term “idealism” is usually used to denote an *ontological* thesis, denying the existence of anything but perceptions (and minds, according to some idealists, Berkeley, for instance). The thesis I impute to Hume, by contrast, is *semantic*: it concerns the *reference* of the words “tree,” “table,” etc. So to avoid confusion, I will use the term “semantic idealism” to denote the view I am imputing to Hume, and whose implications I will discuss. The two theses (the ontological and the semantic) are logically independent. We might be capable of thinking about (even believing in the existence of) material bodies even if there aren’t any. This is an “error theory” about body-terms.¹ Conversely, even if material objects exist, there may be no words in our language denoting them. Of course, it is awkward to state this, because if there are no relevant words, what is it we are supposing to exist? But the difficulty is only apparent. Even if there are no terms in our language denoting (putative) material objects, it is possible to say in it that not everything is a perception.

The distinction between the two versions of idealism is important in the present context. Only the semantic version can plausibly be thought to im-

¹ I borrow the term from Mackie (1977), who claims that our moral terms (“good,” “bad,” etc.) purport to denote moral properties that are too “queer” to exist, although we *think* they do.

1845 pinge on the kinds of thoughts we can have. And Hume is a semantic idealist
 1846 (according to the interpretation I endorse). But he does *not* advocate the onto-
 1847 logical thesis. Indeed, he enjoins us to remain agnostic about things, if any,
 1848 that are not perceptions:

1849 It is a question of fact, whether the perceptions of the senses
 1850 be produced by external objects, resembling them: How shall
 1851 this question be determined? By experience surely; as all other
 1852 questions of a like nature. But here experience is, and must be
 1853 entirely silent. The mind has never any thing present to it but the
 1854 perceptions, and cannot possibly reach any experience of their
 1855 connexion with objects. The supposition of such a connexion is,
 1856 therefore, without any foundation in reasoning. (E 12.12; SBN
 1857 153)²

1858 Here is the second clarificatory remark. Although according to the semantic
 1859 idealist interpretation, both vulgar and “philosophers” identify objects with
 1860 *impressions*, we need, for the purpose of the present paper, to distinguish be-
 1861 tween the beliefs Hume ascribes to them. The vulgar believe—*de dicto*—that
 1862 objects *are* perceptions: an apple, for instance, is a complex impression with
 1863 impressions of colour, taste and smell as (simple) constituents. Indeed, that is
 1864 what they *mean* by the term “apple.” The philosophers believe, at least in their
 1865 reflective moments, in “a double existence internal and external, represent-
 1866 ing and represented” (T 1.4.2.36; SBN 205).³ They “distinguish [...] betwixt
 1867 perceptions and objects, of which the former are suppos’d to be interrupted,
 1868 and perishing, and different at every different return; the latter to be uninter-
 1869 rupted, and to preserve a continu’d existence and identity” (T 1.4.2.46; SBN
 1870 211). According to the semantic idealist interpretation, the independently
 1871 existing “objects” behind our impressions are also impressions (that we do
 1872 not perceive).

1873 Note, next, that the wording in the title is somewhat inauspicious, because
 1874 Hume thinks we cannot talk about spatial points as distinct from bodies.
 1875 “[T]he idea of extension is nothing but a copy of these colour’d points, and
 1876 of the manner of their appearance” (T 1.2.3.4, SBN 34). So talk of the unity
 1877 of *space*, which I will sometimes adopt for ease of exposition, needs to be
 1878 understood as the claim that all the bodies (that ever exist) are *spatially related*.

2 References to the *Enquiry* are to Hume (1999) and to Hume (1975), hereafter SBN.

3 References to the *Treatise* are to Hume (2000) and to Hume (1978), hereafter SBN.

1879 For instance, Rome, London and Paris form a triangle, and ancient Rome is
 1880 located (roughly) between nineteenth century London and modern Cairo.⁴ I
 1881 rely on an intuitive understanding of spatial relatedness, because the notion
 1882 is clear, and I cannot think of a non-circular way of making it more precise.⁵

1883 Here is the fourth clarificatory point. The suggestion that idealist objects are
 1884 not *public*, i.e. that no object can be perceived (at any one time) by two different
 1885 people, has been made in discussions of Berkeley's immaterialist philosophy.
 1886 The claim in which I am interested pertains, instead, to the *unity* of space.
 1887 These questions are logically independent. A space in which intersubjective
 1888 ("public") objects are located may (logically) be fragmented. And, conversely,
 1889 subjective "bodies," perceivable by one person only, may be located in a unified
 1890 space, be spatially related to each other. What I will say about the unity of
 1891 semantic idealist space will have no bearing on the more familiar question—
 1892 the inter-subjectivity of the objects that occupy it.

1893 The structure of the paper is as follows. After considering both kinds of
 1894 spatial unity, synchronic (section 1) and diachronic (section 2), I will conclude
 1895 that in both cases, Hume cannot allow for all the spatial thoughts we seem
 1896 to have, and that semantic idealist space (itself) is fragmented, much more
 1897 markedly in the diachronic case, there being no diachronic spatial relations
 1898 *at all*. This, I will note (section 3), does not entail that there are no causal
 1899 relations, and in particular, does not impugn Hume's causal claims, initial
 1900 appearances notwithstanding.

1901 **1 Synchronic spatial unity**

1902 We all believe that there is a single space in which all extant bodies are located:
 1903 the book that I am now reading, the moon (that I do not perceive now), and

4 It might be thought that diachronic spatial relations are reducible to synchronic ones. Ancient Rome being to the north of modern Cairo concerns the two spatial *sites*, which are co-existent. But, first, talk about spatial sites goes against Hume's relationism about space, his claim that we cannot think of spatial points as distinct from bodies. And, second, the proposed reduction doesn't eliminate cross-temporal spatial relations. To say that ancient Rome was in some presently existing site, S_1 , is spatially to relate two non-contemporaneous sites: that which ancient Rome occupied, S_2 , and S_1 .

5 The suggestion that comes to mind is that in a unified space, there is a *path* between any two points. But what is a "path"? It is not enough that it be possible to reach from any point in it to any other, because that only requires that it be possible to be at the two points at two different times. And this is not the notion I have in mind. To require that two points in a path must be spatially related is to render the definition circular.

1904 the apple I am munching, to name but a few. In this section, I will consider the
 1905 spatial relatedness of this (largely unperceived) totality of coexisting objects
 1906 from a Semantically Idealist perspective (section 1.1), and the spatial thoughts
 1907 Hume's semantic idealist can allow us to have (section 1.2).

1908 *Metaphysics*

1909 The intuitive view is that space is synchronically unified. This view can be
 1910 upheld if, as Jackson (1977, 81–87) thinks, perceptions are spatially located
 1911 in *physical* space, alongside physical objects. They then derive their spatial
 1912 relations (and spatial unity) from it: physical objects are all spatially related to
 1913 one another. So if, for instance, perceptions are located in retinas, which are
 1914 physical objects, they are spatially related to one another through the spatial
 1915 relations between their respective retinas.

1916 As Anderson (1976) notes, Hume sometimes talks in this vein. In explaining
 1917 how we acquire the idea of extension, he suggests that ideas are located in
 1918 the brain: “the mind is endow'd with a power of exciting any idea it pleases;
 1919 whenever it dispatches the spirits into that region of the brain, in which the
 1920 idea is plac'd; these spirits always excite the idea, when they run precisely into
 1921 the proper traces” (T 1.2.5.20; SBN 60–61).

1922 In a similar vein, when he explains how malice and envy are aroused (T
 1923 2.2.8.3; SBN 372), Hume suggests that “the image and idea of the object are
 1924 [...] equally extended in the retina, and in the brain or organ of perception.”

1925 But the intuitive view cannot be taken for granted from the semantic idealist
 1926 point of view. Here, the retina isn't *physical*: it is an *impression* of a retina.
 1927 And if an image of a house (say) is located in a retina-image, this simply
 1928 means that an image of a house is a part of an image of a retina. And this does
 1929 not give the semantic idealist a way of relating perceptions spatially, their
 1930 being located in retinas notwithstanding. For *that*, we need to be told how the
 1931 house-image is spatially related to a tree in a *different* perception, which the
 1932 fact that they are both located in retina-images doesn't determine.

1933 So there is a serious question pertaining to the synchronic spatial unity of
 1934 semantic idealist space. In response, I argue for two claims. First, the objects
 1935 any one person perceives by touch or sight at any one time are spatially related
 1936 to one another. The restriction to two sense modalities is required because
 1937 Hume thinks only these two kinds of perceptions are spatially located. He
 1938 says “an object may exist, and yet be no where” (1.4.5.10; SBN 235). Tastes,

1939 smells and sounds are not spatially located. Second, not all extant objects that
 1940 *are* spatially located are spatially related; space is synchronically fragmented.

1941 In arguing for the first claim, I need to rebut the suggestion, made by several
 1942 commentators, that Hume is committed to thinking that *no* two coexisting
 1943 bodies are spatially related. Thus, Huemer, who, like Hume's semantic idealist,
 1944 rejects the suggestion that perceptions are spatially located in physical space,
 1945 concludes that we must invoke material objects in order to account for the
 1946 spatial nature of our experience. "In perception," he reasonably claims, "[we
 1947 are] aware of things with spatial properties (things with shapes, sizes, and
 1948 spatial relations to each other)" (2001, 150). And, Huemer continues, since
 1949 these are not perceptions located in physical space, they must be material
 1950 objects. Since the semantic idealist denies their existence, he cannot account
 1951 for the spatial nature of our experience.

1952 Huemer's reasoning is specious. The semantic idealist may invoke spatial
 1953 relations *within* perceptions by way of spatially relating perceived "bodies."
 1954 Indeed, this is Hume's strategy. He thinks many minimally visible points are
 1955 simultaneously and adjacently coexistent in our perceptual field: "my senses
 1956 convey to me [...] the impressions of colour'd points, dispos'd in a certain
 1957 manner" (T 1.2.3.4; SBN 34). Again:

1958 The perception [of the table] consists of parts. These parts are so
 1959 situated, as to afford us the notion of distance and contiguity; of
 1960 length, breadth, and thickness [...] the very idea of extension is
 1961 copy'd from [...] an impression, and consequently must perfectly
 1962 agree to it. To say the idea of extension agrees to any thing, is to
 1963 say it is extended. (T 1.4.5.15; SBN 239–240)

1964 Costa (1998, 79) elaborates: "For an idea to represent space it must resemble
 1965 space, and to do that it must itself be an instance of the spatial relation, i.e. it
 1966 must consist of ideas that are spatially related. Thus, an idea of space is literally
 1967 spatially extended."

1968 The semantic idealist is not yet home and dry. The claim that there are
 1969 spatial relations within Humean impressions is contested. Green (1874, 205)
 1970 and Annand (1930, 589) impute to Hume the claim that *no* two impressions
 1971 are co-existent. If that were so, we would never have a compound impression
 1972 with simpler constituents spatially related to one another. But the ascription
 1973 is based on a misinterpretation of Hume's claim that "time [...] consists of
 1974 different parts [...] [which] are not co-existent" (T 1.2.3.8; SBN 35–36). The

1975 idea of time depends on there being *some* non-simultaneous impressions: it
 1976 “must be deriv’d from a succession of changeable objects” (T 1.2.3.8; SBN
 1977 36, italics mine). It doesn’t require—and Hume nowhere suggests that it
 1978 does—that *no* two impressions in the temporal order be simultaneous.

1979 Still, even if Hume doesn’t *say* that there are no spatial relations within
 1980 impressions, perhaps he is *committed* to this claim. I find in Kemp Smith
 1981 (1941, chap. 14) an argument in support of the claim that for Hume, spatial
 1982 relations aren’t part of the content of impressions. My interpretation of Kemp
 1983 Smith isn’t the standard one. Garrett (1997, 52–54) interprets these passages
 1984 in Kemp Smith as claiming that our ideas of space and time do not have
 1985 corresponding impressions. And in response, he suggests, echoing Hume
 1986 himself (T 1.2.3.5; SBN 34), that the ideas of space and time are *abstract*:
 1987 “although there is no *separate* impression of space, every spatially complex
 1988 impression is an impression of space [...] every idea of space [...] is an idea that
 1989 has been copied from previous impressions” (1997, 52–54, original italics).⁶
 1990 But this is not to the point as *I* see it. Kemp Smith’s objection, I think, is
 1991 that there are no *individual* ideas which can represent the abstract idea of
 1992 space (and time), since in no impression—and correlatively, in no idea—is
 1993 the spatial arrangement *present*.

1994 I think my reading better fits Kemp Smith’s text. Spatial arrangements of
 1995 simple perceptions “are, Hume is virtually saying, contemplated or intuited—
 1996 ‘viewed,’ ‘taken notice of’ are his favourite expressions—but *are not sensed*.
 1997 They are non-impressional” (Kemp Smith 1941, 274, italics mine). And he
 1998 asks,

1999 [H]ow is it that [Hume] has not taken what would seem to be
 2000 for him the easier and more obvious course, at least as regards
 2001 space—the course usually taken by those who hold a sensational-
 2002 ist theory of knowledge—that extensity is a feature of certain of
 2003 our sensations (those given through the senses of touch and of
 2004 sight), and in consequence sensibly imaged? (1941, 277)

2005 Whatever Kemp Smith’s intention, the argument is one we should consider.
 2006 If sound, it would show that semantic idealist “bodies” (those to which our
 2007 body-terms refer) are *never* spatially related, because on the interpretation
 2008 of spatiality of “bodies” we are considering, spatial relations obtain within
 2009 perceptions (and not between material objects).

6 Falkenstein (1997), too, interprets Hume in this way.

2010 The argument I am imputing to Kemp Smith for the claim that spatial
 2011 arrangements aren't given in perceptions is that Hume himself thinks the
 2012 idea of space (and time) is not "given in the content of any one perception,
 2013 and also does not consist in any mere summation of them. The arrangement
 2014 is over and above the perceptions" (Kemp Smith 1941, 274). Now, the premise
 2015 does not entail that the spatial arrangement of impressions isn't part of the
 2016 content of the complex impression *in addition* to the coloured minima. To
 2017 bridge the logical gap, another assumption is required, which Kemp Smith
 2018 imputes to Hume: "it is in simples, to the exclusion of any supplementary
 2019 factors, *relational* or other, that compounds consist" (1941, 279, italics mine).
 2020 Since (uncontentiously) Hume also thinks that simple perceptions have no
 2021 extension (spatial or temporal), he is committed, according to Kemp Smith
 2022 (1941, 288–289), to the supposition that extension is not given in experience
 2023 (and, by implication, Kemp Smith 1941, 548 thinks, must be *a priori*).

2024 Kemp Smith adduces indirect evidence in support of the attribution to
 2025 Hume of the "composition theory": it was "so little questioned in his day,"
 2026 so much so that Hume holds to it "tenaciously and dogmatically, without
 2027 argument and in the face of contrary evidence" (1941, 279). But in fact, the
 2028 imputation is implausible. First, Gibson, on whom Kemp Smith relies for the
 2029 attribution, ascribes the view to "thinkers of the *seventeenth* century" (1917,
 2030 47, italics mine), and Hume is an *eighteenth* century philosopher. Second,
 2031 the view Gibson ascribes to them does not, *pace* Smith, preclude relations
 2032 as constituents of wholes; it only requires a whole to be the *aggregate* of its
 2033 constituents: two wholes can differ only if they differ with respect to some
 2034 part. So when Locke, who does belong in the relevant period, says (II.xxv.8,
 2035 italics mine)⁷ that relations are "not contained in the real existence of Things,
 2036 but something *extraneous* and *superinduced*," he doesn't mean to suggest
 2037 that a relation isn't *objective*; that it is imposed by us. He means, far less
 2038 pregnantly, that a relation isn't an *intrinsic* property of the relata. And when
 2039 he says (II.xii.7) that a relation "consists in the consideration and comparing
 2040 one Idea with another," he doesn't mean to suggest that the comparison is
 2041 of *our* making. For instance, and closer to home, he says (II.xiii.2) it "is so
 2042 evident that Men perceive, by their Sight, a distance between Bodies [...] as
 2043 that they see Colours themselves." This is in keeping with compositionality if,
 2044 for instance, *a* being to the left of *b* is composed of *a*, *b* and "to the left of."⁸

7 All quotations from Locke are from (1975).

8 Inukai (2010, 22) notes that compositionality doesn't allow for a distinction between asymmetric relations: aRb and bRa have the same constituents, yet one might hold without the other. But

2045 This does not yet show that Hume’s semantic idealist can allow for spatial
 2046 relations within perceptions. If he subscribes to this (less radical) version of
 2047 compositionality, according to which a relation *may* be part of an idea, but
 2048 has to be an idea *itself*, he is still in trouble vis-à-vis spatiality. For, unlike
 2049 Locke, he cannot allow the relational impression *aRb* (“*a* is to the left of *b*,”
 2050 for instance) to include *R* as a constituent impression, in addition to *a* and *b*.
 2051 This is because Hume subscribes to the principle of separability: “Everything
 2052 that is different [...] may be separated” (T 1.2.2.10; SBN 36). In fact, Hume
 2053 invokes several, logically independent, versions of the separability principle
 2054 (Weintraub 2007). According to the version that is relevant here, a perception
 2055 can constitute the entire content of the mind (at a given time); it is a *complete*
 2056 *image*.⁹ Of course, it *may* appear as part of a more complex image, but it
 2057 *needn’t*.

2058 Hume invokes this version of separability, call it *SP*₁, on several occasions;
 2059 for instance, in the argument he adduces (T 1.2.3.9; SBN 36) to show that
 2060 time is not a “distinct idea,” but rather, a “manner” in which perceptions
 2061 “appear to the mind.” Since time cannot “be conceiv’d without our conceiving
 2062 any succession of objects,” Hume argues, “it can[not] alone form a distinct
 2063 idea in the imagination [...]. The idea of time is not deriv’d from a particular
 2064 impression mix’d up with others, and plainly distinguishable from them.” Note
 2065 that a weaker separability principle, call it *SP*₂, according to which any two
 2066 perceptions are separable *from one another*, which Hume invokes elsewhere,
 2067 does not suffice for Hume’s purpose here. “Five notes play’d on a flute give
 2068 us the impression and idea of time.” But five violin notes would have done
 2069 equally well. *Some* sequence of objects is required, but no particular one. So
 2070 we see that Hume is here invoking the stronger separability principle.

2071 The strong separability principle, *SP*₁, prevents relations, e.g. “to the left
 2072 of” from being ideas, and, consequently, *aRb* from having three constituents,
 2073 *a*, *b*, *R*. The weaker principle, *SP*₂, doesn’t here pose a problem for Hume.
 2074 The relation “to the left of” can be separated from any two *specific* *relata* (the

this seems to me a subtle problem of which Locke was unaware. So it doesn’t constitute evidence against the imputation to him of the compositional view.

9 Hume uses the term “image” broadly, as applying to anything which can be given in, or copied from, experience, not just the *visual*. The term “impression” applies to “*all* our sensations, passions and emotions, as they make their first appearance in the soul [...] [and ideas are] the faint images of these” (T 1.1.1.1; SBN 1, italics mine).

2075 table and the chair) when it relates two *other* relata, a pen and a pencil, for
 2076 instance.¹⁰

2077 Locke, by contrast, rejects separability. (Indeed, he rejects both of its ver-
 2078 sions.) “Many ideas require others as necessary to their Existence or Concep-
 2079 tion, which yet are distinct Ideas. Motion can neither be, nor be conceived
 2080 without Space [...] and they are very distinct ideas” (II.xiii.11). So although
 2081 “to the left of” and “roundness” aren’t complete images, they can count as
 2082 ideas for him.¹¹

2083 So Hume is in trouble with respect to the spatial character of our experience
 2084 *if* he subscribes to compositionality. But there is no clear-cut textual evidence
 2085 that he does, and much that tells against its attribution to him. There are some
 2086 passages that might be taken to favour the ascription, but they are compatible,
 2087 I will argue, with the (weaker) ascription according to which each perception
 2088 has simple perceptions as parts, which does not imply that each perception is
 2089 the *aggregate* of simple perceptions. The first passage is Hume’s explanation
 2090 of the distinction between simple and complex perceptions, where he says
 2091 that “complex perceptions [...] may be *distinguished into parts*” (T 1.1.1.2;
 2092 SBN 2, italics mine). This *might* be taken to suggest that a complex perception
 2093 is the *aggregate* of its simple parts. But it can be taken to mean, instead, that a
 2094 complex perception, unlike a simple one, *has* parts, which does not entail that
 2095 it is identical to their aggregate. The second such passage is Hume’s discussion
 2096 of the association of ideas (T 1.1.4.1; SBN 10), where he attempts to account
 2097 for the way simple ideas are combined. The rules constrain the way simple
 2098 ideas unite, so that, for instance, similar ideas tend to be associated. But the

10 Falkenstein (2006, 68) suggests the problem engendered by the separability principle is that it is not clear how a red point can be separated from a blue point if their “manner of disposition” isn’t a distinct impression. By way of a solution, he suggests that there are here three different impressions: the red point, the blue point and the (complex) impression of the red point to the left of the blue one. But the problem engendered by the separability principle pertains to the *relation* and not to the relata. The former cannot exist on its own, whereas the latter two can.

