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On the Problem of Vague Existence

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*To Niky and Betty, my heroes.
And to Pietro, who definitely came into existence.*

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Preface

The aim of the present work is to investigate the problem of metaphysical vague existence: that is, the vagueness eventually concerning existence, independently from our epistemic and linguistic limitations. In the present work, when we will refer to vague existence, we will always think about metaphysical vague existence. This will be the object of our analysis and this object puts in relation two distinct notions, that are themselves the center of independent and enormous debates: existence and vagueness.¹ Despite the fact that both the literatures on existence and vagueness are extremely rich, it seems like the phenomenon of vague existence has not received the attention that it deserves.

The first aim of this work will be to understand why the problem of vague existence has received so little attention, by comparison with other problems related to existence and vagueness. The important thing to underline is that the notion of vague existence has not been taken much into consideration, despite its playing a pivotal role in many arguments in different metaphysical debates. More precisely, the alleged absurdity of the notion of vague existence has been used as an assumption from which to start for some *reductio ad absurdum* arguments: most notably, for example, David Lewis's argument for unrestricted composition and Ted Sider's so-called argument from vagueness for four-dimensionalism.² The alleged absurdity of the notion of metaphysical vagueness in general (vagueness concerning how the things of the world are, independently from how we think or talk about them) has been "established" throughout the twentieth century by many philosophers,³ sometimes as something like a self-evident truth.

Nonetheless, there are questions that do not seem so absurd, such as the following: when precisely does a determinate object come into and/or goes out of existence? Does it make sense to think about the precise temporal duration of an object's existence? Is the existence of an object vague in some sense? Thus, on one side we have this puzzling questions that seem to require our attention, while on

¹As a first introduction to many relevant topics and bibliographies, see [Salmon 1987] and [Williamson 1994].

²[Lewis 1986]; [Sider 2001].

³See among others: [Russell 1923]; [Dummett 1975]; [Sainsbury 1994].

the other side we have a quite sparse consideration of the notion of vague existence; despite that, the alleged absurdity of the notion has been used as an important instrument in different metaphysical debates.

One of the causes of this discrepancy, between the sparse consideration that the notion has received and the important role it has in some debates, lies in the fundamental features of the so-called "received view" and the relevant idea of existence. Very briefly: since its beginning with Frege and Russell, and then again with other influential philosophers such as Quine and Evans (and many others), analytic philosophy has stressed the importance of logical analysis as a method of inquiry and understanding. The reflection on the notion of existence makes no exception: the existential quantifier " \exists ", conceived in its classical logic form, has become in this perspective the proper way to express existence. This idea, in turn, conveyed the conviction that the proper way to examine the notion of existence is to examine the features of the existential quantifier. Such logical term, "obviously", can harbor no indeterminacy at all, given that in classical logic we hold both bivalence and the law of excluded middle. Thus, " \exists " cannot be subject to any indeterminacy. At any time, an entity exists or does not exist, no third possibility in between: the notion of vague existence cannot make sense.

Another cause of the discrepancy that we have mentioned above, which is strictly related to the first one, is that the problem of vague existence has been characterized mainly in the framework of the debate on composition. The notion of existence itself has been treated in terms of composition and mereology: that is, an existing object would be either a "simple" (i.e., some sort of atomic element) or a sum of other things (i.e., an object that is composed by some parts). In a slogan: composition entails existence. That is: apart from the case of simples, an entity is to be considered as an existing object if and only if a given criterion for composition is fulfilled among certain things (that are the parts of the existing object). The debate on composition has been widely developed and different positions have been defended, but existence and eventually vague existence have been then frequently characterized in terms of mereological sums and criteria for composition. Thus, it has been usually thought that, given that "to exist" is to be the sum of some parts (except for the existence of simples), and given that we can think of these sums of parts by means of a logical language that cannot harbor any indeterminacy, then existence cannot be vague.⁴ This fact has deeply shaped the discussion of the notion of vague existence, and has been a limitation that has narrowed the range of the instruments by means of which we can understand it.

These two causes ("received view" idea of existence *plus* existence in terms of composition) of the discrepancy between the attention that the problem of vague existence seems to deserve and the attention that it has received, considered together,

⁴More on this in Chapter 1.

let emerge a further question: is this standard characterization of vague existence satisfying? That is: is it exhaustive regarding the apparent features of the phenomenon? Our answers will be negative, so we will underline what is missing and which other features need to be considered.

Framework and main questions

One way to start an inquiry on the phenomenon of vague existence is to ask the following, direct question: does the notion of vague existence make any sense? That is: does it make sense to pair the topic of the existence of an object to the problem of vagueness? This paraphrase already brings about some further issues.

First of all, we have to say that we will be concerned here with material objects, not abstract or fictional ones. We will reason about the existences of cats, ships, statues and the like, not about the existence of numbers, concepts, fictional characters and the like. So, we will take into examination objects whose existence, from a common sense perspective, is usually considered evident and nevertheless problematic in some circumstances. Evident, because we tend to believe that cats, ships and statues surely exist; problematic, because we tend to find difficulties regarding the beginning and the ending of the existences of such objects. This is not to say that we will assume common sense (whichever "system of knowledge" we want to indicate by this expression) as a set of beliefs to which we should conform our characterization of the phenomenon of vague existence. Nor we will avoid a confrontation with those kinds of theories that deny the existence of material objects or multiply indefinitely the number of the objects existing, going in both way straightforwardly against our everyday beliefs. Rather, we just want to rule out the issues regarding the distinction between material objects on one side and abstract or fictional objects on the other. Here, we will not be concerned with the indeterminacy and the indefiniteness that can arise when we think about abstract or fictional objects such as the set of natural numbers or the character we know as "Sherlock Holmes". We will investigate the problem of the apparent vague existence of some material objects. Obviously, one of our duties will be to characterize properly the set of material objects that we want to consider, not only by means of examples, but also specifying their proper features.

Secondly, we have to say that we will be concerned with vagueness as a particular kind of indeterminacy. How to define precisely vagueness phenomena is a problem that is itself the center of a debate.⁵ Usually, it is said that vagueness is a matter of soritical series, borderline cases of application of the allegedly vague predicates, and lack of sharp boundaries. Whether these three features are all necessary in order to

⁵For an introduction see [Keefe 2000] and [Hyde 2008].

describe the phenomenon of vagueness or whether one can be thought to be fundamental in respect to the others is also debatable. Our choice here will be to refer to vagueness as a particular kind of indeterminacy, where its peculiarity consists in the fact that it involves the presence of a soritical series: *soriticality* will then be the trademark for distinguishing vagueness from other kinds of indeterminacy.

If we put together these two clarifications concerning the question we have posed, we see another very important issue arising. That is, if we ask ourselves what it would be for the existence of some material objects to be affected by some sort of soriticality, it looks like the answer would be that in such cases the existences themselves of those objects should be the subject of the alleged soritical series; the problem is that it is not clear what should be the variable of such soritical series, as it is in the traditional cases of vagueness.

For instance, let's consider three of the typical examples of vague predicates: "heap", "bald", "tall". Roughly speaking, they appear to be vague (i.e. affected by soriticality) because it looks like we find it hard to think of a precise number of grains, a precise number of hairs, or a precise number of millimeters (or any other apparently adequate unity of measurement for spatial lengths) that should fit the definitions of the extensions of the relevant predicates.⁶ Any time that we think about a plausible number of one of those variables, it seems that if we add or subtract to that number a single unity, then the new number should again fit the definition of the extension of the relevant predicate.

For example, here is a classical formulation of the sorites paradox. The following proposition appears to be definitely true:

- (1) 1.000.000 grains of sand put together are enough to have a heap.

If (1) is true, then we tend to hold that also the following is true:

- (2) If 1.000.000 grains of sand put together are enough to have a heap, then 999.999 grains of sand put together are enough to have a heap.

Applying the classically valid rule of inference *modus ponens* to this pair of premises, we have that the following is true:

- (3) 999.999 grains of sand put together are enough to have a heap.

⁶The case of so-called "observational predicates", such as "red", is also quite typical in the discussion of vagueness, but it is the center of an independent debate: see [Raffman 1994].

But then we are already going down the slippery slope. In fact, we can consider (3) as a further premise for a new argument, and proceed in an analogous way. But then, after several applications of *modus ponens* to an ordered series of premises, we will come to the seemingly false conclusion that, for instance, 2 grains of sand are enough to have a heap. It is not clear at what point in the series we should stop; moreover, the idea itself of the presence of a cut-off in the series is problematic.⁷

Another important thing to underline is that, for what concerns "heapness", baldness and tallness, it looks like we do know what is varying throughout the (eventual) soritical series: in other words, it seems that we know how to measure such "things", we know which is the subject of the relevant soritical series. In the case of vagueness concerning existence, things are much less clear: it is problematic to think about a number of a given variable that should be the parameter for existence, primarily because we do not know which should be variable. So it looks like there is a difference between thinking of a soritical series for "heapness", baldness and tallness on one side, and existence on the other. We will come back on this consideration in Chapter 5.

Variables of the soritical series

The previous considerations could convey the idea that existence *is not* the kind of "thing" that can be affected by soricality; but then again, for instance, it seems that we have a problem of this kind when we think about a living beings and the beginning and ending of his existence. In fact, the individuation of the eventual cut-offs delimiting the temporal duration of a living being's existence seems to be subject to the problem of vagueness. So, it is legitimate to question whether the existence of the living being is affected by some sort of soricality for what concerns its beginning and ending (for the moment, we could call such "beginning" and "ending" the *temporal boundaries* of the living being's existence), although it seems that we cannot reason about existence as we do with other typical examples of vagueness. We want to examine whether the notion of vague existence makes some sense, since it looks like we have a problem of this kind.

The phenomenon seems to require us to take into considerations what we have called the temporal boundaries of an object's existence. We could think, then, that the soricality that apparently affects the beginning and the ending of an object's existence should regard the dimension of time. If this line of reasoning were plausible, then we could believe that we have to build the relevant soritical series on a line

⁷For an introduction to this issue and other relevant topics, see [Keefe 1997].

representing the passage of time.⁸ In this way, we could also choose a proper variable for the series: for example seconds, or nanoseconds, or another temporal unity that we think that could be suitable for our scopes. Thus, in our soritical series, we would have the variations of (say) one nanosecond at each step, and by this mean we should be able to represent the alleged soriticality concerning the beginning and the ending of a material object's existence. Nonetheless, we can see why this strategy is not going to succeed.

Although the dimension of time seems to be involved in the process, temporal unities of measurement like seconds and nanoseconds cannot be taken to represent the soriticality of *existence*. Roughly speaking, existence is not "measured" by a number of seconds (or another temporal unity), even if it looks like it takes place through time. If we build a soritical series on a line representing the "passage of time", at the two extremes of the spectrum we would not have definite existence and definite non-existence (or viceversa), nor we would have definite non-existence, then definite existence, and then again definite non-existence (if we wish to consider a range of time that starts before and ends after the relevant object's existence). Time cannot be the only parameter for the soriticality of existence.

Let's see what happens in the typical cases of vagueness outlined before; we will use an analogous terminology. For what concerns "heapness", if we build a soritical series on a line representing the "passage of grains", at the two extremes of the spectrum we would have an object whose relevant feature is to measure a number of grains that is definitely apt to constitute a heap, and an object whose relevant feature is to measure a number of grains that is definitely not apt to constitute a heap (or viceversa). For what concerns baldness, if we build a soritical series on a line representing the "passage of hairs", at the two extremes of the spectrum we would have an object whose relevant feature is to have a number of hairs that is definitely apt to constitute a case of baldness and an object whose relevant feature is to have a number of hairs that is definitely not apt to constitute a case of baldness. For what concerns tallness, if we build a soritical series on a line representing the "passage of millimeters", at the two extremes of the spectrum we would have an object whose relevant feature is to measure a number of millimeters that is definitely apt to constitute a case of tallness and an object whose relevant feature is to measure a number of millimeters that is definitely not apt to constitute a case of tallness. We would have, in other words, heapness and non-heapness, baldness and non-baldness, and tallness and not-tallness expressed in terms of their proper parameters.

In the case of the alleged exemplification of (perhaps vague) existence on a line representing the dimension of time, what we would have is instead just a succession of times. And that is not enough in order to characterize or measure *existence*

⁸Assuming for the sake of the argument the common sense idea that time really passes. Such thesis has been challenged: as an introduction to this and other related topics, see the following two homonymous books: [Newton-Smith 1980] and [Evans 2003].

and eventually "exists". At most, we could say, we would have an object existing at different times, or a succession of objects at different times; but if time is the only item subject to variations in the soritical series, then we could not explain an eventual change (such as coming into existence or going out of existence) for what concerns the existence of the object we are considering. Thus, the line of reasoning that tries to consider existence only in terms of time, with a temporal unity as the only variable of the relevant soritical series, cannot be exhaustive. We will try to see whether there are other ways for reasoning about the problem of vague existence.

Possible methods of inquiry

A possible way to go through, in order to settle our initial question (does it make sense to pair the issues regarding the existence of an object to the problem of vagueness?), could be that of specifying our perspective from the point of view of physics. That is, as soon as we start to investigate a potential case of vague existence or as soon as we provide an example for discussing the issue (a cat, a ship, a statue...), we could make explicit which physical framework we were adopting (newtonian physics, quantum mechanics, and so on and so forth) and see what happens in that case. We could then approach the problem from this standpoint and see what happens to both the physical matter considered and the dimension of time: this could be a way to define the elements at stake in our investigation.

Despite the plausibility of the previous idea, there is a reason why we will not follow this path. Let's assume by hypothesis that, one day, we will get to know exactly which physical theory explains how the world is in reality. Such a theory, then, would be able to explain perfectly what takes place at a physical level; all of its propositions would be true, and there would be no room left for epistemic uncertainty, nothing left to explain or understand, physically speaking. If this way of addressing our question were promising then, perhaps, in such case we would be in a good position in order to settle what is at stake, make sense of the apparent vagueness regarding the existence of material objects, and explain why in certain cases it can look vague whether an object exists or not. Three options would then be available: our theory could say that in reality it is effectively vague when an object comes into and goes out of existence (for example, because of some kind of interaction that has to occur in order to have the existence of the object); or it could say that there are temporal items such as instants of time and there is indeed a precise couple of instants at which exactly what we need for the beginning and the end of an existence takes place; or it could say that it is indeterminate, but not vague, when an object begins and ceases to exist.

Nevertheless, the point is that in each and every case, at most, we would have established whether there are or not physical occurrences of vague existence; we would have a physical theory that would accept or refuse the physical possibility of vagueness in existence. The theory would state that it can be or it cannot be vague whether a material object exists. The theory would then add something to our knowledge of how the material world is but, despite this important outcome, we would still lack an answer to our philosophical question: i.e., is the notion of vague existence absurd in itself, as it has been so often thought to be, though vague existence looks like a very pervasive phenomenon? In other words, we could say that the philosophical puzzle would still be there, even if we knew how reality is from a physical standpoint. There is a way in which physics can deal with vague existence, but the questions eventually answered from this perspective would not be those with which we are concerned here. This is the reason why we will not go through this way in the present work.

A further path that we could explore, in order to settle our main worries, would be that of taking a position for what concerns some metaphysical debates regarding the notions of time and existence.⁹ That is, again, as soon as we start to investigate a potential case of vague existence, we could make explicit what metaphysical framework we were adopting and see what happens in such case. Assuming one perspective or the other, perhaps, we could account for the apparent occurrences of the phenomena of vague existence in some way.

Nonetheless, there is one final consideration that we should make regarding this method of inquiry, that is analogous to the one we have made while discussing the physical perspective. Suppose that one day we would get to know uncontroversially which option we have to choose in each of those metaphysical debates, for example because a fully reliable oracle would decide to tell us the truth about them. (Let's leave aside for the sake of the argument the skeptical objections on the nature of this oracle: this is not the issue at stake.) What we would get is a body of theories that either would exclude or would include the notion of vague existence, but once again we would still lack an answer to our philosophical questions: is the notion of vague existence absurd in itself, despite the fact that it seems a widespread problem? This is the reason why we will not go through this path in the present work.

The important thing to underline here is that both these ways of trying to deal with the problem of vague existence, starting from physical or metaphysical debates, are legitimate but turn out to be unsuccessful for what is at stake here. In each

⁹Concerning, for instance, the three following debates: (i) that on the metaphysics of time that sees as its main concurring views eternalism, presentism, and the growing block theory (as an introduction, see [Adams 1986]); (ii) the dispute regarding the A-theory and the B-theory for what concerns positions in time (see as a starting point [McTaggart 1908]); (iii) the debate among existence monism, pluralism and nihilism (see for example [Horgan 2000]).

and every perspective that we could adopt, the problem of vague existence and the relevant notion turn out to be either bypassed or accepted as a component of reality. This would be a positive outcome, but our philosophical question would still be unsolved: that is, why does vague existence is so often thought to be an absurd notion or a fake philosophical problem, while at the same time it seems to be a very pervasive phenomenon (at least in certain cases)? Moreover, as we have underlined in the first paragraph, the possibility to avoid occurrences of vague existence is often thought to be a good point in favor of a theory. But then we have to go back to our starting problem and admit that, so to say, the main issue remains: no matter which position we take in the physical and metaphysical frameworks we have mentioned above, we would still have to settle our concerns. In other words, our understanding of the philosophical problem would not be improved.

The remark is that here we are not looking for a strategy to defend or exclude some sort of *possibility* of vagueness in existence. Obviously, we have to start from the analysis of the occurrences of the notion in the literature and thus from some debate related to our problem; but, since this literature will not turn out to be satisfying for what concerns our interests, then we will have to explain why the notion of vague existence deserves more attention.

We will take into examination the main metaphysical debates where the problem of vague existence is involved in some measure: namely, those on composition, persistence and identity. We will investigate some of the most important arguments that we find in these disputes, such as the argument for unrestricted composition by Lewis, the answer to the "Special Composition Question" by van Inwagen, the "argument from vagueness" by Sider and Evans's argument against the existence of vague objects. We will also confront with many other problems, arguments and paradoxes related to those three debates, and this will enable us to shape the framework where the notion of vague existence is usually involved. Starting from the analysis of this framework, we will try to highlight what is missing for a more adequate characterization of the problem of vague existence.

Introduction

As we have noted in the *Preface*, the problem of vague existence is examined mainly in the framework of the debate on composition. Here we will consider some arguments that we find in such debate: that will enable us to introduce the relevant questions and see how the characterization of vague existence in terms of composition takes place. This analysis will show that the notion of vague existence is significantly discussed also in the debate on persistence, which is deeply related to that on composition. So, we will review the most influential lines of reasoning on composition and persistence that are relevant for our concerns, in order to see how the issue of vague existence has been shaped and treated. In particular, we will examine arguments taken from [Lewis 1986], [Van Inwagen 1990], [Sider 2001], [Sider 2003], [Hawley 2002]. Following these disputes and their opposing arguments, we will try to understand how the discussion of the issue of vague existence is rooted mainly in the dispute about composition.

0.1 Lewis on vague existence

David Lewis addresses the question of vague existence in the context of his argument for the thesis of universalism about composition. Before going into the details, let's briefly overview the whole strategy. [Lewis 1986] defends the thesis of modal realism: every possible world, with all its possible inhabitants, is as real as the one in which we live. All these worlds have the same ontological status. Moreover, Lewis holds his kind of counterpart theory: an inhabitant of the actual world exists only in the actual world, but not all the properties that he has in this actual world are essential to him. The given inhabitant could have been different in some respect, he could have had other properties from those he actually has. These "other properties" are modal properties possessed by the counterparts of the inhabitant in other possible worlds. Lewis argues also for the thesis that there exist trans-world individuals: i.e., objects whose parts belong to different worlds. In Lewis's strategy, the thesis of universalism enables him to reformulate counterpart theory in terms of trans-world individuals.¹⁰

¹⁰See [Lewis 1986, pp. 212-213].

The thesis of universalism states that for any two objects, there is another object that has them as its parts. In other words, mereological composition always occurs, independently from how the parts in question are related (or, indeed, *unrelated*: Lewis's claim implies that there is, say, an object composed by my laptop screen, Tom Waits and the city of Paris). So, Lewis holds that mereological composition is absolutely unrestricted. If we claim that composition could be restricted following some intuitions that we have concerning cases taken from our present world, then there would be cases in this present world where composition would not occur. But if composition would not occur also in such kind of ("this-worldly") cases then surely, says Lewis, it would not occur in trans-world cases. The fact is that composition can never be restricted, not even in cases taken from our present world; it follows, in Lewis view, that a restriction on trans-world cases would be unmotivated. Hence, we need an argument for unrestricted mereological composition in order to be able to talk of trans-world individuals. We will examine Lewis's argument for universalism after having settled the terminology at stake.

0.1.1 Mereology, existence and identity

Lewis calls into question what he labels as "our intuitions" about this world and mereological composition. Mereology is the study of the relations of parthood: it concerns the relations between a whole (or "sum") and its parts, and the relations among the parts of a whole. There is a rich debate on whether mereological composition is a sufficient condition for existence and on whether it is analogous to identity.¹¹

Those who accept mereology, like Lewis does, as a precise and ontologically innocent instrument of analysis of the relation between the parts that add up to compose an object and the whole that they compose, usually find no problems in believing that saying that "the parts are the whole" is the same claim as saying that "the parts (taken together) are identical to the whole", and viceversa that "the whole is identical to its parts (taken together)". Suppose that we own a piece of land of 1000 square meters, and suppose that we divide it up into five smaller and non-overlapping pieces of land of 200 square meters each. We can say that the five small pieces add up to compose the whole land we own, but this does not mean that we own a 1000 square meters piece of land in addition to the five smaller pieces. The whole is identical to the sum of the five pieces that compose it. As it is often put, the whole definitely exists, but it is nothing over and above its parts.

