Grounding Grounds Necessity

Julio De Rizzo

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1. Introduction

Some things are necessarily the case and some things are contingently the case. Confronted with this datum, the question naturally arises as to where the necessity of necessary claims 'comes from', that is, why are necessary truths necessary? Without intending to be exhaustive and obviously being unfair in details, the list of available positions include: *primitivism*, that is, the view that necessity is not explainable – that there is no source of necessity; *essentialism*, that is, the view according to which necessities are explained by their being essential to some (or all) objects; *generalism*, that is, the view that the necessity of a truth is explained by its being true with respect to every scenario (typically conceived of as a possible world); finally, *conventionalism*, which states that necessity stems from matters of convention.[1]

The aim of this paper is to add a further position to this picture. In a nutshell, the account states that the source of necessity lies in explanations of particular forms in which necessary truths take part. As I will try to argue, in its essentials, it consists in extending to the modal case some of the ideas worked out in the existing logics of ground. For reasons of space, I will not weigh this position against the ones just cited, hoping that the outline of the view suffices to make it a serious option.

Before presenting the account, a few words of stage-setting are in order. Firstly, I will interpret the question above as asking for the grounds of the necessity of necessary claims.[2] Secondly, I will take grounding to be a non-causal explanatory connection expressible by the connective 'because', whose grammar is one–many, that is, calls for one sentence on the left and allows for a plurality of sentences on the right. Typical examples include: {Quine} exists because Quine exists; (It is raining and grass is green) because it is raining, grass is green. In spite of this regimentation, for convenience I will speak of propositions as grounds and groundees. Throughout the paper, I will focus on full grounding claims, that is, cases in which the grounds are said to fully explain their groundees, as in the examples just mentioned. Following standard assumptions, I will take grounding to be asymmetrical and transitive. Furthermore, I will assume full grounding obeys the following principle:

(*Necessitarianism*) If p because Δ, then $\Box (\bigwedge\Delta \rightarrow p)$

(Henceforth, I use 'Δ ' and 'Γ' as schematic variables for pluralities of sentences (possibly just one sentence and, as will soon be clarified, no sentence at all), 'p' and 'q' for sentences. The symbol resulting from a concatenation of '$\bigwedge$' and a schematic variable for a plurality stands for the conjunction of every member of the plurality in question.)

Finally, it is important to point out that it has become standard to acknowledge different kinds of necessities: physical, normative, conceptual, and so on. In this paper, though the choice of examples concentrates on typical metaphysical necessities, I will leave as open as possible the variety of necessity at stake, hoping that the account will still be of interest even if, in the end, it turns out to be well suited to deal with only a restricted class of the whole space of necessities.

[1] For a survey and further references on these views, see Cameron 2010. The labels for the views differ from mine.
[2] This is in fact the way Hale (2002) frames the issue, for example.

2. Grounding and the grounds of necessity
2.1 The main idea: explanatory necessitarianism

The account takes off from what is, in effect, a strengthened version of Necessitarianism above. Necessitarianism states that grounds strictly imply their groundees. In this, the principle allows us to derive a necessary claim from a grounding claim. It is natural to turn this derivation into an explanatory connection. The resulting principle states:

(*Explanatory Necessitarianism*, henceforth 'EN')

If (p because Δ), then ($\Box(\wedge\Delta \rightarrow$ p) because (p because Δ)).

Let us say that grounding is factive if and only if whenever ⌜ p because Δ ⌝ is true, then ⌜ $\wedge\Delta$ ⌝ and *p* are true as well, non-factive otherwise (Fine 2012: 48– 49).[3] To enlarge the scope of EN, I suggest that 'because' should be read non-factively, that is, as expressing non-factive grounding as just defined. On this reading, the principle covers cases such as '$\Box$ (grass is blue $\rightarrow$ (grass is blue $\vee$ snow is purple))', that is, necessities 'involving' falsities, which on a factive reading of 'because' could not stand in grounding explanations.[4]