11 Inukai cites another Humean reason against the existence of an impression “to the left of” (2010, 203). She points out that Hume explicitly says that there is no additional impression to the impressions of notes from which our idea of time is derived. Rather, the idea of time “arises [...] from the manner, in which impressions appear to the mind” (T 1.2.2.10; SBN 36). There being no relevant difference between time and space, she argues, Hume would say that there isn’t, in addition to “the impressions of colour’d points disposed in a certain manner” (T 1.2.2.4; SBN 34), another impression from which our idea of space is derived. Although *x* can be to the left of *y*, there is no impression “to the left of.” I think this is not an additional Humean *reason* against an impression “to the left of,” but rather, *textual evidence* for the imputation of the claim to Hume.

2099 rules do not imply that the association of simple ideas is the *only* way of
2100 forming complex ideas.

2101 The final relevant passage is more troublesome for my claim that Hume does
2102 not endorse compositionality. In his attempt to account for our possession of
2103 some seemingly problematic ideas, Hume says that “we do not annex distinct
2104 and compleat ideas to every term we make use of, and that in talking of
2105 *government, church, negotiation, conquest*, we seldom spread out in our minds
2106 all the simple ideas, of which these complex ones are compos’d” (T 1.1.7.14;
2107 SBN 23, original italics). But what matters for Hume here is his claim that we
2108 can bring to mind the constituent ideas of these terms should the occasion
2109 require. And this does not require compositionality.

2110 Here, now, is evidence for the claim that Hume *denies* compositionality.
2111 As is apparent from his discussion of distinction of reason, Hume (sensibly)
2112 thinks whiteness is *somehow* part of the impression of a white globe. He
2113 thinks an impression of a white globe is different from an impression of a
2114 black one: “when a globe of white *maRble* is *presented*, we are [not] able to
2115 separate and distinguish the colour from the form” (T 1.1.7.17; SBN 25, italics
2116 mine). We have an impression of a white globe, but neither the whiteness of
2117 the globe nor its roundness is a constituent impression, because neither is
2118 capable of appearing on its own in the mind.¹² So *contra* Kemp Smith, Hume
2119 *breaks* with the compositional tradition.

2120 The break with compositionality is also manifest in Hume’s view of relational
2121 impressions: “space [...] consists of a number of co-existent parts
2122 dispos’d in a certain order, and capable of being *at once present to the sight* or
2123 *feeling*” (T 2.3.7.5; SBN 429, italics mine). But for any relation, R, the fact *aRb*
2124 includes components (*a* and *b*) without being their aggregate; if it was, there
2125 would be no difference between different relations (“to the left of,” “is taller
2126 than,” etc.). Neither, we have seen, does it have R as a component-perception.
2127 So *aRb* isn’t a *combination* of perceptions. It *includes* simple components, but
2128 isn’t their aggregate. It, thus, has a *non-compositional* structure.¹³

12 The white globe is a complex, extended, image (composed of white *minima*), and can appear in the mind on its own. So can a *single* coloured perception (although it has no shape).

13 Hume’s treatment of the apple example (T 1.1.1.2; SBN 2), designed to illustrate the distinction between simple and complex perceptions, is perfunctory. He says “a particular colour, taste, and smell [...] [are] all united together in this apple.” But he is here contravening his own claim, made subsequently, that the colour of an object *isn’t* an impression, because it cannot appear on its own without some shape. Hume is more circumspect in his attitude to the *shape* of the apple, which he *omits* from the list of its constituents.

2129 I conclude that Hume rejects (albeit implicitly) the “composition theory,”¹⁴
 2130 and this rebuts Kemp Smith’s argument for the claim that he is not entitled
 2131 to suppose that spatial relations are *given* in perceptions. But the semantic
 2132 idealist needs to contend with another threat to his claim that spatial relations
 2133 are given in perceptions. If “to the left of” is not a perception, how can it be
 2134 *present* in a perception? The natural thought here (Garrett 1997, 70) is that
 2135 it is a non-separable *aspect* of the perception. It makes a difference to the
 2136 perception without itself being a perception. But Hoffman (2011, 1139) argues
 2137 that Hume takes the separability principle to hold *universally*, and to apply, in
 2138 particular, to *aspects*: “*Whatever* is distinct, is distinguishable; and whatever is
 2139 distinguishable, is separable by the thought or imagination” (T App. 19; SBN
 2140 634, italics mine). Since aspects cannot exist on their own, Hoffman argues,
 2141 they are not separable. Consequently, they are not distinguishable “by the
 2142 thought,” and we cannot, *pace* Garrett, think of R as a (non-separable) aspect
 2143 of *aRb*.

2144 I needn’t here adjudicate between Garrett and Hoffman. For my purpose, it
 2145 suffices to show that even on Hoffman’s (ontologically more austere) interpre-
 2146 tation, Hume countenances relational thoughts like “*a* is to the right of *b*.” The
 2147 first step in showing this is to note that if he cannot, no more can he counte-
 2148 nance monadic thoughts like “*a* is brown.” If R is not a (non-separable) aspect
 2149 of *aRb*, neither is the brownness a non-separable aspect of the perception of
 2150 a brown *a*.

2151 That this is a very unreasonable view doesn’t show that it is not Hume’s,
 2152 but it puts pressure on us to show that he is *not* committed to it (and Kemp
 2153 Smith isn’t vindicated after all). To this end, suppose, following Hoffman’s
 2154 Hume, not only that there are no colours, over and above objects, but also,
 2155 that there are no “aspects” of objects. Now, consider the statement “Fido
 2156 is brown.” We can represent the statement with a perception of a brown Fido,
 2157 and distinguish between *it* and statements ascribing other colours to Fido.
 2158 Despite his (radical) nominalism, Hume (sensibly) recognises that these are
 2159 all phenomenologically different perceptions. The dispute over the existence
 2160 of aspects, whether separable or not, pertains to the *underlying ontology*; to

14 My (interpretative) claim pertaining to compositionality is restricted to the *Treatise*. In the first *Enquiry*, Hume endorses compositionality. “Complex ideas may, perhaps, be well known by definition, which is nothing but an enumeration of those parts or simple ideas, that compose them” (EHU 7.4; SBN 62). But his endorsement here makes sense, since compositionality is simple and elegant, and is precluded in the *Treatise* by Hume’s allegiance to separability, which he relinquishes in the *Enquiry*.

2161 the sorts of facts in virtue of which statements have the truth-values that they
2162 do.

2163 Similarly, there is a phenomenal difference between *a*'s being on the left
2164 of *b* and *a*'s being on the right of *b*, even if (as the principle of separability
2165 dictates) neither perception has a non-separable aspect, "to the left of" or "to
2166 the right of." There are here two distinct perceptions, representing in thought
2167 two different states of affairs.¹⁵

2168 At the end of this (somewhat tortuous) analysis, I conclude that there
2169 *are* spatial relations within Humean perceptions, so (this is the first claim
2170 I set out to defend) the (visual and tactile) "bodies" each person perceives
2171 at any one time are spatially related to one another. This is fortunate for
2172 Hume the semantic idealist, since a commitment to the denial of this claim
2173 would constitute a strong argument against, a *reductio* of, his science of man.
2174 Evidently, our visual experience has a spatial character.

2175 I move to argue for my second claim, that not *all* visual or tactile coexist-
2176 ing objects are spatially related. The supposition that they are all spatially
2177 related means, from the semantic idealist perspective, that they are all in-
2178 cluded within *one* (visual) impression. This is an adaptation of a suggestion
2179 from Berkeley's ontological idealism, at least as it is sometimes construed.
2180 According to Foster's interpretation of Berkeley,

2181 God has an all-embracing perception of a vast spatiotemporal ar-
2182 rangement of sensible qualities [...] As a result, the arrangement,
2183 though just an idea in God's mind [...] qualifies as our physical
2184 world. It is something which has, in relation to us, the publicity
2185 and externality which our concept of the physical requires. (1982,
2186 30)

2187 Of course, Hume will omit God and invoke only the "vast spatiotemporal
2188 arrangement of sensible qualities."

2189 In determining whether Hume's semantic idealist can allow for this all-
2190 inclusive impression, we should consider separately the vulgar and the philo-

15 Inukai claims that because Hume accepts the separability principle, he is committed to denying the phenomenal reality of relations. Relations only exist, she suggests on Hume's behalf, "at the level of ideas *in the imagination*" (2010, 206, original italics). But her claim is based on the mistaken supposition that Hume accepts compositionality. If relations were a real part of our perceptions, she argues, they would be inseparable perceptions, in violation of the separability principle. But without compositionality, the inference is fallacious. Relations can be experientially real without being perceptions.

2191 sophical beliefs. I start with the former. He clearly *cannot* if all the “bodies”
 2192 that we think exist actually do. The all-encompassing impression must include
 2193 *all* the details of all the extant (semantic idealist) “bodies.” For instance, it
 2194 must include the (visual) impressions of all extant cities. So it is too rich and
 2195 detailed to be had by any human.

2196 Perhaps we shouldn’t assume that all these “bodies” exist. After all, Hume
 2197 thinks that although unperceived “bodies” (that is, impressions) *may* (logi-
 2198 cally) exist, our impressions do not, as a matter of fact, continue to exist when
 2199 they are not perceived: “all our perceptions are dependent on our organs, and
 2200 the disposition of our nerves and animal spirits” (T 1.4.2.45; SBN 211). Hume
 2201 adduces several “experiments” in support of this claim, and their cogency may
 2202 be questioned (Bennett 1971; Wright 1983, 44). Fortunately, we can bypass
 2203 this issue. Even if Hume is right in thinking that only perceived bodies exist,
 2204 the threat to the supposition that there is no impression “housing” all extant
 2205 bodies remains, and the space of extant vulgar “bodies” is not unified. The
 2206 experiments at most show that every extant object is perceived by *someone*.
 2207 And since there are many perceivers, there are too many perceived (visual)
 2208 objects to be included in a single human impression. So although the (visual
 2209 and tactile) objects *each person* perceives are spatially related, vulgar space,
 2210 which includes (visual and tactile) bodies perceived by *some person or another*,
 2211 is not spatially unified.

2212 There is another reason for thinking there is no all-inclusive impression.
 2213 Suppose I am sitting at my desk, seeing it and the things on it. The “bodies” I
 2214 perceive are constituents of a single (complex) impression, and stand in spatial
 2215 relations: the pencil is on the left of the pen, for instance. Suppose, further,
 2216 someone else is perceiving the pen and a bookcase behind me, which I am
 2217 not perceiving. Since the pen, the pencil and the bookcase are all perceived by
 2218 someone, they all exist. So we are looking for an impression that will include
 2219 them as constituents. Remember, the vulgar perceive “bodies” *directly*. “The
 2220 very image, which is present to the senses, is with us the real body” (T 1.4.2.36;
 2221 SBN 205). For instance, when a vulgar person has a table-impression, he is
 2222 directly perceiving what the word “table” refers to when used by the vulgar.

2223 Here, the impediment is not that the requisite impression is too detailed,
 2224 but rather, that no impression in vulgar space can play the envisaged role. An
 2225 impression that includes the bookcase and the pen is (intuitively speaking) an
 2226 image of them as seen from a perspective different from my current one (facing
 2227 one, but not the other). And looking at these two objects from somewhere

2228 else (the door, for instance), the image of the pen will be different from the
 2229 image I have of it now, and will, therefore, constitute a *different* image.

2230 What about the philosophers' space? Hume thinks that the philosophers'
 2231 belief in the existence of unperceived "bodies" is *unjustified*, rather than false:

2232 The only conclusion we can draw from the existence of one thing
 2233 to that of another, is by means of the relation of cause and effect,
 2234 which shews, that there is a connexion betwixt them, and that
 2235 the existence of one is dependent on that of the other. The idea
 2236 of this relation is deriv'd from past experience, by which we find,
 2237 that two beings are constantly conjoin'd together, and are always
 2238 present at once to the mind. But as no beings are ever present
 2239 to the mind but perceptions; it follows that we may observe a
 2240 conjunction or a relation of cause and effect between different
 2241 perceptions, but can never observe it between perceptions and
 2242 objects. 'Tis impossible, therefore, that from the existence or any
 2243 of the qualities of the former, we can ever form any conclusion
 2244 concerning the existence of the latter, or ever satisfy our reason
 2245 in this particular. (T 1.4.2.47; SBN 212)

2246 So we cannot tell for any body-impression had by someone whether the
 2247 impression "behind" it, the "body," exists, and correlatively, whether philoso-
 2248 phers' "bodies" can be "housed" in a single all-inclusive impression. This
 2249 means that Hume is committed to the *undecidability* of the synchronic unity
 2250 of philosophical space. But this is far less significant than his commitment to
 2251 the spatial *disunity* of vulgar space. He thinks the vulgar belief is *predominant*:
 2252 "almost all mankind, and even philosophers themselves, for the greatest part
 2253 of their lives, take their perceptions to be their only objects, and suppose, that
 2254 the very being, which is intimately present to the mind, is the real body or
 2255 material existence" (T 1.4.2.38; SBN 206).

1.2 Psychology

2257 I now move to discuss the psychological question, concerning our ability
 2258 to *think* various spatial thoughts. I will focus on thoughts pertaining to the
 2259 spatial relatedness of *particular* objects: {Paris, London}, {Rome, Moscow,
 2260 Neptune}, {Jerusalem, the cup on my desk, the Eiffel tower, the moon}, etc.,
 2261 and will argue that Hume cannot account for those that involve too many
 2262 objects.

2263 It might be wondered why I do not focus, instead, on the *generalisation*
2264 that all contemporaneous objects are spatially related. The answer is that this
2265 seemingly more natural suggestion is problematic, because it is not clear that
2266 Hume's imagism can accommodate thoughts involving complex structures
2267 such as logical connectives and quantifiers. And the generalisation that all ob-
2268 jects are spatially related engenders a special instance of this problem. Hume
2269 explains how error engendered by (nominalist) thinking with representatives
2270 is typically avoided. If we erroneously generalise from an equilateral triangle
2271 that all triangles are equilateral, the "other individuals of a scalenum and
2272 isoceles, which we overlooked, crowd in upon us, and make us perceive the
2273 falsehood of that proposition" (T 1.11.7.8; SBN 21). But he doesn't explain how
2274 the erroneous thought was possible to begin with, how we could *meaningfully*
2275 "assert, that the three angles of a triangle are equal to one another." The natu-
2276 ral suggestion is that a generalisation, that all dogs are brown, for instance, is
2277 a huge conjunction of statements about individual dogs: that Fido is brown;
2278 that Spot is brown, etc. But this suggestion familiarly fails. The universal belief
2279 (about *all* dogs) cannot be reduced to (defined in terms of) them. One might
2280 believe the generalisation without thinking about any individual dog; indeed,
2281 without knowing even of a single one. I avoid the difficulty by focusing on
2282 spatial thoughts that are not vulnerable to this difficulty so as to highlight
2283 another.

2284 I argued above that there is no (human) impression capable of "housing"
2285 *all* the bodies we think exist (at any one time). And similar reasoning will
2286 rule out impressions "housing" a sufficiently large number of them: all the
2287 world's capitals or denizens, for instance. And the same seems to hold for the
2288 corresponding *beliefs*. Like any Humean belief, they are (sufficiently lively)
2289 ideas, and they are seemingly too "crowded" to be human perceptions. So is the
2290 thought (for instance) that Rome is between Paris and Jerusalem *impossible*?

2291 A positive reply would be worrying. Hume might not balk at the suggestion
2292 that all of our everyday spatial beliefs are *false*. It is not an adequacy condition
2293 on the science of man that it *vindicate* our beliefs; its aim is to *account* for
2294 them. Indeed, Hume might view the falsity of some of our spatial beliefs as an
2295 interesting discovery within his science, akin to his claim that our attributions
2296 of personal identity across time and our belief in the continuing existence
2297 of objects are false. Berkeley, too, attributes to us wholesale error when he
2298 suggests that our ordinary causal judgements are false, because causation
2299 requires agency, and the objects of sense are ideas, which are *inactive* (1710,
2300 sec. 25). The true cause of all event, he thinks, is God. But our *having* these

2301 spatial beliefs is a fact that Hume's science of man ought to countenance, and
 2302 even explain (like our (false) belief in the continued existence of bodies).

2303 The suggestion that naturally comes to mind by way of a Humean response
 2304 is that there is a difference between semantic idealist space itself and our
 2305 (ideational) thoughts about it, a difference that might make possible the
 2306 seemingly problematic spatial beliefs. Consider the thought that Rome is
 2307 between Paris and Jerusalem. Putting together my impressions of the three
 2308 cities engenders an impression that is too rich and detailed to be had by any
 2309 human. But Hume thinks an idea of an object needn't include all the details
 2310 included in its impression. "I have seen Paris; but shall I affirm I can form
 2311 such an idea of that city, as will perfectly represent all its streets and houses in
 2312 their real and just proportion" (T 1.1.1.4; SBN 3)? By means of this rhetorical
 2313 question, Hume makes the point that although he has forgotten many of the
 2314 details present in his original impression of Paris, he nonetheless has an idea of
 2315 it. And, similarly, we cannot have a "just" idea of a mite, because a "just" idea
 2316 has to represent "every part" (T 1.2.1.5; SBN 28), which is impossible, because
 2317 of their "vast number and multiplicity." Yet, we do have an idea of a mite (and
 2318 those of "other objects vastly more minute"), which enables us to think about
 2319 it. Similarly, the thought that Rome is between Paris and Jerusalem doesn't
 2320 require an idea with all the details included in my impressions of the three
 2321 cities, so there is no impediment to my having it.

2322 But even if an idea of Paris may be quite "thin" in comparison with Paris
 2323 itself (i.e. its impression), it seems that an idea cannot represent, even "thinly,"
 2324 *all* the (numerous) cities that I think are spatially related: it would (impossibly)
 2325 have to include at least one detail for each city. So we cannot have spatial
 2326 beliefs pertaining to (sufficiently) many objects.

2327 There are two points worth noting. First, the impossibility is due to Hume's
 2328 theory of ideas, not to his semantic idealism. This means that the problem
 2329 will not arise for a non-imagist semantic idealist. Second, the difficulty is not
 2330 restricted to spatial thoughts. Hume's semantic idealist cannot countenance
 2331 *any* thought that involves a large number of objects. The spatial case is an
 2332 interesting special case of the difficulty.

2332 Diachronic spatial unity

2341 *Metaphysics*

2335 We are here concerned with spatial relations obtaining between *non-*
 2336 *simultaneous* objects. Since we are aiming to discern the implications
 2337 of Hume’s semantic idealism, this means that our question pertains to
 2338 cross-temporal spatial relations between *impressions*. If my impression
 2339 includes the (visual) objects on my desk, they are straightforwardly spatially
 2340 related to one another. But how can the lamp in my T_1 -impression be spatially
 2341 related to the computer in my *subsequent* T_2 -impression?

2342 Here is a suggestion for contending with the problem. Several contempo-
 2343 raneous perceptions may constitute a more complex *single* perception: “a
 2344 particular colour, taste, and smell are qualities all united together in this ap-
 2345 ple” (T 1.1.1.2; SBN 2). So can’t *successive* perceptions count as one, *temporally*
 2346 *extended*, perception? And if they do, won’t there be spatial relations between
 2347 even their non-simultaneous constituents?

2348 The answer to the first question is “Yes.” Hume has a reason for thinking
 2349 that some perceptions are temporally extended: “from the succession of ideas
 2350 and impressions we form *the* idea of time” (T 1.2.3.7; SBN 35, italics mine). For
 2351 instance, the (single) idea of a particular temporal sequence (“I ate and then
 2352 I drank”) is composed of two successive ideas, the first of which represents
 2353 my eating; the second—my drinking. The same is true, *mutatis mutandis*, of
 2354 *general* temporal ideas, “lasting 5 minutes,” for instance. Each is represented
 2355 by some particular idea of a succession (a song lasting 5 minutes, for instance),
 2356 and associated with other (isomorphic) particular successions.¹⁶

2357 The second question, as to whether there are spatial relations between
 2358 non-simultaneous constituents of a temporally extended perception, is much
 2359 thornier. We have granted that some perceptions are temporally extended. Let
 2360 us even allow that each person’s entire perceptual biography constitutes
 2361 one (temporally extended) perception. Does this mean that there are spatial
 2362 relations between its non-simultaneous constituents? The answer, I will now
 2363 argue (at length), is “No.”

16 Like any plurality, a complex perception is taken by Hume to be ontologically inferior: it depends for its existence on that of its constituents. “But the unity, which can exist alone, and whose existence is necessary to that of all numbers, is of another kind, and must be perfectly indivisible” (T 1.2.2.3; SBN 31).

2364 Suppose I have a perception of a ball and then of a pen. The two objects
 2365 in the successive perceptions are not spatially related even if they are con-
 2366 stituents of a single (temporally extended) perception. What *would* allow for
 2367 cross-temporal spatial relations between the two perceptions is some third
 2368 perception spatially related to both. If, for instance, both the ball and the pen
 2369 were directly above a cup, the pen at T_2 would be where the ball was at T_1 .

