

Modal Conceptions of Essence

Alessandro Torza

Forthcoming in: Koslicki, K. and Raven, M. J. (eds) *The Routledge Handbook of Essence*.
Routledge.

Word count: 9,440

Abstract: Philosophers distinguish between having a property essentially and having it accidentally. The way the distinction has been drawn suggests that it is modal in character, and so that it can be captured in terms of necessity, or cognate notions. The present chapter takes the suggestion at face value by considering a number of modal characterizations of the essential/accidental distinction that have been articulated and discussed since the early 20th century, as well as some of the challenges that they face.

1. Introduction

Philosophers traditionally distinguish between having a property essentially rather than accidentally—or being in a certain way essentially rather than accidentally, if property talk is to be avoided. Socrates is essentially human and accidentally Xanthippe’s husband. Water is essentially the substance with chemical structure H₂O and accidentally the substance that humans drink to survive. The number 2 is essentially prime and accidentally the number of kings of Sparta at any time during the 5th century BC. The singleton set {Steve Jobs} essentially contains Steve

Jobs and accidentally contains a co-founder of Apple Computer. Somewhat more controversially, humans have their actual parents essentially and their actual jobs accidentally.

The aforementioned examples suggest that the distinction between a thing's essential and accidental properties is modal in character. Because Socrates and Xanthippe might never have met, he could have failed to be her husband, but not to be human. Because there might have been no humans on Earth, water could have failed to be the substance that we drink to survive, but not to have chemical structure H_2O . And so on and so forth. The present chapter takes the suggestion at face value by considering a number of modal characterizations of the essential/accidental distinction that have been articulated and discussed since the early 20th century, as well as some of the challenges that they face.

2. Modality

Modal talk involves expressions such as “necessary”, “possible” and “contingent”, as well as their derivatives. For the purpose of regimenting modal statements, we will employ the language of first-order logic with the addition of two monadic sentential operators: **N** (it is necessary that) and **P** (it is possible that).

The standard interpretation of the resulting first-order modal language is based on (Kripke 1963), which draws on the Leibnizian idea that necessary truth amounts to truth at all worlds, and possible truth amounts to truth at some world. Kripke's theory has two built-in assumptions. One is ontological: individuals can exist across worlds. The other is semantic: individual constants (proper names) are *rigid*, i.e., they refer to the same individual across worlds.

Truth-at-a-world is defined as expected, except for sentences governed by quantifiers or modal operators:

[K \forall] $\forall x\varphi$ is true at world u iff φ is true of every individual existing at u .

[K \exists] $\exists x\varphi$ is true at world u iff φ is true of some individual existing at u .

[KN] $\mathbf{N}\varphi$ is true at world u iff φ is true at every world accessible to u .

[KP] $\mathbf{P}\varphi$ is true at world u iff φ is true at some world accessible to u .

Accessibility is intended as a relation of relative possibility: for v to be accessible to u is for v to be possible from u 's "viewpoint". Unless stated otherwise, it will be assumed that the relation is universal (i.e., that every world is accessible to every world), so that \mathbf{N} captures absolute necessity. Under this assumption, the accessibility relation may be omitted.¹

Once truth *simpliciter* is identified with truth at the actual world, Kripke semantics will output biconditionals such as the following:

- a. "Necessarily, all Greeks are human" (i.e., $\mathbf{N}\forall x(Gx \rightarrow Hx)$) is true iff, at every world, all Greeks are human.
- b. "Aristotle could have been Spartan" (i.e., $\mathbf{P}Sa$) is true iff, at some world, Aristotle is Spartan.
- c. "Some possible cat is necessarily a mammal" (i.e., $\mathbf{P}\exists x(Cx \wedge \mathbf{N}Mx)$) is true iff, at some world, there is a cat such that, at every world, it is a mammal.

A crucial distinction is the one between *de dicto* statements, which say of a proposition (*dictum*) that it is necessary/possible, and *de re* statements, which say of an individual (*res*) that it has some property necessarily/possibly. The distinction may be characterized syntactically in the following manner: a statement is *de re* if either it contains an individual constant within the scope of a modal operator, or it quantifies into the scope of a modal operator; otherwise it is *de dicto*. Thus, "Necessarily, all Greeks are human" is *de dicto* insofar as it ascribes necessity to the proposition

that all Greeks are human. On the other hand, “Aristotle could have been Spartan” is *de re* since it ascribes the property of possibly being Spartan to Aristotle. “Some possible cat is necessarily a mammal” is also *de re* in that it ascribes the property of necessarily being a mammal to some possible cat.

Let us say that a predicate “*P*” is *de re* if the application of “*P*” to an individual constant produces a *de re* statement. Modal conceptions of essence share the core idea that something is essentially so and so just in case it satisfies a suitable *de re* predicate. The way such a predicate is specified is what distinguishes the various modal conceptions of essence.

3. Classical modalism

The modal conception of essence with the longest pedigree, *classical modalism*, is also the conceptually most parsimonious: it characterizes the meaning of the predicate “is essentially *P*” purely in terms of “*P*” and the vocabulary of standard quantified modal logic. Here are four such characterizations, of increasing logical strength, of what it is for something *t* to be essentially *P*:

CONDITIONAL $\mathbf{N}(\exists x(x = t) \rightarrow Pt).$ ²

UNCONDITIONAL $\mathbf{N}Pt.$

WEAK BARCAN $\mathbf{N}Pt \wedge \exists x \sim \mathbf{N}Px.$

STRONG BARCAN $\mathbf{N}Pt \wedge \exists x(Px \wedge \sim \mathbf{N}Px).$

The first two characterizations are far and away the most popular in literature from the last 100 years (Forbes 1985; Kripke 1980; Lewis 1968, 1986; Moore 1920; Paul 2006; Plantinga 1974; Quine 1953), although they can be found either directly or indirectly throughout the history of philosophy arguably as far back as Aristotle’s *Topics* (102b6-7) and *Metaphysics* (1019a1-4), cf.

the chapters *Origin Essentialism* and *Essence: Ancient* for discussion. When interpreted in terms of Kripke semantics, CONDITIONAL says that Socrates is essentially a human iff he is a human at every world where he exists, whereas UNCONDITIONAL says that Socrates is essentially a human iff he is a human at every world. Choosing CONDITIONAL over UNCONDITIONAL comes down to whether one accepts (Hanson 2018; Plantinga 1985, Stephanou 2007) or rejects (Fine 1985; Kripke 1963; Pollock 1985) the thesis of *serious actualism*: that something can have a property only if it exists. For UNCONDITIONAL and serious actualism jointly entail that Socrates is essentially human only if he necessarily exists, which runs against the deep-seated intuition that humans are contingent beings. Thus, the essentialist who adopts UNCONDITIONAL is going to either reject serious actualism, or abandon intuition and embrace *necessitism*, the radical view that necessarily everything necessarily exists (Linsky and Zalta 1994; Williamson 2013).

Now, call *essentialism* the thesis that something is essentially P , for some predicate “ P ”. There is a worry that neither CONDITIONAL nor UNCONDITIONAL is able to capture essentialism as the substantive metaphysical thesis motivated by such examples as the ones from sec. 1. In order to see this, consider the following predicates (read “ $x \leq y$ ” as “ x is a part of y ”, i.e., “either x is a proper part of y or x is identical with y ”):³

$$P_1z =_{def} \exists x(x = z).$$

$$P_2z =_{def} z = z.$$

$$P_3z =_{def} z = t.$$

$$P_4z =_{def} z \leq t.$$

Because the result of substituting “ P_1 ” for “ P ” in CONDITIONAL is $\mathbf{N}(\exists x(x = t) \rightarrow \exists x(x = t))$, which is a truth of modal logic, CONDITIONAL-essentialism turns out to be trivially true. Likewise, substituting “ P_2 ” for “ P ” in UNCONDITIONAL yields the logical truth $\mathbf{N}(t = t)$, hence

UNCONDITIONAL-essentialism is also trivially true. To avoid this result, some have looked for stronger characterizations of essentialism (Marcus 1967; Parsons 1967). For example, WEAK BARCAN is not made automatically true by either “ P_1 ” or “ P_2 ”, since it requires of an essential property that it not be shared by all things. Nevertheless, WEAK BARCAN-essentialism is nearly trivialized insofar as “ P_3 ” yields $\mathbf{N}(t = t) \wedge \exists x \sim \mathbf{N}(x = t)$, which is true just in case t is not the only existent.