EN suggests an 'explanation-first' account of the source of necessity, according to which necessity not only follows from metaphysical explanations (as per *Necessitarianism*), but is *owed to* the grounding connections that the truths in question stand in. For illustration, take a scarlet ball *a*. The ball is red because it is scarlet, and necessarily, if *a* is scarlet, then it is red. EN has it that this necessity holds because (*a* is red because *a* is scarlet). Similarly, it is necessary that if (Socrates is Greek $\wedge$ Quine is American), then (Socrates is Greek $\wedge$ Quine is American) because (Socrates is Greek $\wedge$ Quine is American because Socrates is Greek, Quine is American). And it is necessarily the case that if grass is green, then (grass is green $\vee$ it is raining) because ((grass is green $\vee$ it is raining) because grass is green).

Even if we accept the wide range of necessities explained via EN, it is plain that the principle, as it stands, fails to provide grounds for necessity in every case. For, first, not every necessary truth has the form of a conditional (⌜ p$\rightarrow$ q ⌝). Second, conditionals of the forms ⌜ p$\rightarrow$ p ⌝ and ⌜ p$\wedge$ q$\rightarrow$ p ⌝, for instance, must seemingly be left outside EN's scope, since grounding is asymmetric.

To cover these and related examples, an important amendment in the account is called for: namely, to allow for the empty plurality of sentences to instantiate 'Δ' in the scheme. In this, we make room for because-statements in which the ground is the empty plurality, that is, because-statements expressing what Fine (2012) calls *zero-grounding* cases. According to Fine, there is a distinction to be made between truths that are ungrounded, that is, do not have grounds, and truths that are grounded in the empty plurality of truths. As Fine puts it, one might think of this distinction as mirroring the one in set theory between urelements, such as Socrates, which is not built from anything, and the empty set {}, which is built from an application of the operation of set-building to nothing at all. Though Fine does not endorse examples of zero-grounded truths explicitly, he mentions the truth that Socrates is identical to Socrates, that Socrates belongs to {Socrates} and that if it is raining then it is raining as potential candidates (Fine 2012: 48, Fine forthcoming). (More on this below.)

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[3] '⌜ ' and ' ⌝' are devices of quasi-quotation à la Quine. Not to overload notation, outside of the context of such quotations I use italicized sentential letters as symbols for sentences.
[4] When formulating explanations for necessities, Hale (2002: e.g. 312) comes close to EN; Hanks (2008) suggests that explanations of necessity in general have the form ⌜ $\Box$ p because (p because q) ⌝.

Now having '∅' as a symbol expressing the empty plurality of truths, one might then hold that the proposition expressed by ⌜ ∅ → p ⌝ is in general grounding-equivalent, that is, shares the same grounds and groundees, with the proposition expressed by *p* itself.[5] Taking the foregoing examples for granted, the following turns out an instance of EN:

If Socrates = Socrates because ∅, then (□(Socrates = Socrates) because (Socrates = Socrates because ∅)).

Assuming the antecedent holds, we then arrive at an explanation of the necessity of Socrates being identical to himself.

If, however, we individuate propositions as more fine-grained than this, so as to distinguish the propositions expressed by ⌜ (∅ → p) ⌝ and p (it might be held, for instance, that the first has p as a ground, while the latter does not), then the cases cease to be instantiable in EN, and we need to coin a specific principle to deal with these cases:

(*Explanatory Necessitarianism*$^{+}$, henceforth 'EN^{+}'):

If p because ∅, then □ p because (p because ∅).

I will leave open which option should be pursued. Either way, necessities of a non-conditional form might be accounted for, as long as these cases are indeed zero-grounded in Fine's sense.[6]

How should we determine if a truth is zero-grounded? In providing an answer to this, the analogy provided by Fine (2012: 47–48) and Litland (2017: 287) is instructive. Imagine a machine is fed with propositions, the grounds, and generates other propositions from them, their groundees. When the machine is run with no propositions as input, the propositions thereby generated are zero-grounded. (In contrast, a proposition is ungrounded if the machine never churns it out.) If we speak of grounds being that upon which the groundee depends, intuitively zero-grounded propositions are those which depend on nothing at all, that is, those churned out by the machine when fed with no input.