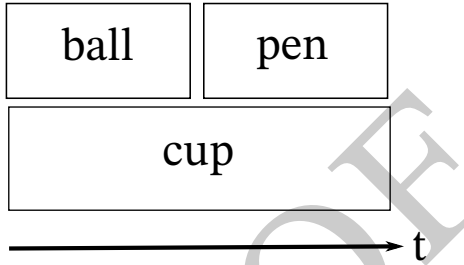


Figure 1: A

2370 But the cup-perception coexists with a succession (the ball-perception and
 2371 the pen-perception). And it is natural to suppose that it must, therefore, be a
 2372 *succession* of (qualitatively identical) perceptions of equally brief durations
 2373 (Price 1940, 46–47; Stroud 1977, 103; Waxman 1994, 200):

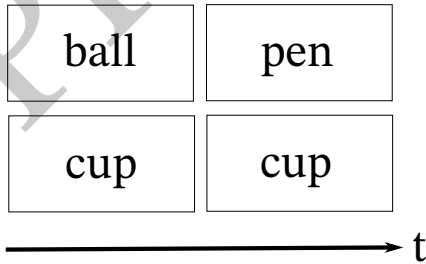


Figure 2: B

2374 But then, it cannot make for cross-temporal spatial relations (between the
 2375 ball-perception and the pen-perception). If we require some external “anchor”

2376 so as to relate the (non-simultaneous) ball-perception and the pen-perception,
 2377 the same is true of the (non-simultaneous) cup-perceptions. That they are
 2378 qualitatively identical doesn't help.

2379 The cup-perception which co-exists with the ball and the pen can make
 2380 for cross-temporal spatial relations only if, as Baxter's (2007, chap. 3) Hume
 2381 thinks, it has no temporal parts, doesn't itself *endure*. I am persuaded by Baxter
 2382 that despite its strangeness, the view of time he imputes to Hume is consistent
 2383 (Baxter provides a formal model), and doesn't contravene our concept of
 2384 time. That something with no temporal parts might coexist with a temporal
 2385 succession is no stranger than was the suggestion that a set can have the same
 2386 size as a proper subset, which Cantor's set theory made respectable. Indeed,
 2387 the (ingenious) proposal Baxter imputes to Hume does to time precisely
 2388 what Cantor did to *size*. By choosing the possibility of mapping one set on
 2389 to another as a criterion for sameness of size, Cantor allows size to violate
 2390 the very intuitive assumption that a set is larger than any proper subset. So
 2391 similarly, by choosing as a criterion for A and B coexisting neither having a
 2392 temporal part that is earlier than all temporal parts of the other, Hume allows
 2393 temporal coexistence to violate the intuitive assumption that coexisting objects
 2394 must have the same number of temporal parts.

2395 But the consistency of Hume's conception does not make for cross-temporal
 2396 spatial relations. The question is whether the (strange) temporal structure *in*
 2397 *fact* obtains. This is a question about the *actual* structure of time, or—in our
 2398 (semantic idealist) context—impressions. *Are* there “steadfast” impressions?
 2399 Suppose I see a ball and then a pen, both above a cup. There are here two
 2400 possibilities as to the temporal structure of my impressions:

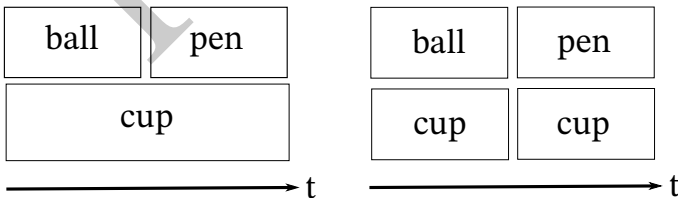


Figure 3: B (left) and A (right)

2401 Which is the correct one? We cannot tell by introspection. True, Hume says
 2402 that “all sensations are felt by the mind, such as they really are” (T 1.4.2.5;

2403 SBN 189), and “[t]he perceptions of the mind are perfectly known” (T 2.2.6.2;
 2404 SBN 366). But elsewhere, he denies that the temporal or spatial structure
 2405 of perceptions is transparent. There is no perceptible dividing line between
 2406 adjacent visual atoms. If there was, it would itself be a perception, contrary to
 2407 the supposition that the two atoms are adjacent. We can tell where one visual
 2408 atom ends and another begins only when they are differently coloured. That
 2409 is why we cannot tell how many points (visual minima) there are in a line,
 2410 and equality of the number of points is “useless” (T 1.2.4.19; SBN 45) as a
 2411 standard for equality of length. It is “difficult for the imagination to break [a
 2412 spot of ink] into its component parts, because of the uneasiness it finds in the
 2413 conception of such a minute object as a single point” (T 1.2.4.2; SBN 42).

2414 But surely, one will protest, if A and B differ *significantly* with respect to
 2415 the number of their atoms, they feel different. In the spatial case, we can tell
 2416 which of two lines is longer when one is markedly longer. “When the measure
 2417 of a yard and that of a foot are presented, the mind [cannot] question, that
 2418 the first is longer than the second” (T 1.2.4.22; SBN 47).

2419 The answer is that the spatial and temporal cases differ. A temporal succes-
 2420 sion, no matter how long, is perceived to be a succession only if its members
 2421 aren’t qualitatively identical: “the idea of duration is always deriv’d from a
 2422 succession of *changeable* objects” (T 1.2.3.11; SBN 37, italics mine).¹⁷

2423 Since the question isn’t decidable by introspection, I submit that we should
 2424 opt for A, because it is much *simpler*. True, there are fewer entities in B. But
 2425 even if (implausibly) Ockham’s razor enjoins us to minimise the number
 2426 of entities (rather than number of *types* of entities), it also bids us to give
 2427 (methodological) weight to simplicity. And B is *structurally* much more com-
 2428 plex. In A, (perfect) coexistence of impressions coincides with sameness of
 2429 number of (non-overlapping) parts.

2430 Not only is Ockam’s razor plausible, Hume subscribes to it (without using
 2431 the label). He says “we must endeavour to render all our principles as universal
 2432 as possible, by tracing up our experiments to the utmost, and explaining all
 2433 effects from the simplest and fewest causes” (T Introduction 8; SBN xii).

17 It might be objected that a sufficiently long temporal succession, even of qualitatively identical perceptions, feels different from a steadfast perception. But this does not help us to decide between A and B. If the steadfast perception of the cup (in B) appeared *on its own*, it would feel different from the corresponding succession (in A). But we are trying to decide between A and B *in their entirety*. And here, because the “steadfast” part of B happens alongside a “changeable” temporal succession (the ball and the pen), the duration we experience may be entirely due to that of the variable succession.

2434 This means that the temporal structure of my impressions isn't the one
 2435 Baxter's Hume allows (perhaps even thinks) it to be. So even if Baxter's inter-
 2436 pretation is correct, and "steadfast" impressions required for cross-temporal
 2437 spatial relations *could* exist, as a matter of fact they don't. I conclude that
 2438 on both interpretations of Hume's view of time, there are no spatial rela-
 2439 tions between non-simultaneous impressions. Humean space is maximally
 2440 fragmented diachronically.

242 Psychology

2442 The falsity of such diachronic spatial thoughts is no skin off Hume's nose:
 2443 he doesn't aim to vindicate common sense. Indeed, it is another interesting
 2444 discovery he makes, showing yet another of our beliefs to be false. But doesn't
 2445 the argument I adduced on Hume's behalf to show that such diachronic
 2446 thoughts are *false* also show that we cannot *have* them? This *would* be a
 2447 problem for Hume, who aims to *account* for human beliefs.

2448 I will argue that there *is* here a problem for Hume, although it is not obvious.
 2449 In our context, ideas differ significantly from impressions. In the case of
 2450 impressions, there is a *tie* between two ways the temporal structure of our
 2451 impressions might be. And simplicity favours the standard structure: each
 2452 temporal atom temporally coinciding with all others with which it overlaps.
 2453 But in the case of ideas, explanatoriness tips the balance in favour of the
 2454 non-standard structure, because only *it* can explain our seeming to have the
 2455 diachronic thoughts.

2456 So Hume can account for our thinking, for instance, that ancient Rome is
 2457 located (roughly) between nineteenth century London and modern Cairo. But
 2458 the diachronic structure of space renders this thought (and others of its ilk)
 2459 *false*. This is not troubling for Hume the idealist. But he *should* be concerned
 2460 by the fact that diachronic spatial thoughts involving *a large number of objects*
 2461 are not possible within his semantic idealist system (because they require
 2462 ideas that are too detailed).

2463 Causation

2464 The fact that there are no diachronic spatial relations seemingly poses a dif-
 2465 ficulty for Hume's invocation of causal claims. Cause and effect, he claims
 2466 in his analysis of causation, must be spatially (and temporally) contiguous,
 2467 or at least linked by an intermediate chain of "causes, which are contigu-

2468 ous among themselves, and to the distant objects” (T 1.3.2.6; SBN 75). And,
 2469 furthermore, causes precede their effects. This means that the requisite conti-
 2470 guity is between objects in *successive* perceptions. But this condition, we saw
 2471 (section 2.2), is never satisfied. The only spatial relations obtain between per-
 2472 fectly simultaneous impressions. This is not a discovery about which Hume
 2473 can be sanguine: it undermines his *own* causal claims, pertaining to the mind.
 2474 For instance, “our impressions are the *causes* of our ideas” (T 1.1.1.8; SBN 5,
 2475 italics mine); resemblance, contiguity in time or place, and cause and effect
 2476 “*produce* an association among ideas” (T 1.1.4.2; SBN 11, italics mine); the
 2477 “mind is *determin’d* by custom to pass from any cause to its effect” (T 1.3.11.11;
 2478 SBN 128, italics mine). Like Hume’s (interpretatively contentious) sceptical
 2479 argument against induction, his semantic idealism threatens to undermine
 2480 his science of man. Indeed, it seems as if the “standard” Hume cannot even
 2481 *think* his causal thoughts about the human mind. Like philosophers’ talk
 2482 about *substance* and *occult powers*, significant parts of the *Treatise* might turn
 2483 out to be *unintelligible*.

2484 Hume wavers in his attitude to the requirement of spatial contiguity. It is
 2485 one of the three conditions he discerns for causation in its analysis. “I find
 2486 in the first place, that whatever objects are consider’d as causes or effects,
 2487 are contiguous” (T.1.3.2.6; SBN 75). But in his discussion of psycho-physical
 2488 causation, he drops the requirement of contiguity. Since being “constantly
 2489 united is *all* the circumstances, that enter into the idea of cause and effect,
 2490 when apply’d to the operations of *matter*, motion may be and actually is, the
 2491 cause of thought and perception” (T 1.4.5.30; SBN 248, italics mine).

2492 Hume seems to have forgotten that in his analysis of causation, he found
 2493 the requirement of contiguity so essential and the idea of action at a distance
 2494 so repugnant, that “when in any particular instance we cannot discover this
 2495 connexion, we still presume it to exist” (T 1.3.2.6; SBN 75). But in fact, he
 2496 adduces spatial contiguity as one of the requirements for causation *tentatively*.
 2497 “We may therefore consider the relation of CONTIGUITY as essential to that
 2498 of causation; at least may suppose it such, according to the general opinion,
 2499 till we can find a more proper occasion to clear up this matter, by examining
 2500 what objects are or are not susceptible of juxta-position and conjunction” (T
 2501 1.3.2.6; SBN 75).


2502 And later, he argues that tastes, smells and sounds “exist no where” (T
 2503 1.4.5.10; SBN 235). And these, of course, are involved in causal relations.
 2504 For instance, a foul smell may cause one to retch, and an unexpected loud
 2505 sound—to jump with fright. So causation does *not* require spatial contiguity

2506 (even if we think that, as a matter of fact, it often goes with it). Hume exploits
 2507 this discovery to vindicate the possibility of psychophysical causation. And we
 2508 can now conclude that semantic idealism does *not* pose a problem for Hume's
 2509 causal claims.

2514 4 Conclusion

2511 The Humean position regarding spatiality that has emerged is the following.
 2512 First, Hume's semantic idealist cannot account for some spatial thoughts
 2513 we seem capable of having, both synchronic and diachronic. And this is a
 2514 problem for Hume's science of man. Second, semantic idealist space (itself)
 2515 is fragmented, much more markedly in the diachronic case, there being no
 2516 diachronic spatial relations *at all*. Hume will view this (metaphysical) implica-
 2517 tion of semantic idealism as an interesting discovery. Finally, because Hume
 2518 does not think causation requires contiguity, his semantic idealism does not
 2519 imply that there are no causes and effects or that his science is replete with
 2520 unintelligible or false causal claims. Neither does it engender a problem for
 2521 our ability to have causal beliefs.*

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PROOF

2608 Boghossian, Bellarmine, and Galileo:
2609 Adjudication and Epistemic
2610 Relativism

WIM VANRIE & MAARTEN VAN DYCK

2611 Many prominent arguments for epistemic relativism take their departure
2612 from the observation that a certain kind of epistemic symmetry is present
2613 in particular empirical cases. In this paper, we seek to attain further clar-
2614 ity about the kind of symmetry at issue, and the sort of relativism to
2615 which such symmetry can reasonably be taken to give rise. The need
2616 for such an investigation is made apparent, we believe, by the fact that
2617 prominent anti-relativist arguments such as that advanced by Boghossian
2618 in his influential book *Fear of Knowledge* (2006) yield distorted pictures
2619 of the matter. Following Boghossian, we present our argument through
2620 a detailed consideration of the dispute between Bellarmine and Galileo
2621 concerning heliocentrism. Contrary to what Boghossian claims, the rel-
2622 evant sort of symmetry does not concern a difference in fundamental
2623 epistemic principles between Bellarmine and Galileo, but rather a much
2624 more localized difference in procedures for adjudication between shared
2625 principles in the novel epistemic circumstances generated by Galileo's
2626 telescopic observations. Bellarmine and Galileo advance fundamentally
2627 different procedures of adjudication that are nevertheless equally ra-
2628 tional. The upshot is not so much the denial that there are absolute
2629 epistemic facts as such, as Boghossian thinks, but rather the denial that
2630 there is an absolute fact of the matter as to which was the most rational
2631 way to proceed: Bellarmine's or Galileo's. What this gives us, is the denial
2632 that there is a *certain kind* of absolute epistemic fact.

2633 Paul Boghossian's influential book *Fear of Knowledge* (2006) has reinvigorated
2634 the philosophical debate on epistemic relativism.¹ In the introduction to his
2635 book, Boghossian characterizes relativism as the idea that "there are many

1 See Baghramian and Coliva (2020) and Kusch (2020) for representative overviews of recent philosophical literature on relativism.

radically different, yet ‘equally valid’ ways of knowing the world, with science being just one of them”—an idea that he claims has been adopted within “vast stretches of the humanities and social sciences” (2006, 2). Boghossian takes it to be the task of analytical philosophers to counteract this, by showing how a careful analysis of this thesis of Equal Validity reveals it to be mistaken or even incoherent.

There are, of course, many versions of epistemic relativism. Our interest lies in relativist positions that take their departure from the observation that a certain kind of epistemic symmetry is present in particular empirical cases, a kind of symmetry that is taken to support a relativistic conclusion. That Boghossian is concerned to address this sort of relativism is apparent both from his choice of targets,² and from his sustained analysis of one prominent such empirical case: the dispute between Bellarmine and Galileo about heliocentrism. Boghossian recognizes that this case has been taken to manifest a form of epistemic symmetry that supports a relativistic conclusion, and seeks to show why this is a mistake.

What is striking, however, is Boghossian’s cavalier way of handling the historical details of the case, to the point of openly admitting that he merely offers “some potted astronomical history” (2006, 59). He relies on an outdated source (de Santillana 1955), and feels free to disregard the historical facts even as reported there: contrary to what Boghossian (2006, 60) suggests, Bellarmine never refused to look through the telescope, but was careful enough to look for himself—as explicitly mentioned by de Santillana (1955, 28)—and moreover to ask the opinion of the expert astronomers at the Jesuit Collegio Romano. It may be the case that there is an unwarranted “fear of knowledge” amongst scholars in the humanities and social sciences, but those scholars could well retort that analytic philosophers should be reminded that there is such a thing as historical knowledge as well—and that there is no need to be fearful of it either.³

Boghossian’s sloppy treatment of the historical evidence has been pointed out before,⁴ but we wish to provide a more sustained investigation of its philo-

2 These targets include such relativists as Shapin, Schaffer, Barnes, and Bloor, whose relativist positions cannot be disentangled from their study of empirical cases.

3 See e.g. Wootton (2007).

4 See e.g. MacFarlane (2008), Kusch (2009), Seidel (2014). Note that our focus on Boghossian’s sloppiness is not meant to suggest that relativists are somehow immune to such sloppy treatment of historical, anthropological, or other evidence. Thanks to an anonymous referee for pressing us on the need to make this point explicit.

sophical significance than has been done so far.⁵ We will argue that a careful consideration of the Bellarmine/Galileo dispute reveals that Boghossian has misunderstood the sort of epistemic symmetry that is at issue, and thereby the relevant thesis of Equal Validity. Contrary to what Boghossian claims, the symmetry is not situated on the level of the fundamental principles of an epistemic system, but rather on the level of the procedures for adjudicating between such fundamental principles.⁶ The relevant thesis of Equal Validity then becomes the thesis that—when faced with a novel epistemic situation such as the one generated by Galileo’s telescopic observations—there may be available fundamentally different yet equally rational procedures for how to adjudicate between epistemic principles in this novel situation. The upshot is not so much the denial that there are absolutely correct epistemic principles as such, as Boghossian thinks, but rather the denial that there is an absolute fact of the matter about which was the most rational way to proceed: Bellarmine’s or Galileo’s. In terms of Boghossian’s initial statement quoted above: the relevant sense in which there may be “different ways of knowing the world” that are equally valid, is quite different from what Boghossian makes it out to be.⁷ As we will explain, this yields quite a different understanding of the sort of reconception of our epistemic rationality that the relativist is after.

We start by discussing Boghossian’s own construal of the relativist argument. According to him, it revolves around the observation that—when we

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- 5 Kinzel and Kusch (2018) have similarly criticized epistemological debates on relativism as suffering from a lack of attention to empirical details. We take our account to be largely complementary to theirs. Whereas we try to make our point by advancing a thoroughgoing internal critique of Boghossian’s treatment of the Bellarmine/Galileo debate, they are more concerned with setting up a general theoretical framework for epistemological relativism in terms of what they call “situated judgment.”
 - 6 Boghossian chose to focus specifically on the Bellarmine/Galileo dispute because it was invoked by Richard Rorty to argue for a relativistic conclusion (Rorty 1979, 328–333). Because Rorty’s use of the case is rudimentary, it is unclear at which level Rorty himself wishes to locate the epistemic symmetry.
 - 7 It is natural to respond that, if the relativist claim as we construe it is not that there are no absolute epistemic facts as such, then it is not, in fact, a *relativist* claim. Our discussion aims to show that the better conclusion to draw is that it is the characterization of relativism as a blanket denial of the existence of absolute epistemic facts that needs to go. The core relativist commitment does not lie in such a blanket denial, but in the sort of thesis of Equal Validity that we will articulate. Note, in this regard, that MacFarlane already pointed out that Boghossian’s thesis of Equal Validity need not rely on the claim that there are no absolute epistemic facts (2008, 398). This reveals that Boghossian’s target is unstable: does he wish to show that there are absolute epistemic facts, or does he wish to argue against Equal Validity? These are not one and the same project. We will return to these issues in more detail below.

2688 are confronted with an alternative epistemic system consisting of a different
2689 set of fundamental epistemic principles—we cannot offer a non-circular jus-
2690 tification of the fundamental principles of our own epistemic system. From
2691 this, the conclusion is to follow that there are no absolutely correct epistemic
2692 principles. Bellarmine’s epistemic system is meant to constitute an example
2693 of such an alternative system. Boghossian argues, however, that Bellarmine’s
2694 system does not qualify because it involves principles of adjudication that are
2695 *ad hoc*.

2696 In this way, Boghossian takes the relevant form of epistemic symmetry to be
2697 situated on the level of a confrontation between the fundamental principles of
2698 different epistemic systems. We argue that a careful analysis of the historical
2699 details of the Bellarmine/Galileo dispute reveals that this misconstrues the
2700 nature of the case: what is at issue in the debate between Bellarmine and
2701 Galileo, is not which fundamental principles to accept (or how to justify them),
2702 but rather the issue of how to *adjudicate* between those principles in the face
2703 of the novel epistemic situation generated by Galileo’s telescopic observations.
2704 The epistemic symmetry lies in the fact that they develop fundamentally
2705 different procedures of adjudication that are equally rational and cannot be
2706 justified in a non-circular way.

