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► To cite this version:

Pascal Engel. Is identity a functional property?. Michael Frauchiger. modalities, identity, belief and moral dilemmas, DE GRUYTER, pp.75-94, 2015, Modalities, Identity, Belief, and Moral Dilemmas, 10.1515/9783110429558-001 . hal-03686570

HAL Id: hal-03686570

<https://hal.science/hal-03686570>

Submitted on 6 Jan 2023

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Is identity a functional property?

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1. Introduction

The very first article authored by Ruth Marcus that I read, in 1977, was “Extensionality” (1960).¹ It awoke me from my Quinean dogmatic slumber, because it explained that extensionality is not limited to the domain of extensional logic and because it showed how one could construct a range of various notions of extensionality of different strengths, including for intensional contexts. It also seemed to me a remarkable example of how a philosopher and logician can *construct* a concept, whereas at the same time my teachers at Ecole normale supérieure were explaining to me that every concept had to be de-constructed with no hope of rebuilding.²

In the same article Ruth Marcus examined the notion of identity and explained that the principle of the identity of indiscernibles

$$(Id\ ind) \ (\forall x) (\forall y) ((Fy \leftrightarrow F x)) \rightarrow (x = y)$$

could also be weakened (to be distinct means to be *discernibly* distinct) . She also hints, at the end of her article that when the statement “involves only proper names”, then replacement of the “Morning star” by “the evening star” in such statements as

It is necessary that the evening star is the morning star

yields no paradox such as Quine’s on the number of planets. It is clearly related to her theorem about the necessity of identity, which she established in her pioneering paper of 1946, and it anticipates the famous discussion of necessary identity statements with proper names in “Modalities and Modal languages” (1962)³.

¹ This article is not reproduced in *Modalities*

² So I mentioned Ruth Barcan Marcus 1960 in a polemical piece against my French teachers, one of whom was Jacques Derrida, in Engel 1979

³ In her 1960 article , Ruth Marcus quotes Fitch 1949, who had himself anticipated this notorious point, later, and notoriously, taken up by Kripke.

It is this topic of the nature of identity, and of its possible variations, which I want to take up here. Traditional debates about the nature of identity bear upon whether it can really be a formal property or relation of objects, given that not all of the classical logical principles of identity seem to be formal at all. This has led philosophers to propose various non classical notions of identity and in particular to relativise the concept. But these attempts meet strong objections. I want here to examine another proposal. It has been suggested that truth could be a functional property, defined by its role, multiply realised in various domains. Can identity be considered as a functional property? The proposal would have the advantage of avoiding relativism about identity. But could it work? I argue that it can't and that we have to stick to our classical absolute concept.

1. *Absolute identity*

The difficulties of the classical definition of identity are discussed by Ruth Marcus in her essay "*Possibilia* and possible worlds" in the context of a discussion of the nature of *possibilia* (1986, 1993:189-213). Identity is taken to be a logical notion characterisable by the properties of reflexivity, symmetry, transitivity, indiscernibility, and substitutivity):

(R) $(\forall x) (x = x)$

(S) $(\forall x) (\forall y) ((x = y) \rightarrow (y = x))$

(T) $(\forall x) (\forall y) (\forall z) (((x = y) \& (y = z)) \rightarrow (x = z))$

(Ind Id) $(\forall x) (\forall y) (x = y) \rightarrow (Fy \leftrightarrow Fx)$

(Id ind) : $(\forall x) (\forall y) ((Fy \leftrightarrow Fx) \rightarrow (x = y))$

It seems to be the best way to define objecthood, and a primitive notion:

« Identity is the strongest equivalence relation that a thing bears only to itself. That there are individuals is already presupposed if the identity relation is to hold. The identity relation does not *confer* thinghood; identity is an essential feature of things. Individuals must be there before they enter into any relations, even relations of self-identity. Of course if we want to *discover* which objects a language or theory takes to be individuals, we look to see which objects are such that they can meaningfully enter into the identity relation. Quantification is not so clear a guide to ontology as is identity. No identity without entity.”
1993 : 200)

The problem, however, as Ruth Marcus reminds us, is that identity is not so clear, and that its definition in terms of indiscernibility (*Id Ind* above) – things are identical when they have all their properties in common- encounters familiar problems: what does it mean to say that two things have all their properties in common? What kinds of properties are involved (qualitative or relational, including the relation of identity itself)? The principle of the identity of indiscernibles cannot be fully logical or formal, for indiscernibility cannot define identity without further metaphysical assumptions.