This analogy aside, the following considerations might be useful in making the distinction between zero-grounded and ungrounded truths clearer. Firstly, some rules of inference underwrite explanatory arguments that parallel grounding claims closely (Litland 2017). A zero-grounded truth then plays the role of a conclusion in an argument resulting from the

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[5] Fine's truth-maker semantics for ground, presented in Fine 2012, 2017, forthcoming and elsewhere, which models the empty plurality of truths via the empty state, that is, the state which is part of every state, underwrites this equivalence. (Note that Fine uses the symbol 'T□' to express the empty plurality of sentences in our sense. See Fine 2017: 630.) To illustrate this in the simplest case in which sentences are modelled by the set of their exact verifiers, note that a conditional is verified by the verifiers of the consequent and the verifiers of the negation of the antecedent. Ex hypothesi, the negation of the empty sentence ('F□' in Fine's symbols) has no verifiers. Thus the verifiers of ⌜ (∅ → p) ⌝ are just the verifiers of *p* itself. Similar considerations show the equivalence to carry over to the conception of propositions that takes falsifiers into account.

[6] I take it that someone drawn to EN will find EN+ a natural step further. This assumption aside, it is noteworthy that EN+ might be motivated independently. For it is a striking feature of the grounding rules for the usual logical connectives, such as conjunction and disjunction, that they mirror the standard introduction rules closely (Schnieder 2011). Arguably the closest to an introduction rule for '□' in usual modal logics is the Rule of Necessitation, which allows the derivation of ⌜ □ p ⌝, from ⌜ ⊢p ⌝, that is, if *p* follows from empty premisses, then it holds of necessity. EN+ might be motivated by pointing out that it parallels the latter rule, in analogy to the parallel observed in the rules in the non-modal case.

application of such rules to the empty set of premisses. In contrast, ungrounded propositions may function only as premisses of further arguments, without being established as conclusions in themselves. Secondly, the claims attributing these statuses to propositions are importantly different in character. Thus to claim that a proposition is ungrounded is tantamount to saying that none of the propositions qualifies as a reason why the former obtains. In other words, an ungrounded proposition simply marks a point where the course of explanations ceases, as in, plausibly, the proposition that a particle *e* has negative charge, that *e* exists, or maybe that such and such atoms are arranged in a specific way. In turn, to get a better grip on what the claim that a truth is zero-grounded amounts to, it is helpful to conceive of grounds as sufficient conditions that bring their groundees about (Fine 2015). The weakest of such conditions, symbolized by '$\emptyset$', suffices to make a zero-grounded proposition hold, as opposed to an ungrounded truth, which, though true, is not brought about in the first place. In this sense, zero-grounded propositions, in contrast to ungrounded ones, are true 'no matter what', as in the proposition that if it is raining, then it is raining, or that Socrates is self-identical, and so on. Thus the claim that a truth is zero-grounded has a bearing on modal status that the claim of ungroundedness lacks.[7] Lastly, to illustrate the distinction with a further example, assume that propositions stating the existence of sets are in general grounded in the plurality of propositions stating the existence of the elements out of which they are built. Following Fine's example above, since the empty set is a limiting case in which a set is built from nothing, its existence is grounded in the plurality that has no propositions as members. In contrast, a urelement such as, say, Socrates, is just not built, and its existence is thus left unexplained by the lights of the same principle.