Those who deny that we can take mereological composition as a sufficient condition for existence and parthood as a relation analogous to that of identity, typically claim that a whole can have different properties from its parts taken together. There

¹¹See for example [Lewis 1991]; [Merricks 2005];

are cases, such as that of the 1000 square meters piece of land, where it is plausible to say that the whole is identical to the five smaller parts considered together. Nevertheless, in other cases mereology does not seem to be an adequate instrument for examining the relation parts-whole, or at least this is what the enemies of "composition as identity" say.¹²

The typical strategy of those who holds that mereology is a precise and ontologically innocent instrument of analysis of the relation between parts and wholes is to defend universalism, ruling out the possibility of vagueness in existence and identity: given n things, there always exists an object that is the sum of those things. The possible indeterminacy apparently arising, in relation to the existence of the sum of any class of things, has to be ascribed to the limitations of our language. Indeterminacy and vagueness would thus be semantical, not metaphysical phenomena: they do not concern composition and identity, which are always precise, nor the notion of existence (but more on this later). On the contrary, those who reject universalism and claim that composition has to be subject to some restriction are usually inclined to say that it can be vague, in some circumstances, whether composition among a certain set of objects takes place. If we assume, as many do, that composition entails existence, then we have that such thesis can force one to hold that existence itself can be subject to the problem of vagueness.

Another well developed debate where the notion of existence and identity turn out to play an important role is that on the constitution of material objects, and in particular on the issue of whether "constitution is identity".¹³ Mereology and composition are not directly involved in this debate, but it will turn out to be useful to briefly settle the terms at stake.

If a constitutes b , can we say that a is identical to b ? The puzzle usually employed in order to exemplify the problem is that of the statue and the lump of clay,¹⁴ so the question is: given that the lump of clay constitutes the statue, can we say that the lump and the statue are identical? In other words, the question is whether material constitution is a sufficient condition for identity.

Briefly, those who claim that "constitution is identity", often argues that denying this thesis forces us to hold that two distinct objects could exist in the same place at the same time, and this would be absurd. After all, if the lump of clay would weigh for example 50 kilos and if we hold that the lump and the statue are two distinct but spatially overlapping objects at time t , then at t we would have a sum of things on the pedestal weighing 100 kilos, which would be indeed absurd. Those who claim that "constitution is not identity" (a thesis known as *constitutionalism*), on the contrary, often point to the different existence and persistence conditions of

¹²See for instance [Lowe 1989].

¹³See among others [Wiggins 1968]; [Johnston 1992]; [Noonan 1993].

¹⁴See Chapter 4 on the paradoxes.

objects of different sorts, and restrict the ban on existing in the same place at the same time to objects of the same sort: that is, a statue and a lump of clay can exist in the same place at the same time, while two distinct statues could not. Moreover, constitution seems to have different properties from identity: in fact, while the latter is held to be transitive, reflexive, and symmetrical, the former plausibly lacks at least symmetry (confront: it is difficult to claim that the statue constitute the piece of clay). Thus, if we want to claim that constitution is identity, it looks like we have to make some revisionary adjustments concerning the properties of such relations.

Now that we have settled the relevant terminology and some of the issues at stake, we can turn to the examination of Lewis's strategy about existence and composition.

0.1.2 The argument for unrestricted composition

Lewis lists a few *desiderata* for mereological sums that could be drawn by common sense: we could well accept as an existing object a sum of things in case these things contrast with their surroundings more than they do with one another, in case they are adjacent, they stick together, and act jointly. We can say that such *desiderata* are criteria for composition. The problem is that, intuitively, each of these four *desiderata* is a source of vagueness, insofar as we can imagine states of affairs in which it is vague whether each of these relations occurs. Obviously, if we take the four *desiderata* together, we just have more troubles. Each of these four criteria brings about a restriction on compositions: they all say that composition occurs if and only if those relations hold among the things that we are considering. But, as we have noted, whether those relations hold can be a vague matter in some circumstances. This fact would entail that composition can be vague: and this is impossible, in Lewis's view. Composition is never vague, composition always occurs. Moreover, it is important to underline that this line of reasoning works even if we choose other kinds of *desiderata*, i.e. other criteria for composition: indeed, it looks like *any* kind of intuitive restrictions on composition could ultimately turn out to be subject to the problem of vagueness.

Now, the question is why it would not be possible for composition to be vague. The argument given by Lewis starts from the assumption that vagueness is always semantic indecision. This does not entail that all language is vague; in fact, here is a key point. Some logical terms are not vague, says Lewis: those for quantification, those for identity and difference, and the truth-functional connectives. The question of whether composition occurs in a determinate situation can be asked without using vague words, so it cannot have a vague answer in Lewis's view (more on this in Chapter 1). Hence, composition cannot be subject to vagueness: it does occur or does not occur. Otherwise, whether composition were vague, we could have in some cases an object (i.e. the mereological sum whose existence is in question) such that,

in Lewis's words, "it sort of is so, and sort of isn't, that *there is* such a thing".¹⁵ And this is straightforwardly impossible.

Lewis draws the conclusion that no restriction on composition can be a source of vagueness. But if the restriction is not vague, it cannot match the common sense intuitions about this world and composition (the four *desiderata* for mereological sums outlined above, or any other required relation among parts). And if it is not motivated by these kind of intuitions, any restriction on composition would be gratuitous. Thus, considering that to free composition from any restriction is a source of philosophical benefits, Lewis welcomes mereological unrestricted composition. This is typical by Lewis: the philosophical utility of a legitimate and consistent thesis is a good reason for endorsing it, independently from its degree of plausibility from a common sense standpoint. This is the conviction that support the whole strategy for the defense of modal realism in *On the Plurality of Worlds*.

At this point, Lewis has only argued against vague restrictions on composition. Even if we accept his argument, this does not entail that composition is unrestricted. Indeed, it could still be completely restricted, so to say. When we are asked if there is the mereological sum of a given class of things, and we exclude along with Lewis all the moderate answers, we are left with two possibilities: "yes, always" or "no, never". We could also answer something like "I don't know", supposing that we would or could not know the answer despite the fact that there is a precise answer, and thus following an epistemic account for the vagueness of composition (see [Williamson 1994]).¹⁶ The absolutely positive answer, which is defended by Lewis, entails that every class of things adds up to compose a whole. The absolutely negative answer, whose proponents are sometimes labeled as "nihilists",¹⁷ entails that there exist only elementary, indivisible elements that never add up to compose complex objects. It is important to underline that in order to accept unrestricted composition by means of a *reductio* of the alternative answers, we should argue against nihilism as well as against moderate answers.

(In this analysis of the relation between vague existence and composition we will not examine the nihilistic view about composition. From this perspective, the only existing things are the *simples*: mereological simples, sub-atomic particles or whatever they can be thought to be. Thus, there cannot be vagueness of composition. There could be vagueness in existence only in the case of an indeterminacy relative to the existence of an entity that would be, if existing, a simple. Perhaps, there is the possibility that the coming into or going out of existence of a simple could be subject to the problem of vagueness. This is not a case in which we are interested while investigating the relation between vague existence and composition: hence, a

¹⁵See [Lewis 1986, pg. 213], emphasis mine.

¹⁶This indeed could be a problem for Lewis's strategy, but the examination of this question would take us far away from our present worries.

¹⁷For a nihilist view on composition, see [Unger 1979]

discussion of nihilism would take us out of the present topic.)

For what concerns the object of the present analysis, that is the relation between the notions of composition and existence, Lewis distinguishes two kinds of talks about existence. On one side, we have the unrestricted way of speaking, which is the correct, philosophical one. On the other side we have the restricted way, which is the intuitive, common sense one. In Lewis's view, using the former kind, vague existence would be unintelligible; using the latter kind, vague existence would not be philosophically problematic (on the contrary, it would just be an apparent consequence of a useful, pragmatic, everyday way of speaking).

There is a well known passage of Lewis's book that is almost always quoted in the debate on composition, where there is the example of the "outback" (see [Lewis 1986, pg. 212]). Here we will focus on a passage, which is located a few lines after, that explains the distinction between the two kinds of talks about existence and deserves in my view the same attention:

"There is a sum, unrestrictedly speaking, but it can perfectly well be a vague matter whether this sum falls within a vaguely restricted domain of quantification. Speaking restrictedly, of course we can have our intuitively motivated restriction on composition. But not because composition ever fails to take place; rather, because we sometimes ignore some of all the things there really are."

Let's consider again the entity we have mentioned above, an entity whose parts are my laptop screen, Tom Waits and the city of Paris. If we hold universalism, these three parts add up to compose a real whole; there exists the mereological sum of these parts. In other words, that is an object, it exists. It has no proper name so if we want to mention it, we cannot do anything but put the whole expression in quotes, in the following way: "my laptop screen, Tom Waits and the city of Paris". And this is not a problem, it is just a little expensive expression that we have to use when we want to refer to that object; but this happens very infrequently. Hence, that just means that common sense restricts composition in such a way that this kind of objects are not usually counted as existent. In other words, we intuitively quantify over objects whose parts are related in a stricter, more intuitive way; but that bizarre kind of object still exists. Any class of things always add up to compose a whole; this whole is an existing object. Vague existence is, in Lewis's view, a fake philosophical problem.

0.1.3 Recap of Lewis's view

Now let's sum up Lewis's perspective about composition. Primarily, we have to say that composition is a kind of mereological relation: it is the "many-to-one" relation

between any number of parts and their fusion. So, at any time that we speak about composition from this point of view, we will be speaking about mereological composition. This relation has peculiar features.

First of all, Lewis holds universalism; that is, *any* class of objects has a fusion that we can count as an existing object, including the already mentioned sum of "my laptop screen, Tom Waits and the city of Paris". Mereology, in Lewis's perspective, is also open to cross-categorial fusions: thus, for example, there exists the sum of yourself, my acoustic guitar, the color red and number four. No special criterion for composition has to be satisfied in order for there to be the fusion of some elements.

Secondly, mereological composition is ontologically innocent. The fusion of a class of objects is nothing more than those objects taken together: once we have agreed on the existence of my laptop screen, Tom Waits and the city of Paris separately, considering their fusion does not add anything to our ontological inventory of what there exists in the world. Obviously, we can disagree, for example, about the ontological status of color red and number four; but then, assuming that we decide to count both of them as some sort of object, counting them together does not add any further object to the list of what there is. If someone holds that there is nothing such as color red and/or number four, he will not accept as existing the fusion of those objects: but this ontological position on one or the other object does not compromise the ontological innocence of mereology.

A third feature of composition is its uniqueness: given a class of objects, there cannot be two or more different fusions of it. Each class has at least one and at most one fusion.

A fourth feature of composition that Lewis exposes and we take into consideration is the "easiness" regarding the description of a fusion. Once we have completely described the objects of a class, including the eventual relations occurring among them, we have completely described their fusion. This idea conforms with the "nothing over and above" thesis: the fusion is nothing more than its parts taken (or, in this case, described) together.

Now, a short recap of the whole reasoning of Lewis. Commonsense restricts composition following certain criteria; if composition is restricted, then it can be vague whether it occurs in a given case; this is absurd, because in that given case we would have an object that is not definitely there, nor definitely not there (in other words, we would have vague existence); hence, composition is unrestricted and any class of objects has a mereological sum; i.e., objects always add up to compose a further object (in other words: universalism); when we face borderline cases of composition in our everyday lives, the vagueness we experience emerges from our restricted, common sense way of speaking; indeed, the source of vagueness is linguistic.

The pivotal points to underline in Lewis's line of reasoning are the three following:

the assumption that vagueness is always semantic indecision, the assumption that the existential quantifier (our main way for expressing existence) can harbor no vagueness, and the principle that if there is vague existence, then it can be the case that there is an object such that it is indeterminate whether it exists, which would be absurd.

0.2 Van Inwagen on vague existence

The theory of universalism enables us to avoid the problem of vague existence; anyway, universalism is a metaphysical theory that is too extreme for some philosophers. Van Inwagen, in his *Material Beings*, defends a moderate answer to what he calls the Special Composition Question, a question that sounds like this: in what circumstances do things add up to compose a further object? His proposed answer is, as he says, moderate, insofar as it entails that there are cases in which composition occurs, and cases in which it does not. At the opposite sides of the spectrum of the possible answers, we have the two extremes: universalism, the thesis that composition always occurs, and nihilism, the thesis that composition never occurs.

As the title says, this book is devoted to the investigation of the physical world. A position like that of Lewis, which accepts as existing the fusion of any class of objects, is in van Inwagen terminology Super-universalism. Universalism is a restricted version of Super-universalism, so from this perspective if you argue against universalism you argue against Super-universalism. And if you argue against both the extreme answers to the Special Composition Question, you leave room for a moderate one.

Van Inwagen presents the following argument against universalism. In this formulations the "xs" stay for what the author calls "simples". Simples are a functional notion, not an ontological or physical one. They are the ultimate, atomic parts of which the material world is made of. Van Inwagen also states that contemporary physics (i.e., 1990's physics) seems to deal with such ultimate parts of the world, speaking of quarks; anyway, the assimilation of quarks to the "xs" is not a pivotal point of his strategy. Universalism, as we have said, entails that a set of *x*s composes *just one* object. If universalism is true, then these *x*s cannot compose two objects, either simultaneously or successively. Moreover, the arrangement of the *x*s is irrelevant to the question of whether they add up to compose something. So if the *x*s compose an object (and universalism says that they always do), then they always compose the very same object. In fact, for the universalist the expression "the sum of (precisely) these *x*s" is a definite description that does not need to be completed with a temporal qualification such as "at time *t*".

Here lies a problem: we - living beings - are composite objects, we persist through

time (i.e. we do not exist only "at one time t "), and we constantly change our parts, insofar as the x s that compose us are constantly changing. The x s that compose me now are almost completely different from the x s that composed me in 2002; most of the x s that composed me in 2002 are now located in several different places, and do not compose me anymore.¹⁸ Nevertheless, we would like to think that I am the same "thing" I was in 2002, even if the definite description "the sum of precisely such x s", which referred to me at one time in 2002, does not refer to me anymore. Human beings, in van Inwagen's words, "provide the clearest examples of objects that are composed of different parts at different times". These examples, in van Inwagen's view, entail that universalism and Super-universalism are false; if they are false, then composition does not always occur.

As we can notice, this argument involves consideration on the persistence of objects: indeed, the pivotal point is that I am the same object I was a few years ago though I have changed almost all of my simples. The argument is based on the conviction that objects persist through time by enduring: this is the so-called three-dimensional view of persistence. Very briefly, three-dimensionalism says that an object endure through time by being wholly present at each time at which it exists; an object can have spatial parts, extended in the three spatial dimensions, but it does not have temporal parts. Four-dimensionalism, on the contrary, says that objects are extended through time as they are extended through space; objects perdure through time by having different temporal parts at the different times at which they exist (more on this in Chapter 2 on vague existence and persistence).

Van Inwagen's argument against universalism rests on the premise that the four-dimensional views of persistence are false. As van Inwagen notes,¹⁹ if you are a four-dimensional universalist you can resist the argument against universalism. That said, in *Material Beings* van Inwagen assumes the truth of three-dimensionalism, while he argues against four-dimensionalism in another work.²⁰

0.2.1 Van Inwagen's answer to the Special Composition Question

Now let's turn to the answer to the Special Composition Question proposed by van Inwagen. We will see how this is related to the issue of vague existence. So the question is: in what circumstances does a class of simples add up to compose a further object? Van Inwagen's proposed answer is: some x s compose an object y if and only if the activity of these x s constitutes a life, or there is only one of the x s.

There are three aspects of this answer that come out at first sight. The first is

¹⁸See [Van Inwagen 1990, pg. 75 and note 26].

¹⁹See [Van Inwagen 1990, note 28].

²⁰[Van Inwagen 1990a]

that, if we accept it, we adopt a rather sparse ontology in which the only existent material objects are simples and living beings. The apparently most numerous set of objects in the world, what we could call the set of artifacts, is indeed a set of virtual objects. What we call "chair" does not really exist as an object: rather, I am now sitting on what we should properly call "an aggregate of simples arranged chair-wise".

The second aspect that emerges is that causation is involved; this fact distinguishes van Inwagen's answer from the two extreme answers and other moderate answer involving some sort of physical bonding.²¹ It is not sufficient to individuate a certain kind of spatial relationship among the parts that compose an object: a causal relation or multigrade causal relations among the parts have to be included in the answer. So the question is: which kind of causal relation? Van Inwagen answer is: when the parts are causally interrelated in order to constitute a life.

This introduces the third aspect of his proposed answer emerging at first sight: we have to specify what this principle of life is. A life is a biological event so, van Inwagen says, it is the business of biologists to provide a precise definition of life. We then have also the related notion of "organism", which is a (in fact the only kind of) composite object. If the activity of a set of simples constitutes a life, then those simples constitute an "organism". Thus, the x s compose y if and only if y is an organism and the activity of the x s constitutes the life of y . Hence, finally, a thing is a proper part of another if the latter is an organism and the former is caught up in the life of the organism.

Here is the problem: van Inwagen's answer entails that living organisms (what there really is, apart from simples) are in some sense vague: they are vague because the relation "to be caught up in a life" is subject to the problem of vagueness. In some circumstances it is indeterminate whether a given simple is caught up in the life of a determinate organism. In other words, "to be a part of" is a vague relation; that is, parthood is vague. If parthood is vague, then composition is vague. In some circumstances it is vague whether a simple is involved in an activity constituting the life of an organism; hence, it is vague whether it composes something. If composition and parthood are vague, then existence is vague. In some circumstances it is indeterminate whether we have to count an aggregate of simples as a living organism (and by consequence as something really existing) or as a mere aggregate of simples (a virtual object that does not really exist).

Van Inwagen tries to explain why we cannot account for the vagueness of existence in purely linguistic terms. The "Semantical Indecision Theory" (that van Inwagen ascribes to, amongst other, [Lewis 1986]) states that the cause of vagueness lies in the indeterminacy of the rules that govern the application of vague predicates and words. Consider the following terms: "rich", "outback", "Kilimanjaro", "tall".

²¹Such as Contact: a class of things add up to compose a further object if these things are in contact. Van Inwagen rejects this kind of answer in [Van Inwagen 1990, sections 3, 6 and 7].

The range of application of such terms is not perfectly defined, so there are cases in which it is not clear whether we can apply them to the object we are considering. In the case of vague existence the problem assumes a different form: from van Inwagen's perspective, there are cases in which it is not clear whether we have a real object or a mere virtual one. In other words, we are not sure as to whether we can give a determinate truth value to an existential claim that quantifies over a "thing" whose existence seems to be vague, because it is indeterminate whether *there is* that "thing".

Let's leave aside the four examples of vague terms that we have just outlined. Van Inwagen would probably say that there is nothing such as the "outback" and the "Kilimanjaro", there are only simples arranged "outback-wise" and "Kilimanjaro-wise"; he would also probably agree on the idea that the vagueness emerging when we try to use "rich" and "tall" is ultimately linguistic. A philosopher whose ontological convictions were different from those of van Inwagen's could reject the first claim and accept the second one. But the question is different for what concerns the vagueness related to objects whose existence is accepted by (almost) everyone. Take the expression "living being", for instance. Everyone, with the exception of the nihilist, would consider that kind of objects, to which the expression "living being" refers to, as undeniably existing objects and therefore would consider objects of that kind as legitimate inhabitants of our ontology. The problem is that living beings, organisms and lives appear to be subject to vagueness. If we examine an aggregate of simples, there are periods of time in which it is not clear whether we can consider that aggregate of simples as a living being or not.

This consideration can be taken in two ways. It can mean that in some periods of time it is indeterminate whether the activity of certain simples is composing a life; or it can mean that in some periods of time there are simples such that it is indeterminate whether they are part of the activity constituting the life. In the first case, the nihilist would say that there is no indeterminacy at all: what we would ever have are simples. The universalist, too, would say that there is no indeterminacy: there exists the aggregate of simples, and whether it composes an organism or not, we can quantify over the mereological sum of those simples and consider it as an existing whole. In the second case, the claim of the nihilist would be the same. The universalist, instead, could go in different ways. For example, he could typically justify this sort of indeterminacy by pointing to the vagueness of the word "aggregate": the semantics for the use of such term would be not specified enough in order to define its precise extension.

Anyway, we have previously said that van Inwagen rejects both the extreme answers to the Special Composition Question. All the moderate answers, including his one, do entail the vagueness of existence. In the case of some sort of "physical bonding answer" such as Contact, we can see that it can be vague whether the chosen kind of physical connection occurs. Contact, for example, is something that

in reality regards the interactions between electromagnetic fields: it is possible to develop cases in which it is indeterminate whether two simples or two objects are definitely *in contact*. And so on and so forth for other kinds of physical bonding answers.

In the case of van Inwagen's answer, the reasons that drive him to accept as a consequence the vagueness of existence are those that we have previously enumerated. Moreover, it seems that every causal relation that can govern composition must be subject to the problem of vagueness: in fact, we can always develop situations in which it is indeterminate whether two (or more) simples or two (or more) objects stand in that relation, independently from the language that we use to describe the situation.

0.3 Sider on vague existence

As we have noted at the beginning of this *Introduction*, the metaphysical debate on composition is intimately linked to that on persistence. Unsurprisingly, the problem of vague existence is then called into question also in the discussion about how things persist through time. Here we will take into examination one of the most important lines of reasoning of such debate.

Ted Sider, developing the point of view defended by Lewis, provided a much discussed argument that is supposed to favor the four-dimensional views about persistence. Let's briefly sum up the terms of the debate about persistence (but see Chapter 2 on vague existence and persistence). The four-dimensional theories say that objects perdure through time, being extended in the dimension of time as well as in the three dimensions of space. Thus, objects have temporal parts as well as they have spatial parts. These theories contrast the three-dimensional perspective: the latter claims that objects are the three-dimensional items we commonly speak of and endure through time. Thus, objects are wholly present at each time at which they exist. Sider²² argues in favor of the so called Stage Theory, which can be taken to be a peculiar kind of four-dimensionalism. His argument from vagueness, as he says, works even for the more general brand of four-dimensionalism.

