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Potentiality and Would-Counterfactuals

Giulia Casini

University of Sheffield

Abstract

In her book *Potentiality: From Dispositions to Modality* (2015), Barbara Vetter introduces a new ontological and semantical framework for modal discourse, based on potentiality. Within this framework, Vetter attempts to formulate an embryonic semantical account for counterfactual conditionals. The aim of this paper is to discuss this tentative account of counterfactuals. Being an account at such an early stage, there are many elements and issues that could be discussed, but this work will focus only on one aspect of it. The aspect in question is the treatment of would-counterfactuals, which requires further examination since Vetter only presents a could-counterfactual version of her account. If we can find acceptable truth-conditions for would-counterfactuals within Vetter's account, this could increase the explanatory power of the potentiality framework and give us some extra reasons to consider it a suitable and adequate model for modality. The paper takes charge of applying Lewis' interdefinability principle between could- and would-counterfactuals to Vetter's truth-conditions for could-counterfactuals, in an attempt to develop a first version of these truth-conditions for would-counterfactuals within the potentiality framework. Even if this first version seems justified and effective, for such an account to fully work we need a deeper investigation into iterated potentiality and the process of iteration.

Keywords: Potentiality, Vetter, Counterfactuals, Modality, Metaphysics.

1. Introduction

In her book *Potentiality: From Dispositions to Modality* (2015), Barbara Vetter introduces a new ontological framework for modal discourse, based on potentiality. Within this framework, Vetter offers various solutions and accounts for issues relating to modality, from metaphysics, to logic, to semantics. Between these “collateral” accounts, she attempts to formulate an embryonic semantical account for counterfactual conditionals.

The aim of this paper is to discuss this tentative account of counterfactuals, with the focus on one aspect of it, which, if developed adequately, could enhance the effectiveness of the potentiality framework as a model for modality. The aspect in question is the treatment of would-counterfactuals, which requires further

examination since Vetter only presents a could-counterfactual version of her account.

Would-counterfactuals are of fundamental importance for any account of counterfactuals, and any account wanting to explain counterfactuals appropriately ought to say something about them, so the application of Vetter's framework to these counterfactuals is a crucial step for the adequacy of her account of counterfactuals. If we can find acceptable truth-conditions for would-counterfactuals within Vetter's account, this would increase the explanatory power of the potentiality framework and give us some extra reasons to consider it a suitable and adequate model for modality.

The aim of this paper is to show that Vetter's formulation in terms of could-counterfactuals can indeed lead to some form of truth-conditions for would-counterfactuals, but not as straightforwardly as she seems to suggest. Also, there are some essential clarifications missing in her account that require a much more detailed discussion of certain concepts that are fundamental to her approach, such as 'iterated potentiality'.

The structure of this paper will be the following. In the first section, I will present a summary of Vetter's framework and her account of counterfactuals. In the second section, I will discuss David Lewis' translations between would- and could-counterfactuals. In the third section, I will present a first attempt to apply these translations and how a possible account of would-counterfactuals comes about. The fourth section will discuss an ambiguity in Vetter's language which affects the formulas developed from her account of counterfactuals, while the fifth section will try to clarify these formulas by applying them to some concrete examples.

In the final section and then in the conclusion, I will suggest that, even if it is possible to formulate some tentative truth-conditions for would-counterfactuals by applying Lewis' translations to Vetter's proposal, many clarifications are necessary to make such truth-conditions acceptable. In particular, the notion of iterated potentiality needs further explanation; and without such explanation there could be issues and difficulties in offering a Vetter-inspired account of would-counterfactuals. Also, even if this account may turn out to be acceptable, still Vetter's proposal only covers counterfactuals involving *de re* modality, without tackling counterfactuals involving *de dicto* modality. Therefore, much more work is needed in all these respects before a complete account of would-counterfactuals can be defined.

Finally, other than being relevant for the specific issue of counterfactuals, the discussion on iterated potentiality raised here can have general implications for Vetter's metaphysics, since it points out some unclarities about the metaphysical notion of iterated potentiality, which is fundamental for Vetter's account.

2. Vetter's Account of Counterfactuals

In her book, Vetter introduces a new semantical framework to match her new account of possibility, based on potentiality. The account of possibility is as follows:

Possibility: "It is possible that p =_{df} Something has an iterated potentiality for it to be the case that p " (Vetter 2015: 197).

From this, Vetter develops a semantics for ‘can’ and other modals, including a semantics for counterfactuals. However, her account is sketched starting from could-counterfactuals, rather than from the traditional would-counterfactuals. Her suggestion goes as follows:

(Could): “‘If x were F , then x could/might be G ’ is true iff x has an iterated potentiality to be G , and being F is an earlier stage in that iterated potentiality” (Vetter 2015: 226).

As you can notice, Possibility offers an account of *de dicto* possibility, while (Could) presents truth-conditions for a *de re* type of counterfactual.¹ This is because the potentiality framework is most naturally applied in the first instance to *de re* possibility statements, and so most of Vetter’s discussion initially involves this kind of possibility. The definition of Possibility represents for Vetter a crucial and necessary attempt to extend her framework to the treatment of *de dicto* possibility. However, this extension to *de dicto* possibility is not included in her initial account of counterfactuals, so her proposal in (Could) only concerns could-counterfactuals expressing *de re* possibility. Therefore, in this paper, the focus will be only on *de re* counterfactuals. Because of this, for simplicity, we will adopt here a *de re* version of Possibility that can be roughly formulated as follow:

Possibility*: It is possible for x to be F =_{df} x has an iterated potentiality to be F .

This is obviously a limitation of Vetter’s proposal, since a complete account of counterfactuals must account for *de dicto* counterfactuals as well, but for the sake of this paper we will accept it, bearing in mind that, even if we were able to define some truth-conditions for would-counterfactuals within Vetter’s framework, again these would only be for *de re* would-counterfactuals initially.

Anyway, in looking for a suitable account of would-counterfactuals for Vetter, our first step must be understanding her could-counterfactual account, and to do this we should examine both its ontological background and its semantical framework.