I take it that Fine's suggested examples fit this characterization of zero- grounded truths. Every logical tautology, for example truths of the forms $\ulcorner (p \rightarrow p) \urcorner$, $\ulcorner (p \vee \sim p) \urcorner$, $\ulcorner (p \wedge q) \rightarrow p) \urcorner$, $\ulcorner p \rightarrow (p \vee q) \urcorner$, as well as self-identities such as 'Socrates = Socrates' and differences such as 'Socrates ≠ Eiffel tower', are plausibly zero-grounded. Tentatively, I would also include among these modal tautologies, for example truths of the forms $\ulcorner \Box p \rightarrow p \urcorner$, $\ulcorner \Diamond p \vee \Diamond \sim p \urcorner$, necessities concerning natural kind memberships, such as 'Socrates is human'; and other Kripkean necessities, such as 'Water is H2O' and 'Saul is son of Dorothy and Myer'. Though a full discussion of this matter is beyond the scope of this paper, it is worth stressing that the a posteriori character of the latter cases far from obviously forecloses the possibility that they owe their truth to no circumstance at all, and are thus zero-grounded alongside the former cases.

EN (and EN^{+}) provide us with the essentials of a promising account of the grounds of necessities. As a consequence of the account suggested, the necessity of every necessary truth is grounded in the truth's being zero-grounded. By way of completion, in the following I will put forward two further principles, which together with those already suggested provide us with a fuller picture of the structure of explanations of necessities.

2.2 First addition: monotonicity explained

Strict implication is monotonic in the sense that, if $\ulcorner \Box (p \rightarrow q) \urcorner$, is true, then for every plurality of sentences Δ in which *p* is included, $\ulcorner \Box (\wedge\Delta \rightarrow q) \urcorner$ is also true. Thus given that, necessarily, if Socrates is human then Socrates is human, it is the case that, necessarily, if Socrates is human

[7] To state this in more precise terms, under the assumption of *Necessitarianism*, every zero-grounded truth is necessary, that is, if $\ulcorner$ p because $\emptyset \urcorner$ is true, then $\ulcorner \Box p \urcorner$, is true. This follows either from the equivalence between *p* and $\ulcorner \emptyset \rightarrow p) \urcorner$, or from the claim that the empty plurality of truths holds of necessity. To put this in terms of the main text, since '$\emptyset$' expresses the weakest condition, that is, the one most easily satisfied in any circumstance, a zero-grounded truth cannot fail to hold. In contrast, lack of grounds is perfectly compatible with contingency of the proposition in question.

and grass is blue, then Socrates is human. I take it that, intuitively, it is reasonable to regard the latter necessity as explained by the former one. That is, necessarily, if Socrates is human and grass is blue, then Socrates is human because, necessarily, if Socrates is human then Socrates is human. Furthermore, there is no reason not to expect this to hold in general: the necessity of every strict conditional with an 'inflated' antecedent stems from an underlying necessity with a 'thinner' antecedent, whenever the latter holds.

(*Monotonicity Explained*, henceforth 'ME')
If $\Box(\wedge\Delta \rightarrow p)$, then for every Γ such that $\Delta\subset\Gamma$, $\Box(\wedge\Gamma \rightarrow p)$ because $\Box(\wedge\Delta\rightarrow p)$

By taking this principle on board, we begin to do justice to some of the structure to which EN is initially blind. For instance, besides the fact that the propositions expressed by ⌜ $\Box(p\wedge q\rightarrow p)$ ⌝, and ⌜ $\Box(p\rightarrow p)$ ⌝, are both grounded in the embedded truths being zero-grounded (via EN), ME suggests that the latter also grounds the former. Thus, even if it turns out that every tautology is zero-grounded in the sense above, ME allows us to derive further grounds for the necessity of some of these truths.

2.3 Second addition: the core intuition extended

The necessity of some propositions admits of a straightforward kind of explanation. Consider, for instance, a disjunction, a disjunct of which is itself necessary, say 'Socrates = Socrates ∨ grass is blue'. Why is this disjunction necessarily the case? Surely an admissible explanation might cite that □ Socrates = Socrates. For the necessity of the disjunct is transmitted to the more complex disjunction. Or take 'Socrates = Socrates ∧ Quine = Quine' and 'If Socrates ≠ Socrates, then grass is blue'. Concerning the former, plausibly, a conjunction of two necessities is itself necessary because its conjuncts are. Thus □ (Socrates = Socrates ∧ Quine =Quine) because (□ Socrates = Socrates, □ Quine=Quine). In a similar vein, concerning the latter case, it is plausible that a conditional with a necessarily false antecedent owes its necessity to the mentioned impossibility. Thus '□ (Socrates ≠Socrates → grass is blue) because □ ~ (Socrates ≠ Socrates)' should come out as expressing an admissible explanation of this necessity.