On the other hand, STRONG BARCAN appears to be immune to (near) trivialization, since it is not satisfied by any of “ P_1 ”, “ P_2 ” or “ P_3 ”. A candidate satisfier of STRONG BARCAN-essentialism is the predicate “ P_4 ”. For on the common-sense assumption that objects may gain and lose parts, if t is not a mereological simple then the substitution instance $\mathbf{N}(t \leq t) \wedge \exists x(x \leq t \wedge \sim \mathbf{N}(x \leq t))$ is true: the first conjunct follows from $\mathbf{N}(t = t)$, whereas the second conjunct is true insofar as t has at least some of its parts contingently. However, “ P_4 ” does not (nearly) automatically satisfy STRONG BARCAN, since it is not a truth of modal logic that parthood is a contingent relation—a thesis that can be, and has been rejected for at least some classes of objects (Chisholm 1973).

The issue with STRONG BARCAN is that it is arguably too strong. For the essentialist wants to be able to assert that 2 is essentially prime. Given STRONG BARCAN, we get that 2 is necessarily prime and something is contingently prime. Yet, we would be hard pressed to find a prime number that could be the product of two smaller natural numbers. The underlying issue is that STRONG BARCAN flies in the face of the intuition that the property of being prime is necessary to anything that has it.

A modal characterization that aims to be neither trivial nor too strong is the *Discrimination-Based Account* of essence, cf. (De 2020).⁴ On this view, t is essentially P iff (i) t is CONDITIONAL-essentially P , and (ii) there is no property X that is CONDITIONAL-essential to everything, and such

that t 's being P is identical with t 's being X . If quantification into predicate position is allowed, and ' \equiv ' expresses higher-order identity, the condition can be expressed thus:

$$\text{DBA} \quad \mathbf{N}(\exists x(x = t) \rightarrow Pt) \wedge \sim \exists X(\forall y\mathbf{N}(\exists x(x = y) \rightarrow Xy) \wedge (Pt \equiv Xt)).$$

This account is not trivialized by the aforementioned predicates, and it does not run into the problem affecting STRONG BARCAN. Nevertheless, DBA still appears to be too strong insofar as it is in tension with the conjunction of two generally accepted theses:

1. that having a property essentially is a noncontingent matter;
2. that necessity is noncontingent, as captured by the axiom schema 4, i.e. $\mathbf{N}\varphi \rightarrow \mathbf{N}\mathbf{N}\varphi$.⁵

For suppose that something t is DBA-essentially P in actuality, and let w be a possible world whose only denizen is t . By 2, it is true at w that $\mathbf{N}(\exists x(x = t) \rightarrow Pt)$ and so, since nothing exists at w other than t , that $\forall y\mathbf{N}(\exists x(x = y) \rightarrow Py)$. It follows that it is true at w that $\forall y\mathbf{N}(\exists x(x = y) \rightarrow Py) \wedge (Pt \equiv Pt)$, and so that $\exists X(\forall y\mathbf{N}(\exists x(x = y) \rightarrow Xy) \wedge (Pt \equiv Xt))$. Hence, t is not DBA-essentially P at w , against 1.⁶

A related issue is that the right conjunct of DBA makes essence extrinsic. For example, a sample of water t has structure H_2O DBA-essentially in actuality, yet it will not have it DBA-essentially at any world where t is the only object. Yet some essential properties are intrinsic, including water's microphysical structure, see (Correia 2006; Denby 2014), as well as the section *Hybrid Modalism* in this chapter.

Similarly, but without appealing to the axiom schema 4, it can be shown that WEAK BARCAN and STRONG BARCAN are also in tension with the necessity of essentiality. Because WEAK BARCAN, STRONG BARCAN and DBA do not fill their intended theoretical role, in the remainder of the chapter the discussion of classical modal views will be restricted to CONDITIONAL and UNCONDITIONAL, unless stated otherwise. It remains unclear whether there exists a suitable

characterization of essentialism that includes the metaphysically substantive cases while excluding properties had as a matter of logic.⁷

4. Identity across worlds

The very intelligibility of *de re* predication, and so of a modal distinction between essential and accidental properties was subject to an influential skeptical challenge due to Quine (1953), although the technical and philosophical work of Ruth Barcan Marcus and Saul Kripke among others went a long way toward rehabilitating *de re* modality. (See the chapter *Quine on Essence* in this volume.)

In particular, Kripke (1980) claims that “The question of essential properties so-called is [...] equivalent to the question of ‘identity across possible worlds’,” (p. 42) by which he means that UNCONDITIONAL-essentialism is intelligible just in case something exists at multiple worlds. The reasoning behind the claim may be reconstructed thus: if a statement of the form $\mathbf{N}Pt$ is truth-apt then, in virtue of its truth condition, we are committed to crossworld identities; conversely, if an individual t is one and the same across worlds, then it makes sense to ask about any predicate whether t satisfies it at each world, that is, necessarily. Insofar as identity—the relation that everything has with itself and nothing else—is “unproblematic” (p. 49), it follows that the intelligibility of essentialism and *de re* predication is likewise unproblematic, cf. (Plantinga, 1973). This line of argument has been resisted on multiple fronts, although less by modal skeptics than by philosophers who think that Kripke’s metaphysical picture is either incomplete or incorrect. Some have indeed argued that the intelligibility of essentialism does not entail the existence of crossworld individuals. In particular, Lewis (1986) has defended *genuine modal realism*, the view

that alternative worlds are just as concrete as the actual one, and pairwise disjoint. Because the individuals of this pluriverse are worldbound, Lewis specifies the truth conditions of modal statements in terms of a counterpart relation, rather than identity: the counterparts of something t at world w are the denizens of w that most resemble t .⁸ According to *counterpart theory* (Lewis 1968), “Socrates is necessarily a mammal” is true iff, for every world w and every w -counterpart Socrates* of Socrates, Socrates* is a mammal. Due to its greater generality compared to Kripke semantics, counterpart theory has been defended in some form or another also by philosophers who accept identity across worlds and reject genuine modal realism (Fara 2008; Forbes 1985; Hazen 1979; Stalnaker 2003; Varzi 2020; Wang 2015). The possibility of interpreting first-order modal language in counterpart-theoretic terms shows that the intelligibility of *de re* predication in general, and of a modal conception of essence in particular, can be decoupled from an ontology of crossworld individuals.

Kripke (1980, p. 45 fn. 13) dismissed counterpart theory on the grounds that it incorrectly entails that “if we say ‘Humphrey might have won the election’... we are not talking about something that might have happened to Humphrey but to someone else, a “counterpart”.” As Lewis (1986, p. 198) points out, however, the condition ‘ x has a counterpart that won the election’ is counterpart-theoretically equivalent with ‘ x might have won the election’, which is ascribed to Humphrey himself, not to his counterpart. Furthermore, under certain assumptions the counterpart theorist is even able to simulate an ontology of crossworld individuals in terms of *counterfactual identity*. For every world w and w -counterpart Socrates* of Socrates, Socrates is counterfactually identical with Socrates* iff, had w been actual, Socrates would have been Socrates* (Torza 2012). The counterpart theorist can counter Kripke’s animadversions by (i) casting the intuitions about identity across worlds in terms of counterfactual identity, and (ii) arguing that counterfactual

identity validates the same modal-logical theses (Leibniz's law, necessity of identity/distinctness, etc.) as strict identity.