2707 Next, we discuss how this deepened understanding of the historical case
2708 problematizes several aspects of Boghossian’s argument. Not only does it
2709 reveal that Boghossian’s somewhat cavalier characterization of Bellarmine’s
2710 procedures of adjudication as *ad hoc* is unfounded, it also reveals that—
2711 for Boghossian’s absolutism to have any bearing on our actual epistemic
2712 practices—it must pertain not only to fundamental epistemic principles, but
2713 also to procedures of adjudication. The relativist thesis of Equal Validity—
2714 once properly understood—does not automatically issue in a blanket denial
2715 of the existence of absolute epistemic facts as such, but rather in a denial of
2716 the existence of a *certain kind* of absolute epistemic facts: facts that would
2717 objectively settle in advance, for any epistemic situation that may arise, what
2718 the uniquely correct procedures of adjudication are in that situation. It is this
2719 absolutist commitment, we claim, that is put under serious pressure by the
2720 historical evidence. Philosophical analyses that identify epistemic systems
2721 with sets of fundamental principles without taking into account the matter of
2722 adjudication, however, are blind to this issue, and thereby blind to the core
2723 relativist concern, as we understand it.

2724 **1 Boghossian on the relativistic argument**

2725 *The argument: circular justifications*

2726 We start by giving a reconstruction of Boghossian’s construal of the relativist
2727 argument. According to Boghossian, the relativist starts by noting that any
2728 argument that we could give for the superiority of our own epistemic system
2729 over alternative ones must rely on epistemic principles that we ourselves
2730 accept, and which therefore belong to the very system we are trying to justify.
2731 Thus, if we *are* confronted with an alternative system, there is a problem: “If
2732 we really do take our confrontation with an alien epistemic system to throw
2733 our system into doubt, and so to call for a genuine justification of that system,
2734 how could we possibly hope to advance that project by showing that our system
2735 is ruled correct by itself?” (Boghossian 2006, 79). Since a genuinely alternative
2736 system is one that rejects our set of epistemic principles, we are stuck in a
2737 vicious circle: we cannot justify our principles without presupposing their
2738 validity, thus begging the question against the proponents of the alternative
2739 system. In such a situation of confrontation, therefore, it is no longer possible
2740 to arrive at justified beliefs about which epistemic principles are correct.
2741 Strictly speaking, this argument does not establish epistemic relativism, since
2742 there might still be absolute epistemic facts, even if we cannot know what
2743 they are. As Boghossian acknowledges, however, there would be little interest
2744 in “an absolutism about epistemic truths which combined that absolutism
2745 with the affirmation that those truths are necessarily inaccessible to us” (2006,
2746 76).

2747 This argument depends on the presence of an alternative system, and it
2748 is here that Boghossian situates the relativist’s invocation of historical cases
2749 such as the Galileo/Bellarmino dispute. As Boghossian sees it, Galileo uses an
2750 epistemic system that is constituted by a number of fundamental principles:
2751 (**OBSERVATION**), (Deduction), (Induction), and possibly (Inference to the
2752 Best Explanation). Let us give the explicit statement of (**OBSERVATION**) as an
2753 example:

2754 **OBSERVATION.** For any observational proposition p , if it visually
2755 seems to S that p and circumstantial conditions D obtain, then S is
2756 *prima facie* justified in believing p . (Boghossian 2006, 64)

2757 That these principles make up Galileo’s epistemic system means that he “relies
 2758 upon them in forming beliefs, or in assessing the beliefs of others” (Boghossian
 2759 2006, 64). These principles are “implicit” in his epistemic practice, he
 2760 operates “according to” them (2006, 65). That these principles are fundamental
 2761 means that their “correctness cannot be derived from the correctness of
 2762 other epistemic principles” (2006, 67). Using these principles, and presumably
 2763 relying heavily on (OBSERVATION) to justify his use of telescopic observations,
 2764 Galileo concludes that the available evidence makes it rational to believe that
 2765 the Earth revolves around the Sun.

2766 Bellarmine, on the other hand, is taken to use an epistemic system with an
 2767 additional fundamental principle:

2768 REVELATION. For certain propositions p , including propositions
 2769 about the heavens, believing p is prima facie justified if p is the
 2770 revealed word of God as claimed by the Bible. (Boghossian 2006, 69)

2771 Using this principle, Bellarmine concludes that it is rational to believe that
 2772 the Sun revolves around the Earth.

2773 Both Galileo and Bellarmine claim that their belief is justified by the avail-
 2774 able evidence, but neither can appeal to any further fact of the matter to justify
 2775 that claim in a way that is acceptable to the other. Boghossian’s relativist now
 2776 concludes—along the lines presented above—that there is no independent
 2777 way to establish whether (REVELATION) is a legitimate fundamental principle,
 2778 so that we must accept that Galileo’s and Bellarmine’s ways of knowing the
 2779 world are equally valid.

2780 Boghossian’s reply to this argument has two main components, which we
 2781 take up in turn. First, he questions the cogency of the inference from the
 2782 presence of fundamentally different epistemic systems to the non-existence of
 2783 absolute epistemic facts (section 1.2). In a second step, he questions not this
 2784 inference, but the premise that Bellarmine presents us with a fundamentally
 2785 different epistemic system (section 1.3).

1.2 Defusing the argument: blind entitlement

2787 To block the inference from the presence of fundamentally alternative epis-
 2788 temic systems to the non-existence of absolute epistemic facts, Boghossian
 2789 invokes what he calls “blind entitlement,” the idea that “each thinker is enti-
 2790 tled to use the epistemic system he finds himself with, without first having to

2791 supply an antecedent justification for the claim that it is the correct system”
2792 (2006, 99). This raises the bar for an alternative system to instill “legitimate
2793 doubt” about our own epistemic system. Such doubt is only legitimate “if we
2794 were to encounter an actual, coherent, fundamental, genuine alternative [...]
2795 whose track record was impressive enough to make us doubt the correctness
2796 of our own system” (2006, 101). In the absence of an alternative system satis-
2797 fying these more demanding criteria, we need not have any scruples about a
2798 circular justification of our own epistemic system. Thus, the conclusion is no
2799 longer that we cannot know what absolute epistemic facts (if any) there are,
2800 but only that we cannot know this while under the spell of such legitimate
2801 doubt. And there is no compelling reason, Boghossian points out, to infer
2802 from this more limited obstacle to our knowing the absolute epistemic facts
2803 that there are none to begin with (2006, 103).⁸

2804 Once this argument based on Boghossian’s notion of blind entitlement is in
2805 place, it no longer matters what the precise nature of Bellarmine’s epistemic
2806 system is: irrespective of whether it instills legitimate doubt or not, the rela-
2807 tivist conclusion that there are no absolute epistemic facts never follows. In
2808 this way, the historical details become irrelevant. The same, moreover, goes for
2809 Boghossian’s original presentation of the argument: when blind entitlement
2810 is not on the radar as imposing constraints on what doubt is legitimate, *any*
2811 imagined alternative system satisfying some minimal conditions of coherence
2812 is supposed to render us powerless to justify our own. Once again, we need not
2813 bother to closely examine the historical details. Boghossian’s characterization
2814 of the relativistic argument makes it proceed more or less independently from
2815 the nature of the actual cases studied by those scholars in the humanities
2816 who, according to Boghossian, accept Equal Validity. Given the emphasis that
2817 such scholars usually place on such cases and the epistemic symmetry which
2818 they take to be manifested in them, this raises the suspicion that Boghossian’s
2819 way of framing the matter fails to take the full measure of their position, a
2820 suspicion that will be confirmed in our subsequent discussion.

8 It is questionable whether the absolutist can be as happy to accept this weaker conclusion as Boghossian seems to suggest. Boghossian does not clarify if or how, once legitimate doubt about our epistemic system has arisen, we would be able to remove that doubt. If we cannot—if such legitimate doubt constitutes an epistemic black hole from which we cannot free ourselves—then the abstract possibility of our knowing what the absolute epistemic facts are antecedent to such doubt would offer little consolation. Boghossian himself admits, in a later paper, that such legitimate doubt would probably leave us in a “crippling *skepticism*” (2008c, 428). In an earlier paper he still took it to be plausible that absolute epistemic facts are *known*, not merely that they can be known (2001, 4).

2821 We can sharpen this suspicion. Boghossian confidently states that “perhaps
 2822 it is overdetermined that the relativist will agree” with the idea of blind
 2823 entitlement (2006, 99). No doubt, all relativists will agree that everybody is
 2824 *prima facie* entitled to use the epistemic system they find themselves with. But
 2825 Boghossian requires more, as he goes on to assume that this entitlement puts
 2826 one in a position to justify the *absolute* correctness of one’s epistemic system,
 2827 and this the relativist will deny.⁹ In assuming this, Boghossian is begging the
 2828 question against the relativists. As will be shown in what follows, relativists
 2829 can resist this move in a principled way by appealing to the results of a more
 2830 fine-grained analysis of the historical details of the Galileo/Bellarmino dispute.
 2831 Rather than blind entitlement ruling out the relevance of historical evidence,
 2832 it is the historical evidence that is taken to prompt a different understanding
 2833 of the nature and scope of this entitlement. As we will see, the resulting
 2834 understanding of our blind entitlement to our own epistemic system is not in
 2835 fact incompatible with the thesis of Equal Validity that the relativist seeks to
 2836 defend.

3.3 *Doubting the premise: fundamental difference?*

2838 In the second step of his reply, Boghossian does not offer a blanket denial
 2839 of the possibility of fundamentally alternative epistemic systems, but argues
 2840 that Bellarmine’s system does not qualify. Still, his analysis yields the general
 2841 conclusion that “it is much harder than one may be inclined to assume at first
 2842 blush to come up with an epistemic system that is a genuine fundamental
 2843 alternative to the ordinary one” (2006, 103). The main question, as Boghossian
 2844 sees it, is this: can we coherently ascribe to Bellarmine an epistemic system
 2845 that has (REVELATION) as one of its fundamental principles, rather than
 2846 as a merely derived principle? Boghossian argues that we cannot, so that
 2847 Bellarmine is simply “someone using the very same epistemic norms we
 2848 use to arrive at a surprising *theory* about the world” (2006, 104). Whatever
 2849 the merits of that surprising *theory*, we would no longer be dealing with a
 2850 fundamentally different epistemic system, so that the relativistic argument
 2851 cannot get off the ground.

2852 Boghossian’s original argument for this conclusion is opaque, so we will
 2853 be relying on the important clarification in his reply to John MacFarlane’s
 2854 objections (Boghossian 2008c; MacFarlane 2008). Suppose that (REVELATION)

9 See already Kusch (2009).

2855 has the status of a fundamental principle. Given that (OBSERVATION) and
2856 (REVELATION) yield conflicting verdicts in some cases, Bellarmine needs
2857 what Boghossian calls an “adjudicating principle” to decide between such
2858 conflicting verdicts, in the same way that we need principles to adjudicate, for
2859 instance, between (OBSERVATION) and (Induction) when they yield conflict-
2860 ing verdicts. The adjudicating principle that Boghossian ascribes to Bellarmine
2861 runs as follows:

2862 BELLARMINE’S ADJUDICATING PRINCIPLE. (OBSERVATION) trumps
2863 (REVELATION) for ordinary life, but [...] (REVELATION) trumps
2864 (OBSERVATION) when it comes to the make-up of the sky. (2008c,
2865 425–426)

2866 The problem, as Boghossian sees it, is that this principle does not sit well with
2867 what he calls the “no arbitrary distinctions principle,” the relevant part of
2868 which reads as follows:

2869 If an epistemic system (or its user) proposes to treat two propositions
2870 p and q according to different epistemic principles, it must recognize
2871 some epistemically relevant difference between p and q . (2006, 98)

2872 According to Boghossian, Bellarmine’s adjudicating principle “would only
2873 make sense if he believed that propositions about the heavens are different in
2874 kind from propositions about earthly matters, so that vision might be thought
2875 to be an inappropriate means for fixing beliefs about them” (2006, 104). He
2876 continues: “But doesn’t [Bellarmine] use his eyes to note that the sun is shin-
2877 ing, or that the moon is half full, or that the clear night-time Roman sky is
2878 littered with stars? And doesn’t he think that the heavens are in a physical
2879 space that is above us, only some distance away?” (2006, 104). Boghossian
2880 seems to see the situation as follows. Before Galileo’s observations, there
2881 was no conflict between (OBSERVATION) and (REVELATION) with regards to
2882 propositions about the heavens, so that Bellarmine did not need his adjudicating
2883 principle to justify his use of the Bible to justify geocentrism. After those
2884 observations, however, there is a conflict. At this point, Bellarmine decides
2885 that the Bible trumps observation with regards to the make-up of the heavens.
2886 But this, Boghossian charges, is *ad hoc*. Bellarmine does not let (REVELATION)
2887 trump (OBSERVATION) with regards to earthly matters, so what reasons are
2888 there to suddenly do so with regards to the heavens, beyond a dogmatic adher-

2889 ence to what he regards as an article of faith? On pains of being epistemically
 2890 irrational, one cannot simply immunize the Bible *à la carte* against contradic-
 2891 tory evidence whenever such evidence happens to arise. Thus, if Bellarmine
 2892 was indeed using (REVELATION) as a fundamental principle with the above
 2893 adjudication principle, his epistemic system was irrational, so that it does not
 2894 constitute a genuine alternative in Boghossian's more demanding sense. To
 2895 save Bellarmine's position from being irrational in this way, we must take
 2896 (REVELATION) as a derived principle that arises from his alternative theory
 2897 about the world rather than pertaining to the fundamental make-up of his
 2898 epistemic system as such. This, however, means that Bellarmine does not
 2899 have a different epistemic system at all, leaving the relativist without a case
 2900 upon which to base their argument.

2901 As will become apparent, there are several aspects of Boghossian's argu-
 2902 ment that are problematic. For now, however, let us simply notice that the
 2903 relativist may resist the argument by showing that Bellarmine had more prin-
 2904 cipled grounds for his adjudication principle than Boghossian allows. Here,
 2905 Boghossian's cavalier treatment of the historical evidence becomes all the
 2906 more striking, since the claim that Bellarmine's principle is *ad hoc* must be
 2907 backed by a historical investigation of the considerations that he himself
 2908 advanced in favor of it, an investigation which Boghossian does not provide.
 2909 Such an investigation, it will now be shown, not only reveals Boghossian's
 2910 claim to be unfounded, it also reveals that Boghossian's whole character-
 2911 ization of the relativist argument misses both the nature and importance of
 2912 the issue of adjudication as such, misconstruing the way in which this issue
 2913 figures in the historical case and thereby also misconstruing the thesis of
 2914 Equal Validity which the relativist argument is meant to establish.

2912 **The historical evidence**

2913 **2.1** *Some plain facts*

2917 Let us first rehearse some plain facts. In March 1616, the Congregation of the
 2918 Index suspended Copernicus' *On the Revolutions of Spheres* "until corrected"
 2919 (Finocchiaro 1989, 148–149). A week before, the Roman Inquisition had
 2920 concluded that the statement that "the Sun is the center of the world and
 2921 completely devoid of local motion" was "foolish and absurd in philosophy,
 2922 and formally heretical" (1989, 146). These decisions were the outcome of a
 2923 prolonged and often public debate between Galileo and some of his opponents

2924 that started soon after the publication of the former's *Siderius Nuncius* in
2925 1610, announcing his first telescopic discoveries.

2926 While this historical episode involves many relevant actors, most analyses
2927 have focused on the opposition between Galileo and cardinal Bellarmine. The
2928 latter was not only the most influential cardinal within the Congregation of
2929 the Index and the Roman Inquisition, but also the most important theologian
2930 in counter-reformation Rome, canonized and named "Doctor of the Church"
2931 in the early twentieth century. The central textual documents are two letters
2932 that Galileo wrote to defend the compatibility of Copernicanism with the
2933 Bible, the "Letter to Castelli" (1613) and the "Letter to the Grand Duchess
2934 Christina" (1615), and one letter from Bellarmine from 1615, reacting in part
2935 to Galileo's Copernican campaign, and which needs to be read against the
2936 background of his earlier theological writings.¹⁰

2.2 *The epistemic status of astronomy*

2938 To correctly gauge what was at stake in the debate we first need to understand
2939 the epistemic status of mathematical astronomy in the period ranging from
2940 Copernicus' publication of his treatise in 1543 to its suspension in 1616.¹¹
2941 Astronomers and philosophers had been debating the possibility of attaining
2942 knowledge of the true structure of the cosmos by astronomical means since
2943 Antiquity, as it was well known that incompatible mathematical models could
2944 account for the same observations. As a consequence, a majority of sixteenth
2945 century astronomers took a sceptical position, which has been characterized
2946 as one of "perpetually frustrated realists" (Barker and Goldstein 1998, 253).
2947 They saw their discipline as aiming for the knowledge of true causes, but they
2948 also believed that due to their limited earthly perspective they necessarily
2949 lacked the information that would allow them to pick out the true model. This
2950 scepticism was frequently coupled with an insistence on the fact that absent

10 Finocchiaro's "documentary history" (1989) presents English translations of the most important documents. Fantoli (1994) provides a rich and up-to-date interpretation of the unfolding of the historical case. Blackwell (1991) gives much background on Bellarmine and offers translations of further relevant documents.

11 Historiographical views on this topic have a long history themselves, going back at least to the seminal work of Pierre Duhem. We will base our summary on Jardine (1984, chap. 7) and Barker and Goldstein (1998), which provide necessary corrections to many simplistic presentations.

2951 any human means to directly observe the structure of the heavens, only God
 2952 could provide the missing information.¹²

2953 Copernicus and his (relatively few) followers stood out against this back-
 2954 ground for their insistence that they could demonstrate the truth of their
 2955 preferred model. This confidence initially rested solely on the surplus mathe-
 2956 matical virtues that they claimed for the heliocentric model, since there was
 2957 no observational evidence available to break the tie between the Copernican
 2958 and a Ptolemaic model.¹³ This seemed to change with Galileo's telescopic
 2959 observations. Most importantly, it became clear in 1610 that Venus showed a
 2960 full cycle of phases, as our Moon does, indicating a path around the Sun for
 2961 that planet.¹⁴

2962 This did not settle matters, though. In the meantime, the model proposed
 2963 by Tycho Brahe in the late sixteenth century was gaining many followers.
 2964 In this model the Sun and Moon circle the Earth, whereas all planets re-
 2965 solve around the Sun (see [Lattis 1994, chaps. 2, 205–211](#)). It incorporated
 2966 the surplus mathematical virtues of the Copernican model, predicted the
 2967 Galilean observations of Venus, and retained a stationary Earth, as demanded
 2968 by Aristotelian physics.

2969 In sum, astronomers and philosophers were well aware of the underdeter-
 2970 mination of astronomical theories by observational evidence, an underde-
 2971 termination which remained after Galileo's telescopic observations. It was
 2972 clear to everybody involved that additional, non-observational, grounds were
 2973 needed if one wanted to establish the superiority of one model over its rivals.

12 The underdetermination problem sketched in this paragraph was not the only factor in determining attitudes towards the epistemic status of astronomy. Related worries arose because all successful mathematical models seemed to violate at least some aspects of Aristotelian physics, and had to deal with some recalcitrant observations. These two latter factors were often invoked in justifying a sceptical attitude towards mathematical astronomy. As it is the underdetermination problem that figures most prominently in the debate between Galileo and Bellarmine, we will not treat these other factors explicitly in our text. Note, to be clear, that we will not infer relativism *from* underdetermination—a procedure that has been criticized extensively in the literature, e.g. [Boghossian \(2006, chap. 8\)](#), [Seidel \(2014, chap. 2\)](#). Rather, underdetermination figures in the debate *between* Bellarmine and Galileo as one of the relevant considerations for determining the epistemic status of Galileo's telescopic observations. Thanks to an anonymous referee for pressing us on the need for this clarification.

13 See [Evans \(1998, 410–413\)](#) for a clear and concise discussion of these mathematical virtues.

14 As usefully pointed out in [Ariew \(1987\)](#), this does not rule out all possible Ptolemaic models, as one can construct models in which the parameters are such that Venus, while moving on a sphere that revolves around the Earth, as a matter of fact also cycles around the Sun. This option does not appear to have been taken seriously by any astronomer at the time.

2974 Such superiority could be motivated by general physical theories (such as the
2975 claim from Aristotelian physics that the Earth was necessarily stationary at
2976 the centre of the cosmos), by invoking theoretical virtues (as the Copernicans
2977 did), or on theological grounds.¹⁵ As we will see, Galileo developed a fourth
2978 option: extrapolating from the early successes afforded by his telescope, he
2979 was confident that his novel astronomical techniques would generate further
2980 evidence that would allow astronomers to overcome the remaining underde-
2981 termination, thus implicitly introducing empirical progress as a criterion for
2982 something like truth-approximation.

2&3 *The theological worry, and two strategies to deal with it*

2984 Even before the formal publication of Copernicus' theory, worries had already
2985 been raised about its compatibility with biblical passages that speak about the
2986 motion of the Sun.¹⁶ As a result, Copernicus' published treatise was prefaced
2987 with an anonymous letter which urged the reader not to interpret the proposed
2988 model as a realist description of the cosmos. Following the sceptical tradition
2989 outlined above, it was claimed that mathematical astronomy was not in the
2990 position to offer such descriptions, and that the treatise should be seen as
2991 providing nothing but a new method for calculating planetary positions. In
2992 this way, the seeming contradiction between Copernicanism and the Bible
2993 was neutralized. This letter was added without Copernicus' knowledge, and
2994 clearly goes against the spirit of the treatise itself, but likely played a large
2995 part in delaying the vigorous public debate that was to arise more than half a
2996 century later as a result of Galileo's campaign.