2.1 Ontological Background

Starting with the ontological background, first we must understand the notion of *potentiality*. With ‘potentiality’, Vetter intends a certain class of properties of objects that goes beyond other modal properties such as powers, dispositions, and abilities: while Vetter uses the term ‘dispositions’ to indicate those modal properties whose ascriptions are context-sensitive, she adopts ‘potentialities’ to indicate the context-insensitive metaphysical background of these properties (see Vetter 2015: 22). Crucially, Vetter connects potentiality to the predicate ‘can’ in almost all its semantical shades: whenever this predicate is truly applied, then the relevant objects have a corresponding potentiality.²

Vetter lists several kinds of potentiality, from joint potentialities to intrinsic and extrinsic potentialities, but of course our interest is overall in *iterated*

¹ In this case, I use ‘*de re* counterfactuals’ to indicate the specific type used by Vetter, where in both the antecedent and the consequent the same object is assigned certain features.

² We can exclude those instances of ‘can’ expressing epistemic possibility, as in “Do you know if John is at home yet?” “He could be” and deontic possibility, as in “Can I turn right here?” “No, you cannot, it is a one-way road”.

potentialities. We can explain what Vetter means with ‘iterated’ by going through an argument structured as follows:

Premise 1: Things have potentialities to possess properties.

Premise 2: Potentialities are properties.

Conclusion 1: Therefore, things should have potentialities to possess potentialities.

Premise 3: A potentiality to possess potentialities is a property.

Conclusion 2: Therefore, things should have potentialities to possess potentialities to possess potentialities.

This does not stop here: it can continue *ad infinitum*. Any of these “further” potentialities are called by Vetter ‘iterated potentialities’ (see Vetter 2015: 136). For example: I do not have the ability to play the piano, but I have the ability to learn, and so acquire, the ability to play the piano; therefore, I have the iterated ability to play the piano. Water does not have the potentiality to break but has the potentiality to freeze and turn into ice, which instead has the potentiality to break. Therefore, water has the potentiality to acquire the potentiality to break, so water has the iterated potentiality to break. Even if the introduction of iterated potentiality in Vetter’s framework was intended primarily as a way to formulate and justify the *de dicto* form of Possibility, we can explain how iterated potentialities work in relation to counterfactuals by using some examples of counterfactuals showing the different stages in the iterated potentiality involved: e.g. “If I had learned how to play the piano, I could play the piano in this room”, “If this puddle of water were frozen, then it could break”. As we will see, counterfactuals actually raise a lot of questions concerning the nature of iterated potentiality and the concept of iteration.

2.2 Semantical Framework

Considering now the semantical framework in which (Could) is inserted, this is the result of Vetter’s attempts to construct a modal semantics based on potentiality and on the metaphysics just presented. The idea is that the modal language in general is used to ascribe potentialities to objects, and that, in most cases, it is the modal predicate ‘can’ that performs these ascriptions. From this we can develop the truth-conditions for ‘can’ statements:

(Can): “ x can F is true iff x has a potentiality to F ” (Vetter 2015: 217).

This analysis is the starting point of Vetter’s modal semantics, which works as a generalisation of (Can) to extend the account to other modal expressions. There are two crucial features of this analysis that are essential to understand the counterfactual account (Could): that ‘can’ must be restricted to an expression of *dynamic modality*, and that ‘can’ must be taken to be *context-sensitive*.

Dynamic modality is defined by Vetter as one of the “flavours” of modality, along with epistemic and deontic modality, which can be defined as follows:

epistemic modality is about what is compatible (or not) with our knowledge, deontic modality is about permission and obligation, and dynamic or circumstantial

modality is about developments that are open (or not) given how things really are (Vetter 2015: 216).³

Vetter's suggestion is that her semantics for 'can' applies specifically to dynamic modality, given that potentialities are supposedly properties that objects have in our reality, and the ascription of potentialities is then "a matter simply of how things really are, not how they ought to be or how we know them to be" (*Ibid.*). Despite being allowed that the predicate 'can' can have both epistemic and deontic readings as well, Vetter stresses that her semantics concerns only its dynamic reading. Because the rest of her semantics is an extension of the semantics of 'can', this means that the other modals considered and discussed within this semantics will be taken to be expressions of dynamic modality as well.

The context-sensitivity of 'can' is due to the large number of cases in which it is used: it can express an ability, or a competence, or the possibility of something happening.

However, it is not the case that any potentiality can be ascribed by any 'can' statement in any context. For example, it would be very odd if "I can play the piano" ascribed to me the ability to play the piano just because I am a human being with functioning hands and I am sitting at a piano, and not because I actually learnt how to play it. Therefore (Can) must be intended as contextually restricted:

(Can*): "' x can F ' is true in a context C iff x has a potentiality to F which is relevant in C " (Vetter 2015: 217).

The context-sensitivity of 'can' will extend to the other modals analysed within Vetter's semantics, so that they will all be treated as context-sensitive as well.

2.3 Counterfactual Account

Vetter's aim is to extend the semantics of 'can' to other examples of dynamic modality so her starting point for an account of counterfactuals is not an analysis of would-counterfactuals, but of could-counterfactuals, which include a direct variant of 'can', like: "If I were taller, I could get that jar". The idea is to construe these counterfactuals as ascribing iterated potentialities, where one potentiality—the potentiality to acquire the property of being taller—in turn brings with it another contextually relevant potentiality—the iterated potentiality to get a particular jar (see Vetter 2015: 226). Following this interpretation, Vetter formulates (Could), offering truth-conditions for could/might-counterfactuals:

(Could): "'If x were F , then x could/might be G ' is true iff x has an iterated potentiality to be G , and being F is an earlier stage in that iterated potentiality" (Vetter 2015: 226).

³ If we want to compare dynamic modality with the more familiar notion of 'alethic modality' we can consider how Vetter defines 'dynamic modality' as "the closest relative of metaphysical modality, if the latter is understood in a realist way (indeed, some linguists include metaphysical or 'alethic' modality, as they sometimes call it, within dynamic modality)" (Vetter 2015: 216).