An alternative avenue of resistance to Kripke's argument for the intelligibility of essentialism involves the idea that crossworld identity is not unproblematic insofar as it requires criteria of identification. These may be either epistemic criteria allowing us to know which object is which across worlds (Hintikka 1970), or qualitative individual essences grounding the identity of objects across worlds (Chisholm 1967).

Kripke (1980, p. 44) famously rejected criteria of identification across the board, arguing that worlds with built-in identities can be introduced by stipulation prior to any epistemic or metaphysical considerations. (See the chapters *Identity, Persistence, and Individuation*, and *The Epistemology of Essence*.)

5. *De dicto* essentialism

We have so far investigated the question of how to best characterize expressions of the form “*t* is essentially *P*,” and it turned out that *de re* modality appears to provide a natural way of doing so. The literature however treats as essentialist claims that do not have that form. Consider the following (Kripke 1980; Putnam 1973, 1975):

1. Necessarily, water is H₂O.
2. Necessarily, cats are mammals.

Both are regarded as essentialist claims: 1 says something about the essence of water, namely that its microphysical structure is H₂O, whereas 2 says something about the essence of cats, namely that they belong to the class *Mammalia* (cf. the chapter *Natural Kind Essentialism*.)

On the face of it, 1 is an instance of UNCONDITIONAL-essentialism, since it may be regimented as the *de re* statement

$$1.1. \mathbf{N}(w = h),$$

provided that “*w*” and “*h*” are singular terms for the water kind and the H₂O kind, respectively. However, the intended reading of 1 is typically about not the water kind, but water samples, that is

$$1.2. \mathbf{N}\forall x(Wx \rightarrow Hx),$$

where the predicates “*W*” and “*H*” pick out the water property and the H₂O property, respectively. Being *de dicto*, 1.2 does not ascribe a modal property to any individual, and so it is not an essentialist statement in the sense discussed so far.

The point is even more straightforward in the case of 2 given its standard first-order regimentation

$$2.1. \mathbf{N}\forall x(Cx \rightarrow Mx),$$

where the predicates “*C*” and “*M*” pick out the cat property and the mammal property, respectively. One might try to turn a statement like 1.2 into a *de re* statement by quantifying into predicate position, so as to express the idea that water and H₂O are properties such that having the former necessarily implies having the latter:

$$1.3. \exists X\exists Y(X \equiv W \wedge Y \equiv H \wedge \mathbf{N}\forall x(Xx \rightarrow Yx)).$$

However, all 1.3 says is that the actual cats are necessarily a subset of the actual mammals, which is not the intended meaning of 1, nor is it equivalent with 1.2.

In order to comply with usage, Mackie (2006, p. 13) suggests instead that a statement be regarded as essentialist just in case it is either *de re* essentialist (viz., UNCONDITIONAL/CONDITIONAL-essentialist) or it expresses an *a posteriori de dicto* necessity. Indeed, statements like 1.2 and 2.1 are quintessential cases of *a posteriori* truths, that is, truths that can only be known on the basis of

empirical evidence. One problem with Mackie's characterization is that it turns essentialism into a disjunctive phenomenon, in sharp contrast to what transpires from the literature, which by and large regards essence as a unified feature of reality.

A non-disjunctive characterization is forthcoming if one pays attention to the way *a posteriori de dicto* necessities are justified. As argued in (Salmon 1981, pp. 166–167), our belief that, necessarily, water is H₂O (i.e., 1.2) may be justified as follows, where “*Sxy*” stands for “*x* has the same microphysical structure as *y*”:

- a. *t* is a sample of H₂O (i.e., *Ht*).
- b. Necessarily, water has the same microphysical structure as *t* (i.e., $\mathbf{N}\forall x(Wx \rightarrow Sxt)$).
- c. If something is a sample of H₂O then, necessarily, what has the same microphysical structure as that is also a sample of H₂O (i.e., $\forall x(Hx \rightarrow \mathbf{N}\forall y(Syx \rightarrow Hy))$).
- d. Therefore, necessarily, water is H₂O (i.e., $\mathbf{N}\forall x(Wx \rightarrow Hx)$).

The conclusion (d) is validly inferred from a bit of empirical data (a) plus two *de re* modal statements (b, c). In particular, b states that it is UNCONDITIONAL-essential to *t* that it have the same microphysical structure as any water sample. Thus, the justification of the original *de dicto* necessity (1.2) involves essentialism in the standard *de re* sense.

This observation prompts the sketch of a characterization covering both *de dicto* and *de re* essentialism: a statement is essentialist iff it is a logical consequence of the conjunction of *de re* essentialist statements and a possibly empty set of non-*de re* statements.

6. Fine's objection to classical modalism

Aside from early skepticism about *de re* modality due to Quine, classical modalism established itself as the standard conception of essence for nearly three decades, until Fine (1994) formulated an objection that single-handedly upended the *status quo*.⁹ In order to streamline the discussion, let us focus on a particular characterization, namely CONDITIONAL. As will soon become clear, Fine's point carries over to a broad class of modal characterizations.

The main claim is that CONDITIONAL fails to provide a sufficient condition for the ascription of essence: something can be necessarily *P* if existent, without being essentially *P*. (Fine does not take issue with the necessity side of CONDITIONAL, see the chapter *Non-Modal Conceptions of Essence*).

The structure of the argument is remarkably simple. The main premise is that essence plays a definitional role: to define the nature of an object (equivalently: to define what an object is) amounts to providing a complete list of that object's essential properties. Not only has this idea a pedigree spanning the history of philosophy, from Aristotle (*Metaphysics*, 1031a1) to Kripke (1980, p. 124, 138)—it is also supported by the examples we have employed so far: it is in the nature of Socrates to be human; it is in the nature of water to have microphysical structure H₂O; it is in the nature of 2 to be prime; it is in the nature of {Steve Jobs} to have Steve Jobs as a member.

This premise is captured by the condition

[F1] If *t* is essentially *P*, then it belongs to the nature of *t* that it is *P*.¹⁰

Now, consider the following three predicates:

P_4z : =_{def} *z* is such that there are infinitely many prime numbers;

P_5z =_{def} *z* is distinct from the Eiffel Tower;

P_6z =_{def} *z* is a member of {Socrates}.

The second premise of the argument is that none of the properties expressed by the above three predicates belongs to the nature of Socrates. The claim is intuitively compelling: were we to spell out what it is for something to be Socrates, we might invoke facts about his DNA, or about the identity of his parents, but we would not invoke facts about prime numbers, or the Eiffel Tower, or set membership. By F1, it follows that

[F2] none of the properties expressed by P_4 - P_6 are essential to Socrates.

The third premise is that the properties expressed by P_4 - P_6 are necessarily had by Socrates if he exists. The claim is hardly controversial. Because it is necessarily the case that there are infinitely many prime numbers, Socrates is such that there are infinitely many prime numbers at any world where he is something.¹¹ Because distinctness is a necessary relation, Socrates is not identical with the Eiffel Tower at any world where he is something.¹² And because set membership is a necessary relation, Socrates is a member of his own singleton at any world where he is something.¹³ By CONDITIONAL, it follows that

[F3] each of the properties expressed by P_4 - P_6 are essential to Socrates,

which contradicts F2. Fine concludes that, if we wish to restore consistency, CONDITIONAL ought to be abandoned: in order for something t to have a property essentially, it does not suffice that t has that property necessarily if t exists.

CONDITIONAL's failure to capture essence has a precise diagnosis. The fact that, say, Socrates is a member of {Socrates} at all worlds is necessary because of the nature of set membership, not because of the nature of Socrates. To put it slightly differently, it is essential to {Socrates} that Socrates is a member of {Socrates} and, because of that, it is necessarily the case that Socrates is a member of {Socrates} if Socrates exists. But it is not essential to Socrates that Socrates is a member of {Socrates}. Thus, whereas the essentiality of membership is asymmetric, the necessity

of membership is not, cf. (Dunn 1990, p. 89–91). Necessity, and modality in general, is not sufficiently fine-grained to represent facts about essence.