There are indeed different criteria of the formal. Quine could not accept the necessity of identity as a formal property of it, except in the *de dicto* sense. But as Ruth Marcus remarks, for instance in her “A Backward Look at Quine’s Animadversions on Modalities” (1988; 1993: 229) and in “Essentialism in Modal Logic” (1967; 1993: 50), the necessity of identity does not need other kinds of essential properties than self-identity, and is committed only to an innocuous form of essentialism. So there is a good ground to accept the necessity of identity among the formal-logical properties of identity. The situation is less clear with the non vague character of identity, which has been defended by Gareth Evans on the basis of a famous argument which is reminiscent of Marcus’s proof of the necessity of identity (Evans 1982)⁴. A lot of discussion has been devoted to whether identity *statements* can be vague or not, but it seems difficult to deny that the property of an object to be self- identical could be vague. So there is good ground for adding to the classical list of formal features of identity (reflexivity, transitivity, indiscernability, substitutivity) those of necessity and non vagueness. All these make identity an *absolute* relation, which holds of objects independently of what kind of objects enter within the relation. In other words absolute identity characterises identity as a formal property in the sense that it is supposed to apply to any kind of object, whether it is physical, biological, mental, natural, artefactual, etc. Any two objects, if they are identical, are identical *simpliciter*, and not relative to any kind or sort.

⁴ (1) $\nabla (a=b)$ (where ‘ ∇ ’ is the operator ‘vaguely’)

(2) $\hat{y} [\nabla (y = a)]$

(3) $\sim \nabla (a = a)$

(4) $\sim \hat{y} [\nabla (y = a)] a.$

From Leibniz’s law of substitutivity one can derive from (2) and (4):

(5) $\sim (a=b)$

which contradicts the initial hypothesis that the identity statement ‘ $a=b$ ’ is indeterminately true.

On Evans’ argument, see Williamson 1994: 253-56, and the references thereof. See Also Engel 1999

In the same article (1993: 228) Ruth Marcus notices that for Aristotle, essential properties are sortal, in contrast to trivial properties such as being an entity and being self-identical. It is precisely because they have wanted to include within the property of being identical sortal properties that some philosophers have attempted to *relativise* identity itself to sortals. Geach (1972) claimed that the absolute concept of identity does not fit our usual way of asking identity questions. When we ask whether one object is identical to another, we never ask whether they are identical *simpliciter*, but we always ask questions of the form: “What kind of thing is x?” and we always reply, in the Aristotelian mode, that x is an F, or G, etc. When we ask whether x is identical to y, it is always relative to a sortal F, G, etc. This is, in a sense, how it should be, since the formal properties of identity (reflexivity, etc.) do not determine what kind of thing x and y are, or under what respect x and y are identical. In traditional terminology what determines which kind of thing is x is what individuates x, and individuation is another matter than identity.

Actually a majority of problems which are called “problems of identity”, those which give rise to famous paradoxes (material composition vs form, identity over time, Theseus’ ship, the problem of the many, etc.) are problems relating to individuation. Take for instance Geach’s case of the cat Tibbles as an illustration of “the problem of the many”.⁵ Tibbles is a cat. Let us suppose that he loses his tail, the resulting object being Tib. Tib differs from Tibbles. But Tibbles minus his tail coincides with Tib. And if Tibbles is a cat, Tib is a cat too. One can say that Tib differs from Tibbles as an individual but is identical to Tibbles as a cat. Aren’t there two Tibbles? A variant has Tibbles losing his hair on the carpet: if Tibbles loses 1000 hairs, 1000 Tibbles are on the carpet.

According to Geach, most of these paradoxes show that the predicate of identity, if it is to make sense within ordinary contexts, has to be relativised. « $a = b$ » has always to be understood as

(R) a is the same F as b

where «F» is a sortal predicate. The problem, as David Wiggins has shown, is that relative identity (R) is incompatible with the principle of the identity of indiscernibles⁶. The dilemma is: either identity is absolute, but it can’t really be a relation into which ordinary objects enter, or it is relative, but then it ceases to be a genuinely formal relation.