2997 Since Galileo claimed that the Copernican system provides a true model
2998 of the cosmos, he had to find a different way to deal with the relevant Bible
2999 passages. He did so by appealing to an already established aspect of the Chris-
3000 tian theological tradition, namely the acknowledgment that the Bible requires
3001 interpretation. It was universally agreed that not all biblical passages should
3002 be read literally. The real problem, then, was how to determine which pas-

15 Strictly speaking, there was a fourth source of information that was frequently appealed to: every-day observation. This was often intimately tied to the first (Aristotelian physics), as Aristotelian epistemology gives a privileged place to this kind of observation in grounding a physical theory. For that reason, we will not treat it separately. Some astronomers appealed to a combination of these different sources, sometimes including all three mentioned, as was the case with Tycho Brahe (cf. e.g. Howell 2002, chap. 3).

16 See Lerner (2005) for some early reactions to Copernicus' ideas.

3003 sages should be given a literal reading, and which ones ought to be interpreted
 3004 non-literally. If it could be argued that the passages on the motion of the Sun
 3005 possibly belonged in the latter category, Copernicans would be free to uphold
 3006 their theory without contradicting biblical evidence.

3007 Broadly speaking, then, two strategies were available for anyone worrying
 3008 about the tension between Copernicanism and the Bible. Either one could
 3009 embrace a realist interpretation of the astronomical theory, and accordingly
 3010 argue for a non-literal interpretation of the relevant passages in the Bible.
 3011 Or if one had a reason to prefer the literal reading of these passages, one
 3012 could appeal to the sceptical tradition and treat the Copernican model as
 3013 nothing more than a convenient instrument for calculation. These are the
 3014 two roads chosen by Galileo and Bellarmine respectively. In this way, both
 3015 the astronomer and the theologian tried to exploit some established aspects
 3016 of each other's disciplines (respectively the possibility of non-literal readings
 3017 and of non-realist interpretations) to justify their position.

2v4 *Galileo and the principle of prudence*

3019 Let us examine Galileo's strategy in more detail. We focus on Galileo's "Letter
 3020 to Christina," which contains his most considered arguments on the matter.¹⁷
 3021 Galileo shares two premises with his opponents: that the Bible contains the
 3022 revealed word of God, and as such is a legitimate source of evidence; and
 3023 that the truths revealed in the Bible cannot be inconsistent with the truths
 3024 uncovered through human experience and reason. This implies that in case
 3025 of an apparent inconsistency between the Bible and natural philosophy, it
 3026 has to be decided whether the relevant passages have been misinterpreted, or
 3027 whether the philosophical claim has not been properly demonstrated.

3028 In the letter, Galileo (correctly) does not presume that he has a proper
 3029 demonstration for the truth of heliocentrism. But he firmly believed that such
 3030 a demonstration was possible, so that anyone advocating a literal reading
 3031 of the relevant Bible passages would be acting prematurely. He does not
 3032 argue that the passages have been misinterpreted, but rather that he and his
 3033 contemporaries were not yet in a position to know the proper interpretation.
 3034 To this end he introduces what has been called a "principle of prudence"
 3035 (McMullin 1998, 292), which states that in case of statements the truth of

17 To a certain extent, interpretations of this complex letter will always be controversial. Compare e.g. McMullin (1998) with Finocchiaro (1986) and Fantoli (1994, 146–168). Our reading is similar to the one defended by Finocchiaro and Fantoli.

3036 which could possibly be demonstrated by appeal to experience and reason,
3037 we should not yet decide on Bible interpretations that possibly contravene
3038 that truth.¹⁸

3039 This leaves open two important questions. What are the statements that
3040 could possibly be so demonstrated? And what are we to do with statements
3041 that do not fall in this category? On the second question, Galileo was clear
3042 enough. If the Bible contains relevant information, we should adhere to the
3043 theologically established reading. This was evidently the case for all matters
3044 of faith and morals, but also for some natural phenomena. His example was
3045 “whether the stars are animate” (Finocchiaro 1989, 104). As God has not
3046 given us the resources to decide on the truth of this statement without further
3047 assistance, we should defer to the double gift of the Holy Writ and the inspired
3048 tradition of its interpretation. The appeal to this divine gift was crucial for
3049 Galileo, because it allowed him to stress that since God has also given us the
3050 capacities of observation and reason, we should use and trust them equally
3051 wherever they apply. This also implies that if the truth of some claim can
3052 possibly be decided using these faculties, this should guide us in interpreting
3053 the Bible.¹⁹ In this way, Galileo could appeal to the traditional metaphor of
3054 God’s two books. God has not only given us two books, but also the appropriate
3055 faculties to read these books (respectively inspiration, and reason and
3056 observation). He has moreover guaranteed harmony between both—provided
3057 we correctly adjudicate between them.²⁰

18 “I should think it would be very prudent not to allow anyone to commit and in a way oblige Scriptural passages to have to maintain the truth of any physical conclusions whose contrary could ever be proved to us by the senses and demonstrative and necessary reasons” (Finocchiaro 1989, 96)

19 Finocchiaro (1989, 105):

[...] in questions about natural phenomena which do not involve articles of faith one must first consider whether they are demonstrated with certainty or known by sensory experience, or whether it is possible to have such knowledge and demonstration. When one is in possession of this, since it too is a gift from God, one must apply it to the investigation of the Holy Writ at those places which seem to read differently.

The limitation to “natural phenomena which do not involve articles of faith” was meant to exclude miracles, i.e. cases where the inspired interpretation of the Bible should be given evidential precedence.

20 Some interpreters have taken Galileo’s inclusion of statements about natural phenomena in the category of statements about which Bible interpretation should be given evidential privilege to constitute an inconsistency on his part, as he seemed to deny all epistemic relevance of the Bible

3058 This appeal to God's gifts also brings us as close to an answer to the first
 3059 question as we can get. We are told that we "may firmly believe" that the
 3060 truth (or falsity) of helio-centrism can be demonstrated by observation and
 3061 reason (Finocchiaro 1989, 104). Galileo asserts that his observations "can
 3062 never be reconciled with the Ptolemaic system in any way, but are very strong
 3063 arguments for the Copernican" (1989, 103). He declines, however, to address
 3064 the remaining underdetermination due to the Tychonic alternative, merely
 3065 stating that "because of many new observations [...] one is discovering daily
 3066 that Copernicus's position is truer and truer" (1989, 103). In sum, the reader
 3067 is simply asked to trust that the process of discovery will go on until a unique
 3068 astronomical hypothesis is definitively established. Independent evidence
 3069 that astronomical methods will allow us to reach such final demonstrations
 3070 is not on offer. The biblical and patristic passages that Galileo used to sup-
 3071 port the idea that God wants us to use our ingenuity to discover new things
 3072 about the natural world are not specific enough. Appealing to the power of
 3073 astronomical methods themselves, on the other hand, would be obviously
 3074 circular—since it was exactly the reach of these methods that was in question.
 3075 Galileo was, in fact, implicitly introducing a novel notion of demonstration, by
 3076 treating progress in a research program as evidence for something like truth-
 3077 approximation, an idea that went far beyond what it meant to demonstrate
 3078 according to "observation and reason" as this was traditionally understood at
 3079 the time.

2.5 *Bellarmino and the principle of consensus*

3081 Bellarmine's reply was short but to the point. He immediately warned Galileo
 3082 and his defenders that treating heliocentrism as a possibly true description of
 3083 the cosmos was "damaging to the Holy Faith by making the Holy Scripture
 3084 false" (Blackwell 1991, 265). In his view, it was already clear that the literal

for statements about natural phenomena at other places (see e.g. McMullin 1998, 314–319). We believe that there are good reasons internal to Galileo's text to see these apparently conflicting statements as imperfect expressions of the underlying, more fundamental principle about God's two distinct gifts to mankind. The latter translates into a distinction that is not completely co-extensive with the one between matters of faith and morals on the one hand, and matters of nature on the other hand (see also the exclusion of miracles in footnote 19). The nature of the gifts implies that within matters of nature a further distinction has to be made between those about which we were given the means to find out the truth on our own, and the ones about which we lack such means—and where we are invited to lean on the Bible if it provides relevant information. (See Fantoli 1994 for more detail on this line of argument.)

3085 reading of the passages in question should be preferred, on the grounds of
3086 what can be called a “principle of consensus,” which had been explicitly
3087 codified at the Council of Trent (held between 1545 and 1563). According to
3088 this principle the preferred interpretation of the Holy Fathers should always
3089 be followed if there was consensus amongst them, as they spoke under holy
3090 inspiration. As Galileo was well aware, the wording of the relevant decree had
3091 seemingly limited the scope of the principle to “matters of faith,” but according
3092 to Bellarmine this implied no real limitation: anything that is said in the Bible
3093 should be considered a matter of faith “ex parte dicentis” (because of the
3094 speaker). If something was the word of the Holy Spirit as spoken “through the
3095 mouths of the Prophets and the Apostles” it automatically became a matter of
3096 faith: there was no way in which we could question their authority (Blackwell
3097 1991, 266).

3098 Having thus addressed the main issue, Bellarmine conceded that something
3099 like the principle of prudence was a valid principle. Occasions can arise in
3100 which we have to adapt our reading of Scripture to observational evidence.
3101 But he also made clear that there was no reason to assume it was applicable
3102 in the debate at hand. The scope of observation is limited to things that
3103 can be directly experienced (among which, to be clear, Bellarmine included
3104 the motion of the stars and Sun), whereas the Copernican hypothesis could
3105 never be directly observed, due to underdetermination. Galileo’s telescopic
3106 observations were perfectly legitimate astronomical data as far as they go, but
3107 could not be used to put the inspired consensus about geocentrism in doubt. It
3108 was rather the other way around: the inspired reading of the Bible taught that
3109 heliocentrism was false, thus confirming the impossibility of using Galileo’s
3110 implicit notion of progress as a criterion of truth.

2.6 *Daring extrapolations and innovations*

3112 After having seen Bellarmine’s letter (which had not been explicitly addressed
3113 to Galileo, but was clearly intended for his eyes), Galileo wrote down some
3114 further notes on the matter. In one of these he accuses his opponents of
3115 committing “the error called ‘begging the question’ ” (Blackwell 1991, 274). As
3116 he saw the situation, Bellarmine cannot use biblical passages to call into doubt
3117 the possibility of astronomical demonstrations, when the “true sense of the
3118 Scripture will already have been put in doubt by the force of the [astronomical]
3119 argument” (1991, 274). It is easy to see, however, that Bellarmine could have
3120 leveled exactly the same accusation at Galileo: he was begging the question if

3121 he wanted to argue that these astronomical arguments could put in doubt the
3122 “true sense of the Scripture,” when their purported conclusions had already
3123 been put in doubt by the force of theological argument concerning the true
3124 sense of Scripture.

3125 Both Galileo and Bellarmine accepted that the Bible and observation are
3126 equally bona fide sources of evidence. Both agreed that further guidelines
3127 were needed to decide what to believe on their basis. Neither the Bible nor
3128 the Book of Nature can be read without proper assistance—assistance which
3129 should also provide the means to adjudicate in cases where the readings seem
3130 to lead to contradictory conclusions. Galileo and Bellarmine also shared a
3131 tradition that provided a number of ways to deal with such cases. Crucially,
3132 however, this tradition provided no clear-cut treatment of the fundamen-
3133 tally new epistemic situation created by Galileo’s telescopic discoveries. Both
3134 Galileo and Bellarmine were extrapolating from past epistemic decisions to
3135 come up with their respective answers about how to proceed in this new
3136 situation. And they did so by claiming that their approach formed a natural
3137 continuation of what everybody had been doing (or at least should have been
3138 doing) all along: Galileo explicitly appealed to the authority of Augustine, one
3139 of the undisputed fathers of the Church, to justify his use of the principle of
3140 prudence, whereas Bellarmine drew on the instrumentalist tradition in astron-
3141 omy. In other words, it was only by offering an interpretation of their shared
3142 tradition that the right “adjudicating principles” could be established and
3143 that the tradition could be continued in a coherent way, given the epistemic
3144 situation at hand.

3145 It is important to stress that the diverging extrapolations by Galileo and
3146 Bellarmine were equally daring but that neither was unreasonable. Galileo’s
3147 claim that his research program of making further mathematically analyzable
3148 discoveries with his new instrument would progress until one could identify
3149 the one true hypothesis was exhilarating but totally unprecedented. Still, this
3150 claim could be partly backed up by Galileo’s observations of Venus’ phases; and
3151 Bellarmine, who reasonably deferred judgement on this matter to the expert
3152 astronomers of the Collegio Romano, in no way disputed the observations
3153 themselves or their direct interpretation (i.e. that they were due to patterns
3154 of partial illumination, and that this ruled out some mathematical models).
3155 On the other hand, Bellarmine’s extension of the principle of consensus to
3156 everything that was stated in the Bible was in line with important tendencies
3157 within the church, but surely not explicitly codified as such in the Council of
3158 Trent. Still, this extension was less of a stretch than might appear, given that

3159 the relevant decrees of the council of Trent did not specify any criterion by
3160 which to determine what counts as “matters of faith and morals.” Since Galileo
3161 never doubted the divine authorship of the Bible, he would have to show how
3162 to distinguish matters of faith from statements not having that status within
3163 the Bible without claiming any direct insights in God’s intentions, and it is
3164 hard to see how he could have done so without simply begging the question
3165 in favor of his realist interpretation of the Copernican model.

3166 There is a deep symmetry here: to Galileo, Bellarmine seems to select *ad*
3167 *hoc* principles with which to safeguard his theological convictions against
3168 astronomical evidence.²¹ To Bellarmine, however, Galileo appears to select *ad*
3169 *hoc* principles with which to safeguard his astronomical convictions against
3170 theological evidence. What can make it hard for us (or, at least, many of us)
3171 to appreciate this symmetry, is that we are predisposed to disregard the very
3172 idea of there being such a thing as theological evidence against astronomical
3173 claims, precisely because we reject the Bible as a source of evidence, especially
3174 with regards to such empirical matters. What we have aimed to show, is that
3175 Bellarmine presents us with a principled epistemic stance—foreign as it may
3176 be to us—which incorporates Galileo’s observations in such a way as to leave
3177 intact the justification of geocentrism on the basis of Biblical evidence.

3175 **3 Reconstructing the relativist argument**

3291 *The central role of adjudicating principles*

3180 The threat of circularity is evident in the stand-off between Galileo and Bel-
3181 larmine. But it is important to notice the precise point at which it arises.

3182 To start, Boghossian’s formulation of (REVELATION) must be corrected.
3183 Recall the formulation:

3184 REVELATION. For certain propositions p [...], believing p is prima
3185 facie justified if p is the revealed word of God as claimed by the
3186 Bible. (2006, 69)

21 This is also how Bellarmine appears to Boghossian, as we have seen. Boghossian’s failure to genuinely engage with the historical evidence renders him incapable of seeing that this characterization of Bellarmine’s epistemic procedure as *ad hoc* relies on background premises regarding the relevant issues of adjudication that will appear equally *ad hoc* to Bellarmine, and which cannot be provided with a non-circular justification.

3187 This neglects the special status of the Bible: If p is indeed the revealed word
 3188 of God as claimed by the Bible, then p is true and must be believed, full stop.
 3189 Both Galileo and Bellarmine accept that whatever is stated in the Bible is true.
 3190 Instead, the interesting epistemic question is: what *does* the Bible say? And it is
 3191 here that an epistemic principle comes in, which we could call (INSPIRATION):

3192 INSPIRATION. For any proposition p , if p is entailed by an inspired
 3193 reading of the Bible, then believing p is prima facie justified.

3194 What is fallible, is not the Bible, but our interpretation of it. The importance of
 3195 this point can be illustrated by noticing how Boghossian's formulation invites
 3196 analyses such as the one given by Markus Seidel, who argues that we can
 3197 understand Bellarmine's reliance on Biblical evidence as an application of a
 3198 more general principle about the testimonial reliability of books (2014, 177). In
 3199 this way, Seidel compares Bellarmine's reliance on the Bible to our reliance on
 3200 physics books. As long as (REVELATION) is taken to be the operative principle,
 3201 this does seem a natural interpretation of what Bellarmine is doing, and it
 3202 straightforwardly renders his adherence to the Bible irrationally dogmatic.
 3203 But this misconstrues Bellarmine's position. While physics books can make
 3204 false statements, the Bible cannot. If it seems as if the Bible says something
 3205 false, this must be because we have misunderstood it. The fault lies in us, not
 3206 in the book. On this, both Bellarmine and Galileo agree. The proper analogy,
 3207 then, is not between the Bible and physics books, but between the Bible and
 3208 the Book of Nature: what is written in the Book of Nature, is *ipso facto* true.
 3209 As with the Bible, the question becomes how to read the Book of Nature.
 3210 Just as (INSPIRATION) is an epistemic principle on how to draw on the Bible
 3211 as a source of truth, so (OBSERVATION) is a principle for how to draw on
 3212 Nature as a source of truth. (INSPIRATION) is not a testimonial principle,
 3213 but more like what Boghossian calls a "generation principle" (2006, 65)—a
 3214 principle that generates justification for beliefs from something that is not
 3215 itself a belief, in this case not a perceptual state as with (OBSERVATION) but a
 3216 state of inspiration.

3217 With this correction in place, we can see that Galileo and Bellarmine agree
 3218 on fundamental epistemic principles like (OBSERVATION) and (INSPIRATION),
 3219 but that they disagree about the proper way of adjudicating between them.
 3220 It is not the validity of the epistemic principles themselves that is at issue,
 3221 but the question how to *apply* them in the fundamentally new circumstances
 3222 created by Galileo's telescopic observations in the aftermath of the Council of

3223 Trent. This question is answered by appealing to the following adjudication
3224 principles:

3225 PRUDENCE. With regards to matters of possible demonstration,
3226 (OBSERVATION) combined with (Deduction) and (Induction) should
3227 take precedence over (INSPIRATION).

3228 CONSENSUS. With regards to matters of faith, (INSPIRATION) should
3229 take precedence over (OBSERVATION) combined with (Deduction)
3230 and (Induction).

3231 We can even say that Galileo and Bellarmine agree to a large extent on the
3232 validity of both adjudication principles, when taken abstractly. Their disagree-
3233 ment arises once the question is raised which of the two is applicable in the
3234 case of the debate on heliocentrism: are we concerned with a “matter of faith,”
3235 so that the principle of consensus applies, or with a matter for “possible astro-
3236 nomical demonstration,” so that the principle of prudence must be followed?
3237 The principles themselves do not give the answer: this can only be found in a
3238 contestable judgment with respect to what can be “possibly demonstrated,”
3239 or what is a “matter of faith.” It is this judgment that determines the rele-
3240 vant procedures of adjudication, and that cannot be further defended in a
3241 non-circular way.

3242 Once this crucial role played by matters of adjudication is highlighted—as
3243 Boghossian (2008c) admits it must be if we are to attain an adequate account
3244 of our epistemic practice—this puts considerable pressure on Boghossian’s
3245 absolutism, according to which we can know the absolutely correct epis-
3246 temic system that fixes which items of information justify which propositions.
3247 Boghossian seems to be caught in a dilemma. Either he accepts that his abso-
3248 lutism is limited to fundamental principles, excluding matters of adjudication,
3249 but then it becomes completely impotent with regards to our actual epistemic
3250 practices, wherein procedures of adjudication play an ineliminable role. Or
3251 he claims that there are absolute facts about the correct procedures of adju-
3252 dication as well, so that it is objectively settled how to adjudicate between
3253 our fundamental principles in *any* epistemic situation. It is precisely this
3254 second claim that the Galileo/Bellarmino case shows to be problematic: it
3255 shows how situations can always arise in which we have to decide on new
3256 ways to adjudicate between our fundamental epistemic principles, and which
3257 are such that there are available different procedures of adjudication none

of which can be justified in a non-circular way. The relativistic conclusion to draw is that we have here a genuine case of Equal Validity, in the form of two equally valid procedures of adjudication which give rise to fundamentally different epistemic systems and which cannot be justified in a non-circular way.

Boghossian, if he wishes to hold on to his absolutism, would have to maintain that it is somehow always objectively settled which procedure of adjudication is the correct one and that we are always—at least in principle—in a position to know what this correct procedure is.²² In this vein, while admitting that matters of adjudication are “complex and variegated” (2008c, 421), Boghossian stresses that they must nevertheless be decidable *a priori*, presenting the following argument: “If we can only think of ourselves as having epistemic principles that deliver determinate verdicts if they are a posteriori, then it is hard to see how we could *ever* figure out what the correct adjudicating principles are. To figure them out from the evidence, it would seem you would antecedently have to know what they are” (2008c, 419). Read as an argument against the relativist claim that the correct adjudication principles cannot be determined *a priori*, this seems to beg the question. After all, the relativist means to deny that we can figure out what the correct adjudicating principles are at all, if “correct” is read as “absolutely correct,” since according to them there are no absolutely correct adjudicating principles.²³ Similarly, if Boghossian is claiming that any *a posteriori* grounds for a procedure of adjudication will be circular because they invoke that very procedure, this can be seen as a version of exactly the point the relativist wishes to make: both Galileo and Bellarmine can indeed only justify their procedures of adjudication in circular ways. At the same time, it must be emphasized that the relevant relativistic picture is not that of someone pulling up a whole epistemic system by their bootstraps, adjudication and all. What is crucial in historical cases such as the Galileo/Bellarmino dispute is that an existing

22 Recall that Boghossian is—rightly—not interested in an absolutism according to which we cannot know what the correct epistemic principles are.