This diagnosis leads to a generalization of Fine’s objection that undercuts not just CONDITIONAL, but classical modalism across the board. As shown in (Torza 2015), there is no way to define the meaning of “*t* is essentially *P*” purely in terms of “*P*” and the vocabulary of standard quantified modal logic, whether first-order or higher-order, compatibly with the following conditions:

- i. Socrates is not essentially a member of {Socrates};
- ii. {Socrates} essentially has Socrates as a member.

Some have reacted by casting doubt on the intuitions leading to F2, and so to the asymmetry of membership essentiality (i-ii). Livingstone-Banks (2017) sets up a dilemma: either such intuitions are pre-philosophical, in which case they lack epistemic weight;¹⁴ or they are philosophical, and so presuppose some alternative, nonmodal conception of essence, which makes them question-begging in an argument against classical modalism. He argues that the value of such intuitions is not in debunking classical modalism, but in motivating a definitional conception of essence; and that choosing this over the modal conception should be the result of systematic considerations about their respective theoretical virtues, rather than considerations about particular cases.

Cowling (2013) has pushed back against F1, arguing that the essence-nature link is negotiable. In support of that claim, he advances an alternative view that identifies the nature of an object with its *sparse* properties, i.e., the ones that characterize the world “completely and without redundancy” (Lewis 1986, p. 60). Sparseness plays a number of key metaphysical roles such as making for qualitative similarity, and determining facts about laws and causation. On the Lewisian picture, sparse properties are the maximally specific properties invoked by fundamental physics:

having a determinate value of mass, and having a determinate value of spin along a given direction are sparse; being green, and being the sum of two primes are not.

Sparseness and essentiality are orthogonal: Socrates's quantity of mass is sparse, though accidental to him, whereas humanity is essential to Socrates, though not sparse. By identifying a thing's nature with the sparse properties that thing instantiates, claims about Socrates's nature will fail to translate to claims about his essence, thus blocking Fine's *reductio*.¹⁵

Pockets of resistance notwithstanding, there is now near-universal consensus that classical modalism is materially inadequate.¹⁶ The remainder of the chapter is devoted to modal conceptions of essence that aim to meet the Finean challenge. (Alternative strategies are discussed in the chapter *Non-Modal Conceptions of Essence*.)

7. Sophisticated modalism

Efforts have been made to show that a purely modal characterization of essence is able to accommodate Fine's cases, as long as the modality involved is nonstandard. We will refer to such a strategy as *sophisticated modalism*. Although the distinction between standard and nonstandard modal notions is somewhat fuzzy, the two most prominent post-Finean purely modal conceptions of essence (to be discussed shortly) employ notions whose intended interpretation appeals to impossible worlds, which are not part of the standard toolbox of the semantics for modal logic.

The least that can be said about impossible worlds is that they are ways the world cannot be. This fact leaves open which impossible worlds there are. On the strictest view, there are none. On the most liberal view, each way the world cannot be is an impossible world. As will soon become

clear, in order for *impossibilia* to make room for a reply to Fine's objection, one must go for an intermediate view.¹⁷

One sophisticated modal conception involves counterfactuals, that is, conditionals of the form

if it was the case that φ then it would be the case that ψ ,

in symbols:

$\varphi > \psi$.

The standard semantics for counterfactuals yields the following truth condition (Lewis 1973; Stalnaker 1968):

[SL>] $\varphi > \psi$ is true at world u iff the possible φ -worlds that are closest to u are ψ -worlds.¹⁸

Closeness is a binary relation on worlds which, on its intended interpretation, is defined by qualitative similarity: closer worlds are more similar. (The relevant criteria of similarity are specified by the context of utterance). Thus, "if kangaroos had no tail, they would topple over" is true in actuality just in case the possible worlds more (relevantly) similar to ours where kangaroos have no tail are worlds where kangaroos topple over.

Brogaard and Salerno (2013) favor the following nonstandard truth condition instead:

[BS>] $\varphi > \psi$ is true at world u iff the possible or impossible φ -worlds that are closest to u are ψ -worlds,

provided that closeness is a binary relation on the class of all worlds, whether possible or impossible. The main rationale they offer for adopting BS> concerns counterpossibles, i.e., counterfactuals with impossible antecedents. SL> makes all counterpossibles, and so both of the following statements, vacuously true:

- i. If arithmetic was complete and consistent, it would prove its own consistency;
- ii. If arithmetic was complete and consistent, the moon would be made of cheese.

However, one may object that, on a fairly natural way of reasoning about impossible scenarios, (i) is true and (ii) false.

BS> offers a solution. If there are impossible worlds where arithmetic is both complete and consistent, the relevant closeness relation is such that the closest worlds where arithmetic is complete and consistent are worlds where arithmetic proves its own consistency, but the moon is not made of cheese. If that much is granted, BS> will make (i) true and (ii) false as desired.

Brogaard and Salerno argue that BS> can help define essence in a way that accommodates Fine's cases, given suitable assumptions about the closeness relation. On their characterization, t is essentially P iff t is CONDITIONAL-essentially P , and if nothing were P then t would not exist—that is:

COUNTERFACTUAL $\mathbf{N}(\exists x(x = t) \rightarrow Pt) \wedge (\sim\exists xPx > \sim\exists x(x = t))$.

Now consider again the predicate

$P_4z =_{def}$ z is such that there are infinitely many prime numbers

and assume that there are impossible worlds at which there are at most finitely many primes.

Because the closest such worlds need not be worlds where Socrates fails to exist, $\sim\exists xP_4x > \sim\exists x(x = \text{Socrates})$ is false. Thus, Socrates is not COUNTERFACTUAL-essentially such that there are infinitely many primes.

Let us turn to the predicate

$P_6z =_{def}$ z is a member of {Socrates}.

Assume that (A1) there are impossible worlds where Socrates does and {Socrates} does not exist; and that (A2) at every possible or impossible world, {Socrates} exists iff Socrates is a member of {Socrates}. Pick a closeness relation such that (A3) some impossible world where Socrates does and {Socrates} does not exist is at least as close as any possible world where Socrates (and so

{Socrates}) does not exist. A1-3 guarantee that among the closest worlds where nothing is a member of {Socrates}, and so Socrates is not a member of {Socrates}, is some impossible world where Socrates exists. Hence, $\sim\exists x(x \in \{\text{Socrates}\}) > \sim\exists x(x = \text{Socrates})$ is false, and Socrates is not COUNTERFACTUAL-essentially a member of {Socrates}.

By the same lights, {Socrates} COUNTERFACTUAL-essentially has Socrates as a member. For, as we already know, $\mathbf{N}(\exists x(x = \{\text{Socrates}\}) \rightarrow \text{Socrates} \in \{\text{Socrates}\})$ is true. Moreover, the closest worlds where nothing has Socrates as a member, and so Socrates is not a member of {Socrates} are, by A2, worlds where {Socrates} does not exist. That is, $\sim\exists x(\text{Socrates} \in x) > \sim\exists x(x = \{\text{Socrates}\})$ is true. It can be concluded that, given A1-3, COUNTERFACTUAL entails the asymmetry of membership essentiality.

The Brogaard-Salerno route ultimately appears to be inadequate, however. First, it is not clear that a closeness relation satisfying A3 is the relevant one, since it flouts the thesis that every possible world is closer than any impossible world (Mares 1997), as well as the thesis that similarity in matters of (e.g., set-theoretic) laws has more weight than similarity in matters of particular fact (Lewis 1979; Steward 2015).

Second, consider the predicate

$P_5z =_{def} z$ is distinct from the Eiffel Tower.