⁵ A paradox, which, as Wiggins 2001 p.173-76 notes, comes from Chrysippus. The phrase comes from Peter Unger, see his 1980

⁶ cf. Wiggins, op.cit, ch.1, Engel 1989, op.cit, p. 241.

Geach's problem about relative identity and the issues raised by the paradoxes of identity show that there is a sharp contrast between what logic tells us about the identity relation – which is absolute, simple, and necessary – and our *identity judgments* – which are relative, context-sensitive and contingent. Geach is right that in many contexts we do not ask whether a thing is identity to another *simpliciter*. Very often we satisfy ourselves with vague or loose identity statements (“This is the same food as the one I had in another restaurant”) or ambiguous ones (for instance we are happy to accept certain type identity statements although we would reject their token counterparts : “This is the same train as the one I took for Arezzo last year”), and we rarely care for what Thomas Reid called the “strict and philosophical sense” of identity in opposition to its “loose and popular” sense (we almost never ask : “Is it *really* the same food as the one from the other restaurant ?”, or “ Is it the *very same* train as the one you took for Arezzo last year?”). In such cases, identity is neither absolute nor transitive, and seems akin to a notion of similarity. But can we content ourselves with the observation that there is a conflict between the loose and ordinary sense on the one hand and the strict and philosophical sense on the other?

The notion of an identity judgement is clearly person or context relative, as well as it is an epistemic notion. The difference between identity judgements from one context to another are obviously differences about the epistemic *criteria* by which we judge one thing to be identical to or to differ from another, or differences about our epistemic interests in asking identity questions. But identity questions are not epistemological questions: they are questions about what things are and their nature. But even if we understand these questions as ontological questions, the problem of the variety of identity questions still arises. When we ask whether a marble statue seen in the Acropolis museum in Athens is the same as one in plaster seen in a tourist shop in the Plaka below, we wonder about a difference in *constitution*. When we ask whether Theseus' ship at one time is the same as a ship of the same shape at another time, we wonder about a difference in material *composition*. These are principles about the individuation of entities, in an objective, and non mind-depend sense. But these questions about individuation differ from identity questions “strictly” speaking. But we cannot rest content with the thought that questions about identity are distinct from questions about individuation. We want to know how they are related. Does individuation depend on identity or vice versa?

3. Wiggins' *individuable essentialism*

Wiggins 2001 ⁷ proposes a way out. He holds that any entity has to conform to the formal principles of the absolute concept, which are norms for specific issues about individuation which occur in various contexts and relative to various purposes that we have of classifying objects into kinds. Without these principles, no judgement to the effect that x is identical to y can make sense. According to Wiggins, however, it does not follow from this that attributions of identity are independent of the implicit reference to *some* sortal or other. Although identity is absolute, "the sortal dependency of individuation" still holds. According to Wiggins' « individuable essentialism » it has to be true both that:

- (1) Identity is absolute and defined by its formal properties (R, S, T, ind Id, Id ind)
2. A thing x is identical to another y if and only if there is a sortal concept F such that x and y fall under F
3. This concept provides the individuation of the entities in question and is a principle of *coincidence* and of *activity*, of *functioning an operation* (in other words it is a substance concept (Wiggins 2001 : 72-73)

According to this conception, individuation is relative to a common sortal concept which underlies any individuation, but this concept is left unspecified by the schema of the theory. It may be any sortal concept which is general enough to track the object. But this sortal concept does not vary from context to context, from one identity question to another. On the contrary the same sortal is presupposed by any individuation. It is the concept of what Wiggins calls a "continuant".