23 To be more precise: there are no *uniquely* absolutely correct adjudicating principles. Below, we will suggest that the relativist may adopt the view that it is absolutely settled—in each epistemic situation—which of the available procedures of adjudication qualify as epistemically rational, as long as it is maintained that there need not be a unique such procedure. As we construe the relativist position, its core commitment lies in the presence of a fundamental form of epistemic symmetry with regards to adjudication in cases such as the Bellarmine/Galileo debate, where the question whether this symmetry is itself “absolute” or “relative” in character is of lesser importance.

3287 epistemic system is confronted with a fundamentally new situation. Galileo
 3288 and Bellarmine, as we have emphasized, already have an epistemic system,
 3289 including adjudicating principles, on which they more or less agreed before
 3290 the advent of Galileo's observations. What needs to be settled, is not how to
 3291 adjudicate between (**OBSERVATION**) (in combination with principles of rea-
 3292 soning) and (**INSPIRATION**) in general, but how to adjudicate between them
 3293 specifically in the face of Galileo's new kind of empirical observations. As we
 3294 have seen, Galileo and Bellarmine can rely on shared reasons—including the
 3295 underdetermination problems in astronomy and disputes about the domain
 3296 of matters of faith in theology—in order to articulate their respective answers
 3297 to that question. What impresses the relativist in a careful study of cases like
 3298 these, is a combination of the fact that this new kind of epistemic situation
 3299 could not have been foreseen, and the fact that the existing epistemic system
 3300 at the time yields no unequivocal answer on how to proceed. As we have tried
 3301 to show, both Galileo and Bellarmine presented coherent ways to employ their
 3302 epistemic system in the situation at hand, with incompatible results. From
 3303 this, the relativist concludes that it makes no sense to conceive of such matters
 3304 as objectively settled in advance. If we believe it to be obvious that, yes indeed,
 3305 the make-up of the heavens is a matter for possible demonstration and not
 3306 a matter of faith, we are simply projecting back into what is an inherently
 3307 indeterminate epistemic situation the centuries of further development since
 3308 Galileo's views came to be accepted.²⁴ Such development does not show that
 3309 Galileo's answer was objectively correct and Bellarmine's objectively incorrect;
 3310 it only shows that we have succeeded in fruitfully building upon the epistemic
 3311 basis that Galileo laid out for us.²⁵

24 Note that this amounts to precisely the sort of *a posteriori* consideration that Boghossian needs to be irrelevant. Boghossian is committed to the claim that Bellarmine himself—given all the information he had—was in a position to rationally decide on the correct adjudication principles through suitable *a priori* reflection. What is *a posteriori*, is whether those correct adjudication principles render either geocentrism or heliocentrism the correct position to adopt, since this requires empirical evidence. If one admits, however, that reflection about the correct adjudication principles must *itself* rely on the further astronomical evidence that was gathered post-Galileo, one is thereby admitting that adjudication is not an *a priori* matter. Moreover, and most importantly, the invocation of such further evidence remains circular from Bellarmine's point of view, since it relies on Galileo's procedure of adjudication. Alternatively, if Bellarmine's procedure had been adopted, it is possible that further theological evidence against heliocentrism would have been gathered, the invocation of which would remain question-begging from Galileo's point of view.

25 In this regard, it should be noted—contrary to what Boghossian suggests—that Galileo's way of supporting heliocentrism with observational evidence is far from straightforward, and itself requires substantial theoretical work. It is all too easy to forget that Copernicanism itself flies

3.2 *Fundamental difference*

3313 We claim that Bellarmine and Galileo should be seen as proposing fundamen-
 3314 tally different epistemic systems, thus effectively countering Boghossian’s
 3315 argument (see section 1.3). There are two main reasons why one could doubt
 3316 this. The first arises from the question whether a mere difference in adjudi-
 3317 cation can lead to fundamentally different systems. The second consists in
 3318 questioning once again the status of (INSPIRATION) as a purportedly funda-
 3319 mental epistemic principle.

3320 The first reason, we think, issues from an underestimation of what may
 3321 be described as the epistemic depth of issues of adjudication. According to
 3322 Boghossian, adjudicating principles “tell us when a piece of evidence for p is
 3323 stronger than another piece of evidence that we might have for rejecting p ”
 3324 (2008c, 419). This leads to a picture of Bellarmine claiming that the Biblical
 3325 evidence for geocentrism trumps the astronomical evidence against it.²⁶ On
 3326 such a picture, it can only be a matter of time before the mounting astronomi-
 3327 cal evidence will tip the balance in favor of Galileo, even if Bellarmine was
 3328 perhaps still rational to hold on to geocentrism. There is, on this conception,
 3329 no fundamental difference between their epistemic stances, and thus no good
 3330 reason to deny the existence of absolute epistemic facts. In response to our
 3331 historical analysis, it will perhaps be admitted that Bellarmine was more ratio-
 3332 nal than he had initially been made out to be, and that Galileo and Bellarmine
 3333 were perhaps not yet in a position to decide on heliocentrism. But, crucially,
 3334 this symmetry will now be interpreted in terms of a lack of sufficient evidence:
 3335 there was not yet enough astronomical evidence to tip the balances in Galileo’s

in the face of much observational data. Does not Galileo, as Bellarmine made sure to point out (Blackwell 1991, 266), use his eyes to see that the Sun is moving? Does he then believe that propositions about the movement of the Sun are different in kind than those about the movement of earthly objects? Is this not an arbitrary distinction? And so on. Of course, it is to address such worries that Galileo developed his innovative analyses of the application of the concept of motion to observational deliverances in the *Dialogue concerning the two chief world systems* in 1632. Finding out new fruitful ways to adjudicate is indeed at the core of much scientific work. Boghossian, on the other hand, states that “the way of fixing beliefs that we call ‘science’ is in large part a rigorous application of these ordinary, familiar principles,” referring to the principles of (OBSERVATION), (Deduction) and (Induction) (2006, 67). This completely ignores the question of how to adjudicate between those principles, as if it is always a straightforward matter *how* to apply them “rigorously.”

26 See e.g. Baghramian and Coliva (2020, 183), who use this to argue that the difference between Galileo and Bellarmine is one in terms of derived rather than fundamental epistemic principles, and thus does not lead to relativistic conclusions.

3336 favour—the astronomical evidence was not yet sufficiently strong to trump
3337 the Biblical evidence, due to the sort of issues of underdetermination that we
3338 laid out above—so that suspension of judgment was perhaps the appropriate
3339 response.

3340 We claim, however, that such an account does not properly take into account
3341 the upshot of our historical analysis. As we have seen, Bellarmine does not
3342 use underdetermination and (**CONSENSUS**) to weigh the Biblical evidence for
3343 geocentrism against the observational evidence against it. Rather, he invokes
3344 underdetermination to deny that Galileo’s telescopic observations provide
3345 grounds for Copernicanism at all. Similarly, Galileo invokes his novel notion
3346 of demonstration and (**PRUDENCE**), not to argue that the Biblical evidence is
3347 insufficient to support geocentrism, but rather to argue that the Bible does
3348 not provide independent evidence for geocentrism at all. Their way to disarm
3349 opposing evidence is not to claim that it is too weak, but rather to deny its
3350 relevance to the issue at hand. The issue of adjudication concerns what kind
3351 of information can be evidence for what kind of claim to begin with, and not
3352 merely the weighing of contrary evidence, as Boghossian claims.²⁷

3353 Once this is seen, it becomes hard to deny that different procedures of
3354 adjudication can give rise to fundamentally different systems. Even though
3355 Galileo and Bellarmine share their fundamental principles, and even nomi-
3356 nally agree on the sort of adjudication principles that are in play, there is a
3357 deep mismatch between them concerning how to properly employ those prin-
3358 ciples of adjudication in the novel epistemic situation generated by Galileo’s
3359 telescopic observations, so that they arrive at entirely different ideas of what it
3360 amounts to to gather the relevant evidence and use it to justify certain claims,
3361 resulting in radically different accounts of the justificatory status of Galileo’s
3362 observations with regards to our beliefs about the make-up of the heavens.
3363 When faced with the question of heliocentrism, one will read the Holy Fathers’
3364 commentaries on the Bible, while the other will look through a telescope,
3365 and both will regard what the other does as fundamentally misplaced. Such
3366 differences cannot be brushed aside as merely “derivative” or “superficial,” as

27 In this way, our analysis of the historical debate allows us to flesh out Stephen D. Hales’ suggestion that the kind of “genuine irreconcilable difference” that can motivate relativism arises when actors disagree over what evidence is relevant to the truth of a certain proposition to begin with, in a situation where “they cannot discover any mutually agreeable meta-evidence which would allow them to settle their dispute over first-order evidence” (2014, 80). What Hales calls “meta-evidence” corresponds to evidence (“reasons” is perhaps a better term here) for the procedures of adjudication.

3367 is further brought out precisely by the deep incompatibility of both procedures
 3368 and the way in which it is hopeless to try to justify them in a non-circular way.

3369 This also allows us to re-evaluate the question whether (*INSPIRATION*) is a
 3370 fundamental principle or not in Bellarmine's epistemic system. Boghossian
 3371 characterizes as fundamental those principles "whose correctness cannot be
 3372 derived from the correctness of other epistemic principles" (2006, 67). Both
 3373 Boghossian and Seidel wish to suggest that (*REVELATION*) is not fundamental
 3374 in this sense, because it is a derived principle that is justified by other epistemic
 3375 principles. Presumably, they would say the same about (*INSPIRATION*).²⁸
 3376 Again, however, this slides over the issue of adjudication. The question is
 3377 not whether an epistemic principle, abstractly formulated, *could* be derived
 3378 from other principles, but whether it *is* so derived. It is a matter of how the
 3379 principle is *used* in justifying beliefs.²⁹ Is it a principle that is taken to be
 3380 only conditionally valid, on the basis of certain evidence and the use of other
 3381 principles? Or is it a principle whose validity is not up for question, and which
 3382 independently grounds the justification of beliefs and other principles? As our
 3383 previous argument shows, this depends on the procedures of adjudication. If
 3384 it is merely a matter of weighing the Biblical evidence against other evidence,
 3385 it is plausible to take (*INSPIRATION*) to be a derived principle. But if it is a
 3386 matter of granting Biblical evidence independent authority over a certain
 3387 domain of propositions, as Bellarmine wished to do, (*INSPIRATION*) becomes
 3388 fundamental: its use cannot be accounted for in terms of other fundamental
 3389 principles. To properly understand the status of (*INSPIRATION*) in Bellarmine's
 3390 epistemic system one must first understand his procedures of adjudication.
 3391 These cannot be separated.

3392 This also helps better to see what was at stake in Bellarmine's discussion
 3393 with Galileo. Galileo's procedures of adjudication move us in the direction in
 3394 which (*INSPIRATION*) may still be regarded as true, but will progressively be-
 3395 come epistemically irrelevant with regards to matters of natural fact. Because
 3396 the Bible is no longer regarded as having any self-standing authority regard-
 3397 ing such matters of natural fact, it will simply be interpreted in accordance
 3398 with the deliverances of science, thereby losing its status as an autonomous

28 Compare Seidel's suggestion, discussed above, that the epistemic role of the Bible in Bellarmine's system can be accounted for in terms of the testimonial reliability of books.

29 See Kusch (2017) for related considerations, yet without highlighting the role of adjudication.

3399 source of evidence.³⁰ In this way, choices in adjudication can give rise to the
3400 phenomenon that fundamental principles lose their epistemic standing. If
3401 the procedures of adjudication evolve in such a way that a principle no longer
3402 plays any independent role in justifying beliefs, it becomes merely derivative
3403 or even wholly irrelevant. This is what happened to (INSPIRATION) in the
3404 centuries following the dispute.

3405 Such considerations also impact how we think about the purported abso-
3406 lute correctness of our epistemic principles. It might well be the case that
3407 principles like (OBSERVATION), (Deduction) and (Induction) play a role in all
3408 coherent epistemic systems that we can conceive of, which is definitely not
3409 the case for a principle like (INSPIRATION). But it is not clear what is gained
3410 by concluding from this that these principles must be absolutely correct. They
3411 are epistemically impotent if not embedded within an epistemic system that
3412 complements them with procedures of adjudication.³¹ When deciding what
3413 to believe, we can never simply defer to the fundamental principles in iso-
3414 lation. Thus, if our epistemic procedures have an absolute grounding that
3415 renders them uniquely rational, this must be because the adjudicating princi-
3416 ples themselves have such an absolute grounding. It is precisely this claim,
3417 we have argued, that the relativist calls into doubt on the basis of historical
3418 evidence.

343 *Blind entitlement and equal validity*

3420 We are now in a position to revisit Boghossian's notion of blind entitlement. We
3421 already noted that Boghossian's appeal to blind entitlement begs the question
3422 against the relativist, insofar as he assumes that it allows one to establish a
3423 system's absolute correctness (see section 1.2). Relativists will agree, of course,
3424 that epistemic agents find themselves with an epistemic system that they
3425 are entitled to use. What is revealed by cases such as the Galileo/Bellarmino
3426 dispute, however, is that this does not thereby put these agents in a position
3427 to unequivocally address any novel epistemic situation that arises. In some

30 As we saw, Galileo's own position was slightly more complicated in that he allowed (INSPIRATION) to provide evidence for the limited domain of claims about the natural world about which empirical research methods had to remain silent.

31 Note that this includes adjudications between applications of one and the same principle, e.g. when confronted with two seemingly conflicting observations. Compare how Galileo had to find a way to deal with the seemingly straightforward observation of the movement of the Sun in the sky, as mentioned above.

3428 cases, their epistemic system, with its existing procedures for adjudication,
 3429 simply does not provide a clear-cut answer to novel questions of justification.
 3430 Thus, their blind entitlement does not put them in a position to establish the
 3431 absolute correctness of whatever extended procedures of adjudication they
 3432 end up settling on.

3433 This line of reasoning allows us to locate more precisely at which exact point
 3434 historical evidence militates against an appeal to absolute facts. Boghossian
 3435 writes:

3436 As in the case of our linguistic and conceptual abilities, our ability
 3437 to form rational beliefs is productive: on the basis of finite learning,
 3438 we are able to form rational beliefs under a potential infinity of
 3439 novel circumstances. The only plausible explanation for this is
 3440 that we have, somehow, internalized a rule that tells us, in some
 3441 general way, what it would be rational to believe under varying
 3442 epistemic circumstances. (2008b, 483)³²

3443 No one can deny the minimal point that that what we learn puts us in a
 3444 position to form rational beliefs in novel circumstances. The question is how
 3445 it does so. Boghossian seems to think that it does so by antecedently fixing the
 3446 rules that determine which beliefs it is rational to have in any novel circum-
 3447 stances whatsoever, so that our only task is to find out what those rules are,
 3448 and apply them to our current situation. Our way of elaborating this minimal
 3449 point, however, would be to say that what we have learned puts us in a position
 3450 to develop new procedures of adjudication when required, in ways that ratio-
 3451 nally extend our existing epistemic system. Such rational extensions, however,
 3452 can be open-ended, in the sense that nothing contained in the conjunction of
 3453 our epistemic system and the novel circumstances need always determine a
 3454 unique such rational extension (to be sure: it often does, but not always, and
 3455 the difficult cases are usually those circumstances that are, in some sense,
 3456 fundamentally novel). This is not to say, to be clear, that anything goes. To
 3457 say that such rational extensions are not necessarily uniquely fixed, is not
 3458 to say that they are not constrained. For instance, in the case of Bellarmine,
 3459 resisting Copernicanism by disregarding Galileo's telescopic observations
 3460 altogether would indeed be irrational. *Pace* Boghossian, however, this is not
 3461 what Bellarmine did. Instead, he developed a principled way to assign an

32 As we already pointed out, these internalized rules would have to include rules on how to adjudicate, if Boghossian's absolutism is to have any bearing on our actual epistemic practices.

3462 epistemic status to those observations within his existing epistemic system,
3463 something he did by invoking antecedently acknowledged considerations of
3464 underdetermination and antecedently established practices of Bible interpretation.
3465 Here, one could proceed to ask: are such constraints on the rationality
3466 of such extensions then, at least, objective? That is: are there absolute facts of
3467 the matter as to which options are and which are not rational? We believe that
3468 it is not necessary for our project in this paper to take a stance on the matter. If
3469 we have shown that there can be fundamentally different yet equally rational
3470 ways of further developing an epistemic system when confronted with novel
3471 circumstances, we have established our target thesis of Equal Validity. It is
3472 not immediately clear to us what exactly would be at stake in the further
3473 question whether there are absolute facts of the matter with regards to which
3474 such developments are rational, and which are not. Indeed, for us, this is an
3475 indication that the initial way of framing the matter in terms of the absolute
3476 correctness of epistemic principles does not go to the heart of the matter.

3477 Let us elaborate a bit on this point. Boghossian himself briefly considers
3478 what he calls “absolutist versions” of relativism (2006, 94fn5). He says that he
3479 wishes to take as his target “the much more radical ‘postmodern’ view which
3480 attempts to evade commitment to any absolute epistemic truths of any kind.”
3481 He adds:

3482 It is easy to see what might motivate someone to take seriously
3483 the idea that there are no absolute epistemic truths of any kind;
3484 it is much harder to see what would motivate the moderate view
3485 that, while there are some absolute epistemic truths, there are
3486 many fewer than we had been inclined to suppose, or that they
3487 make essential reference to such parameters as a thinker’s starting
3488 point.

3489 We propose, however, that it is exactly historical cases such as the Galileo/Bellarmino
3490 dispute that could motivate such a “moderate” view. Boghossian
3491 does not seem to have a stable account of the relativist’s main motivation.
3492 In his book, his point of departure is not the abstract claim that there are
3493 no absolute epistemic facts, but the thesis he calls “Equal Validity.” It is this
3494 thesis that Boghossian finds proclaimed by his colleagues in the humanities
3495 and social sciences, and which he wishes to reject. Now, we have shown how
3496 careful attention to the historical evidence can be taken to confirm a thesis
3497 of Equal Validity, more precisely the thesis that there can be, in a given epis-
3498 temic situation, multiple, equally valid ways of extending the procedures of

3499 adjudication of an epistemic system. One upshot of this view is that different
3500 epistemic agents such as Galileo and Bellarmine can be equally justified in
3501 using fundamentally different epistemic procedures to justify their beliefs,
3502 procedures that result in their adopting contradictory beliefs on the basis of
3503 the same available information. We submit that it is such versions of Equal
3504 Validity, grounded in what we might call localized phenomena of symmetric
3505 open-endedness of epistemic systems with regards to matters of adjudica-
3506 tion raised by certain novel epistemic situations, that are the primary focus
3507 of many relativists. Moreover, it seems to us that Boghossian would not be
3508 prepared to accept the existence of such thoroughgoing cases of epistemic
3509 symmetry—irrespective of whether that symmetry is taken to be “absolute”
3510 or “relative” in character—since he is at pains to argue that Bellarmine’s
3511 epistemic procedures were indeed irrational, and that it is Galileo who should
3512 be said to have locked onto *the* correct epistemic system. By downplaying the
3513 issue of adjudication, the very nature of the issue that occupies the relativist
3514 threatens to remain invisible, since this open-endedness of matters of adju-
3515 dication cannot be captured in terms of the absolute correctness (or not) of
3516 a certain set of self-standing fundamental epistemic principles. Once this is
3517 seen, the further technical question whether the Equal Validity at issue is
3518 itself to be conceived in absolutist or relativist terms, is of lesser importance.
3519 If it would turn out that, indeed, a relativist construal is incoherent, we expect
3520 relativists to respond along the lines of: “So be it. Let us become absolutists
3521 about Equal Validity”. Rather than issuing in a blanket denial of the existence
3522 of absolute epistemic facts, the thesis of Equal Validity issues in a denial
3523 of the existence of a specific kind of absolute epistemic facts, facts that are
3524 meant to preclude the possibility of there being fundamentally different yet
3525 equally rational procedures for adjudication in a given epistemic situation.
3526 Even if Boghossian’s argument that there must be absolute epistemic facts
3527 goes through, this does not refute Equal Validity, and thereby does not refute
3528 the sort of position that he initially presented as his target. Whether that
3529 position is in the end to be described as “relativist” or as “moderately abso-
3530 lutist” or something similar is a terminological question that is peripheral
3531 to the real philosophical issues at hand. What matters, is that it results in
3532 the claim that Bellarmine’s and Galileo’s epistemic procedures were equally
3533 rational in a way that is fundamentally at odds with Boghossian’s absolutist
3534 commitments, commitments that themselves move beyond the mere blanket

3535 assertion that there exist absolute epistemic facts.³³ To frame the debate as
3536 between a blanket assertion and a blanket denial of the existence of absolute
3537 epistemic facts, is to paint it with such a broad brush that all the underlying
3538 subtlety and complexity that renders it so interesting is erased, resulting in a
3539 picture that fails to adequately capture *both* the absolutist and the relativist
3540 position. It is the thesis of Equal Validity—and the question of how exactly to
3541 understand it—that should be the true locus of the debate.