In order for Socrates not to be COUNTERFACTUAL-essentially distinct from the Eiffel Tower, $\sim\exists x\sim(x = \text{Eiffel Tower}) > \sim\exists x(x = \text{Socrates})$ needs to be false, which in turn requires that some of the closest worlds at which the Eiffel Tower is all there is are worlds where Socrates exists. However, at such worlds the Eiffel Tower is identical with Socrates, a scenario that is arguably less, not more similar to actuality than one where the Eiffel Tower does and Socrates does not exist (Steward 2015).

Third, and most importantly, COUNTERFACTUAL fails with respect to a close variant of Fine's Socrates example, namely when modalized properties are involved (Torza 2015). If Socrates is not essentially a member of {Socrates} because his essence does not involve sets, *a fortiori* he is not essentially such that necessarily he is a member of {Socrates} if he exists. However,

$$\text{iii. } \mathbf{N}(\exists x(x = \text{Socrates}) \rightarrow \mathbf{N}(\exists x(x = \text{Socrates}) \rightarrow \text{Socrates} \in \{\text{Socrates}\}))$$

is logically equivalent with $\mathbf{N}(\exists x(x = \text{Socrates}) \rightarrow \text{Socrates} \in \{\text{Socrates}\})$, which we know to be true. Moreover, the counterfactual

$$\text{iv. } \sim \exists x \mathbf{N}(\exists y(y = x) \rightarrow x \in \{\text{Socrates}\}) > \sim \exists x(x = \text{Socrates})$$

is also true. For, at every possible or impossible world, something satisfies the predicate $\mathbf{N}(\exists y(y = x) \rightarrow x \in \{\text{Socrates}\})$ iff it is Socrates. So, (iv) is equivalent with

$$\text{v. } \sim \exists x(x = \text{Socrates}) > \sim \exists x(x = \text{Socrates})$$

which is trivially true. Therefore, Socrates is COUNTERFACTUAL-essentially such that necessarily he is a member of {Socrates} if he exists, which flies in the face of the Finean wisdom.

An alternative sophisticated modal conception of essence, drawing on (Prior 1957), is articulated and defended in (Correia 2007). The proposal rests on a nonstandard semantics for modal discourse with three key ingredients:

Aboutness. Sentence φ is truth-evaluable at world u iff the objects that φ is about exist at u .¹⁹

A sentence is about the objects referred to by individual terms occurring in it. Accordingly, "Plato is a student of Aristotle" is about Plato and Aristotle, whereas "There are prime numbers" is about nothing. Also notice that "Socrates exists" and "Socrates is Socrates" are not truth-evaluable at a world where Socrates does not exist.

Priorean conditional. φ Prior-implies ψ ($\varphi \Rightarrow \psi$) iff the material conditional $\varphi \rightarrow \psi$ is true at every world where φ is truth-evaluable.

The Priorean conditional behaves nonclassically. Suppose that Phaenarete is Socrates' mother at all worlds where Socrates exists, and that Phaenarete exists at some world where Socrates does not. Then, "Socrates exists" Prior-implies "Phaenarete is a mother". However, "Phaenarete is not a mother" does not Prior-imply "Socrates does not exist", since there are worlds where Phaenarete exists but the material conditional "if Phaenarete is not a mother then Socrates does not exist" is not truth-evaluable, and so not true.

Worlds. The intended interpretation of the present semantics involves both possible and impossible worlds.

In particular, it is assumed that there are worlds where Socrates does but {Socrates} does not exist, as well as worlds where there are at most finitely many primes.

With that being said, Correia puts forward the following characterization: t is essentially P iff

PRIOR $\exists x(x = t) \Rightarrow Pt$.

So, t is PRIOR-essentially P just in case t is P at every possible or impossible world where t exists.

PRIOR-essentialism is what one obtains from CONDITIONAL-essentialism by replacing the strict conditional (i.e., $\mathbf{N}(\varphi \rightarrow \psi)$) with the Priorean conditional.

Given suitable assumptions about the nature of (im)possible worlds, PRIOR is able to accommodate Fine's three examples against classical modalism. Assuming that there are impossible worlds such that Socrates exists but there are at most finitely many primes, Socrates is not PRIOR-essentially such that there are infinitely many primes. Since there are possible worlds where Socrates does and the Eiffel Tower does not exist, Socrates is not PRIOR-essentially distinct from the Eiffel Tower. Assuming that there are impossible worlds where Socrates does and {Socrates} does not exist, Socrates is not PRIOR-essentially a member of {Socrates}; and assuming that every possible

or impossible world where {Socrates} exists is such that Socrates is a member of {Socrates}, {Socrates} has PRIOR-essentially Socrates as a member.

By not involving a relation of closeness between worlds, PRIOR avoids the first two difficulties that were leveled against COUNTERFACTUAL. What PRIOR is unable to avoid is the third difficulty involving modal properties. Indeed, every possible or impossible world u where Socrates exists is such that “if Socrates exists then necessarily there are infinitely many prime numbers” is truth-evaluable, and indeed true at u . It follows that Socrates is PRIOR-essentially such that necessarily there are infinitely many prime numbers.²⁰ But if the existence of numbers is irrelevant to Socrates’s essence, so is the necessary existence of numbers. Hence, Correia’s brand of sophisticated modalism fails to meet Fine’s challenge.

8. Hybrid modalism

An alternative approach to characterizing essence compatibly with Fine’s remarks employs a combination of both modal and nonmodal resources, which we may therefore call *hybrid modalism*. Strategies of this sort differ by which nonmodal notions are brought to bear on the issue. *Sparse modalism* (Wildman 2013) characterizes essence by means of standard modal logic augmented with the notion of sparseness. Like Cowling (2013), Wildman identifies the nature of an object with the sparse properties it instantiates; unlike Cowling, he accepts the link between nature and essence (F1). Moreover, Wildman agrees with the consensus view that something is essentially some way only if cannot exist without being that way. The upshot is that something t is essentially P iff

SPARSE t is CONDITIONAL-essentially P , and P is sparse.

The resulting view immediately appears to be overly restrictive. Water is essentially H₂O, yet the property of being H₂O is not invoked by fundamental physics, hence it is not sparse on the standard, Lewisian sense. To overcome the objection, the intended reading of SPARSE employs a looser notion of sparseness, articulated in (Schaffer 2004), such that for a property to be sparse is for it to be invoked by some scientific theory, whether fundamental or not. Thus, such properties as being H₂O, and being vertebrate are Schaffer-sparse, though not Lewis-sparse.

Sparse modalism so understood easily deals with some of Fine's cases. The property of being such that there are infinitely many primes, and the property of being distinct from the Eiffel Tower are not sparse, hence not SPARSE-essential to Socrates. On the other hand, the view runs into trouble with the asymmetry of membership essentiality. If set theory makes reference to any sparse property, the only plausible candidate is the one picked out by the theory's only primitive, namely the membership relation. So, both the property of being a member of {Socrates} and the property of having Socrates as a member are not sparse. It is therefore neither SPARSE-essential to Socrates that he is a member of {Socrates}, nor SPARSE-essential to {Socrates} that it has Socrates as a member.

Wildman thinks that the case of relational properties is best handled by a special-purpose clause such that s bears relation R essentially to t iff

$\text{SPARSE}_{\text{REL}}$ s is CONDITIONAL-essentially such that it bears R to t , and R is sparse.

(The condition generalizes to relations of higher adicity in the obvious fashion.)

But $\text{SPARSE}_{\text{REL}}$ is no improvement over SPARSE. For if membership is indeed a sparse relation, and assuming the standard thesis that membership facts are necessary conditionally upon the members' existence, then it is $\text{SPARSE}_{\text{REL}}$ -essential to Socrates that he is a member of {Socrates}, as well as $\text{SPARSE}_{\text{REL}}$ -essential to {Socrates} that it has Socrates as a member.