From what we said about the semantics of ‘can’ we can gather first, that the counterfactual in (Could) is an expression of dynamic modality and second, that the ascription of the potentialities to be F and G to x is context-sensitive, so that the iteration from being F to being G must be limited depending on the context.

Even if many aspects of (Could) deserve a deeper discussion, including the role of iterated potentiality in it, in this paper I will focus on a comment that Vetter makes that raises some important questions. She clearly states that “[w]ould’ counterfactuals may be defined [...] as the dual of ‘could’ or ‘might’ counterfactuals” (Vetter 2015: 228), suggesting that from (Could) we should be able to construct an analysis of would-counterfactuals—which I will call ‘(Would)’—based on this duality.

The existence of this duality is presented in David Lewis’ work *Counterfactuals* (1973) which supports the idea that might- and would-counterfactuals are interdefinable.

Of course, Vetter’s comment and implications require further investigation. There are two main questions that we need to answer: Are could-counterfactuals the dual of would-counterfactuals as Vetter, via Lewis, suggest? And, if this is the case, what is the correct transition from (Could) to (Would)? The objective of this paper is to discuss what problems there could be in formulating (Would), and whether determining the truth-conditions for would-counterfactuals in a potentiality framework is as simple as Vetter seems to suggest.

3. Lewis’ Translations

In *Counterfactuals* (1973: 21), Lewis presents the following “translations” between might- and would-counterfactuals:

- I. “If it were that P , it would be that Q ” can be translated as “It is not the case that if it were that P , it might be that not Q ”.
- II. “If it were that P , it might be that Q ” can be translated as “It is not the case that if it were that P , it would be that not Q ”.

However, Vetter’s formulation is in terms of could-counterfactuals, given her consideration of the predicate ‘can’ as a signal of ascription of a potentiality. Since the traditional translations suggested by Lewis are between would- and might-counterfactuals, with no explicit mention of could-counterfactuals, this led Vetter to opt for grouping ‘could’ and ‘might’ together, suggesting that could- and might-counterfactuals have the same truth-conditions as given by (Could).

This move is legitimate because, even if ‘might’ is sometimes taken to express epistemic possibility, there is an intrinsic ambiguity in modal expressions, so that we can take ‘might’ to express dynamic possibility and we can read the might-counterfactuals in Lewis’ analysis in the same way as could-counterfactuals, as expressions of dynamic modality and not necessarily of epistemic modality.

It is evident that Lewis was actually excluding an epistemic reading of his might-counterfactuals, given the fact that they can be translated into non-epistemic would-counterfactuals.⁴ Therefore, Vetter is entitled to group her could-

⁴ The duality between would- and might-counterfactuals has not always been so straightforwardly accepted. Robert Stalnaker (1981, 1984) took charge of denying that might-counterfactuals represent a different case or require a different treatment at all, suggesting that they simply are a representation of the speaker’s epistemic status towards the consequent

counterfactuals with Lewis' might-counterfactuals under a dynamic reading, so that she can appeal to his translations even for could-counterfactuals.⁵ In what follows, I will use 'might' and 'could' interchangeably, depending on whether I am talking about Lewis' discussion or Vetter's.⁶

Now that we have excluded the epistemic reading of Lewis' counterfactuals, we can finally focus on his translations. To understand them, we could start by considering the following examples:

- (1) "If they had not hired Jones, they might have hired you".
- (2) "If they had not hired Jones, they would have hired you".⁷

Trying to give an intuitive reading of (1) and (2) in terms of dynamic modality, we can say that a speaker tends to use (1) when there is a possibility that they would have hired you if they had not hired Jones, but the speaker seems to intend that this is still just a mere possibility, and they could still not have hired you in the same way. In (2) on the contrary, the speaker seems to intend that you would have been surely hired if Jones had not been, as if it is more than just a mere possibility.

In *Counterfactuals* (1973: 1-2, 21), Lewis links two different meanings and logical symbols to would- and might-counterfactuals. The basic idea is that, as we define possibility using necessity and vice versa, we can use would-counterfactuals to define might-counterfactuals and vice versa. Therefore, in Lewis' view, (1) can be translated as follows:

- (1*) "It is not the case that if they had not hired Jones, then they still would not have hired you" (= "If they had not hired Jones, they might have hired you").

Conversely, the translation of (2) should be:

given the antecedent. The debate on the relationship between would- and might-counterfactuals arises from the natural ambiguity of modal expressions, and there is still a lot of controversy on how might-counterfactuals should be interpreted (see Eagle 2007; Ferguson 1987; De Rose 1994, 1999). I will not enter in the heat of this debate here, as my only interest is in showing that Lewis did in fact conceive his translations for a dynamic reading of might-counterfactuals and so that Vetter is justified in applying them to her cause.

⁵ Note that Vetter, contrary to Lewis, makes room for epistemic would-counterfactuals in Vetter 2016.

⁶ Vetter points out that we must be careful in treating them as identical. Coming back to the example above, "If I were taller, I could get that jar", Vetter says: "A similar construal would apply to [the example] with 'could' replaced by 'might' (on a dynamic reading)—except, perhaps, that the conditions for contextual relevance at the second stage of the iterated potentiality are different: in the 'could' version, it is easy to read the sentence as requiring that the potentiality to [get the jar] would be an ability, while with the 'might' version that reading is less natural" (Vetter 2015: 226). For simplicity, I will consider them interchangeable.

⁷ Note that here I am using past counterfactuals as examples, while in the rest of the paper the translations will be applied to present-/future-directed counterfactuals. While there is no formal difference in applying the translations to past or present/future counterfactuals, the past examples presented here have the heuristic intent to offer a particularly clear picture of the difference and the relation between might- and would-counterfactuals. Note also that Lewis' translations apply to all cases of counterfactuals both *de re* and *de dicto*, contrary to Vetter's account which is restricted to *de re* counterfactuals.

- (2*) “It is not the case that if they had not hired Jones, then they might not have hired you” (= “If they had not hired Jones, they would have hired you”).