0.3.1 The argument from vagueness

The argument from vagueness received a lot of attention;²³ here is a reconstruction, then our focus will be on its link with the problem of vague existence. First of all,

²²In his almost homonymous article and book, respectively [Sider 1997] and [Sider 2001].

²³See for instance [Varzi 2005] and the bibliography therein.

some definitions. An object x is a fusion of a set of objects S (i.e., it is composed by the objects in S) at time t if and only if: every member of S is a part of x at t , and each part of x at t overlaps at t some member of S . An assignment is a possibly partial function whose domain is a set of times and which ranges over a set of non-empty classes of objects: e.g., the function that assigns at time t the class of objects that exist at t . Our object x is a diachronic fusion of an assignment f if and only if for every t in f 's domain, x is a fusion-at- t of $f(t)$. If x exists only at the times in the domain of the assignment, then it is a minimal diachronic fusion of that function. Now that we have introduced Sider's vocabulary, let's turn to the main argument.

The first step is a development of Lewis's argument for unrestricted composition (see [Lewis 1986] and above). Suppose for *reductio* that composition is restricted: that is, suppose that not every set has a fusion. Sider asks to consider a continuous series of cases connecting C1, a case in which composition among a certain set of objects definitely occurs, and C2, a case in which composition among a set of objects definitely fails to occur (Premise 1). In this series, each pair of adjacent cases is almost identical in every relevant respect concerning composition; and in no continuous series there is a sharp cut-off as to whether composition occurs (Premise 2). Furthermore, Sider claims, in any case of composition, either composition definitely takes place, or it definitely fails to take place (Premise 3). Premise 3 entails that in that series of cases there is a cut-off as to whether composition occurs, but this contradicts Premise 2. Thus, composition cannot be restricted. So either it never occurs (the nihilistic conviction), or it always occurs (as both Lewis and Sider think).

The second step consists in the very argument from vagueness in favor of four-dimensionalism, which is developed in analogy with that for unrestricted composition. Suppose for *reductio* that not every assignment has a minimal diachronic fusion. Then, there must be two cases, call them D1 and D2, connected by a continuous series of similar cases, such that in D1 minimal diachronic fusion occurs, while in D2 it does not (Premise 1'). As in the previous argument, we can say that in no continuous series there is a cut-off as to whether minimal diachronic fusion occurs (Premise 2'). But then again, in any case of minimal diachronic fusion, either it definitely takes place, or it definitely does not (Premise 3'). Premise 3' entails that in that series of cases there is a cut-off as to whether minimal diachronic fusion occurs, but this is denied by Premise 2'. So minimal diachronic fusion cannot be restricted. If we conclude that it never takes place, we are claiming that nothing persists through time apart from simples. Otherwise, we can conclude that minimal diachronic fusion always takes place. In other words: every assignment (a function that has one or more times as arguments and connects them with non-empty classes of objects that exist at those times) gives rise to a minimal diachronic fusion (an object existing only at the times in the domain of the function).

Sider calls this latter thesis (U) and this is four-dimensionalism. In fact, consider what Sider calls the Thesis of Temporal Locality, that is the main claim of four-dimensionalism. Here is what the thesis says: take an object x and two (non-empty and non-overlapping) sets of times T_1 and T_2 such that their union is the interval of time at which x exists. Necessarily, there are two objects, x_1 and x_2 , with the following characteristics: x_1 and x have the same parts in T_1 and the time span of x_1 equals T_1 ; x_2 and x have the same parts in T_2 and the time span of x_2 equals T_2 .

The connection between (U) and the Thesis of Temporal Locality (i.e., four-dimensionalism) is the following: if we apply (U) to the function that assigns x 's unit set to the times in T_1 , we get x_1 ; the same goes for x_2 . In other words, x_1 and x_2 are the minimal diachronic fusions of those functions. But the fact that we can get x_1 and x_2 from x , T_1 and T_2 , entails that the Thesis of Temporal Locality is true. And if this thesis is true, then there are interesting consequences: chiefly, it follows that an object must have a temporal part at each time at which it exists, and this is just what four-dimensionalism says.

0.3.2 Sider's arguments against vague existence

As we said at the beginning of this paragraph, the argument from vagueness has been widely read: every premise and every passage has been examined, and Sider himself has often discussed his positions. Here we will focus on the connection of the argument with the problem of vague existence. Take Sider's paper "Against Vague Existence": while reviewing the argument from vagueness (three premises entail (U); (U) plus Thesis of Temporal Locality give four-dimensionalism), he notes that even if the final step is rejected, the opponents of perdurantism should already be unhappy with (U), the claim that there are minimal diachronic fusions.²⁴ This is true, but the problem of vague existence, as Sider himself points out, plays a crucial role even for this intermediate result (and so, obviously, for the whole argument).

Suppose for *reductio* that composition does not always occur. Now let's recall Premise 3: in any case of composition, either composition definitely occurs, or it does not. In other words, there must be a sharp cut-off in the continuous series that connects a case in which composition definitely occurs, and a case in which it definitely does not; we cannot allow this, Sider says, unless we are inclined to accept the vagueness of composition (and hence of existence, in this perspective where composition entails existence).

If we would accept the vagueness of composition and existence, then we could reject Premise 3. But we cannot accept it. In fact, if there is vagueness in existence, then there is vagueness in how many concrete objects there are in the world, and

²⁴See [Sider 2003, pp. 136-137].

this cannot happen in Sider's view. The reason is that in our world, there is a finite number of concrete objects: for how many they are, there must be a finite number of them, they are not infinite in number.²⁵ For any number n of existing object, we can write a sentence of pure first order logic with identity that says that there exist precisely n objects. Suppose that there exist exactly 2 objects in the world, then the sentence would be:

$$\exists x \exists y (x \neq y \wedge \forall z (z = x \vee z = y))$$

In such a sentence there is no vagueness, insofar as every symbol employed has a precise meaning.

Now let's retrace this line of reasoning from the end to its beginning. The terms of first order logic are precise: in particular, for what concerns our topic, Sider (along with Lewis) claims that quantifiers are unrestricted and cannot be vague. So there is a sentence that can express the precise number of concrete objects that there are in the world; this number must be finite. But if composition and existence cannot be vague, then we are forced to accept Premise 3. As we have seen, this premise, together with the first two, entails that composition always occurs; thus, in the parallel argument from vagueness, this shows that every assignment gives rise to a minimal diachronic fusion, which is something that the enemies of perdurantism are not happy to accept.

Obviously, the key for this line of reasoning is that quantifiers cannot be vague; in particular, Sider argues that the existential quantifier cannot be vague, so there cannot be vagueness in existence. Sider offers two arguments against vague existence.²⁶

The first argument against vague existence tries to show that, even if the notion of a vague quantifier would be intelligible, it would require a different model of vagueness from the one we are used to. The kind of vagueness that a restricted existential quantifier would express, would not be of the "typical" kind: vagueness usually requires precisifications, and this in an assumption in Sider's arguments against vague existence. If we have a vague term, there must be some different candidate meanings of the term that are precise. Take "bald": it can mean that a man with less than 100 hairs on his head is bald, or that a man with less than 101 hairs on his head is bald, and so on and so forth. The extension of the predicate is not precise. This typical perspective, says Sider, is consistent with theories of the "semantical indecision" kind (like, amongst others, Supervaluationism), as well

²⁵Sider distinguishes *existence-at* from *quantification*. The former is expressed by the predicate "exist-at", and concerns the temporal presence at a given time of an object; the latter is an atemporal notion expressed by the existential quantifier " \exists ", and is the proper object of Sider's remark in this case. See [Sider 1997, pp. 7 and 28].

²⁶See [Sider 2003, pp. 138 and 144].

as with the epistemic view of vagueness (see [Williamson 1994]). Perhaps, as Sider admits, it is not consistent with the ontological view of vagueness, the view that vagueness is in the world rather than in our concepts or thoughts. Later we will come back on this very important admission.

The pivotal point for the typical model of vagueness is that, in order to describe it, we can go back to a *background language* that is precise. In fact, we can quantify over the sets of men that are the candidate extensions for the meaning of the predicate "bald". Thus "bald", and even "person" and "hair", can turn out to be vague; but we can talk about this vagueness in a precise way appealing to our background language, where we talk about the existence of the relative candidate sets of meaning. Here is the problem: the same maneuver is not allowed if we try to talk about the vagueness of the existential quantifiers. In this case, there is no background language that can back us up. We could not talk about precisifications of the existential quantifier, some of which would entail the existence of the object in question (and whose existence is vague), while some other would not; we could not do that because even this background language would be vague. In fact, given that the phrase "there is" is exactly what is said to be subject to the problem of vagueness, all the precisifications of the existential quantifier saying that "there is" or "there is not" this object, would ultimately turn out to be vague. Sider draws the following conclusion:

"Assuming *one* bit of language - the quantificational bit - to be non-vague, one can give non-vague descriptions of precisifications of the *rest* of the language, which *can* be taken to be vague. But once the precision of the quantificational portion of the language is challenged, this neat picture breaks down. No refuge from vagueness remains in which to characterize precisifications." (see [Sider 2003, pg. 140])

The second argument against vague existence runs as follows. Premise a): vagueness requires multiple precisifications. Premise b): wherever there is a unique natural kind, there are no multiple precisifications. Premise c): (unrestricted) existence is a unique natural kind. Conclusion: therefore, "exists" and the existential quantifier are not vague.

Each of these premises rests on a related assumption. Indeed, (a) is the same assumption we have found in the first argument. For what concerns (b), Sider says that it comes out of a part of David Lewis's philosophy of language (see [Lewis 1983] and [Lewis 1984]). In particular, the conviction that the meanings of the words we use are given by "use plus eligibility". The former is what human beings provide, as language speakers; the latter is a possible intrinsic feature of meanings, i.e. their suitability to be meant. Moreover, eligible meanings would be natural kinds: they would carve nature at its joints, to borrow along with Sider a classical expression. Finally, (c) is defended by saying that it is natural, and in some circumstances use-

ful,²⁷ to think of plain existence as the one and only eligible candidate meaning for the unrestricted existential quantifier. The fact that each premise rests on an assumption does not imply that the argument is not sound. Rather, we could properly reformulate it as follows:

- A) If we assume the traditional model of vagueness, then we have that vagueness requires multiple precisifications.
- B) If we assume the "use plus eligibility" picture of meaning defended by Lewis, then we hold that when there is a unique natural kind there are no multiple precisifications.
- C) If we assume that, in this picture, existence is a unique natural kind, then we have that existence cannot be vague.

As I have said in the beginning of this *Introduction*, Sider's argument from vagueness has been widely discussed. What we are interested in here is its relation to the topic of vague existence. Thus, we have to underline that, in order for it to work, vague existence must be ruled out: this means that in Sider's view the problem of vagueness (and in particular vagueness in existence) can have a decisive role in metaphysical debates. Sider provides two arguments against vague existence. Both arguments rest on the assumption of a model of vagueness (i.e., vagueness requires precisifications) that is not consistent with the view that vagueness can be "in the world" and/or "ontological". In conclusion, if we assume that vagueness is semantic indeterminacy, then we can follow Sider's arguments against vague existence; and, if we accept them as sound, we can follow the argument from vagueness for four-dimensionalism.

0.4 Hawley on vague existence

With her paper "Vagueness and Existence", Katherine Hawley takes on the challenge started by van Inwagen. Hawley focuses her attention on the relation between the notions of vagueness and existence. Her aim is to show that there is a characterization of the idea of vague existence that is not so absurd as, among others, Lewis and Sider have claimed. This *modest brand* of vague existence would not be problematic as a consequence of a metaphysical theory: and this would be right the kind of vague existence entailed by *Material Beings*. Thus, Hawley says, van Inwagen's proposal would be legitimate. Moreover, we would have a plausible characterization of the notion of vague existence: this would invalidate all the arguments that assume the absurdity of such notion as a premise, as Lewis's argument for unrestricted

²⁷See [Sider 2001, Introduction].

composition and Sider's argument from vagueness for four-dimensionalism.

Hawley starts from this question: does vagueness in existence entails that there can be non-existent object? Considering the traditional characterization of vagueness, based on a model that requires precisifications, we have the following idea: if in a case it is indeterminate whether an object exists, then in such a case we are forced to admit of an indeterminacy regarding the existential quantifier, insofar as " \exists " is our way of expressing existence. But then, we would have that in some precisifications of " \exists ", the object that we would be considering (and whose existence is vague) would not exist. Thus, we would have a non-existent object whose existence would be vague; and this is paradoxical. This controversy about the possible existence of a non-existent object arises from the lines of [Lewis 1986] that we have already quoted: if we allow for an occurrence of vague existence, we would admit of a thing "such that it sort of is so, and sort of isn't, that there is any such thing", as Lewis writes.

If we accept this picture of vague existence, says Hawley, we adopt its *immodest brand*; nevertheless, Hawley thinks that there is a modest brand of vague existence, like that entailed by [Van Inwagen 1990], that is not paradoxical. Saying that in some cases it is vague whether an object exists does not entail that in such cases there is an object such that it is vague whether it exists. That is: if we hold that in certain circumstances there is no fact of the matter as to whether an object exists, because its existence is subject to the problem of vagueness, we are not postulating the existence of an object such that it is indeterminate whether it exists or not.

0.4.1 Vague existence and properties

As we have just seen through the paragraphs dedicated to the analysis of Sider's perspective, there are arguments against the possible vagueness of existence and the existential quantifier. On the contrary, Hawley claims that there can be occurrences of vague existence even considering "exists" and the relative unrestricted quantifier precise. In fact, examining a case of vague existence, we can maintain that it is indeterminate whether a given property is instantiated in such case. For the first time in this survey of the connections among the notions of existence, composition and persistence, we face a direct link between the topic of vague existence and the discussion about properties. We will now take into consideration this link, along with Hawley.

A possible way of dealing with existence has its contemporary roots in the works of Frege, Russell and Quine: we can call it the second-order account of existence.²⁸ Briefly, existence would be a particular property of properties, i.e. the property

²⁸This is the so-called "received view" about existence. On this topic, see for example [Salmon 1987]. See also Chapter 3 on vague existence and identity.

of being instantiated. For instance, take a definitely existing object, yourself: the property of "being *yourself*" has an instance (we can substitute "yourself" with your proper name). Instead, take a definitely non-existent object, the squared circle: the property of "being the squared circle" does not have an instance.

Now consider a case of vague existence, a case in which there is no fact of the matter as to whether a determinate property is instantiated. In such a case we have a precise property and a precise meaning for the existential quantifier, but it is vague whether that property has an instance. In this way we are not quantifying over an object; indeed, it is vague whether the property is instantiated in an object. If it were, then there would exist the object; if it were not, then there would not exist the object. The idea, as we have said, is that it is indeterminate, and thus there is no fact of the matter as to whether there is an object in such case. In other words, here is what we would have in Hawley's view in a case of modest vague existence:

- 1) Metaphysical vague existence, without the controversial entailment of the possible existence of non-existent objects.
- 2) Metaphysical vague existence, without multiple precisifications for the existential quantifier and its applications; " \exists " thus maintains its sharp nature.
- 3) Metaphysical vague existence, without thinking that there is a particular property called "vague existence".

Eliminating these worries, says Hawley, we create room for a reasonable characterization of (modest) vague existence.

Obviously, there remain problems for the second-order account in itself, independently from its relations to the issue of vague existence.²⁹ An alternative view about existence is to consider it as a first-order property of objects, just as the grammatical applications of the predicate "exists" seem to suggest; existence would thus not be different from redness or tallness.³⁰ As an example, let's take again a definitely existing object, yourself: in this perspective we can say that this object has, amongst other, the property of having a certain height h , a certain mass m , and the property of existence. Instead, consider again a definitely non-existent object, the squared circle: this object would have the property of being squared, the property of being circular, but would not have the property of existence. This second case looks incoherent, because it seems that we are falling back on the mistake of quantifying over an object that does not exist. Perhaps, this problem could be handled referring to the squared circle as to an "entity": something we can talk about but that does not exist, at least not in the way an "object" exists. But then, it looks like in this perspective the first-order account leaves open the matter of whether we

²⁹On this topic, see [Salmon 1998].

³⁰See for instance [McGinn 2001].

can distinguish amongst different types of existence.³¹

Now consider a case of vague existence, a case in which it is not definitely true nor false that we have an object to quantify over. In such a case we would not be forced to characterize the object as vague, neither we would have to blame the property of existence for being vague. Rather, Hawley says, we could say that it is indeterminate whether in this situation we do have an object instantiating, *amongst other*, the first-order property of existence. For example, if we say that it is vague whether an object *o* exists, we are in a situation in which there is no fact of the matter as to whether the property of "being *o*" and the property of existence are co-instantiated. Hence, the modest brand of vague existence seems to be compatible also with the first order account of existence.

0.4.2 Hawley's modest brand of vague existence

The modest brand of vague existence does not entail that there are vague objects or vague properties; it rather deals with states of affairs. In her book *How Things Persist*, Hawley sums up these considerations in few lines:³²

"For what else could it be for an object to be vague except that it be indeterminate whether it has a certain property, or indeterminate whether it bears a certain relation to a certain other object? And what else could it be for a property or relation to be vague except that it be indeterminate whether that property or relation is instantiated by a certain object?"

Now, if we go back to van Inwagen's conclusions, Hawley says, we can see that they fit this characterization of vague existence, while they avoid the risk of allowing for the possibility of the existence of non-existent objects. For example, take a number *n* of simples, and suppose that it is indeterminate whether they add up to compose a further object (i.e., in van Inwagen's view, an organism). In this case we can hold that it is indeterminate whether these objects stay in a determinate relations among themselves: the relation of *participating in the same life as*. Thus, we do not have to quantify over vaguely existing objects, nor we have to think about the property of existence. Furthermore, van Inwagen's conclusions would not be untenable even if we wanted to accept that existence is a property of objects. Take another example of vague existence provided in [Van Inwagen 1990] and recalled by Hawley: the vague existence of a virus. In this case, says Hawley, we can say that

³¹The analysis of this debate would take us far away from our present concern. The bibliography on neo-Meinongian theories of existence is very rich: on this issues, see for example [Berto forthcoming]

³²See [Hawley 2001, pg. 109].

there is ontic indeterminacy as to whether the properties of *existence* and *being a virus* are co-instantiated. The modest brand of vague existence does not force us to say that it is indeterminate whether some vaguely existing objects instantiate these properties.

Hawley's strategy has some weaknesses that we will take into consideration later in the present work. For the moment, it is important to underline that the conclusion that Hawley draws from the previous reasoning is that the modest brand of vague existence is legitimate and compatible with a metaphysical theory that involves restricted composition. Hence, she says, the arguments that favor unrestricted composition and four-dimensionalism, resting on the premise that existence cannot be subject to the vagueness, would have to take into consideration this modest brand of vague existence.

0.5 Recap

By means of this introductory survey we have settle the terms for the following discussion of the problem of vague existence. We have seen that this issue has been discussed mainly in relation with the analysis of composition, but has a role also in the debate on persistence. On one side, we have examined very influential arguments, such as those of Lewis and Sider, that on the alleged absurdity of the notion of vague existence build a defence of some revisionary theories: e.g., universalism and some form of four-dimensionalism or stage theory. On the other side, we have an well developed metaphysical theory that entails and accepts occurrences of vague existence, such as that of van Inwagen, that is successively defended also by Hawley.

This brief recap is just a schematic picture of the different positions at stake. Anyway, it can be useful to underline once again that the fundamental assumption of all these theories is that existence depends on the relation of composition, which is in turn usually but not mandatorily shaped in terms of mereology. This perspective has deeply influenced the analysis of the problem of vague existence. In Chapter 1, we will go into the details of this connection between vague existence and composition.

Chapter 1

Vague existence and composition

Starting from the arguments that we have outlined in the *Introduction*, in this Chapter we will go into the details of the link between the notion of composition and the problem of vague existence. First of all, let's briefly sum up the terminology at stake.

Composition is the relation that can occur between a given class of objects: if it takes place, then these objects add up to compose a further one, that is the sum of the objects.

Unrestricted composition is the thesis that says that given any class of objects, these object always have a sum. Universalism says that given any class of objects, there always exists a further object that has those objects as its parts. For example, consider a pair of elements, no matter of which kind (physical objects, abstract objects, fictional objects...): x and y . If you accept universalism, then you hold that there is an object (call it o) that the two elements compose. This thesis is also known as unrestricted mereological composition.

Restricted composition, on the contrary, is the thesis that says that given a class of objects, there are or can be different criteria to establish whether these objects add up to compose a further one. Thus, if you take a number n of elements, sometimes they can be said to be parts of an object (i.e., they have a sum), sometimes they can't; it depends on whether they satisfy a determinate criterion for composition or, in other words, on whether they stay in a certain relation among themselves.

As we have said since the *Preface*, the (alleged) vagueness of existence is usually considered a particularly problematic kind of vagueness. The notion of vague existence could be introduced as follows. In this characterization, let's distinguish an *object* from an *entity*: the former definitely exists, while the latter indicates something that is not definitely existing. Thus:

- a) If in some circumstances there is metaphysical vagueness concerning the existence of an entity, then in such circumstances there is no fact of the matter as to whether this entity exists or not. This indeterminacy is not due to epistemic

or semantic deficiencies.

- b) If in a given situation it is vague whether an entity exists, then it is indeterminate whether there is such an entity in that situation; i.e., in this perspective "there is" and "exists" are thought to be synonyms.
- c) If in a given situation it is vague whether an entity exists, then it is indeterminate whether we have one object to count or not in that situation; i.e., in this perspective we count only definitely existing objects.
- d) If it is vague *when* an object comes into or goes out of existence, then during the relevant periods of time it is vague whether we have one object or no object. In other words, if it is vague when an object begins to exist, then at certain times it is vague whether it *already* exists; if it is vague when an object ceases to exist, then at certain times it is vague whether it *still* exists.