Wildman ultimately bites the bullet and defends a metaphysics of sets that makes all membership facts essential, thus rejecting the asymmetry of membership essentiality. Such a move is problematic on two counts. First, sparse modalism is explicitly motivated as a way of meeting the Finean challenge. Insofar as it fails to accommodate what is arguably the hardest part of that challenge, the view is dialectically unstable.

Second, the asymmetry of essentiality can also be detected in relations other than membership, which renders Wildman's views about the metaphysics of sets beside the point. Consider the *prima facie* plausible view that in order to define natural numbers it suffices to state the axioms of (second-order) Peano arithmetic, whereas the negative integers are defined out of the natural numbers by means of further axioms, e.g., that every $-n$ is such that $n + (-n) = 0$. It is then essential to -1 , but not to 1 , that $1 + (-1) = 0$. Consider now the dyadic relation of adding up to zero. If that relation is sparse, and given the necessity of mathematical facts, then it is both $\text{SPARSE}_{\text{REL}}$ -essential to 1 that $1 + (-1) = 0$, and $\text{SPARSE}_{\text{REL}}$ -essential to -1 that $1 + (-1) = 0$; if the relation is not sparse, then it is neither $\text{SPARSE}_{\text{REL}}$ -essential to 1 that $1 + (-1) = 0$, nor $\text{SPARSE}_{\text{REL}}$ -essential to -1 that $1 + (-1) = 0$. Either way, sparse modalism fails to predict the observed asymmetry of essentiality.

In order to capture such asymmetries, de Melo (2019) introduces the notion of *slot-relative sparseness*.²¹ The fact that Socrates is a member of $\{\text{Socrates}\}$ tells us everything about the way $\{\text{Socrates}\}$ is, but nothing about the way Socrates is. The fact that Anna loves Bob tells us something significant about the way Anna is, but very little about the way Bob is. These examples suggests that membership is sparse relative to the second but not the first slot, and that the loving relation is sparser relative to the first than the second slot.

Construing sparseness as a relation between a property and a slot makes room for a more fine-grained characterization of essence in the case of relational properties. According to *locally sparse modalism*, s bears relation R essentially to t iff

L-SPARSE_{REL} s is CONDITIONAL-essentially such that it bears R to t , and R is sparse relative to the slot occupied by s .

When suitable assumptions are in place, it follows that $\{\text{Socrates}\}$ is L-SPARSE_{REL}-essentially such that it has Socrates as a member, whereas Socrates is not L-SPARSE_{REL}-essentially a member of $\{\text{Socrates}\}$.

So far, so good. However, locally sparse modalism is bound to break down whenever applied to relations that, unlike membership, are not asymmetric. For if -1 is L-SPARSE_{REL}-essentially such that $1 + (-1) = 0$, the relation of adding up to zero must be sparse relative to its second slot. From this and the necessary fact that $-1 + 1 = 0$ it follows that 1 is L-SPARSE_{REL}-essentially such that $-1 + 1 = 0$, against the aforementioned remark that the essence of natural numbers is exhausted by the axioms of Peano arithmetic, and so does not involve negative integers.

The reason why locally sparse modalism flounders is that essentiality is a function of the relata, not of their position in a relation. As a consequence, the asymmetry of essentiality can be observed in asymmetric, as well as not asymmetric relations. In order to save the spirit of de Melo's proposal, sparseness should therefore be construed as a relation between a property and an object, not between a property and a slot. Whether such a view is tenable, and whether it can be motivated on independent grounds are yet unexplored questions.²²

Alternatively, instead of engineering a new notion of sparseness, one might look for some off-the-shelf relation between properties and objects that will play the suitable role. This route has been

undertaken by Bovey (2021), who puts forward a characterization of essence in terms of standard modal logic plus a relational notion of *intrinsicity*.²³

If something t is P , then t is intrinsically P if it is P in virtue of the way it is on its own; and it is extrinsically P if it is not intrinsically P , cf. (Bader 2013).²⁴ For example, every massy object is intrinsically massy; every unaccompanied object is extrinsically unaccompanied; and every massy object is intrinsically such that something is massy, whereas every nonmassy object is extrinsically such that something is massy.

Intrinsic modalism is the view that t is essentially P iff

INTRINSIC t is both CONDITIONAL-essentially P and intrinsically P .

The rationale behind the proposal is that part of what makes a property essential to a thing t is that the property is had by t no matter what everything else is like. The idea happens to track a good deal of our intuitions concerning what is essential rather than accidental: having chemical structure H_2O is had by a water sample independently of what surrounds it, whereas being married to Xanthippe is had by Socrates in virtue of what further entities are like, including Xanthippe.

The same intuition appears to underlie Fine's examples. Socrates is extrinsically, and so not INTRINSIC-essentially such that there are infinitely many prime numbers. Likewise, Socrates is extrinsically, and so not INTRINSIC-essentially distinct from the Eiffel Tower. The situation is (once again) trickier when it comes to capturing the asymmetry of membership essentiality. Socrates is a member of {Socrates} in virtue of the way both Socrates and {Socrates} are. Because {Socrates} is not a part of Socrates, Socrates is not a member of {Socrates} in virtue of the way Socrates is on his own. Therefore, Socrates is extrinsically, and so not INTRINSIC-essentially a member of {Socrates}.

Whether Socrates is a member of {Socrates} in virtue of the way {Socrates} is on its own depends on whether Socrates is a part of {Socrates}. On the standard, mereological notion of parthood, the parts of a set are its subsets, hence Socrates is not a part of {Socrates}. {Socrates} will then be extrinsically, and so not INTRINSIC-essentially such that it has Socrates as a member—against the desideratum. On a more liberal notion of parthood, however, the members of a set too are parts of the set (Fine 2010), which guarantees that the property of having Socrates as a member is had intrinsically by {Socrates}, and so that {Socrates} is INTRINSIC-essentially such that it has Socrates as a member.

Thus, with a modicum of fine-tuning, intrinsic modalism is able to accommodate Fine's examples. Whether the result generalizes is unclear, however. For we would like the proposal, jointly with suitable assumptions, to entail that -1 is, whereas 1 is not INTRINSIC-essentially such that $1 + (-1) = 0$. This in turn requires that $1 + (-1) = 0$ hold in virtue of the way -1 is on its own, and it does not hold in virtue of the way 1 is on its own. As to the former, one might argue as follows. Suppose that (*) if $f(m) = n$, then m is a part of n . Then, 0 is a part of 1 , since 1 is the result of applying the successor operation to 0 , and 1 is a part of -1 , since -1 is the result of applying the inverse operation to 1 . Assuming that the relevant parthood relation is transitive, it follows that the property of being such that $1 + (-1) = 0$ is intrinsic to -1 , as desired. However, since $1 = -(-1)$, (*) implies that -1 is a part of 1 . Because 0 is also a part of 1 , it follows that $1 + (-1) = 0$ holds in virtue of the way 1 is on its own, and so that 1 is INTRINSIC-essentially such that $1 + (-1) = 0$, contrary to our desideratum. The same kind of challenge will present itself *mutatis mutandis* with other asymmetric instances of essentiality.

Moreover, intrinsic modalism is straightforwardly incompatible with the essentiality of extrinsic properties. If Kripke (1980) and Salmon (1981) are right, everyone is essentially the offspring of

their actual parents, yet the property of being Phaenarete's son is extrinsic to Socrates (cf. the chapter *Origin Essentialism*). If Sider (2001) is right, we ought to regard the property of being human as extrinsic to everything that has it: something is human iff it is a maximal human-like object—on pain of falling prey to the problem of the many (Unger 1980). However, the consensus view is that Socrates is essentially human. The issue carries over to other sortal properties (cf. the chapters *Identity, Persistence, and Individuation*, and *Biological Species*).