These translations too seem to suggest that the consequent of would-counterfactuals, on the assumption of the antecedent, looks in a way “more fixed” or “more determined” than the consequent of might-counterfactuals. The idea is that when we use a counterfactual, we first consider the possibility for the antecedent to be the case, but then the use of ‘would’ seems to indicate more strongly that, given the antecedent, the consequent should be the outcome, while the use of ‘might/could’ seems to indicate that, given the antecedent, the consequent is perhaps only one of various possible outcomes.⁸

Therefore, we can summarize the difference between might/could- and would-counterfactuals by saying that ‘might’ and ‘could’ (again, in their dynamic reading) both indicate that the consequent is *possible given the antecedent*, in opposition to ‘would’ which indicates that the consequent is *necessary given the antecedent*.⁹

The relevance of this distinction will become clear later, but for now we can move on to consider the application of Lewis’ translations to Vetter’s (Could) and the problems that this creates.

4. From (Could) to (Would)

Now that we have laid the ground for our discussion and offered justifications for Vetter’s proposal, it is finally time to focus on how the translations suggested by Lewis could work for Vetter’s account.

Recall once again (Could), but this time in a slightly extended version:

- (Could): “If x were F , then x could be G ” is true iff x has an iterated potentiality to be G , and a potentiality for x to be F is an earlier stage in an iterated potentiality for x to be G .

To proceed, let us take first the exemplifying could-counterfactual used by Vetter in (Could) and turn it into the corresponding would-counterfactual, to which we then apply Lewis’ translation:

- (3) “If x were F , then x would be G ”.
 (3*) “It is not the case that if x were F , then x could be not- G ”.

⁸ It is worth noting that we cannot explain the difference between would- and might/could-counterfactuals explicitly in terms of necessity and possibility, saying that the consequent of a would-counterfactual is necessary, while the consequent of a might/could-counterfactual is possible, because it is always given the possibility for the antecedent to be the case, that then we evaluate whether the consequent is necessary or possible. Therefore, saying that the consequent is necessary or possible should always be under the clause *given the antecedent*. Here with “possibility for the antecedent to be the case” I do not mean to exclude counterfactuals with impossible antecedent, rather I mean that we are taking the antecedent to be the case for the sake of the evaluation of the counterfactual, whether this antecedent is possible or not.

⁹ A final clarification: note that Lewis’s account does not rule out the very possibility of $(P \wedge \sim Q)$, where “If it were that P , it would be that Q ” is true; it just has it that Q holds in all the *closest* P -worlds. However, for the sake of the article, I will continue with my simplification ‘*necessary given the antecedent*’.

(3) is the counterfactual we are interested in and for which we want to find the truth-conditions when formulating (Would). Hence, the construction of (Would) must start from (3*), because it is the negation of a could-counterfactual, whose truth-conditions can be extrapolated from (Could), but it is also equivalent to (3), so that its truth-conditions will be those of (3).

There are some important remarks to make on (3*). Crucially, it involves negation, and in two instances: first, (3*) is a negation of a could-counterfactual; second, this could-counterfactual that is negated in (3*) has itself a negation in its consequent. Note that this second negation (“*x* could be not-*G*”) takes narrow scope with regard to ‘could’, meaning “*it is possible for x not to be G*” (or “it is possible for *x* to be not-*G*”), and not “*it is not possible for x to be G*”. This is quite an important distinction because the change of scope corresponds to a different treatment in potentiality terms.

In Vetter’s terms, “*it is not possible for x to be G*” means that *x* does not have the potentiality to be *G*. This happens when we consider our *de re* Possibility* above. If “It is possible for *x* to be *G*” corresponds to the fact that *x* has a potentiality to be *G*, then “It is not possible for *x* to be *G*” should correspond to the fact that *x* does not have a potentiality to be *G*. The lack of a potentiality to be *G* by *x* can be taken to correspond to the lack of the possibility for *x* to be *G*, and therefore to the impossibility for *x* to be *G*. Thus, the broad scope on the negation is taken to claim *x*’s lack of a potentiality to be *G*.

On the contrary, “*it is possible for x to be not-G*” means, in Vetter’s terms, that *x* has the potentiality to be not-*G*, because of Possibility* once again. Rather than claiming a lack of a potentiality to be *G* by *x*, the narrow scope on the negation must be taken to mean the ascription to *x* of a potentiality to not be *G* (for a similar distinction concerning negation in Vetter, see her 2015: 86, 145-46).

This is an important point in trying to determine the truth-conditions of (3*), because it involves a narrow scope on the negation of ‘could’ and not a broad one. Therefore, our next step is to apply (Could) to a counterfactual presenting such a negation:

(Could~): “If *x* were *F*, *x* could be not-*G*” is true iff *x* has an iterated potentiality to be not-*G*, and a potentiality for *x* to be *F* is an earlier stage in an iterated potentiality for *x* to be not-*G*.

Now, to go from (Could~) to the truth-conditions of (3*) we should simply negate the former.

(TC3*): “It is not the case that if *x* were *F*, then *x* could be not-*G*” is true iff it is not the case that (*x* has an iterated potentiality to be not-*G*, and a potentiality for *x* to be *F* is an earlier stage in an iterated potentiality for *x* to be not-*G*).

Here though is where the first problem with Vetter’s formulation arises. Like (Could), (Could~) is in the form of a *conjunction*: *x* has not-*G* AND *F* is an earlier stage of not-*G*. Therefore (TC3*) is the negation of a conjunction and, as is well-known, the negation of a conjunction is in fact a *disjunction*:

$$(C/D) \sim(A \wedge B) \equiv (\sim A \vee \sim B)$$

As the initial truth-conditions for could-counterfactuals—as per (Could)—are conjunctive, then the negation of such truth-conditions amounts to a disjunction of the negated conjuncts. Therefore, the truth-conditions of the negation of a could-counterfactual are:

(~Could): “It is not the case that if x were F , then x could be G ” is true iff it is not the case that x has an iterated potentiality to be G , *or* it is not the case that a potentiality for x to be F is an earlier stage in an iterated potentiality for x to be G .