3542 **4 Conclusion**

3543 As Boghossian characterizes the relativist argument, the relativist conclusion
3544 is meant to arise by considering how a confrontation with a fundamentally
3545 different epistemic system brings us to doubt the correctness of our own epis-
3546 temic system. Our discussion reveals that this is not necessarily a good way
3547 to capture what the relativist is after. A more adequate formulation would
3548 be: the relativist conclusion arises from the observation that no epistemic
3549 system can, by itself, unequivocally settle all potential matters of adjudication
3550 that might arise in fundamentally novel epistemic situations. Although this
3551 is meant, of course, to undermine the idea that our own epistemic system,
3552 with its historically developed procedures of adjudication, is absolutely cor-
3553 rect, this is not meant to bring into doubt the rationality of our using that
3554 system in deciding epistemic matters. Rather, it is meant to make us recon-
3555 ceive that rationality. If the focus is on historical cases, this reconception will
3556 have a backwards-looking character. By coming to recognize that Galileo's
3557 development of his epistemic system was only one of multiple equally valid
3558 ways to go, we come to recognize that an acknowledgment of the rationality
3559 of our own epistemic system—which is a product of Galileo's views—need
3560 not preclude the recognition that there were, at certain historical crossroads,
3561 other options available that were equally rational. At the same time, this
3562 recognition also has a forward-looking effect. After all, there is no way to
3563 exclude that we will encounter similar cross-roads, where we will ourselves
3564 be confronted with genuinely novel questions of justification to which our
3565 current epistemic system offers no clear-cut answers. What our analysis is

33 Recall that Boghossian himself is quite aware of this, as is made apparent both by his recognition that he needs absolute epistemic facts to be in some sense accessible to us, and by his recognition that his position requires that we are able to establish *a priori* which principles of adjudication are correct. Neither of these claims are entailed by the mere claim that there are absolute epistemic facts.

3566 meant to bring to the fore, is that to conceive of ourselves as rational does
 3567 not mean to conceive of ourselves as being in the possession of an epistemic
 3568 system that somehow deals in advance with all novel epistemic situations
 3569 that scientific, technological, cultural, political, or any other kind of evolution
 3570 may throw at us. It is meant to help us recognize that our capacity to deal with
 3571 such situations is precisely that: a capacity to *deal* with them, to develop novel
 3572 ways of proceeding where the epistemic tools we have at our disposal yield
 3573 no determinate answer. It is meant, we could say, to help us self-consciously
 3574 exercise our *creative* rationality, which is just as essential to who we are with
 3575 regards to epistemic matters as it is with regards to any other.*

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* THANKS

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Perspectivity and Rationality of Perception

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Susanna Schellenberg has presented several arguments for the “situation-dependency thesis” (SDT), i.e. the claim that (visual) perceptual experiences are necessarily situation-dependent, insofar as they represent objects’ situation-dependent properties. In my critical response to her paper, I focus on her argument from the “epistemic dependence thesis” (EDT), according to which “perceptual knowledge of intrinsic properties is epistemically dependent on representations of the relevant situation-dependent properties” (Schellenberg 2008, 75). I consider what support she musters for EDT, so as to make an objection to her argument from EDT. To address this objection (or, rather, to bypass it), I will re-formulate the EDT, as a different but closely related thesis that I will call EDT*, informed by the admittedly radical Husserlian view that perception is epistemically rational.

In a paper titled “The Situation-Dependency of Perception,” Susanna Schellenberg presents several arguments for the “situation-dependency thesis” (SDT), i.e. the idea that (visual) perceptual experiences are necessarily situation-dependent. One of her arguments involves an appeal to the “epistemic dependence thesis” (EDT), i.e. the claim that “perceptual knowledge of intrinsic properties is epistemically dependent on representations of the relevant situation-dependent properties,” where intrinsic properties are the properties that do not depend on the object’s relations to other individuals distinct from itself: e.g. its intrinsic size or shape, irrelative to the perceiver’s viewpoint (2008, 75). In my critical response, I focus on the argument from the EDT, including what support she musters for the EDT, so as to make an objection to this argument. To address, or rather, to bypass, this kind of objection, I will re-formulate the EDT as EDT*, modifying Schellenberg’s ideas concerning perspectival perception and perceptual epistemology along Husserlian lines.

3690 In particular, EDT* is informed by the admittedly radical view that perception
3691 is epistemically rational, in the sense of being responsive to evidence.

3692 As part of her account of the SDT, Schellenberg fleshes out the idea of
3693 situation-dependency in terms of perceptual experiences' necessarily repre-
3694 senting situation-dependent properties, e.g. an object's situation-dependent
3695 size or shape, relative to the perceiver's point of view (2008, 56–57). The notion
3696 of a situation-dependent property provides a way of regarding the perspectival
3697 properties, and, thus, the perspectivity of perception, in mind-independent
3698 terms. Schellenberg's argument for the EDT is based on the claim that the
3699 defeat of one's perceptual evidence for situation-dependent properties neces-
3700 sarily brings with it the undercutting defeat of a line of evidence for intrinsic
3701 properties (but not vice versa). She complements such "asymmetry of defeat"
3702 with a similarly conceived "asymmetry of warrant." I will challenge these
3703 ideas by means of a counterexample.

3704 However, I will also propose a peculiar re-formulation of EDT, viz., as
3705 EDT*, which, I believe, does not fall prey to this kind of objection, while still
3706 doing justice to Schellenberg's basic underlying intuition that "one perceives
3707 an object's intrinsic properties precisely because of the way the object is
3708 presented" (2008, 56–57). By contrast with Schellenberg's EDT, I will defend
3709 a thesis, according to which the perspectivity of perceptual experience is
3710 accounted for in terms of (subjective) appearance properties, not situation-
3711 dependent properties, and the pertinent relation of epistemic dependence is
3712 construed as obtaining between perceptual experiences and their aspects, not
3713 between beliefs or judgments. So, it is built into my account that perceptual
3714 experiences not only provide, but also receive evidential support—a radical
3715 idea which renders perceptual experiences epistemically rational, and which
3716 I propose to articulate in terms of the Husserlian notions of fulfillment and
3717 disappointment, i.e. a kind of experiential confirmation and disconfirmation.

3718 Schellenberg argues for a view of the perspectivity of perceptual experi-
3719 ence by appeal to the contributions that perceptual experiences make to our
3720 epistemic rationality. I choose the same starting point and try to deepen her
3721 line of thought, viz., by proposing that perceptual experiences themselves be
3722 regarded as rational.

3723 **1 The SDT and the Argument from the EDT**

3724 I will set the stage for the arguments of the present paper by giving an ex-
3725 position of Schellenberg's central ideas and arguments. In general, Schel-

3726 lenberg addresses the issue of how we can be said to perceive the intrinsic
3727 properties of physical objects, while perceiving such objects from different
3728 perspectives. In Section I of her paper, she contrasts her approach with naïve
3729 realist views, which downplay the perspectival nature of perception, insofar
3730 as they regard perception as direct and thus appear to have no need to appeal
3731 to situation-dependent properties, and traditional views which account for
3732 the perspectival aspect of perception by invoking mind-dependent objects or
3733 properties, like sense data or appearances. In Section II, she proceeds to set
3734 forth her own view, articulated by appeal to situation-dependent properties.
3735 According to her, situation-dependent properties are functions of the intrinsic
3736 properties of the object, and of the situational features, e.g. the perceiver's
3737 location or the lighting conditions. She adds that situation-dependent prop-
3738 erties are, furthermore, ontologically dependent on and exclusively sensitive to
3739 intrinsic properties and situational features. Such a view renders the situation-
3740 dependent properties just as objective and mind-independent as the intrinsic
3741 properties, and can be presented in a rigorous way by invoking Christopher
3742 Peacocke's notions of scene and scenario content.

3743 Schellenberg offers several lines of argument for *SDT*. Most prominently,
3744 in Section II, there is an argument based on the point that her view can do a
3745 good job accounting for Peacocke's example of a perceptual experience of two
3746 same-sized trees located at different distances from the subject. The example
3747 provides a way to scrutinize different accounts for whether they can render
3748 the content of perspectival perceptual experience consistent: we clearly want
3749 to avoid the idea that one perceives the two trees as being both the same size
3750 and not the same size. Schellenberg, however, addresses the problem elegantly,
3751 viz., by providing a formulation according to which we perceive the two trees
3752 as having the same intrinsic size and different situation-dependent size. Her
3753 title for her Section II, "The Argument for the Situation-Dependency Thesis,"
3754 surely refers to this particular argument, insofar as it is the most prominent
3755 of all the considerations that she offers in support of her view in Section II.
3756 However, Section II also contains other considerations in favor of *SDT*, as well
3757 as an indication that still others will be put forward in the rest of her paper.¹

1 Thus, Schellenberg argues that her view has four advantages over alternative accounts. First, it brings with it the putative advantage of rendering the accuracy conditions of perceptual experiences richer, viz., by situation-dependent properties. The second putative advantage is that recognizing situation-dependent properties allows us to do justice to the fact that there is a wide range of viewing conditions that count as normal. Third, we are now in a position to appreciate the epistemic dependence of intrinsic properties on situation-dependent properties (Section

3758 As for the EDT, Schellenberg gives a detailed discussion of this claim in
 3759 her Section III, titled “The Argument for the Epistemic Dependence The-
 3760 sis.” The argument for the EDT is rightly regarded as part of an argument
 3761 for the SDT. Schellenberg makes this clear at the end of Section III, “If re-
 3762 presenting intrinsic properties is [epistemically] dependent on representing
 3763 their situation-dependent properties, then the representation of situation-
 3764 dependent properties must be a necessary part of perceptual content” (2008,
 3765 80). In other words, by Schellenberg’s lights, the EDT counts as support for the
 3766 SDT. The argument from EDT appears to be dialectically at least as weighty
 3767 as the argument concerning consistency of content (the pre-eminent argu-
 3768 ment in her Section II, as we have seen). I am saying this because several
 3769 accounts of perspectivity unquestionably succeed in avoiding inconsistency
 3770 of content—yet the argument from EDT can be viewed as providing a further
 3771 principled consideration, enabling Schellenberg’s view to prevail over this
 3772 group of alternative views. Also, Schellenberg particularly directs it against
 3773 the kind of “naïve direct realism” which proposes to altogether do away with
 3774 the perspectival aspect of perception (2008, 75).

3775 2 Defeat, Warrant, and the Argument for the EDT

3776 As part of her argument for SDT from EDT, Schellenberg makes a case for
 3777 EDT. I will proceed to clarify the EDT and her argument for it, and to bring a
 3778 counterexample to EDT. Schellenberg articulates the argument for EDT by
 3779 once again invoking Peacocke’s tree example, viz., as focus of considerations
 3780 pertaining to defeat of evidence,

3781 The subject has experiential evidence that the two trees are the
 3782 same size. This evidence is, however, parasitic on her evidence
 3783 that the nearer tree is presented as larger than the tree that is
 3784 further away from her. Both layers of evidence are liable to defeat.
 3785 However, if evidence for the situation-dependent properties is
 3786 defeated, the subject’s evidence for the intrinsic properties is de-

III). And, fourth, if we accept her view, it will be possible for us to embrace the motivations of phenomenism and indirect realism, while remaining direct realists (Section IV). This is a rich variety of ideas. In what follows, I will set aside all but the third claim of an advantage for her view, i.e. the argument from EDT: I believe that Schellenberg regards it as a more important argument than the other advantage-based considerations that she invokes, insofar as these are either un-developed (the first and the second) or clearly conceived as dependent on EDT (the fourth).

3787 feated, but not vice versa. Defeaters can be understood in two ways.
 3788 While undercutting defeaters block the line of evidence from
 3789 which the warrant actually arises, rebutting defeaters provide in-
 3790 dependent lines of evidence warranting the contrary conclusion.
 3791 If the subject's evidence for the situation-dependent properties is
 3792 defeated, then her evidence for the intrinsic properties is undercut
 3793 (and not just rebutted). (2008, 76–77)

3794 This undercutting defeat claim is not devoid of prima facie plausibility.² Take
 3795 P to be the experiential evidence to the effect that R , i.e. the nearer tree is
 3796 presented as larger than the other. Take Q to be the experiential evidence to
 3797 the effect that S , i.e. the nearer tree is the same size as the other. Schellenberg's
 3798 claim is that if $\sim(P \rightarrow R)$ or $\sim R$, then $\sim(Q \rightarrow S)$. If we accept $\sim(P \rightarrow R)$, i.e. the
 3799 idea that the evidence for R is undercut, then it appears not implausible
 3800 that the line of evidence for S is also undercut. In other words, it seems quite
 3801 plausible that if we cannot trust our experience with regard to R , i.e. the nearer
 3802 tree's being presented as larger than the other, then neither can we trust it
 3803 with regard to S , i.e. the nearer tree's being the same size as the other. On the
 3804 other hand, we can make sense of the rebuttal of R as, likewise, undermining
 3805 our trust in our senses. Thus, accepting $\sim R$ leaves us with an inconsistent
 3806 triad P , $P \rightarrow R$, and $\sim R$. Now it is, again, natural to accept $\sim(P \rightarrow R)$, yielding
 3807 the same situation as before.

3808 Notice that these considerations seem to point to an *asymmetry* of defeat.
 3809 Granting, for the sake of argument, that if I take a pill that distorts my ex-
 3810 perience of a tree's situation-dependent size, it will always also distort my
 3811 experience of its intrinsic size, should we also concede the converse point,
 3812 in cases where I take a pill that, first and foremost, distorts my experience
 3813 of the tree's intrinsic size? We clearly should not, because the latter kind of
 3814 pill might achieve its effect by confusing me about my distance from the tree,
 3815 while leaving uncompromised my experience of its situation-dependent size.

3816 To achieve a well-rounded appreciation of how these ideas bear on EDT,
 3817 let us continue the above quotation,

3818 If the subject's evidence for the situation-dependent properties is
 3819 defeated, then her evidence for the intrinsic properties is undercut
 3820 (and not just rebutted). It follows from this that the asymmetry
 3821 of defeat is grounded in an asymmetry of warrant. It is because

2 For a classic source on defeasibility, see Pollock (1974, chap. 2).

3822 the evidence for the situation-dependent property is in the line of
 3823 evidence for the intrinsic property that defeat of the former entails
 3824 defeat of the latter. And it is because the evidence for the intrinsic
 3825 property is not in the line of evidence for the situation-dependent
 3826 property that defeat of the former does not entail defeat of the
 3827 latter. Thus, evidence for intrinsic properties is dependent on
 3828 evidence for situation-dependent properties both with regard to
 3829 defeat and warrant. (2008, 77)

3830 Remember that in our introduction we have already quoted EDT as the claim
 3831 that “perceptual knowledge of intrinsic properties is epistemically dependent
 3832 on representations of the relevant situation-dependent properties” (Schellen-
 3833 berg 2008, 75). We have now learned that it is to be unpacked as a claim about
 3834 “asymmetry of defeat” and “asymmetry of warrant,” where the former asym-
 3835 metry claim is argued for directly, and the latter by a kind of inference to the
 3836 best explanation. Schellenberg invites us to accept certain ideas concerning
 3837 defeat, and then also that they are best accounted for by accepting certain
 3838 points concerning warrant. Notice that, insofar as she makes specifications
 3839 concerning rebutting and undercutting defeat, they are precisely what it takes
 3840 to argue that the evidence for a certain situation-dependent property is, so
 3841 to speak, part of the line of evidence that can warrant perceptual knowledge
 3842 of an intrinsic property. In order to establish this, the defeat of the experiential
 3843 evidence for situation-dependent properties needs precisely to result in
 3844 the undercutting of the evidence for intrinsic properties, and not just, some-
 3845 how, in its rebuttal by other lines of evidence. (There may or may not also be
 3846 additional rebutting defeaters of the evidence for intrinsic properties.)

3847 As far as I am concerned, there are just two points that Schellenberg has
 3848 not made explicit. For one, she has not said what she means by asymmetry of
 3849 warrant. In view of her detailed explanation of the asymmetry of defeat, it
 3850 seems apt to conceive of the asymmetry of warrant in analogous terms: in the
 3851 absence of experiential evidence that could yield a warrant for the relevant
 3852 situation-dependent property, there also fails to obtain a line of experiential ev-
 3853 idence that could yield a warrant for an intrinsic property; but not vice versa.³
 3854 As for the second inexplicit aspect of Schellenberg’s account, she never, in her
 3855 discussion of the EDT, says what kind of item she has in mind as the recipient

3 I take it that a body of evidence can fail to yield a warrant while not having been defeated. Instead, there may not have been sufficient evidence, or the evidence may not have been suitably interpreted.

3856 of evidential support. She appears to be discussing perceptual experiences,
3857 and yet there is a philosophical consensus, which remains unchallenged (and
3858 even unmentioned) by her, to the effect that perceptual experiences, while
3859 providing evidential support for beliefs and judgments, cannot themselves
3860 receive evidential support.⁴ It is therefore safe to assume that she is really
3861 talking about the defeat and warrant of evidence for perceptual beliefs or
3862 judgments.

3863 *EDT* is open to objection by the following counterexample. Suppose that I
3864 am looking at a tree that is three meters tall. It has the situation-dependent
3865 property of appearing, from where I stand, to be the same height as the length
3866 of a pencil in my outstretched hand. But I am reliably informed that I have
3867 ingested a pill which makes it as likely as not that I experience the situation-
3868 dependent size of a tree as considerably smaller. E.g. if its real situation-
3869 dependent height is the same as the length of a pencil, I may experience it as
3870 being the same as the length of half a pencil. I am also told that whenever the
3871 pill does this to me, it will also increase the apparent distance between me
3872 and the tree, so that it will still appear to have the intrinsic property of being
3873 (of a height that could be described as) three meters tall. Now the evidence for
3874 the situation-dependent property has been undercut, but the evidence for the
3875 intrinsic property has not been in any way defeated. Our experiential evidence,
3876 in this case, does not yield a warrant for the tree's situation-dependent size,
3877 but it does for its intrinsic size.

3878 It is possible to reply to this counterexample by arguing that it does not
3879 confute *EDT*, because in this case we are getting it right about the intrinsic
3880 size only by accident. Yet, I have been reliably informed that the pill regu-
3881 larly, predictably achieves its effects in me, altering my experience of distance
3882 whenever it alters my experience of situation-dependent size. We could, like-
3883 wise, even conceive of perceivers whose visual system functions this way by
3884 default, without any need for the pill, and who are aware of this fact. Bear
3885 in mind also that by attaining such awareness of the workings of the pill,
3886 the perceivers cannot re-gain their warrant concerning situation-dependent
3887 properties: according to the setup of our counterexample, the pill may or may
3888 not alter one's experience of the situation-dependent properties. Therefore,
3889 the counterexample really does tell us something about situation-dependent
3890 properties, viz., that they cannot perform the epistemic role that *EDT* accords
3891 to them, and that they are not well-suited for developing the intuition that

4 For a discussion of this view, and a challenge to it, see Siegel (2017).

3892 “one perceives an object’s intrinsic properties precisely because of the way the
3893 object is presented,” as Schellenberg has sought to do (2008, 75).

3894 Another worry about the counterexample is that if I am, indeed, informed
3895 by somebody that the pill has such an effect on me, then my evidence for
3896 the intrinsic properties is a combination of perceptual and testimonial evi-
3897 dence, with the upshot that we are no longer, strictly-speaking, dealing with
3898 perceptual knowledge of the intrinsic properties, and the scenario we have
3899 envisioned is therefore not a counterexample to EDT. It seems that here we
3900 can reply that our talk of the informant, just as our talk of the pill, is simply a
3901 convenient pointer, a device that we could, in principle, dispense with,⁵ and
3902 invoke a situation where the subject has found out about the effects of the
3903 pill by himself, e.g. by comparing, as it were, a sample of visual experiential
3904 data from after taking the pill, with samples from other times. Perhaps, even
3905 in that case, our evidence would not be all perceptual, but would also have to
3906 involve memory and thought, leaving our counterexample with a problem?
3907 However, it seems to me that here, if we do accord a minimal role for (some-
3908 thing like) memory and thought, they can be regarded, not so much as raising
3909 issues peculiar to our case, but as being, more generally, part of the enabling
3910 conditions of epistemic perception.⁶ We could make a very limited appeal to
3911 (something like) memory and thought, so as not to have to invoke them as in-
3912 dependent sources of evidence, but merely as part of what it takes to organize
3913 and interpret the perceptual evidence. I believe that such ideas fit naturally
3914 not only with a broadly Kantian outlook, but also with the Husserlian outlook
3915 that we will proceed to articulate in section 3 of this paper, viz., as functioning
3916 towards the “constitution” of the perceptual experience and its objects, with
3917 an emphasis on coordinating aspects of the diachronic experience, some of
3918 them retained and others merely anticipated.