The notion of vague existence is thought to be a source of a lot of philosophical problems, as we will see. Thus, many philosophers have tried to avoid vague existence as a consequence of their metaphysical theories.¹ However, an interesting thing to note is the following: the wish to avoid vague existence has driven those philosophers to accept other metaphysical thesis that are rather extreme or at least controversial.

1.1 Lewis on composition

In his book *On the Plurality of Worlds* David Lewis argues in favor of the metaphysical thesis of unrestricted composition. He does that by means of an argument against all kinds of restriction on composition. In his view, a pivotal role is played by the impossibility of occurrences of cases of vague existence.²

He starts by saying that common sense usually restricts composition: usually, we think that a class of objects add up to compose a further object if and only if some intuitive *desiderata* are satisfied. Nevertheless, Lewis claims that any intuitive *desiderata* for composition would give rise to problems of vague composition, because it is always admissible for an intuitive *desideratum* to be satisfied to a borderline degree. In such a case, if it is vague whether the *desiderata* for composition occurs, then it is indeterminate whether composition takes place and, by consequence, whether the elements that we are considering do have a sum.

For example, let's consider some elements and say that composition occurs only

¹See for instance [Lewis 1986]; [Sider 2001]; [Morreau 2002].

²See [Lewis 1986] and the *Introduction*.

if the elements we are considering act jointly: we can imagine a state of affairs in which it is not determinate whether our elements act jointly, and thus in this case it would be indeterminate whether composition occurs. Not only in this situation it would be indeterminate how many objects there exist; we could also build a soritical series that would drive us to conclude that it is always indeterminate whether those elements act jointly (and so compose something). Lewis argues that no restriction on composition can be vague but, given that if it is not vague it cannot fit the nature of our intuitive *desiderata*, then no restriction on composition would follow the reasons that could motivate it. Lewis's conclusion is that every restriction would be gratuitous, and so composition is unrestricted. Lewis, in order to justify the apparent occurrences of the phenomenon of vague existence, embraces a semantical indecision theory of vagueness. For example, in his perspective if it looks vague whether the object *o* exists, the source of this vagueness is to be found in the rules that govern our use of the name "*o*"; *o* in itself (i.e., the sum of things to which "*o*" vaguely refers to) cannot indeterminately exist.

Here is a relevant quotation:

"The question whether composition takes place in a given case, whether a given class does or does not have a mereological sum, can be stated in a part of language where nothing is vague. Therefore it cannot have a vague answer. There is such a thing as the sum, or there isn't. It cannot be said that, because the *desiderata* for composition are satisfied to a borderline degree, there sort of is and sort of isn't. What is this thing such that it sort of is so, and sort of isn't, that there is any such thing? No restriction on composition can be vague. But unless it is vague, it cannot fit the intuitive *desiderata*. So no restriction on composition can serve the intuitions that motivate it. So restriction would be gratuitous. Composition is unrestricted" (see [Lewis 1986, pp. 212-213])

We can describe the basic structure of the whole reasoning by means of the following five points: (1) Common sense typically restricts composition. In our everyday way of thinking and speaking, we usually hold that some objects are parts of a whole, while some other do not compose any further object. For example, we usually agree that my legs, arms, head and so on compose an object (in this case, my body), while my legs, the arms of Michael Jordan and the city of Venice do not compose any object. (2) Any restriction on composition is constitutively subject to the problem of vagueness. If we try to make explicit a criterion for restricting composition, we see that we can generate borderline cases of application. We can always imagine a situation in which it is vague whether a given criterion is satisfied. (3) If composition is vague, then existence can be vague. In fact, if we imagine a situation in which it is vague whether a given criterion for composition is satisfied, then in such situation it is vague whether the object that would be the resultant of

composition exists. (4) Vague existence is impossible. It cannot be vague whether an object exists or not. (5) Conclusion: common sense is wrong about composition, indeed composition is unrestricted, it always occurs.

This argument, as we will see, had a great impact on the disputes about composition and vagueness. Anyway, there are a few aspects that have to be underlined before discussing the assumptions and the outcomes of the argument itself.

First of all, the opening sentence the argument we have quoted is already problematic. Lewis claims that the metaphysical question about composition is the following: when does a class of objects have a mereological sum? This means that the notions of composition and mereological sum are strictly correlated, in this perspective: given a number of objects, we have composition among them if and only if they have a mereological sum. Thus, Lewis thinks about composition in a mereological framework.

The second claim of Lewis is that that question about composition can be settled in a part of language free from vagueness; that is, the "classical logic part" of language, where we find the classic logical connectives and quantifiers. This claim lets emerge a further connection, between the notions of composition and mereological sums on one side and that of existence on the other. Lewis holds that we can ask whether there exists the mereological sum of some objects using the existential quantifier. The existential quantifier would be the only way we have to express existence, and it could not carry any indeterminacy. An entity does definitely exist, or definitely does not.³ Thus, a mereological sum does definitely exist, or definitely does not. Hence, finally, the composition among some objects does definitely take place, or definitely does not. There is an explicit connection among the notions of composition, mereological sums and existence.

Lewis thus takes for granted that the metaphysical question about composition can be asked in genuine logical terms (more on this topic later). The problem is that, even if we concede that that question is asked in precise terms, we are not forced to give a precise answer: for example, as we have previously underlined, we could adopt an epistemic perspective. Anyway, for what concerns us now, we have to note that, eliminating the epistemic point of view, Lewis restricts the debate to a dispute between linguistic theories and ontic theories about vagueness and composition.

Here we need to underline that, in order to be able to follow and analyze Lewis's argument for unrestricted composition, we have to take the following, preliminary steps. First of all, we have to hold that the notions of compositions, mereological sums and existence are linked together. Secondly, we have to go with the received view about existence. Finally, we have to rule out the epistemic view of vagueness. In a certain measure, these can be seen as "standard" decisions. In fact, mereology is the standard framework for the discussions about composition, the received view

³Lewis follows the so-called "received view" about existence. See Chapter 3 on vague existence and identity.

is quite predominant when speaking about existence, and the epistemic account for vagueness has had generally less fortune in respect to the linguistic one. Although we can see them as "standard", we have to say that these three steps are decisive in Lewis's strategy.

1.1.1 Lewis's assumptions and conclusions

So, Lewis endorses an extreme metaphysical thesis such as universalism, and he thus avoids the problem of vague existence. Let's consider again the case of an entity whose existence seems to be vague, but from Lewis's point of view, recalling the four point about vague existence that we have previously enumerated:

- a) If in some circumstances there is metaphysical vagueness concerning the existence of an entity, then in such circumstances there is no fact of the matter as to whether this entity exists or not. This indeterminacy is not due to epistemic or semantic deficiencies. - *This characterization, speaking philosophically (and, thus, unrestrictedly), is unintelligible. There are no cases of vague existence. Vagueness is semantical indecision.*
- b) If in a given situation it is vague whether an entity exists, then it is indeterminate whether there is such an entity in that situation; i.e., in this perspective "there is" and "exists" are thought to be synonyms. - *Given that in this perspective "there is" and "exists" are considered synonyms, neither of the two can turn out to be vague in Lewis's view. If it appears to be vague whether we can say that an object *o* exists, it must be because of the semantics of "*o*".*
- c) If in a given situation it is vague whether an entity exists, then it is indeterminate whether we have one object to count or not in that situation; i.e., in this perspective we count only definitely existing objects. - *It cannot be vague whether we have an object to count or not. Given *n* elements, there is always a further object that has these elements as its parts, because composition always occurs. There definitely exists the mereological sum of any given class of elements.*
- d) If it is vague *when* an object comes into or goes out of existence, then during the relevant periods of time it is vague whether we have one object or no object. In other words, if it is vague when an object begins to exist, then at certain times it is vague whether it *already* exists; if it is vague when an object ceases to exist, then at certain times it is vague whether it *still* exists. - *In such kind of situations, when it seems that an object is coming in or going out of existence, we have some elements that are beginning or ceasing to be in a certain relation to one another; it can be vague whether this relation occurs,*

during some periods of time, but these elements still compose a further object (indeed, they always do): the set that contains the elements definitely exists and count as one object at every time.

Having said that, we can take into consideration the assumptions and the outcomes of the argument. There are three assumptions underlying Lewis's argument (later on we will confront them with those underlying the replies to Lewis). Here is the list:

- i) *Composition entails existence.* This is related to the first claim of Lewis that we have previously discussed. The answer to the question concerning the existence of the sum of x and y (two entities, no matter what their nature or relation is) depends on the position one holds about composition. If composition occurs among x and y , then there is their sum; if composition does not occur, then there is no sum; if it is indeterminate whether composition occurs, then it is indeterminate whether there is the sum. Given that (as his argument tries to show) in Lewis's view composition always occurs, then there always is the sum of any given two or more entities, and this sum can be legitimately considered as an existing object if we hold universalism.
- ii) *Vagueness is always semantical indecision, but there is a part of language free from vagueness.* Lewis says that whether a given class of entities has a mereological sum can be stated in a part of language that does not include any vague component, apart from the names of the entities. The logical form of this conviction, taking into consideration two entities, is the following:

$$\exists x \exists y [S(x, y)] \rightarrow \exists z [z = S(x, y)] \vee \neg \exists z [z = S(x, y)]$$

where " z " indicates the mereological sum of object x and object y . In Lewis's view, neither the existential quantifier nor the logical connectives can harbor any vagueness. This means that whenever the existence of the sum of two entities looks indeterminate, the reason is to be found in our linguistic attitudes: that is, in the semantics of the names of the entities (" x ", " y " and " z " in our case) or in the rules that govern our everyday (non philosophical and, thus, restricted) way of speaking.

- iii) *The law of excluded middle holds in relation to existence.* Lewis says that it is not possible that it sort of is so, and sort of isn't, that a thing exists. From a metaphysical point of view, a thing definitely does or does not exist, there is no "in-between" third possibility. The source of an eventual indeterminacy must be located in the rules that govern our language (or, eventually, in our knowledge, although this is not Lewis's view).

In conclusion, we can say that the key to understand the relation between universalism and vague existence, in Lewis's perspective, is the assumption that composition entails existence. Considering a class of elements, there exists a further object, with those elements as its parts, if and only if composition occurs. Given that composition *always* occurs, considering a class of elements there always exists a further object that has them as its parts; it cannot be vague whether there is the sum of the elements. In this way, assuming that not even the existence of the atomic elements of which reality is composed can be vague, then the problem of vague existence is avoided once and for all cases. There still remain occurrences of the phenomenon of vague existence, but we can account for that through a semantical indecision theory of vagueness. This result goes together with the acceptance of a very radical thesis, universalism.

1.2 Van Inwagen on composition

Peter van Inwagen seems to accept the assumption that existence is a consequence of composition. In [Van Inwagen 1990], as we have seen in the *Introduction*, the author tries to answer what he has called the Special Composition Question: in what circumstances do things add up to compose something? That is, when it is true that:

$\exists y$ the x s compose y .

In this formulations the " x s" stay for what the author calls "simples". In van Inwagen's view, simples definitely exist. If there is something in addition to a class of simples depends on whether composition occurs; that is, it depends on whether these simples stay or not in a determinate relation among themselves. Thus, composition is restricted following a given criterion. In particular, van Inwagen claims that a class of simples compose something if and only if their joint activity constitutes a life. By consequence, the only existing things apart from simples are living organisms. As anticipated by Lewis, and accepted by van Inwagen, this restriction can turn out to be vague. It can be vague whether the activity of a class of simples constitutes a life, but this entails that in such cases it can be vague whether there exists an object in addition to the simples that indeterminately compose an organism. Van Inwagen, contrary to Lewis, prefers to pay the high metaphysical price of vagueness in existence, rather than the high metaphysical price of universalism.

Let's review the four point of the previous description of vague existence, this time from van Inwagen's perspective:

- a) If in some circumstances there is metaphysical vagueness concerning the existence of an entity, then in such circumstances there is no fact of the matter

as to whether this entity exists or not. This indeterminacy is not due to epistemic or semantic deficiencies. - *This is exactly what van Inwagen is inclined to accept.*

- b) If in a given situation it is vague whether an entity exists, then it is indeterminate whether there is such an entity in that situation; i.e., in this perspective "there is" and "exists" are thought to be synonyms. - *Also van Inwagen considers "there is" and "exists" as synonyms, so both of them can turn out to be vague in certain situations. If it appears to be vague whether the object o exists, the source of this vagueness can be also metaphysical, not merely semantical.*
- c) If in a given situation it is vague whether an entity exists, then it is indeterminate whether we have one object to count or not in that situation; i.e., in this perspective we count only definitely existing objects. - *Van Inwagen admits this kind of counting indeterminacy. For example, if it is vague whether the three simples a, b, and c add up to compose an organism, then it is indeterminate in this situation how many objects we have to count.*
- d) If it is vague *when* an object comes into or goes out of existence, then during the relevant periods of time it is vague whether we have one object or no object. In other words, if it is vague when an object begins to exist, then at certain times it is vague whether it *already* exists; if it is vague when an object ceases to exist, then at certain times it is vague whether it *still* exists. - *If a class of simples is beginning or ceasing to compose an organism,⁴ it is vague during these periods of time whether we have a further object or not. There exist the simples, but it is indeterminate whether there exists the organism that would have these simples as parts.*

The problem of vague existence turns out to be linked to the debate on composition because of the assumption that, we could say, something exists just in case it is composed (if it is not a "simple", whatever we mean by this term). Hence, if composition cannot be a vague matter, then existence will not be a vague matter. On the contrary, if composition is restricted, following van Inwagen's idea or any other kind of restriction, and thus can be subject to the problem of vagueness in some circumstances, then also existence can be subject to vagueness in those circumstances.

⁴I.e., in van Inwagen's terminology, if these simples are beginning or ceasing to "act jointly following the principle of Life".

1.3 Lewis's principle

We can now begin to discuss what we will call "Lewis's principle". In Lewis's words, the principle says:

"It cannot be said that, because the *desiderata* for composition are satisfied to a borderline degree, there sort of is and sort of isn't [the sum of any given class]." (see [Lewis 1986, pg. 212])

In other words it is impossible to claim that, if it is indeterminate whether composition occurs for a given class of entities in a certain situation, then it is indeterminate whether there is the sum of the given class of entities (i.e., whether there exists a further object). The impossibility of this entailment, in Lewis's view, depends on the three assumptions that we have outlined above and in particular on the impossibility of vague existence. The form of the argument is the following:

If composition is restricted (and thus can be vague) then existence can be vague.
 Existence cannot be vague.
 Thus (by *modus tollens*): composition is not restricted.

Here we will provide a formal representation of the principle, in order to confront it with those given by critics and commentators of Lewis. Let x and y be two entities, whose relation seems to be indeterminate in respect to a given criterion for composition, F ; let z indicate the (eventual) sum of the two entities $S(x, y)$; finally, let ∇ be a sentential operator that indicates indeterminacy (let's read it as "it is indeterminate whether" - what follows the operator). Its dual is Δ , a sentential operator that indicates determinacy (let's read it as "it is determinate that" - what follows the operator). Lewis's Principle states the following:

$$\forall x \forall y [\nabla F(x, y) \leftrightarrow \nabla \exists z [z = S(x, y)]]$$

In Lewis's view, this implication does not hold because the indeterminacy operator cannot turn on the existential quantifier, insofar as existence cannot be vague. This means, in this specific case, that there always exists the sum of two entities. This in turn implies that composition cannot ever fail to occur, neither it can indeterminately occur: the notation " $\nabla F(x, y)$ " is meaningless, from Lewis's perspective, speaking philosophically. Then, Lewis admits that in our everyday (restricted) way of speaking we can choose to hold vague criteria for composition, following which it can seem to be indeterminate whether there exists the sum of two entities in some situations; but this has nothing to do with the ontology of what there really is.

The formula representing Lewis's principle is classically equivalent to the following:

$$\forall x \forall y [\nabla F(x, y) \wedge \neg \nabla \exists z [z = S(x, y)]]$$

Which is in turn equivalent to:

$$\forall x \forall y [\nabla F(x, y) \wedge \Delta \exists z [z = S(x, y)]]$$

This is right what Lewis holds: given any two entities, such that it is indeterminate whether these entities are in a certain relation among themselves (i.e. it is indeterminate whether the relation between the entities satisfies a given criterion for composition), it is determinate that there exists the sum of these two entities. In other words, Lewis's principle states that mereological composition is unrestricted. Given any two entities, it does not matter whether a given criterion for composition seems to be satisfied to a borderline degree: there always exists the sum of those entities. This formulation will enable us to confront Lewis's principle with its critical readings.

1.4 Van Inwagen's principle and Lewis's alleged paradox

Peter van Inwagen discusses Lewis's argument for unrestricted composition in his *Material Beings*;⁵ he calls it "Lewis's paradox". Van Inwagen quotes the same lines of Lewis that we have reported above. In order to analyze van Inwagen's position, we need to introduce his terminology. The "extension" of a predicate is, as usual, the class of objects to which the predicate definitely applies; the "frontier" of a predicate is the class of objects to which the predicate neither definitely applies nor definitely fails to apply; if we say that something belongs to the frontier of a predicate F , this idea is expressed by " $\exists z \nabla Fz$ "; the xs are the simples.

Van Inwagen says that Lewis, in his argument against any restriction on composition, uses this inference form, claiming that it is impossible:

$$\nabla \exists z Fz \rightarrow \exists z \nabla Fz$$

This is what van Inwagen calls "Lewis's paradox". It should mean that it is impossible that, if it is indeterminate whether there exists something such that it would be the sum of some entities, then there exists something such that it is indeterminate whether it is the sum of such entities.

Van Inwagen calls into question this inference because, in his view, it conveys a belief in non-existent objects. In fact, the second member of the inference says

⁵See [Van Inwagen 1990, Chapter 19].

that there exists something that is such that it is indeterminate whether it exists (following a given criterion for composition). But if it is indeterminate whether something exists, there is no fact of the matter as to whether this thing does exist or does not. Thus, we would be saying that there exists something that possibly would not exist; in other words, we would be saying that there exists an object that could be non-existent (in fact, it is indeterminate whether it is existent or non-existent), and this is indeed impossible.

Apart from this last consideration, it is important to underline another aspect of van Inwagen's reasoning: what he ascribes to Lewis and calls "Lewis's paradox" *is not* what Lewis says with his "principle". Let's confront the relevant forms, elaborated starting from the same remarks of Lewis:

Lewis's paradox (in van Inwagen's formalization):

It is impossible that: $\nabla \exists z Fz \rightarrow \exists z \nabla Fz$

Lewis's principle (in our formalization):

$$\forall x \forall y [\nabla F(x, y) \leftrightarrow \nabla \exists z [z = S(x, y)]]$$

Lewis does not claim that the former implication is impossible. By means of his rhetorical question, "What is this thing such that it sort of is so, and sort of isn't, that there is any such thing?", he is not saying that accepting a restriction on composition would not imply *the existence of something that can indeterminately satisfy the restriction* (or: " $\exists z \nabla Fz$ "). Rather, he is saying that accepting a restriction on composition would not imply *an indeterminacy regarding the existence of something that would be eventually the resultant of composition* (or: " $\nabla \exists z [z = S(x, y)]$ "). The latter is the impossible implication in Lewis's view, not the former.

As we have said, the argument provided by Lewis plays a very important role in the debates on the notions of compositions and existence. Nevertheless, some philosophers have used in their works the misleading interpretation of Lewis's words provided by van Inwagen.⁶

Van Inwagen obviously defends also his own proposal about the link between composition and existence. Let's go on analyzing what we shall call "van Inwagen's principle", in opposition to "Lewis's principle". Van Inwagen claims that:

"from the fact that it is indefinite whether anything is the sum of the x s, it does not follow that something is such that it is indefinite whether it is the sum of the

⁶See for example [Hawley 2002]; [Hyde 2008]; [Carmichael forthcoming].

xs." (See [Van Inwagen 1990, pg. 274])

Given that we have called "*z*" the eventual sum of two or more entities (for example, the sum of two or more *xs*, in the case reported in this quotation), we can express "the fact that it is indefinite whether anything is the sum of the *xs*" with " $\forall z \nabla Fz$ ". Furthermore, we can express "something is such that it is indefinite whether it is the sum of the *xs*" with " $\exists z \nabla Fz$ ". Van Inwagen thus says that there are cases in which we want to say that " $\forall z \nabla Fz$ " is definitely true, while " $\exists z \nabla Fz$ " is not. We can formalize this claim in the following way:

$$\forall z \nabla Fz \leftrightarrow \exists z \nabla Fz$$

which entails the following:

$$\forall z \nabla Fz \wedge \neg \exists z \nabla Fz$$

That is to say that: it is indeterminate whether anything is the sum of the *xs*, and it does not exist anything such that it is indeterminate whether it is the sum of the *xs*. This is what we will call "van Inwagen's principle".

Now let's recall the last formalization we have given of "Lewis's principle":

$$\forall x \forall y [\nabla F(x, y) \wedge \Delta \exists z [z = S(x, y)]]$$

If we confront the two principles, we can see that the outcomes of the two reasonings are opposite, even if the starting point is the same. Lewis, from a situation in which it is indeterminate whether composition occurs between any elements (in this case, two elements, *x* and *y*), derives that it is definitely the case that there exists an object such that it is the sum of the elements considered. Van Inwagen, from the same situation, derives that it is not the case that there exists an object such that is the composition of the elements considered.

As a provisory conclusion, we can say that this confrontation of the two principles should at least show that, for both philosophers, the notion of existence strongly depends on the notion of composition. Existence is characterized in terms of composition: every existing object is either a mereological simple, or a composition of some parts (that is, the sum of those parts).