From which it looks like (Would) should be presented as a combination of (~Could) and (Could~):

(Would): “If x were F , then x would be G ” (“It is not the case that if x were F , then x could be not- G ”) is true iff it is not the case that x has an iterated potentiality to be not- G , *or* it is not the case that a potentiality for x to be F is an earlier stage in an iterated potentiality for x to be not- G .

What does (Would) mean? Are these truth-conditions effective? To answer these questions, it can be helpful applying all the abstract formulas above to some concrete examples.

5. Being an Earlier Stage—Part 1

As we can notice, all our formulas include an extremely ambiguous concept, expressed with the phrase ‘is an earlier stage’. Therefore, before attempting a practical application of these formulas, we should at least attempt to define it. Vetter does not explicitly explain it, and her language on this is always metaphorical, talking about a potentiality “bringing with it” another (2015: 226), or “being part of a chain of potentialities” (2015: 137). Even if this concept is clearly metaphysical in Vetter’s account, the idea of ‘being an earlier stage’ is difficult to clarify: is it expressing a sort of “process of iteration” that happens in stages, or is it suggesting that iterated potentialities themselves have stages? Whatever the answer, our interest here is on counterfactuals, so let us retrace what could have led Vetter to introduce this notion to explain counterfactuals.

If we accept a very rough simplification, counterfactuals can be taken to be expressions of a relation existing between antecedent and consequent, where a certain consequent is taken to be a necessary or a possible outcome of a certain antecedent, so that such a consequent is said to be necessary or possible *given such an antecedent*.

What Vetter needs to do is to offer a metaphysical picture that can map such linguistic expressions and therefore give account for such a relation. Traditional forms of dispositionalism could rely on a stimulus-manifestation relation to provide this metaphysical basis (see Bird 2007 or Jacobs 2010), but Vetter strongly rejects this kind of dispositionalism. Therefore, she needs to find another way to fit counterfactuals in her framework.

The expression ‘being an earlier stage’ is intended to do precisely so: antecedent and consequent of a counterfactual are related because the two potentialities ascribed by the counterfactual are related as well, with one being the earlier stage of the other.

This seems a plausible solution, where the reasons for the truth of a counterfactual in the semantics are backed up by the underlying metaphysics. However, what does it mean exactly for a potentiality to be ‘the earlier stage’ in another? My preferred interpretation of this is Vetter’s view of a “chain” of potentialities. Such a proposal does remain quite cryptic, but it seems to offer an intuitive idea that can suggest a metaphysical picture of potentialities somehow related to each other.

However, even if Vetter's formulation of (Could) with this interpretation of 'being an earlier stage' could work at a superficial and intuitive level, the more we try to unravel it and apply it to other counterfactuals, the more this notion of 'being an earlier stage' turns out to be inadequate and imprecise. Indeed, the distinction between could- and would-counterfactual in terms of the consequent being *possible given the antecedent* or *necessary given the antecedent*, which is the key for a formulation of (Would), requires an extra step, as we will see in the applications below: that the connection between the potentialities involved in a counterfactual must have modal nature. Following our rough interpretation, it is the antecedent that *makes* the consequent *necessary or possible* within a counterfactual, so the 'earlier-stage' relation should be able to map this semantic intuition. Therefore, the relation between the potentialities in antecedent and consequent should be characterized in a modal way: being part of the same chain of potentialities must imply some sort of necessity or possibility for the later-stage potentiality to be possessed if the earlier-stage potentiality is possessed.

In the applications below, I will try to make sense of why we need to include this extra modal notion for Vetter's account and for my formulas to offer some adequate truth-conditions for counterfactuals. We will see that it is really not obvious how this can work, and how the underlying metaphysics can match our linguistic intuitions on counterfactuals.

6. Application: Colourful Cats

In formulating some examples to test the efficacy of our formulas, let us make three assumptions. First, that some ginger cats have a white belly—a ginger cat can be "white-bellied", while some other ginger cats do not have a white belly—a ginger cat can also be "non-white-bellied".¹⁰ Second, that all ginger cats are tabby. Third, that there is no white cat that is tabby.¹¹

From these assumptions, if we take "Leo" to refer to a specific cat, we get an example for (Could), "If Leo were ginger, he could be white-bellied", an example for (Could~), "If Leo were ginger, he could be non-white-bellied", one for (~Could), "It is not the case that if Leo were white, he could be tabby" and finally one for (Would) "If Leo were ginger, he would be tabby".¹²

Before applying our formulas to these examples, we need to make a final clarification: all features here, including 'being tabby' and 'being white-bellied', are taken to be exclusive and exhaustive with their opposite, like 'being non-tabby' and 'being non-white-bellied': all cats are either tabby or non-tabby, so that there

¹⁰ The use of 'white-bellied' is for maintaining the same "adjective" form of the other examples and formulas as "the potentiality to be white-bellied", "being white-bellied", etc.

¹¹ With this I mean an always completely and uniformly white cat.

¹² As one of the referees to this work rightly pointed out, this example can flag another difficulty for Vetter, concerning once again the nature of iterated potentiality. As the referee suggested, we could doubt that the counterfactual "If Leo were ginger, he could be tabby" is really a matter of Leo's having two potentialities, one of being ginger and one of being tabby endowed by the first potentiality. We could instead think that there is just one potentiality: to be ginger in a certain way, namely in a tabby way. This is a justified worry raising from the ambiguous definition of iterated potentiality given by Vetter and the difficulties in understanding its stages, and it surely deserve attention, but for the sake of the argument I will assume that all the counterfactuals I am using are attributing two different potentialities to Leo.

is no cat that is both tabby and non-tabby and there is no cat that is neither tabby nor non-tabby.

Application of (Could):

(4) “If Leo were ginger, he could be white-bellied” is true iff Leo has an iterated potentiality to be white-bellied (A), and a potentiality for Leo to be ginger is an earlier stage in a potentiality for Leo to be white-bellied (B).