3919 Someone might voice the yet different concern that, in our scenario, we in-
3920 voke a piece of evidence that defeats the perceptual evidence for the situation-
3921 dependent property, and then reach for additional evidence, e.g. from ad-
3922 ditional testimony, to ensure that we still have evidence for the intrinsic
3923 property.⁷ Thus, our informant tells us that the pill may make the situation-
3924 dependent size appear smaller, *and* then she also tells us that when it does

5 The idea of modifying our example, so as to leave out the pill, was already discussed in the previous paragraph.

6 For a discussion of the enabling conditions of epistemic perception, see Cassam (2007, sec. 1.4), with various examples given, 37–38.

7 Here, too, keep in mind that testimony per se can be eliminated from our account.

3925 so, it accordingly makes the distance appear greater. This may not seem right.
3926 But let us recall what claim we are questioning: “If the subject’s evidence
3927 for the situation-dependent properties is defeated, then her evidence for the
3928 intrinsic properties is undercut [...]” (Schellenberg 2008, 77). We need to
3929 invoke a case where the evidence for the situation-dependent properties is
3930 defeated, but the evidence for the intrinsic properties is *not* undercut. Now,
3931 the worry is that if we invoke the evidence that, so to speak, *really* defeats the
3932 the subject’s evidence for the situation-dependent property, viz., from the first
3933 piece of testimony, then the evidence for the intrinsic properties *is* undercut.
3934 Yet surely the evidence from the combination of the first and the second items
3935 of testimony *also* defeats the evidence for the situation-dependent property,
3936 but without undercutting the evidence for the intrinsic property. We thus have
3937 a counterexample to the EDT.⁸

3938 **3 An Alternative Account of the Epistemic Dependence**

3939 Taking as my starting point this objection to EDT, I will proceed to offer an
3940 alternative account of what I take to be the pertinent epistemic dependence
3941 relation. This is not to say that there may not be other ways of tackling the
3942 objection; I will try to do it in a way that relates interestingly to Schellen-
3943 berg’s own approach and builds on aspects of it. So as to bypass the problem
3944 that arose for situation-dependent properties, I will formulate my account in
3945 terms of subjective appearance properties.⁹ Also, remember I pointed out that
3946 Schellenberg aims to give a kind of account of the nature of our perceptual

8 Reviewers of this paper have suggested that there might be yet another way to challenge my counterexample to EDT, viz., by arguing that even if the counterexample renders false the conditional that Schellenberg uses to argue for EDT, the EDT could still be true. However, I have difficulty seeing how this could be so. Assume that the conditional is false: the evidence for the relevant situation-dependent properties is defeated, but the perceptual evidence for the intrinsic properties, instead of being undercut in its entirety, is either rebutted or remains undefeated. What this means is that, in addition to the line of evidence from representations of situation-dependent properties, there must also be some other line of perceptual evidence for the intrinsic properties, by virtue of which one could have perceptual knowledge of intrinsic properties, while not having representations of the relevant situation-dependent properties. If this is so, perceptual knowledge of intrinsic properties is *not* epistemically dependent on representations of the relevant situation-dependent properties, i.e. EDT is false.

9 In her 2008 paper, Schellenberg speaks of appearance properties as subjective or mind-dependent (2008, 72). In a more recent paper, the terminology has shifted, and she and her co-author argue that appearance properties can be understood either in mind-dependent or mind-independent terms (Green and Schellenberg 2018).

3947 experiences, and yet, if rigorously spelled out, it instead seems to amount to
 3948 an account of the epistemology of our perceptual beliefs. I merely put forward
 3949 this thought as an observation, not, in any way, an additional objection to
 3950 Schellenberg's view. But I will re-phrase EDT in such a way that it really does
 3951 capture what I take to be a significant point about perceptual experiences:
 3952 *perceptual experience* of intrinsic properties is epistemically dependent on ex-
 3953 periences of the relevant appearance properties. This thesis—call it EDT*—I
 3954 take to be supported by the consideration that if the experiential evidence in
 3955 support of one's experience of an appearance property is either rebutted or
 3956 undercut, then a line of experiential evidence in support of one's perceptual
 3957 experience of an intrinsic property will be undercut. Likewise, absent the
 3958 experiential evidence warranting an experience of an appearance property,
 3959 there also fails to obtain a line of evidence warranting a perceptual experience
 3960 of an intrinsic property.

3961 The most pressing question our account would need to deal with is how we
 3962 can be mistaken about subjective appearance properties—to be able to make
 3963 sense of EDT* as being non-vacuous.¹⁰ This is, *prima facie*, a quite difficult
 3964 issue, but I believe we will be able to address it by drawing upon a Husserlian
 3965 view of perceptual experience, especially the ideas of fulfillment and disap-
 3966 pointment, i.e. kinds of experiential confirmation and disconfirmation. Let
 3967 us briefly sketch this view.¹¹ On the assumption that the back sides of objects
 3968 are perceptually experienced by us, the experience, the presence, of the back
 3969 side must clearly be phenomenally different from that of the front side. To
 3970 mark this distinction, let us call the experience of the front side “full” and
 3971 the experience of the back side “empty.” Now we can also call the transition
 3972 from “empty” to “full” experience, e.g. as I turn the object around, “fulfill-
 3973 ment.” We can think of such fulfillment as a gradually cumulative process, as
 3974 I examine the object in various ways. It yields a view that we can extend to
 3975 our perceptual experience of the different perceptual properties, e.g. shape,
 3976 size and color, not just as a way to think about the experience of the object's

It also needs to be said that, in speaking of appearance properties, I am using the term “property” differently from Husserl. Husserl speaks about properties (*Eigenschaften*) in a more restrictive sense that would not be applicable to size, shape, or color appearances (1989, sec. 1, chapter 2).

10 Schellenberg believes that we cannot be mistaken about subjective, mind-dependent appearance properties (2008, 74). (To remind the reader, Schellenberg's situation-dependent properties are conceived as objective, mind-independent.)

11 For a detailed, authoritative introduction to Husserl's view of perceptual experience, including a discussion of the significance of fullness and emptiness, see Bernet, Kern and Marbach (1993, chap. 4).

3977 back sides vs. front sides.¹² On the Husserlian view, the “empty” experience is
3978 conceived entirely in terms of more or less tacit anticipations of ways in which
3979 the experience might continue, or, as we might put it, anticipations of fullness.
3980 Indeed, according to this view, the presence of objects and their aspects in
3981 perceptual experience is conceived entirely in terms of such anticipations of
3982 fullness, realizing the fulfillment conditions for these objects and their aspects.
3983 We can thus say that the contents of perceptual experience are fulfillment
3984 conditions, rather than, say, accuracy conditions, which a certain mainstream
3985 view takes them to be. (Here, we need not argue that this mainstream view is
3986 in any ways problematic or even untenable.)¹³

3987 I will illustrate certain salient aspects of our Husserlian view with a quo-
3988 tation from Husserl, viz., informing us that the perceptual object is given
3989 through “adumbrations” (*Abschattungen*), i.e. perspectival appearances, with
3990 the present adumbrations always pointing to the ones to come, insofar as the
3991 perceiver anticipates them, and it is by virtue of the having and fulfillment
3992 of such anticipations that one’s experience of the object’s front side can be
3993 integrated into an “omni-sided” experience,

3994 If, [...] in a perception, the series of appearances runs its course in
3995 continuous unity, then the first determination of the change, the
3996 so-called differential of movement, already defines the “direction”
3997 of the course, and thereby is given a system of intentions that
3998 are continuously setting out and continuously getting fulfilled.
3999 In normal perception, these are anticipatory intentions. (The se-
4000 ries of appearances is dominated by a certain teleology.) Every
4001 phase refers to the following one. That, of course, should not be
4002 taken to mean that we focus on the appearances, since we are
4003 indeed directed to the object as the perception flows on. But every
4004 adumbration is precisely an adumbration of the square; every
4005 one “brings the square to appearance,” but each in a different
4006 way. And every one brings to appearance something that previ-

12 It has been argued that Schellenberg’s idea of a situation-dependent property will not so readily generalize from size properties to other, e.g. shape, properties (Jagnow 2012, sec. 2).

13 For a discussion of perceptual contents as accuracy conditions, see Siegel (2010, pt. 1).

Should anybody, at this stage, express the worry that our fulfillment-based view is a phenomenalist or an idealist one, whereas Schellenberg is concerned with accommodating perspectival perception as part of a realist account, we may reply that there are renowned Husserl scholars who regard such a view as realist, or at least compatible with realism. See, e.g. Crowell (2013, 16, 18), and Drummond (1990, 264–270).

4007 ously did not appear, not precisely that way. In addition, each
 4008 one points forward: in the stream of appearances, the stream of
 4009 objective adumbrations, we feel ourselves drawn on from adum-
 4010 bration to adumbration; each one points forward objectively in a
 4011 continuity, and in this forward referral, the adumbration is an in-
 4012 timation of what is now coming, and the intimation, the allusion,
 4013 the intention, is fulfilled. The one-sided view opens out to what
 4014 is “omni-sided.” Already in the case of a single determination, we
 4015 experience what this determination is, not in the one view with its
 4016 single adumbration, although it indeed stands there as self-given,
 4017 but only by traversing the adumbrations, whereby the determina-
 4018 tion is brought to a complete, “omni-sided” givenness. And this
 4019 complete givenness is constituted in the consciousness of unity
 4020 which produces a perpetual fusion of intention and fulfillment.
 4021 (1997, 86–87)

4022 Having thus presented the basics of our Husserlian view, let us return to
 4023 the issue of how to make sense of our being mistaken about appearances.
 4024 According to our view, objects and their intrinsic properties are present to us
 4025 in terms of structured series of appearances, past, present, and future. The
 4026 future appearances are experienced by virtue of certain anticipations. There
 4027 is, of course, considerable leeway concerning what exactly one may be antic-
 4028 ipating while having a perceptual experience, say, of a red ball, but insofar
 4029 as the object is indeed experienced as being red, and as being a ball, and in
 4030 certain experiential circumstances rather than others, there are constraints on
 4031 the anticipations. Moreover, the thus constrained anticipations can be disap-
 4032 pointed (yielding disappointments of the relevant perceptual experience). My
 4033 point is that we can be wrong about appearances qua anticipated appearances.
 4034 Insofar as we are pursuing a certain structured line of appearances, e.g. in
 4035 perceptually experiencing a red ball, we are achieving fulfillments which
 4036 constitute the experiential evidence for certain upcoming appearances. If a
 4037 different appearance turns up, incompatible with these anticipations, it rebuts
 4038 the evidence based on which we had formed our anticipations, leading to the
 4039 formation of other anticipations, and to a re-configuration of our experience
 4040 in terms of another constellation of fulfillment conditions.

4041 Someone might object to these remarks by suggesting that perceivers do not,
 4042 in fact, anticipate appearances. Instead, they may have anticipations about the
 4043 objects that they perceive. In reply, perceivers can indeed have anticipations

4044 about the objects they perceive, but on the present view, the givenness of
4045 these objects is accounted for in terms of other anticipations that are not
4046 about objects but appearances, amounting to a condition of possibility of our
4047 perceptually experiencing objects. Such are the anticipations that Husserl
4048 speaks about in the above block quotation. As we have just learned, his ac-
4049 cording a role for these anticipations and appearances “should not be taken
4050 to mean that we focus on the appearances, since we are indeed directed to the
4051 object as the perception flows on” (1997, 86). Nevertheless, reflection can re-
4052 veal the requisite anticipations and their fulfillments as aspects of perceptual
4053 experience.

4054 Having spoken about the disappointment of tacit anticipations concerning
4055 appearances, we now turn to the disappointment of perceptual experiences
4056 themselves. Insofar as EDT* is about the undercutting of experiential evidence
4057 for intrinsic properties, it may not be very clear how it could be understood in
4058 terms of the Husserlian language of disappointments, because superficially it
4059 may seem that the Husserlian disappointment is in all cases basically a kind
4060 of rebuttal, rather than undercutting. Prima facie, the disappointment seems
4061 to consist in one’s realizing, e.g. as the light changes, or as one takes a closer
4062 look, that what one took to be a red object, is really a green one, or that what
4063 one took to be a large object, is actually a small one.¹⁴ This seems like a kind
4064 of rebuttal: e.g. the object cannot be red, despite appearing to be red before,
4065 in view of the new evidence that we just received, in the improved lighting,
4066 to the effect that it is green.¹⁵

4067 However, this cannot be the general account of disappointments, insofar as
4068 a disappointment with regard to the object’s redness does not necessarily yield
4069 an experience of the object as having some other color, such as green. It can
4070 also give way to a more or less deep perceptual confusion, or indeterminacy,
4071 where one is not sure what color one may be seeing. The nature of a disap-
4072 pointment does not consist in a rebuttal by a new perceptual constellation,
4073 but, rather, in the interruption of a series of appearances that was projected to
4074 continue into the future, even infinitely. The disappointment of a perceptual
4075 experience involves a kind of rebuttal, viz., of the anticipated appearance,

14 To be clear, this is how Husserl himself describes some cases of disappointment. See e.g. (1973b, 88). I am not claiming that these are not really disappointments. Instead, I argue that not all aspects of such cases are necessary for a disappointment (in the Husserlian sense).

15 A rebuttal, say, of a hypothesis, does not generally require that one produce a superior alternative hypothesis. In our case, however, the rebutting evidence would, by the same token, also support an alternative “hypothesis.”

4076 yet does not itself consist in a rebuttal, but in an undercutting. The evidence,
 4077 e.g. for redness, is corrupted or compromised, rather than just outweighed by
 4078 new evidence. The fulfillment conditions for redness yield a set of structured
 4079 infinite series of color appearances, ways in which one's experience of red can
 4080 go, and any finite series of color experiences constitutes evidence for redness
 4081 insofar as it forms part of any such infinite series. But once an appearance
 4082 turns up that does not fit into such an infinite series, the support from the
 4083 foregoing appearances is lost. Indeed, they are typically incorporated into
 4084 another series, e.g. one consistent with the fulfillment conditions for green-
 4085 ness. Thus, Husserl argues that, in such a situation, a modification "takes
 4086 place *retroactively* in the totality of the preceding series," e.g. as "the earlier
 4087 apprehension, which was attuned to the harmonious development of the" red
 4088 and uniformly round," is implicitly "reinterpreted" to "green on one side and
 4089 dented" (1973b, 89).

4090 Apart from the above point concerning the inapplicability of the idea of
 4091 rebuttal, what other reason is there to believe that this is an adequate account
 4092 of the phenomenon of perceptual disappointment? While there are, presum-
 4093 ably, both gradual and abrupt disappointments, it seems to me
 4094 that if disappointment were regarded as fundamentally a kind of rebuttal, the
 4095 paradigmatic case would have to be that of a gradual disappointment, as new
 4096 evidence emerges and gradually outweighs the previously existing evidence.
 4097 But I think that in the paradigmatic cases the defeat is abrupt, e.g. as one just
 4098 suddenly sees that the shape, size or color is not as one took it to be. This
 4099 suggests that we are dealing with an undercutting: the existing evidence is
 4100 vitiated by a new development.

4101 But why should the cases of an abrupt disappointment, and not the others,
 4102 be regarded as paradigmatic? One way to think about it is that the abrupt cases
 4103 most straightforwardly realize the principle at work, viz., fullness prevailing
 4104 over emptiness. Absent other considerations, present appearances win out
 4105 against ones that have sunk back into the past—underscoring the fact that
 4106 we do not adjudicate first-personal evidence from some detached perspective
 4107 but respond to it, so to speak, from the midst of things, where this just means
 4108 that present fullness impresses itself upon our consciousness in a privileged
 4109 way. None of this militates against the consideration that if we add on other
 4110 factors, e.g. the inertia of habit, or cognitive penetration, the past appearances
 4111 may prove resilient, resistant to undermining.

4112 We can now see that it is possible to make sense of EDT* in terms of the
 4113 Husserlian view: if the experiential evidence for the appearance properties

4114 is defeated, the pertinent evidence for the intrinsic properties will be under-
4115 cut. Therefore, perceptual experience of intrinsic properties is epistemically
4116 dependent on experiences of the relevant appearance properties. Thus con-
4117 ceived, EDT* is a compelling claim about the nature of perceptual experience
4118 and perceptual presence. Before, we did not look very deep into whether
4119 the problem highlighted by our counterexample was due to the idea of a
4120 situation-dependent property specifically, or the idea of a mind-independent
4121 perspectival property more generally, but with our view we have distanced
4122 ourselves from all such conceptions, and refrained from attempting to purge
4123 our conception of the perspectival nature of perceptual experience, of sub-
4124 jective ingredients. Our subjectivization of perspectival properties has the
4125 effect of rendering it more difficult (though not impossible, as we have seen)
4126 to defeat the experiential evidence in favor of them. It should therefore be
4127 unsurprising that it is now also more difficult to conceive of a case where the
4128 evidence for the perspectival property is defeated, but the relevant evidence
4129 for the intrinsic property is not. Indeed, I cannot think of a way to do it. Our
4130 above counterexample to Schellenberg's view has no bite against the present
4131 view. If, as in our scenario, I ingest a pill and it alters my experience so that
4132 the tree perspectivally appears the same height as the length of half a pencil
4133 in my outstretched hand, instead of how it might otherwise have appeared,
4134 then this is the perspectival property in terms of which the intrinsic height of
4135 the tree is experienced, consistent with the idea that the latter is epistemically
4136 dependent upon the former. By contrast, if we were experiencing the tree in
4137 terms of a series that led us to anticipate its appearing the same height as
4138 the length of half a pencil in our outstretched hand, and it surprised us by
4139 appearing otherwise, then the evidence for this perspectival height would be
4140 defeated, but so would the evidence for the relevant intrinsic height—unless
4141 the system of appearances associated with this intrinsic height allows for
4142 greater perspectival variety, at this juncture.

4143 We have seen that, on the present view, perceptual experiences can be
4144 either supported or undermined by experiential evidence, in sharp contrast
4145 with the more commonly held view that perceptual experiences can *provide*
4146 evidential support for beliefs, but not *receive* evidential support themselves.¹⁶
4147 This amounts to the view that perceptual experiences are rational, in the
4148 sense of being responsive to evidence—providing a way to render cogent
4149 Schellenberg's talk of a relation of epistemic dependence between perspectival

16 For a discussion of this topic, see Siegel (2017).

4150 and intrinsic properties, in perceptual experience.¹⁷ To be sure, we cannot
 4151 revise our perceptual experiences in quite the same ways that we can revise
 4152 our beliefs. Nor can we choose, or decide, to be disappointed. Nevertheless,
 4153 we can be responsive to experiential evidence in choosing where to take our
 4154 perceptual experience, which fulfillments to seek and how to render ourselves
 4155 open to disappointments. In these regards, we can be praise- or blameworthy
 4156 as perceivers.

4157 In this paper, we have built towards the idea of the rationality of perception
 4158 by invoking considerations specific to perceptual experience, but be it said
 4159 that our position conforms with Husserl's general view of intentionality. For
 4160 Husserl, every kind of intentional experience is associated with kinds of
 4161 evidence which could support it by bringing the pertinent object or objectivity
 4162 to fullness, which he also refers to as original givenness or self-givenness, "*The*
 4163 *concept of any intentionality whatever*—any life-process of consciousness-of
 4164 something or other—and *the concept of evidence, the intentionality that is*
 4165 *the giving of something-itself, are essentially correlative*" (1969, 160). Husserl
 4166 further elaborates on this point in relation to the idea of objectivity as such,

4167 *Category of objectivity and category of evidence are perfect correlates.*
 4168 *To every fundamental species of objectivities*—as intentional unities
 4169 maintainable throughout an intentional synthesis and, ultimately,
 4170 as unities belonging to a possible "experience"—*a fundamental*
 4171 *species of "experience," of evidence, corresponds*, and likewise a
 4172 fundamental species of intentionally indicated evidential style in
 4173 the possible enhancement of the perfection of the having of an
 4174 objectivity itself. (1969, 161)

4175 It is a natural and well-known part of this picture that perceptual experiences
 4176 provide the requisite evidence for our beliefs and judgments, but we must
 4177 not neglect the fact that perceptual experiences themselves harbor emptiness,
 4178 which they can overcome (though never entirely) as they unfold through time.
 4179 This shows perceptual experiences to be self-supporting, viz., by fulfillment.

17 The present view of the rationality of perception bears considerable similarities to Susanna Siegel's ideas regarding the same topic (2017). I have already explored this connection elsewhere (cf. Laasik 2021).

4184 Conclusion

4181 Susanna Schellenberg argues for the situation dependency thesis (SDT); one of
 4182 her arguments is by appeal to the epistemic dependence thesis (EDT), a claim
 4183 of a kind of asymmetry of both defeat and warrant, which she phrases in terms
 4184 of situation-dependent properties. I have objected to EDT by counterexample,
 4185 and circumvented the objection by re-phrasing EDT as EDT*, viz., in terms of
 4186 subjective appearance properties, rather than situation-dependent properties.
 4187 I have developed this view as an aspect of a Husserlian view of perceptual ex-
 4188 perience, involving the ideas of fulfillment and disappointment. The view has
 4189 the intriguing upshot that perceptual experience is rightly viewed as rational,
 4190 viz., as responsive to experiential evidence—enabling us to deepen Schellen-
 4191 berg’s central concern with the epistemic significance of the perspectivity of
 4192 experience.*

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