1.4.1 Van Inwagen's semantics for his principle

Van Inwagen then develops a semantics for a language whose vocabulary consists of the existential quantifier, the indeterminacy operator, and some predicate-letters. This semantics should be able to show that the inference form " $\nabla \exists z Fz \rightarrow \exists z \nabla Fz$ " is not valid, because there are counterexamples to it; so, it is not the case that it

would be impossible because of the reasons provided by Lewis. Thus, what van Inwagen calls "Lewis's paradox" would not hold as an argument against restricted composition. Nevertheless, given what we have previously said, this maneuver turns out to be at least misleading, insofar as we have shown that Lewis *does not* suggest that that inference form is impossible. Hence, this semantics cannot be a counterexample to any of Lewis's theories. Apart from that, van Inwagen also claims that his semantics shows a coherent way to speak a language in which composition is restricted, and it will be useful to make some considerations about it.

Van Inwagen introduces the notions of "full object", an object that definitely exists, and "borderline object", an object such that it is indeterminate whether it exists. Obviously, the second is right the paradoxical kind of object that van Inwagen (and Lewis too) wants to rule out; nonetheless, van Inwagen uses this notion in his semantics for its "heuristic value". Speaking correctly, what van Inwagen calls "borderline objects" in his semantics are in fact sets of simples such that it is not definitely true or false that these simples compose an object. From an ontological point of view, when we consider a "borderline object", we do have something existing, i.e. a given number of simples. The fact is that it is indeterminate whether these simples compose an object, and thus it is indeterminate whether such object exists.

If a full object falls within the extension of a given predicate G , it means that it definitely exists and G definitely applies to it; if it falls within the frontier of G , it means that it definitely exists but G does not definitely apply nor fail to apply to it. If a borderline object falls within the extension of G it means that, whether it would turn out to exist (that is, whether composition between the simples that indefinitely compose the object did definitely occur), G would apply to it; if it falls within the frontier of G it means that, whether it would turn out to exist, it would still be indeterminate whether G applies to it. From the combination of what we find in the extension and in the frontier of G , says van Inwagen, we can derive the value of " $\exists G$ ", that is in his view the truth value of a sentence expressing the existence of an object to which G applies. Value 1 stays for definite truth; value 0 stays for definite falsity; value $1/2$ stays for indeterminacy. Van Inwagen recapitulates the rules to find the value of " $\exists G$ " as follows: if there is a full object in the extension of G , this is a necessary and sufficient condition in order to give value 1 to " $\exists G$ ", while if both the extension and the frontier of G are empty we must assign value 0. The value will be $1/2$ in every other case.

Van Inwagen claims that this semantics provides two counterexamples to the inference " $\nabla \exists z Fz \rightarrow \exists z \nabla Fz$ ":

- 1st) If the extension of the predicate F contains no full objects and the frontier of F contains only borderline objects, then " $\nabla \exists z Fz$ " has value 1, while " $\exists z \nabla Fz$ " has value $1/2$. Hence, the former cannot definitely entail the latter.

2nd) If the extension of F contains only borderline objects and the frontier of F is empty, then " $\nabla \exists z Fz$ " has value 1, while " $\exists z \nabla Fz$ " has value 0. Again, the former cannot definitely entail the latter.

Thus, for Inwagen, it is possible to develop a coherent semantics for a language that contains " \exists " and " ∇ " in order to speak a language in which composition is restricted.

This semantics is three-valued but still incomplete, in his own author's view. Van Inwagen uses the indeterminacy operator without further qualification: it applies or fails to apply to any given sentence. Therefore, in this framework we are not able to account for degrees of vagueness, although in van Inwagen's view vague existence is a matter of continuous degree, just as well as composition is. Nevertheless, van Inwagen chooses to develop a three-valued incomplete semantics because, in order to match the real nature of the vagueness of existence, he would have needed "as many values as there are real numbers".⁷ Van Inwagen explicitly admits that a fully satisfactory account of vagueness would have to go this latter way. He limits himself to that three-value semantics because he claims that, although incomplete, it is sufficient to provide counterexamples to Lewis's paradox against restricted composition and vague existence.

We have already said that van Inwagen's treatment of Lewis's theory on composition is misleading; nevertheless, we can compare the overall strategies of the two philosophers about composition and existence. Thus, we will now turn on the confrontation of the three assumptions of Lewis's argument with the outcomes of van Inwagen's analysis (see the relevant list in Paragraph 1.1.1 on Lewis's assumptions and conclusions):

- i) *Composition entails existence.* This entailment holds also from van Inwagen's point of view. Indeed, this is the reason why existence can be subject to the problem of vagueness: because composition can be vague. If at a certain time t it is indeterminate whether the joint activity of a given class of simples constitutes a life (this is the criterion for restricting composition defended by van Inwagen), then at t it is indeterminate whether there exists an object (that would be, if definitely existing, an organism) composed by these simples.
- ii) *Vagueness is always semantical indecision, but there is a part of language free from vagueness.* Contrary to Lewis, van Inwagen thinks that there can be vagueness for what concerns existence and the application of the existential quantifier. In certain situations it can be vague whether there exists an object: this vagueness in existence depends on the vagueness of the relation of composition, as we have seen. We can express the vagueness of existence by pairing

⁷See [Van Inwagen 1990, pg. 282].

the indeterminacy operator with the existential quantifier in the following way: " $\nabla\exists$ ". This is legitimate in van Inwagen's perspective. For example, in order to say that it is vague whether an object x exists, following a given criterion for composition G , we can write: " $\nabla\exists xGx$ ", and this makes sense.

- iii) *The law of excluded middle holds in relation to existence.* As we have seen, van Inwagen develops a semantics where bivalence does not hold. This semantics is supposed to reflect (approximatively, as van Inwagen admits) the possibility of metaphysical vague existence. Thus, van Inwagen does not retain the law of excluded middle in relation to existence. This revision of standard logic violates one of the pivotal convictions that van Inwagen lists at the very beginning of his work.⁸ In particular, conviction number 3: "the book adheres to standard logic as an ideal. [...] I have tried to construct a theory that violates the constraints of standard logic only in extreme cases". The question of existence is then one of these extreme cases (as well as those of parthood and identity: see [Van Inwagen 1990, chapters 17 and 18]).

It is important to stress that only point (a) seems to work as an assumption for both Lewis and van Inwagen. In fact, while (b) and (c) have the role of assumptions in Lewis's argument, their negation is not presupposed by van Inwagen: rather, the acceptance of the possibility of vagueness for what concerns the application of the existential quantifier and the refusal of the law of excluded middle are seen by van Inwagen as inevitable consequences of his metaphysics of material objects. So, Lewis and van Inwagen develop their arguments starting from one identical assumption, but with radically different outcomes.

1.5 Further remarks

One of the most important consequences of this relation between composition and existence is that, changing opinion about composition, we are driven to consider in a different way *the very same portion of matter*. Let's consider a determinate quantity of matter. Suppose that this quantity is a class of some elements that are not definitely related among themselves in respect to a given criterion for composition. Moreover, suppose that, in this case, both the philosopher who likes universalism and the philosopher who provides the given criterion for restricting composition consider as existing the elements that belongs to the class. Both philosophers think that there definitely exist these elements. Their views diverge as to whether there exists a further object, something we should count, in addition to the things that

⁸See [Van Inwagen 1990, pg. 3].

are included in the quantity of matter. The philosopher who goes with universalism thinks that there always is the sum of the things included in the quantity (and this sum is a definitely existing object, an object that is identical to the considered quantity of matter), no matter how the elements are related. On the contrary, the philosopher who restricts composition would say that, in this case, it is vague whether we should consider as existing another object, apart from the elements included in the quantity of matter.

This case should show that both philosophers are considering "the same bit of the world": i.e., a determinate quantity of matter. They have by their hands the same "things", so to say. Nevertheless, the ontology of the two philosophers differs because of their metaphysical convictions about composition. On one side, we can avoid occurrences of vague existence and counting indeterminacy by endorsing universalism; on the other side, we can avoid mereological unrestricted composition but it seems that we are forced to accept occurrences of vague existence and counting indeterminacy.

There is another aspect that I want to underline: what we could call "common sense" does play a marginal role in the dispute. One of the first claims of the enemies of universalism is that it is foolish to say that there is an object composed by yourself, my acoustic guitar, the color red and number four. In the same manner, one of the first claims of the enemies of vague existence is that it is foolish to say that *you* do not have precise (spatial and/or temporal) boundaries and so that, in some circumstances, *your* existence can be subject to some vagueness. Namely, in this case, *your* existence would have been indeterminate while "you" were coming into existence, as well as it will be indeterminate while "you" will be going out of existence.

On the other side, the friends of mereological unrestricted composition claim that it is perfectly legitimate and understandable to say that there is an object composed by yourself, my acoustic guitar, the color red and number four: we just have to consider these entities together (i.e., their sum), even if we are not used to. Again, in the same way, the friends of vague existence claim that it is quite intuitive to say that during some periods of time it is indeterminate whether you (already/still) exists: indeed, the continuity of change would be one of our common sense insights about the nature of the world, and this continuity is compatible with vague existence.

In conclusion, "common sense" does not have a decisive influence on this debate, even if sometimes it is invoked as an ally by a disputant or another. Both universalism and vague existence have their costs and benefits, from a metaphysical point of view and from a common sense point of view. What interest us is to understand whether it is satisfying to characterize existence and vague existence in terms of composition.

Chapter 2

Vague existence and persistence

As we have seen in the relevant Chapter, the problem of vague existence is strictly linked to the debate on composition; nevertheless, such problem cannot be fully subsumed in the framework of that debate. In a characterization of vague existence given only in terms of parthood, mereological sums, and restricted or unrestricted composition, the dimension of time would not have the importance that it apparently deserves. Material objects seem to come into existence and go out of existence during some periods of time (whether these "coming into" and "going out of" existence are thought to be instantaneous or not is one of the issues at stake); moreover, it definitely looks like there are periods of time in which a material object determinately exists, and periods of time in which it determinately does not. This means that some sort of change occurs with the passage of time and such change, *perhaps*, cannot be explained only in terms of composition.

It looks like this change does not concern only the notions of composition and parthood, but it regards these notions in a sort of "combination" with the dimension of time. The problem emerges when we try to single out the unique instant at which the alleged change takes place (or the precise temporal boundaries of the event, if we assume that the alleged change is not instantaneous). The individuation of sharp cut-offs delimiting the temporal boundaries of the existence of a given material object seems to be subject to the problem of vagueness. That is the reason why between the definite existence and the definite non-existence of a material object, around both the periods of time of its coming into and going out of existence, it often looks like there are times in which it is vague whether the object we are trying to consider exists or not.

The debate on persistence regards the criteria for the identity through time of objects. Consider an object o and suppose that it persists from time t_1 to t_2 : let's hold that o exists at both t_1 and t_2 . The different theories of persistence, as we will see, account for this identity through time in very different ways. This debate on persistence is important for our main worries because, on one side, if we could

explain how things persists then, perhaps, we could say something more about the occurrences of the phenomenon of vague existence. On the other side, the analysis of the different theories on persistence will enable us to see whether the problem of vague existence has an impact even on such debate, as it as on that on composition. Finally, we will see whether combining the notions of composition and persistence is enough in order to provide a more adequate characterization of the problem of vague existence.

In this Chapter, we will start from the description of a paradox concerning the existence of Matthew, a monkey who lived in the eighteenth century. Here we will present a version of the paradox in which the problem of vagueness emerges in relation with the dimension of time, in order to make the paradox relevant for the discussion of the link between the questions of vague existence and persistence. This paradox will serve as an example for the discussion of the different points of view about how material objects persist through time. In the second part of the Chapter, in fact, we will outline the characteristics of the three main perspectives about persistence: three-dimensionalism (or endurance theories), four-dimensionalism (or perdurance theories) and the "equivalent position" (as I will call the point of view which sees the previous two as basically translatable one into the other). That will enable us to see how the three main perspectives on persistence can deal with the paradox of Matthew.

2.1 The paradox of Matthew the monkey

Let's consider Matthew, a monkey who lived for about fifty years, during the XVIII century. There was a period of time, call it P , in which Matthew definitely existed: indeed, this period lasted more or less fifty years. Before P , there was another period of time, call it $B.P.$, when Matthew definitely did not exist yet; $B.P.$ ended when Matthew came into existence. After the end of P began another period, call it $A.P.$, when Matthew definitely did not exist anymore ($A.P.$, indeed, still lasts nowadays). Thus, some sort of changes took place: that is, in the passage from $B.P.$ to P Matthew came into existence, while in the passage from P to $A.P.$ Matthew went out of existence.

The problem lies in the observation that the individuation of the temporal locations of the changes from $B.P.$ to P and from P to $A.P.$ seems to be subject to the problem of vagueness. In fact, it looks like P lacks precise temporal boundaries (and so do $B.P.$ and $A.P.$). As soon as we try to single out the sharp cut-offs delimiting the existence of Matthew from a temporal point of view, we see that their individuation can give rise to a soritical series. Suppose that we believe that Matthew came

into existence at time t , a precise instant back in the XVIII century: we then hold that the necessary and sufficient conditions for the existence of Matthew started to occur exactly at t . The problem is that it looks plausible to believe that the same conditions, whatever they are, occurred also one nanosecond earlier than t . After all, how could the passage of one billionth of a second determine a significant difference concerning the conditions for the existence of Matthew?

Obviously, the paradoxical nature of this idea resides in the fact that it lets emerge a soritical series. In fact, from the admission that P (could have) started at $t-1\text{ns}$, we can then go on and build an argument that, from apparently true premises, by successive applications of the classical rule of inference *modus ponens*, would drive us to accept apparently false conclusion: for instance, step by step at one point we would come to the conclusion that Matthew came into existence at some time in 460 b.C., and then even earlier (obviously, such dates should be expressed in the following way: " $t - x$ ", where x stays for the relevant amount of nanoseconds). That is, we would not be able to individuate the passage from $B.P.$ to P . The same insights holds for $t+1\text{ns}$: the issue in this case concerns the choice of t instead of $t+1\text{ns}$ as the starting instant for the existence of Matthew, and is subject to the same problem we have just outlined. Moreover, an analogous reasoning holds for the passage from P to $A.P.$: as soon as we claim that Matthew went out of existence at a determinate time, it seems that we are caught again in other soritical series.

Thus, there are periods of time in which it looks vague whether there already/still exists Matthew the monkey: the temporal boundaries of the existence of Matthew appears to be subject to the problem of vagueness. It seems to be vague whether Matthew persists during those periods of time: the conditions for the persistence of Matthew appears to be subject to the problem of vagueness. That is the reason why this paradox interests us here. The soriticality involved in the paradox poses the issue of whether it makes sense to look for a couple of determinate times at which the change from non-existence to existence (and viceversa) occurs: that is, the determinate times at which Matthew began and ceased to persist. Thus, part of the nature of this paradox of Matthew concerns the present Chapter directly, and regards the relation between the phenomenon of vague existence and the debate on persistence.

2.2 Theories of persistence

We are considering the existence through time of a material object, Matthew: this existence has a beginning, then it has a "career", and finally it has an end. We can say that Matthew comes into existence, then exists, and finally goes out of existence. All these three activities (coming into existence, existing, and going out of

existence) take place in time, and the question is whether it makes sense to look for their precise temporal boundaries. During certain periods of time (namely, around the very beginning and around the very ending of Matthew's existence) it looks vague whether Matthew already/still exists. Furthermore, it also seems like we are always considering the career of *one and the same object*, that is Matthew: indeed, as we have said above, the debate on persistence concerns the criteria for the identity through time of an object. It is Matthew's existence that begins, lasts, and ends: we say in fact that Matthew persists through time.

If we could explain how an object persists then, perhaps, we could account for the phenomenon of vague existence. As we will see later, this possibility is actually seen as a key factor that should promote a certain kind of views about persistence against its rivals. Even in the debate about persistence we can underline an aspect that already came out when we were dealing with the notion of composition: the possibility to avoid the occurrence of cases of vague existence is seen by many philosophers as a good reason for adopting a theory, even if this theory seems to go against common sense and has rather high metaphysical costs. We will come back on this aspect after having examined the principal points of view about persistence.

There are a lot of different theories that try to explain how things persist.¹ We will summarize them speaking of the three main perspectives about persistence: three-dimensionalism, four-dimensionalism, and what I will call the "equivalent position", i.e. the point of view that sees three-dimensionalism and four-dimensionalism as basically equivalent. Before taking into consideration the case of Matthew from these three perspectives, let's see some general descriptions.

Three-dimensionalism² has this name because it includes all those theories that say that physical objects are extended only in the three dimension of space. Being extended in space, these objects have spatial parts. These objects *are not* extended through the dimension of time. This means that they do not have temporal parts: they are always fully present at each time at which they exist. The 3D views say that physical objects endure through time: they persist by enduring. For example, let's look at a tree: it has a length, a width and a depth at any time we look at it. We can talk of its upper, middle and lower part, or of its northern and southern side; we can "divide" it in many spatial parts, and look at, or talk about, just some of its spatial parts. On the contrary, at any time at which we look at the tree, it is fully present from a temporal point of view. This means that at any time we are looking at the whole tree (again, from a temporal perspective), which is not extended through time as it is through space.

¹I am quoting here the title of a book that introduces to this issue and the relevant bibliography, while promoting a particular point of view about it: [Hawley 2001]. Hawley defends the "stage-theory" view.

²Among the works that reflect on a three-dimensional perspective on persistence we can find [Van Inwagen 1988]; [Haslanger 1994].

Four-dimensionalism³ has this name because it includes all those theories that say that physical objects are extended through time as they are extended through space; thus, they spread themselves in four dimensions. This means that they have temporal parts as they have spatial parts. The 4D views say that physical objects perdure through time: they persist by perduring. To perdure is to change temporal parts: different 4D views account for this change (and for the nature of temporal parts) in different ways, but the main idea remains the same. For example, let's consider again our tree: it has a length, a width and a depth at any time we look at it. Anyway, when we look at it, it would be more adequate to say that we are always looking at a temporal part of it. We should talk of a certain part of the tree at a certain time t , and then of its earlier or later temporal parts at other times, exactly in the same way as we talk of the upper and the lower part of it from a spatial point of view.

The "equivalent position"⁴ tries to show that three-dimensionalism and four-dimensionalism deal with the same "matter" from an ontological perspective. Roughly, the 3D and 4D views would be just saying the same thing in different ways, and by using different names; nevertheless, all such theories would be inter-translatable. It is true that four-dimensionalists claim that objects have temporal parts, something that is denied by three-dimensionalists. The fact is that the elements to which both the perdurantist and the endurantist refer to, in order to account for the persistence of physical objects, are the same ontological elements. For example, in the case of the tree, what ultimately exists accordingly to both the points of view are a persisting object, some sets of subatomic particles or mereological simples, and the different times at which the tree exists. The only philosophical difference between the 3D and the 4D views would be in the *description* of the relation between those ontological elements.

Now let's try to see in details what happens with the paradox of Matthew the monkey, starting from the three points of view about persistence that we have just outlined. How can they account for the apparent vagueness concerning Matthew's existence around the periods of time in which the monkey is coming into existence or going out of existence?

2.2.1 Matthew again: three-dimensionalism

The three-dimensionalist has different options available. Suppose it appears to be indeterminate whether Matthew was already (or was still) existing at a given time

³Among the works that defend a four-dimensional perspective on persistence we can find [Heller 1984]; [Sider 1997].

⁴Among the works that defend an "equivalent position" between the endurantist and the perdurantist perspectives on persistence, we can find [Miller 2005]; [Lowe 2011].

t. Claiming that an object is fully present whenever it exists, as endurantists we can go in four different ways thinking about Matthew at time *t*:

- 1) We can say that there were many objects, each of which almost equally suitable as a candidate for being the referent of the name "Matthew". All these objects differed one from each other because they had different temporal boundaries: they came into (and/or went out of) existence at slightly different times. The problem is that the semantics of the name "Matthew" does not single out properly which was the real good fit for the name. Thus, the source of the indeterminacy that we face considering time *t* would be the multiplicity of the almost totally overlapping objects existing around that time, together with the deficiency regarding the rules that govern the use of the term "Matthew": such rules would not be defined enough in order to single out which object was the right referent for the name. That is, the extension of the name "Matthew" would lack sharp boundaries, and this would be the reason why we face borderline cases of application in some circumstances: namely, in this example, at time *t*. This is a linguistic account for the phenomenon of the vague existence of Matthew.
- 2) We can say that in reality there was no such a thing as a monkey (or as any "composite" object). The only existing objects would be the simples, the ultimate, indivisible elements constituting the material world. These simples are enduring objects that are wholly present at each time at which they exist. Sometimes it looks like they add up to compose a bigger object, for example a monkey. Thus, in our everyday way of speaking, we are driven to talk about "monkeys" and give them names, whereas from a metaphysical point of view this attitude would be mistaken. In this case, the ontology of the theory turns out to be extremely sparse, and the problem of the indeterminacy we face at time *t* would be in a certain sense linguistic again: the source of the phenomenon of the apparent vagueness regarding the existence of Matthew is to be found in our loose talk, and namely in the (wrong) ontology presupposed by the semantics of our everyday way of speaking. This is a nihilist and linguistic account for the phenomenon of the vague existence of Matthew.
- 3) We can say that, instead, there was a precise instant at which Matthew began to exist, and a precise instant at which Matthew ceased to exist, and that Matthew was always fully present between these two instants. Thus, the period of time that we have called *P* would have indeed a sharp beginning and end. The problem would lie in the fact that we would not be able to single out the two instants delimiting the duration of *P*. Thus, this incapability would be the reason why the name "Matthew" seems to have borderline cases of application: the source of the apparent indeterminacy that we face at time *t*

would be our ignorance; that is, our lack of knowledge as to whether t is part of P or not. This is an epistemic account for the phenomenon of the vague existence of Matthew.

- 4) We can say that during some periods of time, around what we call the "beginning" and the "ending" of Matthew's existence, there is no fact of the matter determining whether an object exists or not. Matthew fully existed whenever he existed: the problem is that at time t it is genuinely (that is, ontologically) indeterminate whether Matthew existed. The source of the indeterminacy that we face at time t would be how the things of the world are made and change through time. In other words, we could say that P lacks precise boundaries not because of our linguistic or epistemic limitations. This is a metaphysical account for the phenomenon of the vague existence of Matthew, which indeed would not be just a phenomenon: it would be a fact of the world.