Such a view seems equipped to answer some of the paradoxes about identity, such as the problem of the many. Confronted with the Tib-Tibbles case, individuable essentialism will say that Tib and Tibbles are two distinct entities which coincide under the same sortal (*cat*). Wiggins rejects any view which would say that Tib and Tibbles are composed of distinct spatio-temporal parts. Their difference is based upon their constitution. Although identity is a stable property, there are variations in the conditions of persistence, which differ according to whether one deals with material objects, biological organisms, persons, artefacts or different kinds of entities. Each one of these has its own individuable kind, but continuants falling under these kinds have distinct persistence conditions. Constitution does not *define* identity, but identity supervenes on constitution. Identity is any relation

⁷ Oxford, Blackwell, 1980. The book had a first version in 1968, *Identity and Spatio temporal continuity*, and a third one as *Sameness and Substance Renewed*, Oxford University Press., 2001

which conforms to the formal principles (R), (S), (T), (id ind), (ind id), but for each kind of entity, there is a substantive account of the individuation of members of that kind, and conformity to the formal principles is a consequence of that account.

But can Wiggins' individuating essentialism solve our problem? If persistence conditions vary with the kind of entity involved in each case, and if identity supervenes on persistence conditions, how can we escape the conclusion that identity is nothing over and above the constitution of the kinds? Do the formal principles hold in the same way in all domains? For instance if we accept that the constitutive principles for personal identity are based on a notion of psychological continuity of the Lockean or Parfitian kind, will identity be transitive? Presumably not, for this depends upon whether psychological continuity involves a strong or a weak form of continuity⁸. Can't we accept that the principles of individuation of some entities, such as social groups like clubs or associations, can be vague (a club does not cease to exist if it loses one of its members, but a loss of ten members may be fatal, where does the limit fall?). Do the formal principles of identity hold in basic physics? A number of writers hold the view that in quantum physics the identity of indiscernibles fails as well as the principle of the non-vagueness of identity.⁹ Similarly for biological entities¹⁰. The individuation conditions of an organism depend upon persistence conditions which differ from those of physical objects, artefacts or persons. These conditions are those which guarantee the continued process of the life of the organism. But things are not so clear at the beginning of life: for instance the possibility of monozygotic twins suggests that a zygote is not a single and coherent life, but a system which has the potential capacity to form several lives. Hence in what sense are we confronted with a coherent whole or with a set of autonomous cells? The individuation conditions are not clear either at the end of the life of (human) organisms: medical practice has replaced cardio-pulmonary death with cerebral death. Should we then say that the irreversible loss of cerebral functions constitutes the death of the person or that of the organism? Another example of the complexity of identity questions for living beings is the nature of the "self" in immunology. According to Carosella and Pradeu (2006) the classical model in immunology which rests upon the distinction between the self and the non self presupposes that every element external to the organism provokes a reaction designed to preserve its integrity. But immunitary reactions are not limited to exogenic factors (bacteria, parasites, foetuses are tolerated by the self). This is why, according to Carosella and Pradeu, the criterion of identity is continuity rather than identity. They show that any

⁸ see Parfit 1984 : 205-206 . Wiggins discusses these issues in chapter VII of Wiggins 2001

⁹ S. French et M. Redhead 1988

¹⁰ see in particular the interesting article by Boniolo and Carrara 2004

strong discontinuity within immune receptors and their targets gives rise to a reaction of the immune system, which does not discriminate between self and non-self, but between endogenous or exogenous epitopes which are constantly present and others which break the continuity of interactions. This is why, according to them, biological identity is nothing but a kind of continuity:

“The continuity hypothesis conceives of identity as an identity-continuity, since it claims that nothing more than the spatiotemporal continuity of adhesions between immune receptors and ligands defines immune identity. This hypothesis can therefore be seen as the immunological point of view on the identity of organisms. According to the continuity hypothesis, nothing like a permanent ‘core’ to be preserved against all foreign threats is presupposed and thought to define immunity. Changes from the inside and changes from the outside equally can trigger an immune response, depending on the conditions of encounter.” (Pradeu and Carosella 2006: 247)

Another problem raised by Wiggins’ conception is that it seems to presuppose a form of Aristotelian essentialism in biology. He holds in particular that the sortals upon which continuants depend are natural kinds. A number of writers, however, starting with David Hull, have held that biological entities such as species can be considered as individuals and not as kinds. If this is correct one would need a different conception of the sortals upon which the continuants depend.