As said, (Could) is a conjunction, and a conjunction like $(A \wedge B)$ is true only if both A and B are true, so we can say that (4) is true only if both conjuncts in the application of (Could) are the case.

Considering the first conjunct (A), if you recall Possibility*, the fact that Leo has an iterated potentiality to be white-bellied, simply means that it is possible for Leo to be white-bellied. Therefore, for (4) to be true, a necessary condition is that it is possible for Leo to be white-bellied, i.e., that the consequent is possible. However, considering the second conjunct (B), for the counterfactual to be true the other necessary condition is that this iterated potentiality for Leo to be white-bellied is part of a “chain” of other potentialities (and in this sense is “iterated”), the previous “chain rings” or earlier stages of which include a potentiality for Leo to be ginger. The idea of a chain of potentialities could be quite in line with Lewis’ representation of could-counterfactuals as having the consequent *possible given the antecedent*, because if we take the existence of such a chain to which both potentialities belong as previous and later stages to mean that Leo’s possession of a potentiality to be white-bellied is in some ways *made possible* (but not made necessary) by Leo’s possession of a potentiality to be ginger, then we can clearly see that the consequent is made possible by the antecedent.

Application of (Could~):

(5) “If Leo were ginger, he could be non-white-bellied” is true iff Leo has an iterated potentiality to be non-white-bellied (A), and a potentiality for Leo to be ginger is an earlier stage in a potentiality for Leo to be non-white-bellied (B).

This is another conjunction $(A \wedge B)$ so we can apply the same reasoning as before. Considering the first conjunct (A), once again the fact that Leo has an iterated potentiality to be non-white-bellied means that, for (5) to be true, a necessary condition is that it is possible for Leo to be non-white-bellied, i.e., that the consequent is possible. In the same way as before though, this is not sufficient, because for the truth of (5) the other necessary condition is that this iterated potentiality for Leo to be non-white-bellied is part of a chain having a potentiality for Leo to be ginger as an earlier stage, as per the second conjunct (B). Again, this could maintain the idea of the consequent of a could-counterfactual being *possible given the antecedent* because we could again interpret the existence of a chain to which the potentialities belong in previous and later stages as the fact that Leo’s ‘being non-white-bellied’ is *made possible* (but again not necessary) by Leo’s ‘being ginger’.

Application of (~Could):

(6) “It is not the case that if Leo were white, he could be tabby” is true iff it is not the case that Leo has an iterated potentiality to be tabby ($\sim A$), or it is not the case that a potentiality for Leo to be white is an earlier stage in a potentiality for Leo to be tabby ($\sim B$).

Here, in contrast with our previous examples, we are dealing with a disjunction. Therefore, we must keep in mind that for a disjunction like $(\sim A \vee \sim B)$ to be true is sufficient that either one between the two disjuncts is true, which suggests that it should be sufficient for the truth of (6) that only one of the disjuncts $\sim A$ and $\sim B$ is the case.

Considering the first disjunct ($\sim A$), the fact that it is not the case that Leo has an iterated potentiality to be tabby should mean, by Possibility*, that it is not the case that it is possible for Leo to be tabby, so that (6) should be true if it were *impossible* for Leo to be tabby, and this should be sufficient for the truth of (6). We could then interpret (\sim Could) as saying that the negation of a could-counterfactual is true (and so a could-counterfactual is false) if the consequent is impossible; but note that this impossibility is intended as unrestricted and independent from the antecedent, so we should clarify that, following the first disjunct, (6) is true if the consequent is *impossible simpliciter*, in contrast with *impossible given the antecedent*. With '*impossible simpliciter*' I intend a situation in which the consequent is always impossible (and in this sense is 'unrestrictedly impossible') rather than a situation in which a normally possible consequent is not allowed by the antecedent, hence the expression '*impossible given the antecedent*'. Note that, obviously, if a consequent is *impossible simpliciter* it will also be *impossible given the antecedent*: if it is always impossible, it will be impossible also when the antecedent is the case.

However, we know that it is not *impossible simpliciter* for Leo to be tabby, because it is metaphysically possible for Leo to be tabby, therefore we should consider the second disjunct ($\sim B$) for evaluating (6). In this case, it should be sufficient for the truth of (6) that a potentiality for Leo to be white is not an earlier stage in a potentiality for Leo to be tabby, which could be interpreted as the fact that there is not a chain of potentialities including both a potentiality for Leo to be tabby and a potentiality for Leo to be white as an earlier stage in this potentiality.

If we are entitled to interpret 'not being an earlier stage' as the fact that it does not exist a chain including both potentialities, and the non-existence of such a chain as the fact that Leo's possession of a potentiality to be tabby is *made impossible* by Leo's possession of a potentiality to be white, so that Leo's 'being white' makes it impossible for Leo to be tabby, then we get the desired and intuitive interpretation of the negation of a could-counterfactual, which is true not only when the consequent is *impossible simpliciter*, but also when the consequent is *impossible given the antecedent*.¹³

Therefore, it seems that these truth-conditions for the negation of could-counterfactuals work if we interpret the negation of 'being an earlier stage' in a certain way. I will shortly consider whether any questions might be raised about this interpretation but let us first move to the application of (Would).

¹³ Note that there is another case in which the negation of a could-counterfactual is true, as suggested by Vetter: "This [account] implies that the 'might/could' counterfactual is false when it is impossible for x to be F " (Vetter 2015: 226, note 16). This can be explained in potentiality terms by saying that if it is impossible for x to have the earlier-stage potentiality to be F , then, if being G is part of a chain including being F , x cannot have an iterated potentiality to be G either, so that it is impossible for x to be G (first disjunct). Otherwise, if it is impossible for x to have a potentiality to be F , but x has a potentiality to be G , then the potentiality to be G must not be part of a chain including the potentiality to be F (second disjunct).

Application of (\sim Could) and (Could \sim) = (Would):

(7) “If Leo were ginger, he would be tabby” is true iff it is not the case that Leo has an iterated potentiality to be non-tabby (\sim A), or it is not the case that a potentiality for Leo to be ginger is an earlier stage in a potentiality for Leo to be non-tabby (\sim B).