Each of the four previous options has its immediate benefits and costs, both from a philosophical perspective and a common sense perspective.

The first one accounts for the phenomenon of vague existence by multiplying indefinitely the inhabitants of our ontology. Where we see Matthew and tend to count one object, there would be in reality a lot of different objects; the majority of these objects are not considered by the semantics of our everyday language, which pretends to link the name "Matthew" to just one of them. The problem is that it is vague which one is the right referent of the name. The source of the occurrences of the phenomenon of vague existence is thus explained, to the cost of accepting an ontology extremely "populated". This point of view, with its expanded ontology, poses other kinds of issues, such as how it is possible the overlapping of a multitude of physical objects.⁵

The second one goes in the opposite direction, and accounts for the phenomenon of vague existence by radically restricting the inhabitants of our ontology. Where we see Matthew and tend to count one object, there exists "just" a lot of (three-dimensional) simples arranged in a certain way. The semantics of our everyday language lets us speak of only one big composed object (and call it "Matthew") for practical reasons, but this habit brings about some linguistic problems. For instance, this habit would be the source of the phenomenon of vagueness concerning the temporal boundaries of the existence of what we name "Matthew", because this term does not refer in reality to anything genuinely existing. This point of view, holding such a sparse ontology, have to account for other issues, such as why it looks so implausible to claim that there are no ordinary things.⁶

The third one accounts for the phenomenon of vague existence without forcing us to hold extreme convictions from an ontological standpoint. There is exactly

⁵For a discussion of this question, see for example [Gilmore 2007].

⁶I am quoting here the title of a work that reflects on this question: [Unger 1979].

one object where we see Matthew, as we are commonly driven to think. Moreover, Matthew began and ceased to persist at two precise instants, although we cannot single them out. The source of the occurrences of the phenomenon of vague existence is thus explained from an epistemic standpoint. Such point of view about persistence challenges our common sense insights regarding the beginning and the end of the existence of a material object. We tend to find difficulties, for example, in believing that Matthew started to exist from precisely one instant, not a single instant earlier or later; and the same goes for the end of Matthew's existence.⁷

The fourth one, in a certain sense, *does not* account for the phenomenon of vague existence. Rather, it accepts it as a genuine manifestation of a metaphysical indeterminacy. This vagueness concerns the alleged precise instants at which Matthew's existence should have started and ended: it would make no sense to think about them because there was no such a thing as a *single starting instant* or *single ending instant* for the existence of Matthew. This point of view should then deal with the issue of considering existence and the existential quantifier as subject to the problem of vagueness. The benefit would be the possibility to avoid radical interventions at the level of how many things exist where we see one object, as well as the counter-intuitive claim that there were a *single starting instant* and a *single ending instant* for the existence of Matthew but we cannot know them.⁸

2.2.2 Some remarks on three-dimensionalism

Apart from their immediate benefits and costs, the four strategies available for the three-dimensionalist present significant differences about their understandings of role of the dimension of time. These four options are meant to be different interpretations of one and the same perspective on how objects persist. This perspective sees an object as always fully present throughout its entire existence: that is, an object persist by wholly existing throughout "its time" (i.e., the time at which it exists). Nevertheless, the four options are not uniform among themselves for what concerns their considerations about the link between the phenomenon of the vague existence of an object and its persistence.

The first two strategies cut this link by locating the source of the phenomenon in the discrepancy between the ontological and the semantical levels: while the semantics that we use drives us to believe that Matthew counts as one object, in reality there would exist many more objects (strategy 1) or no such an object (strategy 2). In both cases the dimension of time is eliminated from the set of the possible sources of the phenomenon of vague existence: indeed, there is no genuine problem of vague

⁷For a classical study of the notion of vagueness, followed by a defence of an epistemic account, see [Williamson 1994].

⁸For an articulated proposal of this kind, see [Van Inwagen 1990].

existence. From this standpoint, every existing object is three-dimensional and begins and ceases to persist at a couple of precise instants, whether it is Matthew himself, a candidate to be the referent of the name "Matthew", or just one of the simples arranged in a way that looks like what we call "Matthew". Thus, these first two kinds of three-dimensionalism account for the problem of vague existence without involving the temporal dimension as one of its sources: hence, time would only apparently have an important role in the case of the vagueness concerning the existence of Matthew.

Something similar happens with the epistemic account (strategy 3), even if in a different way. P , that is the time of the existence of Matthew, has a perfectly definite duration: the monkey started and ended to persist at a couple of determinate instants. The source of the phenomenon, as we have said, would be at the epistemic level: in this case the three-dimensionalist claims that there are two precise cut-off points delimiting the beginning and the end of P , but we cannot know them. So even following this strategy, as with the previous two, the phenomenon of the vague existence of Matthew around the times of his coming into and going out of existence would not strictly depend on the temporal nature of these activities (i.e., on the fact that they take place through time). The beginning and the end of the existence of a material object such as Matthew would be instantaneous, there would exist a precise couple of instants delimiting P , and hence there would be no metaphysical problem of vague existence.

Following the first three kinds of three-dimensionalism, the dimension of time is thus eliminated from the group of the possible sources of the phenomenon of vague existence. The link between vague existence and persistence would be basically semantic or epistemic. In other words, such link would be "*de dicto*", as it is sometimes put, in opposition to "*de re*" (which means ontological and/or metaphysical).

The fourth strategy available for the three-dimensionalist, on the contrary, maintains the link between the phenomenon of the vague existence of an object and its persistence. This kind of three-dimensionalism holds that it is genuinely indeterminate when Matthew came into and went out of existence; there is a metaphysical problem concerning the duration of P . Thus, the phenomenon of the vague existence of Matthew lets emerge a real metaphysical indeterminacy that takes place during certain periods of time.

This is in my view the only version of three-dimensionalism in which the dimension of time is held as a part of the question. In particular, it is the only strategy in which the three-dimensionalist holds that changes from non-existence to existence (and from existence to non-existence) are not supposed to take place at a determinate couple of instants, whether we could know them or not. There is a process of coming into existence and there is a process going out of existence: both processes do not have definite temporal boundaries. This would be the reason why it would have no sense to talk of a single starting instant and a single ending instant for the

existence of Matthew. It can be genuinely vague whether an object persists during some periods of time; from this standpoint, such vagueness cannot be accounted for by eliminating the temporal dimension of the existence of Matthew from the group of the possible sources of the problem.

Let's briefly sum up these considerations about three-dimensionalism: the endurantist claims that Matthew was wholly present whenever he existed; during some periods of time, it appears to be vague whether Matthew exists or not (i.e., is wholly present or not); if the monkey came into and went out of existence at a couple of different precise instants (as it is claimed by the first and the third strategy), then the source of the apparent vague existence of Matthew is not metaphysical and does not concern the dimension of time; if there was no such a thing as a monkey (as it is claimed by the second strategy), then again the dimension of time is not seen as one of the possible sources of the apparent vague existence of Matthew; instead, if we hold that Matthew was a single object wholly present throughout P , and we find difficulties in thinking about the temporal boundaries of P independently from our epistemic limitations, then the source of the problem could be metaphysical and strictly related to the dimension of time (as it is claimed by the fourth strategy).

2.2.3 Matthew again: four-dimensionalism

The four-dimensionalist has basically the same four options available for the three-dimensionalist. Nevertheless, perdurantists usually think that their kind of view about persistence, if developed in a certain way, has among its benefits the alleged capacity to resolve traditional metaphysical puzzles in an "easy" and intuitive way (something that the endurantists would not be able to do).

This way of interpreting four-dimensionalism corresponds to the first option (see point 1 of the previous list), with an adjustment relative to the notion of temporal parts. The perdurantist can say that where we see Matthew, there exists in reality a great quantity of slightly different four-dimensional objects. These objects, being extended through time as they are through space, are composed by many temporal parts: they differ one from each other precisely because, at the edges of their existence, they include different temporal parts. That is to say that each four-dimensional aggregate of temporal parts comes into existence at a different time, by having one more (or one less) temporal part in respect to the other aggregates.

All these objects exist, even if we tend to give a name (and count) just one of them. In fact, composition between temporal parts is usually supposed to be unrestricted.⁹ The apparent vagueness about the existence of Matthew at time t would be caused by a deficiency of the semantics of the language we speak, and in

⁹On this feature, see [Sider 2001] and the *Introduction*.

particular of the name "Matthew". The extension of such term would be just not determined enough in order to pick out a single four-dimensional object from the multitude of the almost overlapping candidates for being the referent of the term itself. The name "Matthew" has thus a vague extension, relatively to the temporal boundaries of the existence of its referent: that is, the term "Matthew" does not state *how long* is the aggregate of temporal parts composing its referent. We can say "how long" precisely because the four-dimensionalist claims that an object is extended through time as it is through space. Thus, as Matthew can be "longer" or "shorter" from a spatial point of view, having some more or some less spatial parts, so it can be from a temporal perspective, having some more or some less temporal parts. This account thus combines a four-dimensional metaphysics of objects with a semantical indecision theory of vagueness.

2.2.4 Some remarks on four-dimensionalism

Among the alleged costs of this kind of four-dimensionalism, we can list the following: the claim that every object is an aggregate of temporal parts; the claim that each temporal part can be a part of different objects (multiplying indefinitely the potential inhabitants of our ontology, as in the correspondent first strategy for three-dimensionalism); the relating claim that composition is unrestricted among temporal parts. Among the alleged benefits of this kind of four-dimensionalism, the capability to deal effectively with some traditional metaphysical puzzles.

For example, let's briefly consider the paradox of the statue and the lump of clay.¹⁰ Suppose that we have a lump of clay, and suppose that a statue is made out of that lump of clay; then, successively, the statue is dismantled. There is a period of time in which the statue and the lump both exist, and indeed seem to be identical, one and the same thing. The problem is that they cannot be considered identical, insofar as they do not have the same properties: for example, the lump can survive the mixing of its spatial parts, and indeed exists both before and after the time of the statue's existence. The four-dimensionalist can deal with the puzzle by saying that the statue and the lump of clay both exist, and share some temporal parts (and thus coincide) during some periods of time. The three-dimensionalist, on the contrary, would not be in a position to hold that a pair of distinct objects both exist and coincide during a certain period of time: it would not be plausible to claim that two different things could be wholly present in the same place at the same time.

Another typical puzzle that should be solved, from a perdurantist perspective, is

¹⁰The bibliography on this topic is very wide: see as an introduction [Lowe 2003]. See also both the *Introduction* and Chapter 4 on the paradoxes.

the well-known paradox of the ship of Theseus.¹¹ Consider the first ship belonging to Theseus, and suppose that we start replacing its damaged wooden planks, one by one, until the last of them. Moreover, suppose we build a second ship, made of the original planks, once we have repaired them. The problem is which should be thought to be the "ship of Theseus". The four-dimensionalist can deal with the puzzle by saying that there are several four-dimensional objects made up by the different stages of the first ship and/or the second ship, and which we choose to name the "ship of Theseus" depends only on our linguistic concept of "ship". Then, there is no metaphysical puzzle, because the uncertainty and indeterminacy raised by the paradox would be fully linguistic or epistemic. The three-dimensionalist, on the contrary, would not be in a position to face the vagueness regarding the times when the first ship eventually ceases to exist and when the second begins to exist, as well as the indeterminacy about which ship is the referent of "the ship of Theseus".

As for the cases of the statue and the lump and the ship of Theseus, says the perdurantist, the apparent vagueness of Matthew's existence during some periods of time is explained away using the notions of temporal parts, unrestricted composition and semantic indecision. Each temporal part of that thing is existent, there is no indeterminate fact of the matter. The indeterminacy lies in the semantics of the term "Matthew", not in the nature of the objects of the world. The rules that govern the use of the name "Matthew" are not defined enough in order to single out a precise number of temporal parts that would belong the set of the parts actually composing Matthew; despite that, all the temporal parts involved (belonging or not to the set of those composing Matthew) are parts of some four-dimensional object. Thus, paying the metaphysical price of believing in temporal parts and unrestricted composition would thus be worth in order to avoid occurrences of metaphysical vague existence.

But here lies a problem for this perspective: as we have seen in the *Introduction*, the notion of vague existence plays a pivotal role in the Lewis-Sider strategy about composition and persistence. In particular, in the argument for unrestricted composition and in the famous "argument from vagueness", the assumption of the impossibility of vague existence is the hinge on which turns all the line of reasoning. Then, as we have seen in the *Introduction*, there are independent arguments against vague existence (for instance in [Sider 2003]), but they rest on a further assumption, that is the adoption of a model of vagueness that requires precisifications. This model, as we have said, is incompatible with the view that vagueness could be genuinely in the world. This move is legitimate: we can say that if we accept this model, then we can follow Sider's arguments against vague existence, and finally follow the argument from vagueness in favor of a four-dimensional point of view about persistence. The problem is that, then, we cannot list the alleged capabil-

¹¹Even more than for the previous case, the bibliography on this puzzle (reported by Plutarch and elaborated by Hobbes) is immense. For a discussion connected to the present debate, see [Sider 2001]. See again also Chapter 4 on the paradoxes.

ity of four-dimensionalism to avoid the occurrences of the problem of metaphysical vague existence as a good point against three-dimensionalism. The whole strategy, taken in its entirety, looks circular.

Apart from the problems concerning the Lewis-Sider strategy, let's reconsider the link between vague existence and persistence from a four-dimensional perspective. The important point, in my view, is that we can repeat what we have said about the first three kinds of three-dimensionalism: the dimension of time is eliminated from the group of the possible sources of vague existence. Assuming that the temporal parts of an object are instantaneous items, such as "*M* at *t*" (this is the usual account given by perdurantists), we have again that the beginning and the end of every material object (such as Matthew and all of the other almost overlapping candidates for being the referent of the term "Matthew") are instantaneous, and so there would be no genuine problem of *vague existence*. Every existing object would persist between two determinate instants, that is, having a single starting temporal part and a single ending temporal part, even if the semantics of our everyday language generates an apparent vagueness regarding how such objects persist. Thus, as with the first three kinds of three-dimensionalism, the link between vague existence and persistence would be basically semantic or epistemic (even if the latter account is less popular than the former among perdurantists).

2.2.5 Matthew again: the equivalent position

Perdurantists typically choose the semantic indecision account for vagueness. Despite that, they have the possibility to go in each of the four directions available also for the endurantists. This fact, perhaps, can be seen as a further symptom that three-dimensionalism and four-dimensionalism are basically equivalent. The "equivalent theory" is based on the conviction that both the two main views about persistence deal at the very end with the same ontological elements; in this sense, they would differ from a metaphysical point of view in how they describe the relations among the same elements.¹² They would indeed be different views about persistence, but they also would be translatable one into the other. Roughly, their metaphysical vocabulary would differ in talking about the same ontological matter.

The vocabulary of the endurantist is the following. At each time at which Matthew (fully) exists, it is composed by smaller spatial parts. Let's say that it is ultimately composed by mereological simples, whether we are thinking about them as a physical or metaphysical notion. Matthew is made by different sums of simples at different times, but nevertheless persist through time. Thus, we can say

¹²Assuming for simplicity here that ontology investigates "what there is", and metaphysics "the nature of what there is".

that if Matthew exists at time t , then Matthew is composed by a sum of simples S at t . S exists whenever the simples that belong to it exist even if, at different times by t , say at t' , S could not compose Matthew anymore. At t' , suppose, Matthew could be composed by S' , a different sum of simples. Thus, Matthew persists from t to t' by changing some of the simples that compose him. In conclusion, what there exist for the endurantist in such situation, and in particular what he counts on for explaining the identity through time of Matthew, are these elements: Matthew, S , S' , t and t' .

The vocabulary of the perdurantist, instead, is the following. At each time at which Matthew (partially, from a temporal perspective) exists, it coincides with one of its temporal parts. A temporal part of Matthew is something spatially coinciding with Matthew, but existing only at a given time. We can talk of lasting temporal parts (for example, "Matthew during its second year of life"), but the ultimate temporal parts are often thought by perdurantists to be instantaneous. For example, given that we have assumed that Matthew exists at time t , then the temporal part of Matthew at t is spatially coinciding with Matthew at t ; the same goes for Matthew and another temporal part at t' . Indeed we can say that Matthew *is identical to* his temporal part at t , and *is identical to* his temporal part at t' , and persist from t to t' by changing his temporal parts (these being composed by different sums of simples). In conclusion, what there exist for the perdurantist in such situation, and in particular what he counts on for explaining the identity through time of Matthew, are these elements: Matthew, Matthew at t , Matthew at t' , t and t' .

The equivalent position holds that three-dimensionalism and four-dimensionalism hinge on the same ontological elements, while they differ only in the way in which they explain how these elements are related. For example, let's consider a temporal part of Matthew, something that plays a crucial role in the four-dimensional perspective, while does not exist from a three-dimensionalist point of view: take for example Matthew at t . This is nothing more than the sum of simples composing Matthew at t , i.e. what the endurantist would call S , taken at time t . As Lowe claims,¹³ the existence and identity conditions of such a temporal part show that it fully depends, from an ontological point of view, on the sum of subatomic particle S and the moment of time t .

Thus, the perdurantist's claim that he would be in a better position in order to account for the phenomenon of vagueness would be false. This consideration, in Lowe's view, also conveys the idea that the study of the problem of vagueness cannot settle the dispute regarding which of the two main accounts for persistence we should choose. Going back to our paradox, for the equivalent theorist the apparent vagueness of Matthew's existence at time t would remain an issue whichever view about the persistence of Matthew we decide to hold.

¹³See again [Lowe 2011].

2.3 Further remarks

The notion of persistence is supposed to link the question of the existence of material objects to the temporal dimension that such existence seems to have. Thus, the different theories of persistence try to account for the phenomenon of the identity through time of an object: they try to explain how an object can exist at different times, maintaining its identity. Nonetheless, an interesting thing to underline is that the dimension of time, that is an integral part of the phenomena of vague existence, is typically excluded by many theories of persistence from the group of the possible sources of such vagueness. Following those theories, the source would be *always* semantical or epistemic.

The only exception, as we have seen, consists in the fourth strategy available for the endurantist, that is exemplified by the proposal of [Van Inwagen 1990]. This picture looks promising as a characterization of the problem of vague existence where the dimension of time is involved as it seems that it deserves to be. Nonetheless, we have explained in the *Introduction* and in Chapter 1 that the notion of existence and the related issue of vague existence are characterized from this perspective as ultimately depending on the relation of composition; and this, in turn, seem to be a limiting picture of the problem of vague existence, for reasons outlined earlier and on which we will turn again in Chapter 5.

In conclusion, it seems that the frameworks of the debates on composition and persistence are not satisfying for what regards a proper characterization of the problem of vague existence, at least for what concerns some of its occurrences.

Chapter 3

Vague existence and identity

Despite the fact that we have been claiming that the problem of vague existence has been discussed mainly in the disputes on composition and persistence, an analysis of the occurrences of such problem would not be complete without an examination of its role in the debate on identity. Actually, we can say that identity is the third pole of the philosophical framework in which the problem of vague existence is usually characterized.

The notion of identity has been deeply discussed. The debate on its nature and features has covered a very wide range of questions and hypothesis, such as the relation with Leibniz Law,¹ the absolute or relative nature of the notion,² as well as its simplicity or complexity.³ Here, we will focus on the problem of indeterminate identity and examine how it is linked with our main concern, the problem of vague existence. (In conformity with the starting assumption of this work, we will take vagueness to be a particular kind of indeterminacy, whose primary feature is soriticality: we will use the terminology following this assumption).

3.1 Evans argument

As soon as we start to reason about indeterminate identity, we have to take into consideration an article that has deeply influenced the debate on this topic: the famous one page paper by Gareth Evans, "Can There Be Vague Objects?".⁴ Here is a standard reconstruction of the argument.

¹See for example [Black 1952].

²See [Geach 1967] and [Noonan 1980].

³See, among others, [Lewis 1986]; [McGinn 2001].

⁴[Evans 1978]. The literature on this specific topic is very rich, and there are many reconstructions of Evans's argument, aimed at a defence or a confutation of the argument itself: see for example [Lewis 1988]; [Lowe 2011].

Let "a" and "b" be singular terms; let "∇" be a sentential operator which expresses indeterminacy. Evans claims that the following cannot hold:

$$(1) \nabla(a=b)$$

He then assumes the truth of (1) and develops his argument as a *reductio ad absurdum* of such assumption. It is important to underline that, in Evans strategy, (1) is meant to say that there is no fact of the matter about the identity of *a* and *b*: this is the idea that Evans wants to challenge. Evans notices that (1) conveys the fact that *b* has a property: the property of being such that it is indeterminate whether it is identical to *a*. The symbol that is commonly used for the abstraction operator is "λ":⁵ The abstraction operator is used in order to render a sentential form that expresses something about an object in a form that makes explicit the relevant property expressed in the sentence about the object. This is why we can say that, starting from a sentence that tells something about an object *o*, we can *abstract* the relevant property of *o*, or we can *ascribe* the relevant property to *o*. In order to express that in the logical notation, we use the lambda operator. Thus, Evans says that from (1) we have the following:

$$(2) \lambda x[\nabla(x = a)]b$$

So the first step of Evans argument consists in a property abstraction: (2) says that *b* has the property of being such that it is indeterminate whether it is identical to *a*.