The aforementioned examples suggest that intrinsic modalism, while providing a good approximation of the target notion, is overly restrictive. Now, INTRINSIC tells us that, in order for t to be essentially P , t 's being P concerns t on its own. Here is a way of relaxing that condition: in order for t to be essentially P , t 's being P concerns t , or any further things involved in the explanation of t 's existence. A view along these lines is articulated in (Rizzo 2022) by construing explanation in terms of the relation of metaphysical ground.²⁵

The resulting view, call it GROUND, accommodates the Finean cases, is compatible with the existence of extrinsic essences, and fares at least as well as intrinsic essentialism with respect to the other examples discussed in this section. Notably, it appears to capture the asymmetry involving the relation of adding up to zero. For, arguably, facts involving 1 ground the existence of -1 , and facts involving 0 ground the existence of 1. Ground being transitive, it follows that -1 is GROUND-essentially such that $1 + (-1) = 0$. On the other hand, facts involving -1 do not ground the existence of 1, hence 1 is not GROUND-essentially such that $1 + (-1) = 0$.

9. Conclusions

While the dominant view throughout the 20th century, classical modalism has been found wanting and then quickly set aside as a consequence of Fine's critique. Although essence is now widely regarded as more fundamental than necessity, and modality at large, two alternative strategies have been developed in order to meet the Finean challenge: sophisticated modalism, and hybrid modalism.

The jury is still out on whether either is able to draw the line between essential and accidental properties as required. If some variant or other of modalism were to prove successful, we could draw a twofold moral. On the one hand, we would have evidence against the currently mainstream view that essence is prior to modality. On the other hand, one should not conclude that Fine's point is unwarranted. For the gist of it is that the apparatus of standard modal logic is incapable of analyzing essence. So, any attempt at carrying out that analysis by either interpreting modality in a nonstandard fashion, or augmenting it with nonmodal machinery is going to be more grist to Fine's mill.

10. Related topics

For a discussion of relevant topics the reader may consult the following chapters from this volume:

- I.1 *Essence: Ancient*
- II.2 *Non-Modal Conceptions of Essence*
- II.4 *Natural Kind Essentialism*
- II.5 *Origin Essentialism*
- II.8 *The Epistemology of Essence*
- III.2 *Biological Species*

III.3 *Identity, Persistence, and Individuation*

IV.1 *Quine on Essence*

References

- Almog, J. (1991) "The What and the How," *The Journal of Philosophy*, 88 (5):225–244.
- Bader, R. M. (2013) "Towards a Hyperintensional Theory of Intrinsicity," *The Journal of Philosophy*, 110 (10):525–563.
- Berto, F. and Jago, M. (2013) *Impossible Worlds*. Oxford: Oxford University Press.
- Bovey, G. (2021) "Essence, modality, and intrinsicity," *Synthese*, 198 (8):7715–7737.
- Brogaard, B. and Salerno, J. (2013) "Remarks on counterpossibles," *Synthese*, 190 (4):639–660.
- Chandler, H. S. (1976) "Plantinga and the Contingently Possible," *Analysis*, 36 (2):106–109.
- Chisholm, R. M. (1967) "Identity through Possible Worlds: Some Questions," *Noûs*, 1:1–8.
- Chisholm, R. M. (1973) "Parts as Essential to Their Wholes," *Review of Metaphysics*, 26:581–603.
- Coates, A. (2022) "Essence, triviality and fundamentality," *Canadian Journal of Philosophy*, 52 (5):502–516.
- Correia, F. (2007) "(Finean) Essence and (Priorean) Modality," *Dialectica*, 61 (1):63–84.
- Cowling, S. (2013) "The modal view of essence," *Canadian Journal of Philosophy*, 43 (2):248–266.
- De, M. (2020) "A Modal Account of Essence," *Metaphysics*, 3 (1):17–32.
- Della Rocca, M. (1996) "Essentialism: Part 1," *Philosophical Books*, 37 (1):1–13.
- De Melo, T. X. (2019) "Essence and Naturalness," *Philosophical Quarterly*, 69 (276):534–554.
- Denby, D. (2014) "Essence and Intrinsicity," In R. M. Francescotti (ed) *Companion to Intrinsic Properties*, Berlin: De Gruyter.
- De Rizzo, J. (2022) "A ground-theoretical modal definition of essence," *Analysis*, 82 (1):32–41.

- Dummett, M. (1993) "Could There Be Unicorns?" in *The Seas of Language*, Oxford: Clarendon Press.
- Dunn, J. M. (1990) "Relevant Predication 3: Essential Properties," in J. Dunn and A. Gupta (ed) *Truth or Consequences*, Dordrecht: Kluwer Academic Publishers.
- Fara, D. Graff (2008) "Relative-sameness counterpart theory," *The Review of Symbolic Logic*, 1 (2):167–189.
- Fine, K. (1985) "Plantinga on the reduction of possibilist discourse," J. Tomberlin and P. van Inwagen (eds) *Alvin Plantinga*, Dordrecht: Springer.
- Fine, K. (1994) "Essence and modality," *Philosophical Perspectives*, 8:1–16.
- Fine, K. (2010) "Towards a Theory of Part," *Journal of Philosophy*, 107 (11):559–589.
- Fine, K. (2012) "Guide to Ground" in F. Correia and B. Schnieder (eds), *Metaphysical Grounding*, Cambridge: Cambridge University Press.
- Forbes, G. (1985) *The Metaphysics of Modality*, Oxford: Clarendon Press.
- Gorman, M. (2005) "The essential and the accidental," *Ratio*, 18 (3):276–289.
- Hanson, W. H. (2018) "Actualism, Serious Actualism, and Quantified Modal Logic," *Notre Dame Journal of Formal Logic*, 59 (2):233–284.
- Hazen, A (1979) "Counterpart-theoretic semantics for modal logic," *The Journal of Philosophy*, 76 (6):319–338.
- Hintikka, J. (1970) "The semantics of modal notions and the indeterminacy of ontology," *Synthese*, 21 (3–4):408–424.
- Koslicki, K. (forthcoming) "Modality and Essence in Contemporary Metaphysics," in S. Newlands and Y. Melamed (eds), *Modality: A Conceptual History (Oxford Philosophical Concept Series)*, Oxford: Oxford University Press.

- Kripke, S. A. (1963) "Semantical Considerations on Modal Logic," *Acta Philosophica Fennica*, 16: 83–94.
- Kripke, S. A. (1980) *Naming and Necessity*, Cambridge, MA: Harvard University Press.
- Lewis, D. K. (1968) "Counterpart theory and quantified modal logic," *The Journal of Philosophy*, 65 (5):113–126.
- Lewis, D. K. (1973) *Counterfactuals*, Malden, Mass.: Blackwell.
- Lewis, D. K. (1979) "Counterfactual Dependence and Time's Arrow," *Noûs*, 13 (4):455–476.
- Lewis, D. K. (1986) *On the Plurality of Worlds*, Malden, Mass.: Wiley-Blackwell.
- Linsky, B and Zalta, E. N. (1994). "In defense of the simplest quantified modal logic," *Philosophical Perspectives*, 8:431–458.
- Livingstone-Banks, J. (2017) "In defence of modal essentialism," *Inquiry*, 60 (8):816–838.
- Mackie, P. (2006) *How things might have been: individuals, kinds, and essential properties*, New York: Oxford University Press.
- Marcus, R. Barcan (1967) "Essentialism in modal logic," *Noûs* 1 (1):91–96.
- Mares, E. (1997) "Who's afraid of impossible worlds?," *Notre Dame Journal of Formal Logic*, 38 (4): 516–526.
- McDaniel, K. (2004) "Modal Realism with Overlap," *Australasian Journal of Philosophy*, 82 (1):137–152.
- Moore, G. E. (1920) "External and Internal Relations," *Proceedings of the Aristotelian Society*, 20 (1):40–62.
- Parsons, T. (1967) "Degrees of essentialism in quantified modal logic," *Noûs*, 1 (2):181–191.
- Paul, L. A. (2006) "In defense of essentialism," *Philosophical Perspectives*, 20 (1):333–372.