Let us apply the same reasoning applied above, keeping in mind again that for the truth of a disjunction (\sim A \vee \sim B) is sufficient that only one between the two disjuncts is true, and so that it should be sufficient for the truth of (7) that at least one of the two disjuncts \sim A and \sim B is the case.

Considering the first disjunct (\sim A), the fact that it is not the case that Leo has an iterated potentiality to be non-tabby should mean that it is not possible for Leo to be non-tabby. Given our exclusive notion of ‘tabby’ and ‘non-tabby’, this means that (7) should be true if it were *necessary* for Leo to be tabby and this should be sufficient for the truth of (7). As before, we could then interpret (Would) as saying that a would-counterfactual is true if the consequent is necessary, but because this necessity is intended again as unrestricted and independent from the antecedent, it should be said that, following the first disjunct, (7) is true if the consequent is *necessary simpliciter*, rather than *necessary given the antecedent*. Once again, ‘*necessary simpliciter*’ is used to indicate those situations in which the consequent is always (unrestrictedly) necessary, while ‘*necessary given the antecedent*’ indicates those situations in which a normally non-necessary consequent is enforced by the antecedent. And again, any consequent that is *necessary simpliciter* will be a consequent that is *necessary given the antecedent*, because if it is always necessary, it will be necessary also when the antecedent is the case.

However, once again we know that it is not *necessary simpliciter* for Leo to be tabby, because it is metaphysically possible for Leo to be non-tabby, so we need to consider the second disjunct (\sim B). In this case, it should be sufficient for the truth of (7) that Leo’s potentiality to be ginger is not an earlier stage in Leo’s iterated potentiality to be non-tabby, which could be interpreted as the fact that there is not a chain of potentialities including both a potentiality for Leo to be non-tabby and a potentiality for Leo to be ginger as an earlier stage in this potentiality.

As before, if we are entitled to interpret this ‘not being an earlier stage’, as the fact that there is not a chain including both potentialities, and the non-existence of this chain as the fact that Leo’s possession of a potentiality to be non-tabby is *made impossible* by Leo’s possession of a potentiality to be ginger, then we can say that Leo’s ‘being ginger’ makes it impossible for Leo to be non-tabby. Again, I will discuss whether any doubts might be raised about this interpretation but, if we accept it, given our exclusive notion of ‘tabby’ and ‘non-tabby’, then if it is impossible for Leo to be non-tabby, then it is necessary for Leo to be tabby. Therefore, we can interpret the second disjunct as saying that (7) is true if Leo’s ‘being ginger’ makes it *necessary* for Leo to be tabby, so that we finally get the desired interpretation of a would-counterfactual, which is true not only when the consequent is *necessary simpliciter*, but also when the consequent is *necessary given the antecedent*.

7. Being an Earlier Stage—Part 2

The use of the examples above shows that under a certain *modal* interpretation of the ‘being an earlier stage’ relation, both (\sim Could) and (Would) can offer some

effective truth-conditions that are quite in line with our intuitions on those kinds of counterfactuals.

Such an interpretation suggests that the relation of a potentiality being an earlier stage in another iterated potentiality is connected to the existence of a chain of potentialities including them both. To provide a modal interpretation of this relation, it was suggested that the *existence* of this chain could be taken to mean that an object's possession of the earlier potentiality *makes possible* the possession of the later iterated potentiality by the same object as well, while the *non-existence* of this chain could be taken to mean that an object's possession of the earlier potentiality *makes impossible* the possession of the later iterated potentiality by the same object.¹⁴

If Vetter's formulation already allowed us to interpret (Could) as saying that for the truth of a could-counterfactual the consequent should be *possible given the antecedent*, the addition of the notions of '*making possible*' and its opposite '*making impossible*', concerning the possession of a potentiality in view of the possession of another, allowed us to interpret (~Could) as saying that, for the truth of a negated could-counterfactual, the consequent should be *impossible given the antecedent*, and (Would) as saying that, for the truth of a would-counterfactual, the consequent should be *necessary given the antecedent*, which are all extremely desirable and intuitive interpretations.

Without a modal interpretation of '(not) being an earlier stage' of this sort, we may struggle to get these desirable interpretations concerning the consequent of these counterfactuals, and to account for the difference between could- and would-counterfactuals, so the '*making possible/impossible*' formulation connected to the existence or non-existence of chains of potentialities seems a viable option to solve this issue.

However, the crucial problem is to confirm whether we are entitled to offer this interpretation of 'being an earlier stage'. As we said, looking at what Vetter has to say about iterated potentiality and its 'stages', she does not really explain what she means by 'stages', so that we do not have an idea of the nature of them, whether they are stages 'within' an iterated potentiality, in the sense that this potentiality could be a sort of "macro" potentiality including all its earlier-stage potentialities, or stages in a "process" going from one separated potentiality to another.

In truth, the relation between iterated potentiality and counterfactuals was not investigated fully in her book, since her main objective in introducing iterated potentiality was to extend the scope of potentiality to *de dicto* possibility, rather than to apply it to the specific case of counterfactuals. Still though, the idea that it comes in stages seems quite a crucial aspect of iterated potentiality, and very much essential to an understanding of it that is not purely intuitive but properly

¹⁴ As one of the referees to this work pointed out, someone could think that the 'making possible' link is merely the same as the link between a potentiality and its manifestation: if the existence of a potentiality with *p* as its manifestation makes *p* possible, then a potentiality whose manifestation is another potentiality makes the latter potentiality's manifestation possible. This application of the manifestation relation is interesting, and it would be worth investigating it, but the fact that this relation is primitive seems to make the explanation of the link between antecedent and consequent of a counterfactual somehow unsatisfactory. Therefore, this paper prefers to consider that there should be another metaphysical relation, that is not taken as primitive.

metaphysical. Nevertheless, Vetter does not clarify what it means, metaphysically speaking, for an iterated potentiality to have stages.