Importantly, these explanations reflect a feature of the non-modal case: namely, that a logically complex sentence, if true, owes its truth to the truth-values of its component sentences. From this idea, labelled the 'core intuition' in Schnieder 2011, one can derive the usual principles of grounding governing logically complex truth-functional sentences. Now regarding the modal case, one could conceive of an extended core intuition, according to which a logically complex sentence might owe its modal value – its being contingently or necessarily the case – to the modal value of its component sentences. In contrast to the non-modal case, however, the intuition should be formulated only restrictedly, since there are cases in which a logically complex sentence does not owe its modal value solely to the modal values of its component sentences (for instance, a tautology ⌜ $p\vee\sim p)$ ⌝, for contingent *p*).

Regarding necessities, the extended core intuition might be captured along the following lines:

(*Extended Core Intuition*, henceforth 'ECI')
If p because Δ, then if $\Box\wedge\Delta$, then $\Box p$ because $\Box q, \Box r, \Box s, \ldots$ (for $\{q,r,s, \ldots\}=\Delta$).

As the reader might inspect, the explanations we started this subsection with follow from ECI. To illustrate, since (Socrates≠Socrates→ grass is blue) because ~(Socrates ≠ Socrates), and □ ~(Socrates ≠ Socrates), then □ (Socrates≠Socrates→ grass is blue) because □ ~(Socrates≠ Socrates). The other cases follow exactly the same pattern.

Both ME and ECI underwrite explanations of necessities in terms of other, less complex necessities. Conjoined with EN these principles provide us with a structured account of the grounds of the necessity of necessary truths in general. Accordingly, at the bottom, we have what we could call ‘base necessities’, that is, atomic necessary truths and truths of the forms $\ulcorner p \rightarrow p) \urcorner$, $\ulcorner p \vee \sim p) \urcorner$, the necessities of which are solely explained by the fact that these truths are zero-grounded (as per EN and EN^{+}). At a higher level, besides being also zero-grounded, more complex necessary truths have their necessity explained by grounding connections between the truths contained in them (as in truths of the forms $\ulcorner (p \wedge p) \rightarrow (p \wedge p) \urcorner$, $\ulcorner p \rightarrow p \vee q \urcorner$, via EN) or by the necessity of their component sentences (as, for example, in $\ulcorner (p \wedge q) \rightarrow p) \urcorner$ via ME and truths of the forms $\ulcorner \Box p \rightarrow p) \urcorner$, $\ulcorner \Diamond p \vee \Diamond \sim p) \urcorner$, $\ulcorner p \wedge q) \urcorner$, for *p* and *q* necessary, $\ulcorner p \vee q \urcorner$, $\ulcorner \sim\sim p \urcorner$, for *p* necessary, via ECI).

3. Conclusion

In this paper, I briefly outlined an account of the grounds of necessity based on extensions of ideas already implemented in the case of the grounds for non-modal truths. In keeping the paper short, a detailed comparison with existing accounts – in particular, essentialism, which seemingly has by now the largest number of contenders – must be left for another opportunity. As a matter of fact, the view just outlined is far from obviously incompatible with essentialism, and it might turn out that these positions, far from being rivals, should in the end be seen as complementary in accounting for the whole space of necessities. At present, let it just be noted that the existing accounts all resort to auxiliary notions in answering the question of what the grounds of necessities are. May this short exposition succeed in calling some attention to accounts which draw from the notion of grounding not only in the question, but in the answer itself.[8]

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