- Plantinga, A. (1973) "Transworld Identity or Worldbound Individuals?" in M. Munitz (ed) *Logic and Ontology*, New York, NY: New York University Press.
- Plantinga, A. (1974) *The Nature of Necessity*, Oxford: Oxford University Press.
- Plantinga, A. (1985) "Replies to my colleagues," in J. Tomberlin and P. van Inwagen (eds) *Alvin Plantinga*, Dordrecht: Springer.
- Pollock, J. L. (1985) "Plantinga on possible worlds," in J. Tomberlin and P. van Inwagen (eds) *Alvin Plantinga*, Dordrecht: Springer.
- Putnam, H. (1973) "Meaning and Reference," *The Journal of Philosophy*, 70:699–711.
- Putnam, H. (1975) "The Meaning of "Meaning"," in *Mind, Language, and Reality: Philosophical Papers*, vol. 2. Cambridge: Cambridge University Press.
- Quine, W. V. O. (1953) "Three Grades of Modal Involvement," *Proceedings of the XIth International Congress of Philosophy*, 14:65-81.
- Roca-Royes, S. (2011) "Essentialism vis-à-vis *Possibilia*, Modal Logic, and Necessitism," *Philosophy Compass*, 6 (1):54–64.
- Salmon, N. U. (1981) *Reference and essence*, Princeton, New Jersey: Princeton University Press.
- Salmon, N. U. (1989) "The logic of what might have been," *Philosophical Review*, 98 (1):3–34.
- Schaffer, J. (2004) "Two Conceptions of Sparse Properties," *Pacific Philosophical Quarterly*, 85 (1):92–102.
- Sider, T. (2001) "Maximality and Intrinsic Properties," *Philosophy and Phenomenological Research*, 63 (2):357–364.
- Skiles, A. (2015) "Essence in abundance," *Canadian Journal of Philosophy*, 45 (1):100–112.
- Stalnaker, R. (1968) "A Theory of Conditionals," In N. Rescher (ed) *Studies in Logical Theory*, Oxford: Blackwell.

- Stalnaker, R. C. (2003) *Ways a World Might Be: Metaphysical and Anti-Metaphysical Essays*, Oxford: Oxford University Press.
- Stephanou, Y. (2007) “Serious actualism,” *Philosophical Review*, 116 (2):219–250.
- Steward, S. (2015) “Ya shouldn’ta couldn’ta wouldn’ta,” *Synthese*, 192 (6):1909–1921.
- Torza, A. (2012) “‘Identity’ without Identity,” *Mind*, 121 (481):67–95.
- Torza, A. (2015) “Speaking of Essence,” *Philosophical Quarterly*, 65 (261):754–771.
- Unger, P. (1980) “The Problem of the Many,” *Midwest Studies in Philosophy*, 5 (1):411–468.
- Varzi, A. C. (2006) “Strict Identity with No Overlap,” *Studia Logica*, 82 (3):371–378.
- Varzi, A. C. (2020) “Counterpart theories for everyone,” *Synthese*, 197 (11):4691–4715.
- Walters, L. (2014) “The Possibility of Unicorns and Modal Logic,” *Analytic Philosophy*, 55 (2):295–305.
- Wang, J. (2015) “Actualist counterpart theory,” *The Journal of Philosophy*, 112 (8):417–441.
- Wildman, N. (2013) “Modality, Sparsity, and Essence,” *Philosophical Quarterly*, 63 (253):760–782.
- Williamson, T. (2013) *Modal Logic as Metaphysics*, Oxford: Oxford University Press.
- Zylstra, J. (2019) “Essence, necessity, and definition,” *Philosophical Studies*, 176 (2):339–350.

¹ See (Salmon 1989) for reasons to decouple absolute necessity from a universal accessibility relation.

² A further modal definition of essence is sometimes mentioned in the literature, namely $\mathbf{N}(t = t \rightarrow Pt)$. This is materially equivalent with UNCONDITIONAL if self-identity is necessary, and with CONDITIONAL if self-identity is necessarily equivalent with existence.

³ The following remarks concerning trivialization makes the routine assumption that modal logic has the property of normality, and that it preserves all truths of first-order logic.

⁴ De traces the Discrimination-Based Account of essence back to (Della Rocca 1996) and (Marcus 1967).

⁵ See (Salmon 1981, pp. 229-252) for an influential line of argument against the modal schema 4; cf. (Chandler 1976). See (Roca-Royes 2011) for discussion. Note that the schema also fails on the counterpart theory of (Lewis 1968).

⁶ The objection from the necessity of essentiality carries over to the account of essence favored by De (2020), which is DBA plus the condition that the property expressed by ‘*P*’ be qualitative.

⁷ For an attempt at characterizing nontrivial essence by a combination of modal and nonmodal notions see (Coates 2022).

⁸ *Pace* Lewis, it is possible to interpret *de re* predication in terms of identity even if worlds are disjoint (Varzi 2006), and it is possible to be a modal realist even if worlds are not disjoint (McDaniel 2004).

⁹ Fine’s line of argument against classical modalism is anticipated in (Almog 1991, p. 232).

¹⁰ The converse of F1, although subscribed by Fine, is not required by the argument.

¹¹ This step is warranted on the assumption that (i) for every condition φ there exists the predicate “*x* is such that φ ”, and that (ii) each predicate expresses a property.

¹² The necessity of distinctness follows from the conjunction of Leibniz’s law and the axiom schema B (i.e., $\varphi \rightarrow \mathbf{N}\sim\mathbf{N}\sim\varphi$), which is routinely associated with metaphysical modality. See (Dummett 1993) for an argument against B, and (Walters 2014) for a rebuttal; cf. (Salmon 1989) on the logical status of B.

¹³ Notice that the thesis that set membership is a necessary relation does not follow from standard set theory (viz., ZFU), which is an extensional theory, nor does it follow from the necessitation of standard set theory, which is a *de dicto* intensional theory. Rather, it is a substantive *de re* assumption about the nature of sets. For discussion see ch. 5 of (Forbes, 1985).

¹⁴ But see (Kripke 1980, p. 42) on the value of intuition in modal matters.

¹⁵ It is unclear whether the objection rests on substantive disagreement, or whether it boils down to an alternative convention on how to use the term “nature” (Torza 2015).

¹⁶ Gorman (2005) argues that essence cannot be captured neither modally nor definitionally.

¹⁷ On the logical and philosophical relevance of impossible worlds see (Berto and Jago 2013).

¹⁸ Some differences between Stalnaker’s and Lewis’s semantics for counterfactuals are being glossed over which, while significant, do not affect the present discussion.

¹⁹ Like (Prior 1957) and unlike (Correia 2007), it is being assumed that to exist at u is to be something at u . Nothing critical of what is said here hangs on that choice.

²⁰ Notice that Correia defines the Priorean conditional only for pairs of unmodalized sentences. In order to discuss predicates like “is necessarily such that there are infinitely many prime numbers”, that limitation has been lifted.

²¹ According to de Melo, naturalness should also be relativized to kinds of objects, a modification he puts to work in addressing a number of objections to Wildman’s view that are not discussed here, including the ones in (Skiles 2015). In the interest of simplicity, relativization to kinds is being set aside.

²² Koslicki (forthcoming) expresses skepticism concerning the very idea of relativizing naturalness.

²³ An attempt at defining essence in terms of a nonrelational notion of intrinsicality, carried out in (Denby, 2014), runs into similar issues as sparse modalism, cf. (Zylstra 2019).

²⁴ Notice that it is possible for something t to be P both in virtue of the way it is on its own, and in virtue of the way something else is—namely, when t ’s being P is metaphysically overdetermined. Consequently, t ’s being intrinsically P is compatible with t ’s being P in virtue of the way something else is.

²⁵ On metaphysical ground see Fine (2012).