There is indeed a sense in her presentation in which the possession of iterated potentialities *depends* on the possession of the earlier stages, but the nature of this dependence is not clear. The metaphor of a chain does not help much either, because again it is not explained what sort of relation there is between its “chain rings”. I have tried not to deal with this by suggesting that what matters is the *existence* of this chain, rather than the relation connecting its rings. The modal aspect required was attributed to an existential quantification over the chain rather than to any characteristic of the chain itself. It seemed a sensible solution and loosely based on a familiar philosophical tradition which links existential quantification (over possible worlds) to possibility. Above, I worded this modal aspect in terms of ‘*making possible*’ or ‘*making impossible*’, which could be quite ambiguous, so let me rephrase the idea more clearly. On one side, the fact that there is a chain connecting two potentialities is taken to correspond to the fact that it is possible for an object to possess the second (iterated) potentiality if this object possesses the first potentiality. On the other, the fact that there is not a chain connecting them is taken to correspond to the fact that it is impossible for the object to possess the second potentiality if it possesses the first.

Even if this view is comforting in having such a familiar look, and seems plausible enough, there are clearly some issues with it. One problem is that, at the end of the day, the idea of a chain of potentialities is only a metaphor, so Vetter should find a way to explain more precisely on what we would existentially quantify in this case. The metaphor might work, and seems to work, but we are lacking a deeper metaphysical explanation of it. Also, this solution seems just to go back in circle, because it looks like we are simply saying in a metaphorical way that, for it to be possible that an object possesses a potentiality given its possession of another, there must exist a relation between the possession of the former potentiality and the possession of latter, without really saying what this relation is and how to establish whether this relation is in place.

Vetter’s attempt to apply her metaphysical framework to counterfactuals relies on a metaphysical picture of iterated potentiality that is not developed enough for it to map the counterfactual language. In addition, if we accept that there is a semantical difference between could- and would-counterfactuals, as Vetter herself suggests, then her metaphysics lacks the instruments to account for it, because this requires a modal formulation of ‘being an earlier stage’ that makes this notion even more cryptic.

A purely intuitive notion of ‘being an earlier stage’ simply cannot offer enough sound metaphysical explanation to provide adequate truth-conditions for counterfactuals, overall if we accept that the truth-conditions for could- and would-counterfactuals should be different.

Note that there is another issue with iterated potentiality concerning counterfactuals which too is linked to the idea that this potentiality comes in stages. If we consider that between two potentialities there can be several ‘stages’, ‘chain rings’, or ‘iterations’, Vetter’s account seems to enforce the truth of counterfactuals regardless of the number of these stages between them. This means that we should accept as true even counterfactuals where the number of iterations implied seems to be too high: “If this cloud of steam turned into water, it could break” cannot be considered true, despite it being true that if the water then turns into ice, it could break. Once again Vetter’s ambiguity in defining iterated potentiality

does not help. Metaphysically speaking, she does not impose a hierarchy over the stages, for example by saying that only the possession of the ‘immediately-before’ or ‘directly-related’ earlier-stage-potentiality can count towards the possession of a certain iterated potentiality. Therefore, in terms of counterfactuals, it is hard to see how we can reject those involving two potentialities with an enormous number of chain rings between them.

A possible solution could be appealing to the context sensitivity of counterfactuals to avoid enforcing the truth of these counterfactuals. Given that the semantics of counterfactuals derived from the semantics of ‘can’ requires them to be context-sensitive, then the potentialities that are considered when evaluating a counterfactual should be constrained by the context in which the counterfactual is asserted. Therefore, we could suppose that, while metaphysically speaking there is indeed an iteration from the cloud of steam turning into water and its breaking, in terms of context the leap required over the steps of this iteration is too wide for it to be relevant to the truth-conditions of the counterfactual.

However, this appeal to the context is problematic because even if we know that the context determines that the leap is too wide, that still requires explaining. A context always needs a metaphysical background on which to operate and make a selection of what is relevant, so once again we need to have a clearer metaphysical explanation of these ‘stages’ over which the leap happens. Accepting that the context does a job without a strong metaphysical backup could be a serious risk for Vetter’s ambition to provide a robust metaphysics of potentiality meant to serve as a non-context-dependent metaphysical background for the context to operate on.

Nevertheless, this is quite a separate issue from the one at hand and requires a much more extended investigation and discussion, but it is worth noting that counterfactuals including an extreme leap over a high number of iterations could represent a strong case against Vetter’s semantics and an additional worry for her notion of iterated potentiality.

8. Conclusion

The application of Lewis’ interdefinability principle and translations, together with the application of the rules concerning negated conjunctions, seems to allow the development of (Would) from (Could) via the intermediate stages of the translation (Could~) and (~Could), so that (Would) looks like a passable initial proposal for the truth-conditions of would-counterfactuals within Vetter’s framework.

However, for this proposal to work, some clarifications are essential, in particular concerning the notion of iterated potentiality and the idea that it comes in stages. The notion of ‘being an earlier stage’, despite sounding quite intuitive, is in truth quite cryptic, especially in metaphysical terms. Also, to allow an understanding of the difference between could- and would-counterfactuals, this notion should have a modal interpretation, which is not considered by Vetter. Even if the metaphorical representation of ‘being an earlier stage’ in terms of chains of potentialities, together with the modal interpretation given by an existential quantification over these chains, seems to offer a plausible picture, this metaphor is not backed up by a deeper metaphysical background within Vetter’s metaphysics and so it cannot provide us with a satisfactory explanation.

The application of Vetter's framework to counterfactuals has flagged some crucial ambiguities in her account that need to be solved. The unravelling of these ambiguities requires a much longer and more extensive discussion than what can be offered in this paper. Even if, using the instruments that she has given us in her book, together with our knowledge of counterfactuals and logic, it seems to be possible to formulate an initial version of (Would), a lot of work is needed before an account of would-counterfactual within Vetter's framework can be fully defined. Her (Could) and my (Would) are only the starting points for developing an account of counterfactuals based on potentiality and much more work must follow. In addition, this first step is only towards an account of *de re* counterfactuals, so the whole matter of *de dicto* counterfactuals still needs to be tackled.

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