Most of the writers who criticize the use of the classical and absolute notion of identity suggest that we should dispense with these principles and replace them with principles for a weaker relation than identity, namely continuity, for which not all of the principles such as (*Id ind*) are valid. The view that identity principles can be in some sense reduced to the principles which hold for constitution (mostly distinct continuity principles for the various kinds of entities) raises, however, serious problems. The first one is that it resurrects the ghost of the thesis of the relativity of identity, and of a pluralistic view according to which there are as many types of identity relations as there are principles of individuation in each domain. Thus there would be physical identity, biological identity, personal identity, social identity, etc. Some writers, like Boniolo and Carrara 2004, simply accept this form of relativism. But then it is hard to see how it can escape the difficulties adduced for Geach’s view. Or one has simply to bite the bullet, and reject the classical and absolute notion of identity.

The second difficulty of the pluralistic or anti-essentialist conception consists in its reduction of identity to continuity. As many discussions on the problem of personal identity since Locke and Butler have shown, identity is not the same thing as continuity.¹¹

4. Functionalism about identity

How could we reconcile the unity and the absoluteness of the identity relation with the plurality of the modes of constitution and of the conditions of persistence of objects of different kinds? A possible solution takes its inspiration from the familiar functionalist conception of mental states in the philosophy of mind. According to functionalism, the mental properties of an organism are defined by the causal role of the properties of that organism. In most contemporary versions of the view, functional properties are second-order properties: they are role-properties of first-order (physical and biological) properties of organisms. These roles are “multiply realised” in these first order properties of the organisms, and supervene upon them, without being identical to these properties. This functionalist picture can be extended to other kinds of abstract properties. In particular a number of writers have proposed that *truth* could be conceived as a functional property defined at the abstract level as satisfying a set of “platitudes”, and realised in various domains (Pettit 1996, Lynch 2005,2009). On Lynch’s version of the view,

Just as, according to functionalism about mental states, our use of “belief”, “desire” and other mental terms can be individuated in terms of the role that they play, together with other states, in mediating between inputs and outputs, we could say that the predicate “true” is a place mark for a certain role marked by the usual platitudes: asserting statements that one believes, which correspond to reality, on which people can converge, etc. But the issue of the nature of the properties which “realise” these roles is left open. Truth is a property which can be variably realized, just as a functional property can be so realised. Summarizing the idea, Wright says:

« The concept of truth admits a uniform characterisation wherever it is applied – the characterisation given by the minimal platitudes, which determine what is *essential* to truth...The form of pluralism for which space is allowed by this overarching uniformity is

¹¹ See the classical objection to Locke by Joseph Butler, *First Dissertation to the Analogy of Religion*, 1736, rep in J. Perry, ed. *Personal Identity*, Berkeley University Press, Berkeley and Los Angeles, 1977

variable realisation. What constitutes the existence of a number is different from what constitutes the existence of a material object. » (Wright 1996)

In other words truth is a second-order property, which has to be realised in various ways in first-order properties which will underlie this role. In each case we shall to give arguments to secure that the realist story is correct or not. The idea is close to one which had been advanced by David Wiggins in his theory of identity (Wiggins 1980). Identity is the one and only relation captured by the principles of reflexivity, symmetry, transitivity, substitutivity and the identity of indiscernibles, but there are varying conditions of identity for material objects, persons, events, biological beings, social objects, etc. Similarly truth is a multiply realizable role-property, which we can “ramsify” with a Ramsey sentence :

X has a property that plays the truth role iff $\exists t_1 (t_1 \dots O_1, \dots O_n) \& x \text{ has } t_n$

Cette conception fonctionnaliste de l'identité pose cependant problème si nous essayons de spécifier les rôles de la notion par rapport à ses réalisations dans différents domaines. Est-ce que l'on dira que l'identité est toute propriété qui joue le rôle d'identité, comme la continuité spatio-temporelle ou la similitude parfaite? Mais alors la notion d'identité se trouve à nouveau réduite à ces notions, ce qui est le contraire de ce qui était recherché. Dira-t-on que l'identité est la propriété du second d'ordre d'avoir la propriété qui joue le rôle de l'identité ? Mais quel serait ce rôle ? Une autre difficulté concerne la réalisabilité multiple, si nous poursuivons l'analogie avec le cas des propriétés mentales. Selon la thèse de la réalisabilité multiple du fonctionnalisme du mental, il n'y a rien de commun entre la propriété d'être une douleur dans un organisme et dans un autre. Mais alors comment peut-on parler d'identité ?