Nevertheless, every element is such that it is not indeterminate whether it is identical to itself. Thus, says Evans, we can take the following as a premise:

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

This in turn conveys the fact that *a* has a certain property: the property of being such that it is not indeterminate whether it is identical to *a*. This is equivalent to saying that *a* lacks the property of being such that it is indeterminate whether it is identical to *a*. This can be expressed in the following way:

$$(4) \neg\lambda x[\nabla(x = a)]a$$

The step from (3) to (4) is thus analogous to that from (1) to (2), and consists again in a property abstraction. Evans then says that we can apply Leibniz's Law to (2) and (4). Leibniz's Law is known as the "Principle of identity of indiscernibles": if *a* and *b* have exactly all and the same properties, then *a* and *b* are identical. Its converse is the "Principle of the indiscernibility of identicals": if *a* and *b* are

⁵We will use this symbol instead of the "λ̂" that figures in Evans paper.

identical, then they have exactly all and the same properties. The two principles are sometimes called, respectively, the "first" and the "second" Leibniz's Law; other times it is the conjunction of both principles that is called Leibniz's Law.

Anyway, we have to note that Evans recurs to the contrapositive of the first Leibniz's Law, a principle that we can call the "non identity of discernibles": if a and b do not have exactly all and the same properties, then a and b are distinct. By this latter principle, from (2) and (4), we have the following conclusion:

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

Evans then provides a further consideration.⁶ In order to come to the formal contradiction of the first assumption, Evans says that if " ∇ " and its dual " Δ " (which then should express determinacy) generate a modal logic as strong as S5, then the first four steps can be strengthened by " Δ " and by consequence we can derive the following:

$$(5') \Delta\neg(a = b)$$

which formally contradicts (1), and thus would complete the *reductio ad absurdum* argument. Despite its importance in Evans argument, witnessed by the rich debate it gave rise to, we will not focus the attention on this final step. On the contrary, I want to take into examination the two previous steps of Evans argument, because they have become very "popular" in the debates on indeterminate identity and vagueness; indeed, we can find them in the discussion of several examples and paradoxes used in the relevant literatures. With the first step (let's call it "*Step I*"), Evans states that saying that it is indeterminate whether an object, denoted by a singular term such as " b ", is identical to an object denoted by a singular terms such as " a ", amounts to saying that b has the property of being such that it is indeterminate whether it is identical to a . This is a property that a lacks, because a is determinately self-identical. With the second step (let's call it "*Step II*"), Evans applies the contrapositive of the first Leibniz's Law to the two terms in question (more precisely, to (2) and (4) in the paper), in order to conclude that a and b are determinately distinct.

Now let's resume the argument. In the beginning informal lines of his article, Evans argues that if we hold the thesis that the world can be vague (i.e., says Evans,

⁶This final step is problematic and has been widely discussed. See for instance [Parson 2000] and again [Lewis 1988] and [Lowe 2011].

Let's recall that " \diamond " is the modal symbol for expressing possibility and " \square " the modal symbol for necessity. S5 is a system of modal logic that introduces the following axiom:

$$\diamond p \rightarrow \square \diamond p$$

which can be given also in the following way:

$$\diamond \square p \rightarrow \square p$$

that any true description of it is subject to the problem of vagueness) and the thesis that there can be vague identity (i.e. vagueness in identity statements), and we combine these two thesis, the result is that we have to hold that there might be vague objects (i.e., "objects about which it is a *fact* that they have fuzzy boundaries"). Many have argued that, contrary to what the title asks, Evans paper does not answer the question of whether there is the possibility of the existence of vague objects.⁷ Rather, what it tries to demonstrate is that there cannot be indeterminacy in identity statements. Thus, the conclusion of Evans argument (whether this is considered to be sound or not) would be "only" that there cannot be indeterminacy in identity statements. Whether this is a sufficient condition in order to rule out the possibility of the existence of vague objects (as Evans claims) is an idea that can be challenged, as we will see later.

3.2 Vague objects, indeterminate identity and vague existence: different uses of Evans argument

We will now take into consideration three cases where "*Step I*" and "*Step II*" of Evans argument turn out to play an important role, in order to examine whether the arguments where such steps are used are sound. In these arguments, the notion of indeterminate identity is linked in different ways and measures to the problem of vague existence. We will start from Micheal Tye and his notion of "vague object";⁸ then we will see Harold Noonan's arguments on indeterminate identity;⁹ finally, we will consider again Katherine Hawley and her defence of a modest kind of vague existence.¹⁰

3.2.1 Tye on vague objects

In his works Tye argues against the thesis that the non-linguistic world is precise and defends the idea that there exist vague objects, giving a particular characterization of this notion. An object is vague if it has fuzzy boundaries, where this is tantamount to saying that the object lacks sharp boundaries. For an object to lack sharp boundaries, in Tye's view, amounts to the following condition: there is a set whose members are elements such that it is determinate that they are parts of the object, there is a set whose members are elements such that it is determinate that

⁷See among others [Edginton 2000]; [Tye 2000].

⁸[Tye 1990]; see again also [Tye 2000].

⁹See in particular [Noonan 2004]; [Noonan 2008].

¹⁰[Hawley 2002]. See also the *Introduction*.

they are not parts of the object, and there is a set whose members are elements such that it is indeterminate whether they are parts of the object. Moreover, it is metaphysically indeterminate whether there are further elements that belong to one of the three sets above; that is, those sets are themselves vague, because their membership is not determinate. This is the reason why an object of that kind lacks sharp boundaries and is thus vague.

Tye then proposes a semantics with three truth values (true, false and indefinite) that should conform to his characterization of vague objects. Tye holds that his view sticks to the common sense standpoint about material objects, and in particular to three allegedly intuitive insights: (i) many objects have fuzzy spatial or temporal boundaries, (ii) each of them is nonetheless determinately self-identical and determinately distinct from any other object, and (iii) we can precisely denote this kind of vague objects by means of rigid designators.

Tye accepts only part of Evans conclusion: he agrees that identity statements are never indefinite in truth value, but he explicitly rejects the idea that this fact excludes the metaphysical possibility of the existence of vague objects. Tye nonetheless claims that an identity statement can have a vague *meaning*, if at least one of the terms involved denotes a vague object; but that does not give rise to indeterminacy in identity, in his view.

Here is Tye's reasoning. Consider Everest: Tye holds that (i) it lacks precise spatial boundaries, but (ii) its identity is never indeterminate and (iii) we can precisely refer to it using the name "Everest". Tye argues in the following way. Intuitively, there are pieces of matter such that it is indeterminate whether they are part of Everest; call one of these pieces "*p*". Now consider a precise object, call it "E1": it is an object with sharp boundaries, almost completely overlapping Everest, but determinately including *p* as one of its parts (indeed, we can take E1 to be one of the precisifications of Everest). Thus, both "Everest" and "E1" are rigid designators. But then, Tye argues, the identity statement "Everest=E1" cannot be subject to any indeterminacy. In fact, E1 has a property that Everest lacks, and namely the property of determinately including *p* as one of its parts. So, by *Step II* of Evans argument, we have that "Everest=E1" is false.¹¹ This means, in Tye's view, that holding that there exist vague objects does not entail that necessarily there is an indeterminacy in the identity statements regarding such objects.

It is also possible to reshape Tye's argument in the following way, in order to stress its analogy with Evans argument (Tye himself suggests that we can show by means of Evans argument that "Everest=E1" is false). Suppose for *reductio* that it is indeterminate whether "Everest=E1", because of the vagueness of the object denoted by "Everest". Then, by *Step I* of Evans argument, we have that E1 has the property of being such that it is indeterminate whether it is identical to Everest.

¹¹Nevertheless, says Tye, the same statement has a vague *meaning* because of the presence of a precise designator (that is "Everest") that denotes a vague object (Everest).

Given that it is not indeterminate whether Everest is self-identical, we again have by *Step I* that Everest lacks the property of being such that it is indeterminate whether it is identical to Everest. Thus, by *Step II*, we conclude that it is not the case that it is indeterminate whether "Everest=E1": the identity statement is false.

3.2.2 Tye and the coming into and going out of existence

Tye wants to defend the philosophical legitimacy of the common sense intuition that there exist objects whose boundaries can be fuzzy from a spatial and/or temporal point of view. In his works Tye considers explicitly cases of what he calls "fuzzy spatial boundaries", such as those of Mount Everest in his main example; but then, arguably, his reasoning shall be extended to the consideration of the temporal boundaries in other examples. Now the issue that interests us here is whether it is really possible to generalize from the spatial case of vagueness proposed by Tye to other cases of vagueness, and namely the temporal cases. In other words: given that our main concern is the notion of vague existence, and in particular the problem of the temporal boundaries of the coming into and going out of existence of certain objects, the question is whether we can sensibly define as "vague objects" objects whose temporal boundaries are fuzzy *in Tye's sense*.

Tye suggests that an object is vague if it has borderline spatio-temporal parts and there are other elements such that there is no fact of the matter as to whether they are parts, borderline parts or non parts of the object. Let's see whether this characterization works in a temporal case. Take a period of time P : suppose for simplicity that the whole period of time does not have gaps into it: it is a continuous portion of time with no interruptions. Suppose that during P , after a while from its beginning, an object (call it " o ") comes into existence, exists, and then goes out of existence before the end of P . In the early part of P , the object in question definitely does not exist yet, then it comes into existence, then determinately exists, then goes out of existence, and in the final part of P the object definitely does not exist anymore. Finally, again for simplicity, suppose that o is the only object ever existing in P . Following Tye, we should say that throughout the period of time at stake, there are three sets of objects. There is the set of the objects that are such that it is determinate that they are parts (or "constituents", as Tye also says) of o , the set of the objects that are such that they are borderline parts of o , and the set of the objects that are such that they are definitely non-parts of o ; moreover, there would be no fact of the matter as to whether there are other objects belonging to one of the three sets.

Tye considers what could be a temporal case of vague existence in a reply to an objection that he owes to Keith Hossack.¹² Here is the objection. Suppose that

¹²See [Tye 2000, note 9 on page 208].

we have a cloud (one of Tye's paradigmatic examples for a vague object) and we name it "Fred"; suppose also that we remove one by one the water droplets from the vicinity of Fred towards its inner core; at the end of the process, Fred does not exist anymore (it has gone out of existence), while during the times around the middle of the process it is indeterminate whether it still exists; but then in this latter situation it would also be indeterminate whether Fred is identical to one of the collections of water droplets existing at those times, contrary to Tye's claim that vague objects do not give rise to indeterminacy in identity statements.

Here is Tye's reply: "existence at t " and "identity at t " are properties that can admit of borderline cases, but this does not entail that existence and identity *simpliciter* (i.e., tenselessly) admit of borderline cases. If at time t it is indeterminate whether Fred exists, then it is indeterminate whether it is identical to something existing at t . Nevertheless, there is no indeterminacy in which object Fred is: "Fred" sharply denotes a vague object, an object that is determinately distinct from any other object, *tenselessly*.

3.2.3 Some remarks on Tye's view

It seems to me that Tye's answer to Hossack does not solve the issue concerning his idea of a temporally vague object, that is an object with fuzzy temporal boundaries in his particular characterization. Let's reconsider the example of o existing in P . We have this insight: there is not a precise couple of instants at which o comes into and goes out of existence. Indeed, it looks like o lacks sharp boundaries from a temporal point of view. This fact, in Tye's perspective, amounts to saying that there are three sets of objects (parts, non-parts and indeterminate parts of o) and that it is objectively indeterminate whether there exist other elements belonging to one of the three sets.

The first problem with this characterization, in the temporal case, regards the set of the objects that are such that they are definitely non-parts of o . It is not clear what kind of objects this set should contain. After all, during the earlier part of P , definitely before the coming into existence of o , there exist no other objects, and thus nothing can be definitely a non-part of o ; the same consideration holds for the later part of P , definitely after the going out of existence of o . Anyway, we could adjust Tye's definition and simply claim that the set of the objects that are such that they are definitely non-parts of o is empty. Then, there would remain the set of the parts of o and the set of the borderline parts of o , and both sets would have indeterminate membership: but here emerges a second problem. Thinking about Everest and its spatial boundaries, we have the common sense intuition (to which Tye is happy to conform its position) that some pieces of matter are not definitely constituents nor definitely non-constituents of the mountain: it is harder to find

analogous elements in the temporal case.

Perhaps, a borderline part of o at a given time t could be a piece of matter (call it " b ") such that there is no fact of the matter as to whether it is o . Then, we could say that there is no fact of the matter as to whether b is identical to o at t . But this is not possible from Tye's perspective, for reasons explained above: the identity statement " $b=o$ " should be definitely false, even if strengthened with the clause "at time t ". After all, b definitely exists at time t , while o does not, and thus by *Step II* we can infer that " $b=o$ " is false. This outcome is indeed in conformity with Tye's idea: we have a vague object without indeterminacy in identity. But then, how could b be a borderline spatio-temporal *part of* o ?

A possible explanation would be to say that "part of" is itself vague. Tye rejects this hypothesis: he admits that "part of" can give rise to borderline cases, but claims that the metaphysical vagueness of many objects (such as Everest) is not entailed by the vagueness of "part of". Tye claims that "part of" is vague only if at least one of the objects involved in the relation is vague, while the contrary does not hold: the alleged vagueness of "part of" would not entail the existence of vague objects. Intuitively, says Tye, if we consider two perfectly precise objects (i.e. objects with sharp boundaries), there can be no indeterminacy as to whether one is part of the other. If there is such indeterminacy, it must be because at least one of the objects involved lacks sharp boundaries.

Tye considers what is an analogous case in his perspective: the predicate "is exactly six feet in length". Such predicate, intuitively, is not vague. Nevertheless, in Tye's view it admits of a borderline case: for example, we can reason about a cloud that is such that it is indeterminate whether it is exactly six feet in length, because of its fuzzy spatial boundaries. This shows in Tye's view that the presence of a borderline case is not a sufficient condition in order to conclude that a predicate is vague. The predicate "is exactly six feet in length" is precise because its meaning does not exclude the possibility of being satisfied by precise objects, even if it admits as borderline cases some vague objects. The same holds for "part of": there can be no precise objects that are such that it is indeterminate whether one is part of the other, while there can be borderline cases if one of the objects involved in the relation is vague: thus, "part of" is not vague, as "is six feet in length". On the contrary, other terms are genuinely vague. Tye cites the following examples: "large", "tall", "red", "Everest". Those terms are vague because they admit of borderline cases, whether or not such borderline cases are vague or precise objects. Everest, for example, admits of a borderline case such as E1 (above we have defined E1 as one of the possible precisifications of Everest). In other words, a necessary and sufficient condition for a predicate to be vague is to admit of borderline cases that are precise objects in themselves, and "part of" is not a predicate of this kind.¹³

¹³For more arguments, see [Tye 2000], where the author argues against the thesis that the vagueness of "part of" is the source of any compositional vagueness that seems *to be in the objects*,

There is another way of trying to make sense of the case outlined above, on the vagueness concerning the temporal boundaries of *o*, and its relation to *b* (that by hypothesis is a possible borderline part of *o* at *t*). We could choose as our metaphysics for persisting objects some kind of four-dimensionalism or stage theory, and pair it with a linguistic treatment of vagueness. Then, it would be indeterminate whether *b* is a temporal part or stage of *o* because of the semantics of the name "*o*", for example.¹⁴ Anyway, this four-dimensional/stage theory option is not available for Tye for two reasons. First: it would rule out the genuine vagueness of *o*, confining the sources of vagueness to the rules that govern the semantics of the name. Hence, we would not have a metaphysically vague object, i.e. an object about which it is a fact that it has fuzzy boundaries. Second: it would be a kind of revisionary metaphysics that contrasts with the common sense beliefs, and this is never advisable in Tye's view.

In the end, it seems that we are left without a proper characterization of what it would be for an object to be vague from a temporal point of view, from Tye's perspective. We know that, following Tye, we should conform to the common sense insight that many objects do not have precise temporal boundaries: we can intuitively agree on the thesis that there is not a precise couple of instants at which a given object comes into and goes out of existence. However, it is not clear how we could make sense of this idea in the framework of the characterization of vague objects provided by Tye. If we stick to the common sense idea that material objects are three-dimensional and look, from Tye's perspective, at the temporal vagueness concerning their existence, we are driven back to the problematic idea outlined above. For an object to be vague from a temporal point of view amounts to an indeterminacy regarding the existence of elements that are definitely part of, definitely non part of, or borderline cases of being a part of a given object. What these borderline cases are, from a temporal point of view, is much less clear than in the spatial case. Ruling out the possibility of vagueness in identity statements does not help to improve the plausibility of this position.

3.2.4 Noonan on indeterminate identity

Trying to answer the question "are there vague objects?", Noonan argues against what we can indicate as the "intuitive view", that is the common sense position *à la* Tye: a position that allegedly makes coexist the belief in the existence of vague objects and the conviction that identity statements are never subject to indeterminacy. Noonan rejects this view. He claims that, on the contrary, if we follow Evans in saying that identity cannot be indeterminate, then it is not easy to hold the intu-

a thesis defended in [Sainsbury 1994].

¹⁴See Chapter 2 on vague existence and persistence.

itive view on vague objects; otherwise, we could accept cases of ontic indeterminacy in identity, but in this way we would have to find an answer to Evans argument.

Noonan provides two arguments for his conclusion. Both have the form of a series of examples allegedly linked together: if we accept Noonan's considerations on the intuitive view in one case of the series, then in the author's view we are forced to accept the same considerations also for every other case of the same series, even where the intuitive view turns out to be implausible, on pain of falling into absurdity. Here we will focus on one particular example that figures in both the series; this case will enable us to see how Noonan uses *Step I* and *Step II* of Evans argument.

Consider the case of Alpha Hall and Beta Hall, linked by a structure such that it is indeterminate whether they are distinct buildings or parts of one and the same building.¹⁵ Suppose Mr. Jones is lecturing in Alpha Hall and Mr. Smith in Beta Hall, and take the two following expressions: "the building Jones is in" and "the building Smith is in". Noonan claims that it seems plausible to say that the identity statement "the building Jones is in = the building Smith is in" is indeterminate in truth value, perhaps because of some semantical deficiency in the rules that govern the use of the terms involved. Nonetheless, he adds, it would be consistent for those who believe in metaphysical indeterminacy to hold that "the building Jones is in" and "the building Smith is in" are precise designators of vague objects. The building Jones is in is such that it is indeterminate whether it includes or not Beta Hall as one of its parts, while the building Smith is in is such that it definitely includes Beta Hall (indeed, we have that Smith is lecturing in Beta Hall by hypothesis). Instead, the building Smith is in is such that it is indeterminate whether it includes or not Alpha Hall as one of its parts, while the building Jones is in is such that it definitely includes Alpha Hall (Jones is lecturing in Alpha Hall by hypothesis). But then, says Noonan, the common sense view is forced toward an implausible conclusion: given that we have involved precise designators of vague objects with different properties, by *Step II* we would have to conclude that the identity statement "the building Jones is in = the building Smith is in" is false, not indeterminate.

Moreover, following Evans, the advocate of metaphysical indeterminacy (*à la* Tye) should also say that "the building Jones is in" denotes an object that is definitely different from any of its possible precisifications, such as Alpha Hall alone, or the whole structure including both Alpha and Beta and the linking path. For example, if we consider the identity statement "the building Jones is in = Alpha Hall", then by *Step I* we could ascribe to the building Jones is in a particular property: namely, the property of being such that it is indeterminate whether it is identical to Alpha Hall. Assuming that it is not indeterminate whether Alpha Hall is identical to Alpha Hall, by *Step I* we could also say that Alpha Hall does not have

¹⁵See [Shoemaker 1984].

the mentioned property. Finally, by *Step II* we could conclude that the identity statement is false, not indeterminate. And so on and so forth for every other admissible candidate object for being (identical to) the building Jones is in. The same considerations, with the relative adjustments, work for "the building Smith is in". This would be perhaps a legitimate strategy, says Noonan, but its conclusions are nonetheless absurd.

Furthermore, the same argument can be displayed considering the examples of "the Greatest Briton",¹⁶ "the mouse and the tail",¹⁷ "Fred's house and the garage",¹⁸ and "Everest".¹⁹ In Noonan's view, it is impossible to distinguish in line of principle the cases where the common sense position *à la* Tye seems plausible (such as Everest case) from the cases where it looks absurd (as with the mouse or the Halls cases). Hence, Noonan concludes that it is not possible to hold both the idea that there are metaphysically vague objects and Evans's conclusion on the impossibility of indeterminacy in identity statements, as Tye said.

Noonan takes into consideration the Halls case also in another series of examples, from a different perspective. Per hypothesis, it is determinately the case that Mr. Jones is lecturing in *one* building, as well as that Mr. Smith is lecturing in *one* building; "the building Jones is in" should be seen as a rigid designators of a vague object, and the same goes for "the building Smith is in". Again per hypothesis, we cannot say that the building Jones is in is determinately identical to the building Smith is in, because Alpha Hall and Beta Hall are linked by a structure that is such that it is indeterminate whether Alpha and Beta Halls are two different buildings or two parts of one building. We could intuitively conclude that it is objectively indeterminate whether the building Jones is in is identical to the building Smith is in. But this claim contradicts the conclusion that we have previously drawn from our application of *Step I* and *Step II* to the very same case.

Noonan then says that the same argument can be displayed considering the cases of "Everest", "the mouse and the tail" and "the brain transplant" (we will turn later on this latter example): and again it is impossible to "draw a line" between plausible and not plausible applications of the common sense view among these cases. Thus, Noonan argues once more that we cannot hold both Evans argument and the idea that there are metaphysically vague objects.

¹⁶An analogous example is to be found in Tye 2000.

¹⁷See [Hawley 2002].

¹⁸See [Lewis 1993].

¹⁹See [Tye 1990] and the previous paragraphs in the present Chapter.

3.2.5 Noonan and the coming into and going out of existence

It is very interesting to underline the final, parenthetical remark of "Are There Vague Objects?". Perhaps, says Noonan, the case of temporally ontic indeterminacy is different from those analyzed in the previous series of examples ("the Greatest Briton", "the mouse and the tail", "the building Jones is in", "Fred's house and the garage" and "Everest"). In his "Does Ontic Indeterminacy in Boundaries Entail Ontic Indeterminacy in Identity?" he then considers what he presents as a possible temporal case of indeterminacy; as we have already said, he then links it to a new series of examples (including "the mouse and the tail", "the building Jones is in" and "Everest"), in a new argument, in order to show that his previous conclusion still holds.