La réponse est que, comme dans la conception fonctionnaliste du mentale, l'identité est une *et* plurielle. Il y a une et une seule propriété que toutes les entités d'un domaine particulier ont, l'identité. Elle se définit fonctionnellement par les propriétés formelles de la conception absolue de l'identité, c'est-à-dire (R, S, T, IndId et IndId). Mais elles la réalisent différemment. Pourtant les réalisations ne peuvent pas être parfaitement différentes d'un domaine à l'autre. Revenons au cas du soi immunitaire. Le fait que le soi ne soit pas une substance protégée de l'extérieur et qu'il n'y ait pas de « noyau » commun et permanent protégé contre des menaces extérieures implique-t-il qu'il n'y ait pas des lois causales qui définissent le système immunitaire? De nombreuses définitions de l'identité biologique :

en font une forme d'intégration fonctionnelle. Un système est fonctionnellement intégré s'il régle fonctionnellement les activités pertinentes de ses parties sous un ensemble de conditions externes de manière à permettre l'autoreproduction et le maintien du système (autopoïèse, homéostasie). De même, si l'on prend un point de vue évolutionniste, on dira que chaque fonction est une fonction « propre » sélectionnée par le système dans son passé biologique. Je propose de considérer la propriété d'identité comme une telle propriété fonctionnelle, survenant sur les conditions variables d'individuation.

Cette conception ne revient-elle pas à une forme d'essentialisme ? Oui, mais de l'essentialisme individuatif. Elle est en fait parfaitement comptatible avec celle de David Wiggins, et on peut la considérer comme un développement de cette dernière. La conception de David Wiggins et le fonctionnalisme quant à l'identité sont compatibles avec les faits propres à la continuité dans un domaine particulier, et l'identité peut demeurer ce qu'elle a toujours été, une propriété absolue, une affaire de tout ou rien.

The idea, as intimated, is that for each respect that is relevant in a context, the context contains a corresponding similarity space.¹³ If color is a relevant respect in C , then SC will contain a color space; if shape is relevant, SC will include a shape space; if time is relevant, it will include a temporal space; and so on. For each similarity space $r \in SC$; let $dr(_,_)$ be the distance function associated with that space; so $dr(a,b)$ measures the distance between the representations of objects a and b in r . Also associated with each $r \in SC$ is a threshold value $tr_r > 0$; which may be different for different r and also—though for reasons given above this may be taken as optional—different for the same r in different contexts C . With this at hand, we can state a precise definition of folk identity:

$$Id_C(a,b) \iff \exists r \in SC: dr(a,b) \leq tr_r$$

C : \emptyset

Variants of this definition are not hard to conceive. For example, we might stipulate that two objects are identical $_C$ iff the sum of the distances between their various representations in the similarity spaces corresponding to the respects that are relevant in C does not exceed a certain threshold value, which depends on the context; or we might consider taking a weighted average of those distances, supposing that all relevant respects need not bear equally heavily on our identity judgments in a context.

???

Second, there is not the slightest linguistic evidence to suggest that the folk's identity judgments do not always respect the putative reflexivity and symmetry of the identity predicate. So presumably we should not regard as admissible explications of the phrase "being highly $_C$ similar in all relevant $_C$ respects" that

do not render folk identity reflexive and symmetric.

(1) entails a contextual version of Leibniz's

Law. Within the similarity space approach, properties are representable as regions in the domain of a similarity space; for instance, the property blue corresponds to a certain region in color space

The analogy with functionalism, as we'll see shortly, is apt.

But truth can't be a second-order property, for the reason just noted. That would imply that truth is the property of having some property that has certain features. But does the second-order property itself have those features? That is, it seems that we want to say that *truth itself* is objective and a goal of inquiry. But now is my belief's having the property of having a property that is a goal of inquiry a goal of inquiry? Well compare: suppose the color red is a second-order property: being red is having the property of having a property with certain features, such as a reflective variance.

Does the property of having a property with a given reflective variance itself have that reflective variance? Not obviously; indeed, obviously

not

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