As an example of temporal indeterminacy, Noonan suggests to take into consideration the already mentioned case of Brown and Brownson.²⁰ Briefly: imagine that Brown's brain is transplanted into Robinson's body at time t . Moreover, suppose that Brown is determinately the only person in Room 100 before t , while Brownson (the resultant person after the transplant) is determinately the only person in Room 101 after t . Thus, says Noonan, "If we interpret this as a case of ontic indeterminacy in temporal boundaries (contrary to Shoemaker's own view)", then we have to say that the person in Room 100 before t is such that it is indeterminate whether he is in Room 101 after t , and viceversa the person in Room 101 after t is such that it is indeterminate whether he is in Room 100 before t . Then, we are forced to say that these two persons are not determinately identical.

Nevertheless, says Noonan, they are not determinately different, that is non-identical. If they were, then it would be false that there is only one person in Room 100 before t (and one person in Room 101 after t). In fact, Brown is determinately in Room 100 before t , and Brownson is indeterminately in Room 100 before t : hence, were Brown and Brownson determinately different, it would be indeterminate whether in Room 100 before t there were one or two persons (analogously for what concerns Room 101 after t). Thus, says Noonan, if we see this case as an example of ontic indeterminacy in temporal boundaries, then we have to say that it is indeterminate whether the person in Room 100 before t is identical to the person in Room 101 after t . That is, it is indeterminate whether Brown is (identical to) Brownson.

The conclusion to be drawn, in Noonan's view, is that the answer to his paper title's question should be affirmative: (temporal) ontic indeterminacy in boundaries does indeed entail ontic indeterminacy in identity. From Noonan's perspective, the problem with this latter claim is that it contradicts the conclusion of Evans argument: once more, this would be another case that shows that it is not possible to hold both that there is ontic indeterminacy in the (temporal, in this case) boundaries

²⁰See [Shoemaker 1984], and Chapter 4 on the paradoxes.

of an object and that there is no indeterminacy in the identity statements regarding such object. In other words, Noonan concludes that we cannot hold Evans conclusion together with the belief in the existence of vague objects.

3.2.6 Some remarks on Noonan's view

Let's take into examination Noonan's reasoning. First of all, a quick remark on the terminology: Noonan uses the terms "vague" and "vagueness" independently from the fact that soriticality is involved (as with Everest) or not (as with Brown and Brownson, Fred's house or the greatest Briton) in the examples he provides. In both the papers that we have analyzed, it looks like he considers "indeterminacy" and "vagueness" as interchangeable. In the following analysis, on the contrary, we will stick to the choice of the present work to characterize vagueness in terms of soriticality, as a special kind of indeterminacy.

Now let's reconsider once again the case of Brown and Brownson. Noonan interprets it as a case of indeterminacy in temporal boundaries, while in my view it is not. Eventually, it can be treated as a case for discussing personal identity, as in Shoemaker and Swinburne's original formulation, or in van Inwagen proposal in his *Material Beings*. The alleged temporal indeterminacy of this case would disappear once we would have settled the question regarding the identity criteria for human beings: the problem regards indeed such criteria. For example, if we argue in favor of the thesis that a person "follows" his brain, then we have to say that Brown is identical to Brownson.

Assuming this criterion for personal identity, would it be possible to build up a soritical series where in each case bigger and bigger parts of Brown's brain were "implemented" in Robinson's body, removing the corresponding physical parts from Robinson's brain? We could start from a case where Brown would definitely be different from Brownson because, say, only the one per cent of Brown's brain is transplanted, proceeding through a soritical series until a case where the whole brain of Brown were transplanted in Robinson's body. (Let's avoid for the sake of simplicity the biological complications due to the qualitative relevance of the different parts of the human brain, and make it just a case of "quantity" of brain transplanted.) Nonetheless, even in this case we would have first and foremost a problem of personal identity, and not a genuine problem of temporal boundaries. Indeed, the changes occurring in such soritical series would not involve in any measure the dimension of time; once we would have settled the question of the criteria for personal identity concerning the percentage of brain transplanted, we would have no indeterminacy regarding the temporal boundaries of the entities involved.

Furthermore, Brown and Brownson example cannot be taken as a temporal analogous case to Alpha and Beta Halls spatial case, in a series that should link such

examples to that of Everest as in Noonan's strategy. In fact, the vagueness of Everest concerns the mountain's spatial boundaries. The indeterminacy of the building Jones is in concerns the spatial features of the structures that links it to the building Smith is in.²¹ The indeterminacy of Brown and Brownson *does not* concern the temporal features or boundaries of the two entities, in analogy with the previous spatial cases: rather, as we have shown, it concerns the identity criteria for personal identity.

There is another feature that distinguishes spatial cases from the allegedly temporal one. In the example of Alpha and Beta Halls, it can be indeterminate (following a particular interpretation) whether the building Jones is in is identical to the building Smith is in because of some spatial features of the structure at stake. In other words, in such case an ontic indeterminacy in some of the boundaries involved entails an indeterminacy in identity. But the converse does not hold: we cannot plausibly say that an ontic indeterminacy in the identity of the building(s) entails an indeterminacy in some of the boundaries involved. Briefly: in the Halls case it would be an indeterminacy in the boundaries that could entail an indeterminacy in identity. This consideration is indeed in conformity with Noonan's strategy in his paper.

On the contrary, in the example of Brown and Brownson, the entailment between the eventual indeterminacies of the boundaries and the indeterminacy of the identity involved goes in the opposite direction, so to say. Assuming for the sake of the argument that there is an indeterminacy in the temporal boundaries of Brown and Brownson, such indeterminacy would nonetheless depend on the indeterminacy of the identity of Brown and Brownson. We cannot plausibly say that the identity statement "Brown=Brownson" is indeterminate because of the indeterminacy of the temporal boundaries of the objects involved. Briefly: in the brain transplant case, it would be an indeterminacy in identity that could entail an indeterminacy in the boundaries. And this is not in conformity with Noonan's strategy in his paper.

In conclusion, I think that the "Brown and Brownson case" does not represent a case of indeterminacy in temporal boundaries and it is not suitable as an example for Noonan's series of cases against the intuitive view on the existence of vague objects. Noonan asks, after having presented his series: "where do we draw the line" (among these cases)? That is: how could we separate the cases where the thesis of a metaphysical indeterminacy in the boundaries of the objects involved is plausible,

²¹Even if it is not necessary in the discussion of the original case, we could coherently build a soritical series regarding the spatial boundaries of the linking structure. On one end of the spectrum, we could have a big and solid corridor that connects Alpha Hall and Beta Hall in such a way that it is evident that they are parts of the same building, while on the other end we could have just a few little flints on the ground that indicates the way to walk in order to pass from Alpha Hall to Beta Hall, which would then be determinately different buildings. Around the middle of the spectrum, we could have cases such that it is indeterminate whether they connects two parts of the same building or two different buildings.

from the cases where such idea turns out to entail absurd conclusions? Perhaps, we could try to draw a line that separates the spatial cases from a proper temporal one, for which indeed we still have to find a suitable characterization. Perhaps, a proper case of metaphysical indeterminacy in the temporal boundaries of an object would not turn out to have absurd implications. If this is the case, then Noonan parenthetical remark at the end of "Are There Vague Objects?" still poses a problem: maybe, despite all that has been said, the case of temporal ontic indeterminacy *is* indeed different.

3.2.7 Hawley on vagueness and existence

In her paper "Vagueness and Existence" Katherine Hawley explicitly poses this question: does a commitment to ontic vague existence entail a commitment to ontic vague identity, and thus force us to confront with Evans argument against indeterminate identity? Hawley argues against two ways in which such an entailment could be said to take place. Her aim is to preserve the plausibility of the thesis of modest vague existence,²² by denying that it has the bad consequences it is usually said to have: in particular, for what concerns us now, the consequence of a violation of the ban on indeterminacy of identity provided by Evans argument. Here we will focus on the second of those ways, in order to show how Hawley uses *Step I* and *Step II*.

Let's assume, along with Hawley, van Inwagen's metaphysics of material objects, and consider the following case. Suppose that on a mat there is a very unhealthy hamster, going out of existence: indeed, it is indeterminate whether at time t the hamster is dead or alive so, more precisely, it is indeterminate whether there is a hamster on the mat at t . Let's call "SP" the set of the simples that are the candidate composers of the hamster (they compose the hamster if and only if their joint activity constitutes a life: at t it is indeterminate whether their joint activity constitutes a life); let's call "SH" the set of things on the mat. At time t , says Hawley, were the hamster be definitely alive, we would have all the simples and the hamster on the mat; while were the hamster be definitely dead, we would have only the simples. Given that it is indeterminate whether the hamster is dead or alive, this could be seen as a case in which it is indeterminate whether SP is identical to SH, and this indeterminacy in identity would be a consequence of the vague existence at t of the hamster.

First of all, let's see how Hawley denies that this could be a case where vague existence entails indeterminate identity; then we will develop some further considerations. Hawley denies the entailment because she denies that the identity relation between SP and SH is indeterminate. If that was the case, then there would be

²²The kind of vague existence entailed by the metaphysics of material objects defended by [Van Inwagen 1990]. See the *Introduction*.

room for only two strategies: finding a response to Evans's argument, showing that indeterminacy in identity statements is not problematic, or accepting Evans argument, hold that there cannot be indeterminacy in identity and thus (given that, by hypothesis, indeterminate identity would be a necessary condition for vague existence) deny that there can be vagueness concerning existence. Hawley says that we are not forced to choose between one of these two strategies insofar as that between SP and SH *is not* a case of indeterminate identity. She claims that we shall say that it is false that SP is identical to SH: the two sets are determinately distinct. The procedure is the same that we have already met in previous cases: suppose for *reductio* that it is indeterminate whether "SP=SH"; by *Step I*, we ascribe to SH a particular property, that is the property of being indeterminately identical to SP; given that it is not indeterminate whether SP is identical to SP, by *Step I* we can say that SP does not have that property; by *Step II*, we could conclude that the identity statement "SP=SH" is indeed false.

We could also claim, along with Hawley, that SP is such that it is determinate that it has n members (where n is the precise number of simples that are the candidate composers of the hamster at t), while SH is such that it is indeterminate whether it has n members or $n+1$ members (all the simples plus the hamster). Thus, directly from *Step II*, we would be forced to say that SP and SH are definitely distinct.

The "positive" outcomes, following Hawley, would be that in this way we do not have to confront with Evans's argument and at the same time we can deny that modest vague existence entails indeterminate identity. The "negative" outcome, instead, would be that we should reject the principle of Extensionality where one of the sets involved in an identity statement does not count a determinate number of members. Extensionality amounts to the following biconditional: two sets are identical if and only if they have the same members. Hawley says that, by means of the Kleene truth-table (provided also by Tye for his semantics for speaking of vague objects)²³, we have that the truth value of an identity statement concerning two sets such that it is indeterminate whether they have the same members must be indeterminate. The truth value is true where it is determinate that the two sets have the same members and false where it is determinate that the two sets have different members. Hence, either we find another semantics for the biconditional, or we should hold Extensionality only where the memberships of the sets involved are determinate, and reject it otherwise: Hawley opts for the latter solution saying that, after all, if we are inclined to accept indeterminacy regarding the membership of a set, then we have to make some adjustments somewhere else in our theory.

²³See [Tye 1990]; [Tye 1994].

3.2.8 Hawley and the coming into and going out of existence

Let's examine the case of SP and SH, that is the second possible case of entailment from vague existence to indeterminate identity provided by Hawley. In order to discuss her argument starting from the same ground, let's assume, along with Hawley, van Inwagen's metaphysics for material objects. The question is whether at time t it can really be indeterminate whether on the mat there exist only the simples or the simples plus the hamster. Suppose for the sake of simplicity that there are just 1000 simples on the mat (and, thus, that SP counts one thousand members): can we say that at t it is indeterminate whether SH has 1000 or 1001 members, and thus say that we could see the whole situation as a case of alleged indeterminacy in identity between SP and SH? It looks like we cannot.

Let's reconsider the the disputes on whether constitution is identity.²⁴ If we hold that constitution is identity, then we have to say that the aggregate of matter that is the set of the simples is identical to the hamster; so, were the hamster alive, we could not count it in addition to the simples, because that would be counting the same thing twice.

If we hold that constitution is not identity, then we have to say that the aggregate of matter that is the set of the simples is not the hamster, because they are objects of different sorts; so, were the hamster alive, we could not count in the same set objects of different sorts and say that SH has 1001 members.

My conclusion is that in any case, whichever thesis about the link between constitution and identity we decide to hold, we could not say that at time t it is indeterminate how many members SH counts, because we cannot count the hamster as a possible addition to the set of simples.

Now let's reconsider also the dispute on whether composition is analogous to identity²⁵ (even avoiding consideration on restricted or unrestricted composition). If we hold that composition is analogous to identity, than we have to say that the hamster is identical to the sum of its parts; so, were the hamster alive, it would be nothing "over and above its parts", it would be the parts taken together. Saying that on the mat there would be the simples and the hamster would be "double counting" the same portion of reality.

If we hold that composition is not analogous to identity, then we have to say that the hamster is not just the mereological sum of its parts: it is something else, something with different persistence and identity conditions in respect to the sum of its parts. But then it would not be legitimate to add up in one and the same sum the simples and the hamster, and claim that SH, were the hamster alive, would count 1001 members.

So again I think that in any case, whichever thesis about the link between com-

²⁴See the *Introduction*.

²⁵See again the *Introduction*.

position and identity we want to defend, we could not say that at time t it is indeterminate how many members SH counts, because we cannot count the hamster as a possible addition to the set of simples.

Thus, in my view, the case of SP and SH cannot be taken as an instance of indeterminacy in identity, but not because it is definitely false that SH is identical to SP (with all the following considerations on the principle of Extensionality); rather, because SH cannot be construed as a set eventually containing the simples plus the hamster.

Moreover, there is another consideration that could undermine Hawley's reasoning about SP and SH. The question is: assuming that it could be indeterminate whether the two sets are identical, would this really be a case of metaphysical indeterminate identity entailed by a case of vague existence? In my view, it would not. Hawley's case would be at most, as the author herself says, a case of indeterminate identity among sets. Basically, sets are mathematical objects; it is possible to coherently include sets in our ontology, and say that they are part of our inventory of the world. We could also hold that in certain circumstances it is indeterminate whether two sets are identical, as Hawley points out (even if, then, we should confront with Evans argument: but this is not strictly a *reduction ad absurdum*). The fact is that, in my view, indeterminacy in identity among sets entailed by vagueness in existence is not tantamount to metaphysical indeterminacy in identity entailed by vagueness in existence. The latter, for which we still have to find a plausible example, should be a case where the vagueness due to problems concerning the temporal boundaries of the coming into and going out of existence of an object o brings about an indeterminacy regarding the identity of an object q . Then the question with an indeterminate answer would be: is it the case that the object q is the same object as o ? Or, briefly: is q identical to o ? This indeterminacy would not regard the membership of sets, if not secondarily; it would be primarily an indeterminacy as to whether we could consider q as identical to o , an indeterminacy not due to semantical or epistemic limitations nor to sets membership.

3.2.9 Some remarks on Hawley's view

There is another argument that Hawley develops in "Vagueness and Existence" and involves considerations on indeterminacy in identity and/or existence. The author reflects on the impact of vague existence upon the problem of counting; briefly, by "the problem of counting", we indicate the issues concerning the question of how to number the objects of the world, and if it is really possible to do that. So the question that Hawley poses is whether eventual cases of vague existence entail that there is vagueness in the total number of things that there are in the world. Or, in other words: can we characterize the notion of vague existence by studying its con-

sequences upon counting? Hawley's answer is negative, and here is her argument.

Let's assume again van Inwagen's metaphysics for material objects. We could say that, given that in a case of vague existence, such as that of the hamster, it is indeterminate whether in a certain spatiotemporal region there exists an object or not, then it is indeterminate how many objects there are in that region. And if we extend this singular case to all the cases of vague existence in the world, it would be even more evident that there would be vagueness in how many objects there are in the world. That is: vagueness in the number of existing things, exactly what Lewis and Sider consider impossible for the reason we have analyzed. Nonetheless, Hawley says, there could also be vagueness concerning the number of existing elements in a given spatiotemporal region even without vagueness in existence. For instance, it could be indeterminate in certain circumstances whether an object is determinately inside or outside of that region: thus, it would be indeterminate how many objects there are in that region.

Here is the first problem of Hawley's argument: this latter example is not extendable in terms of vagueness about how many things there are in the world, as the example of the hamster (i.e. a case of vague existence) was. Let's grant Hawley the possibility that there can be indeterminacy as to whether a given material object is inside a particular region. Now take a determinately existing material object o and a spatiotemporal region A , and suppose it is vague whether o is inside A . Then, it would be indeterminate how many objects there are in A . But this would not entail an overall indeterminacy about how many material objects there would be in the world, because o is determinately existing by hypothesis and thus determinately located in some spatiotemporal region (given that it is a material object): if it is not inside A , it would be somewhere else. Thus, if we take the whole world, that is the whole spatiotemporal region, in this perspective there would be vagueness about the location of some objects (like: is o here or there?), but no vagueness concerning how many objects there are (like: let it be here or there, o is one existing object to count).

Anyway, let's concede that this problem does not affect the soundness of Hawley's argument. In order to provide a positive answer to the question as to whether vague existence has an impact upon counting, we could say that if it is indeterminate how many objects exist in the world, then there must be vagueness in existence. But this characterization does not hold, claims Hawley. The fact is that there are other circumstances and issues that have an impact upon counting. Primarily, the activity of counting is affected by how and what we decide to count: hence, the debate is about "principles of individuation" and eventually "sortals" and concepts. Counting can be affected also by the problem of indeterminate identity: in fact, if we have a case in which it is vague whether a is identical to b , then in such case it is indeterminate whether we have one or two objects to count. And this situation is extendable in terms of indeterminacy concerning how many objects there are in

the entire world. Thus, there could be vagueness regarding the number of existing objects without vagueness in existence. Hawley draws this conclusion: we cannot characterize the notion of vague existence by considering its impact on counting.

This conclusion, it seems to me, just does not follow from the previous considerations. Claiming that indeterminacy in the number of things can depend on other factors than vague existence, does not entail that vague existence cannot lead to the same outcome. Rather, it implies that we cannot characterize indeterminacy in the number of existing objects in terms of vagueness in existence. But the question that Hawley poses goes in the opposite direction: she asks whether eventual cases of vague existence entail that there is vagueness in the total number of things that there are in the world. The argument of "Vagueness and Existence" *does not* rule out a positive answer.

In conclusion, I agree with Hawley when she says that the SP-SH example is not a case of indeterminate identity entailed by vagueness in existence, but I believe that Hawley's reasons for this thesis are not sound. Moreover, I agree that the problem of counting cannot be characterized only in terms of vague existence, but I hold that that does not entail that vagueness in existence cannot have an impact on counting.

Now the further question is whether the case of the hamster on the mat can be taken as a proper example of vague existence, independently from its relation to the problems of indeterminacy in identity and counting. On a first examination, this case looks at least more promising, for a possible characterization of the problem of vague existence, compared to the examples that we have found in Tye and Noonan, but this idea is debatable. Thus, only after further reasoning on what could be a plausible case of vague existence, we will be in a better position in order to see whether such case can have an impact on the problems of identity and counting.

3.3 Further remarks

The problem of vague existence is supposed to play a role in some arguments concerning the notion of identity and the issue of indeterminate identity. The analysis of such arguments provided further elements to the characterization of vague existence but, as in the debates on composition and persistence, it still looks like the problem is used as an instrument in many of those arguments, without being taken at face value. This fact can have an impact on the uses that the notion of vague existence is supposed to display in the debates on identity, as in the case of Tye and Noonan's arguments, as well as in the case of Hawley's example.

Identity, composition and persistence are the three poles that define the framework in which the problem of vague existence has been shaped. We have seen the reasons why, in my view, this framework is not satisfying in order to provide an ad-

equate examination of the problem. Every example or paradox that we have taken into consideration, allegedly representing a case of vague existence, turned out to be misleading or at least in need to be completed by further elements. Now we have to see whether we can find out which are the conditions for having a proper case of vague existence.

Chapter 4

A survey of some traditional paradoxes

4.1 Five paradoxes

As a plausible place where to look for a proper occurrence of the problem of vague existence, we could start from the analysis of a few typical puzzles, in some measure related to our concerns. Thus, here we will recall five well-known paradoxes that we find in the literature about vagueness. These paradoxes are often used to exemplify cases of vague composition, vague persistence and vague identity. Given that, as we have seen, the debates on composition, persistence and identity are linked to the notion of vague existence, we could think that such paradoxes could be quoted also in order to exemplify cases of vague existence. On the contrary, we will underline the reasons why none of those paradoxes is apt for an exemplification of the problem of vague existence. We will analyze the paradoxes of the ship of Theseus, Tibbles the cat, the lump of clay and the statue, the disruption machine and finally the brain transplant. Those five paradoxes lack two of the conditions that seem to be necessary in order to have an occurrence of the problem of vague existence.

Successively, we will recall the paradox of Matthew the monkey: such case, as we will see, seems to be more promising for exemplifying those necessary conditions for an occurrence of vague existence.

4.1.1 The Ship of Theseus

Theseus leaves the port of Athens on one ship, made of wooden planks, and the citizens call it the "ship of Theseus". While floating overseas, the sailors replace the damaged planks, one by one, until all the planks that made the ship that left the port have been changed. Once they come back to Athens, the sailors repair the

damaged planks and build a new ship, with exactly those planks (i.e., the planks that made the ship that originally left port), and with the same shape of the original. Thus, in the end, we have two ships. The questions that arise are: which one is the ship of Theseus? When does (eventually) the first ship cease to be the ship of Theseus? When does (eventually) the second ship begin to be the ship of Theseus? When does the second ship begin to exist (i.e., when does we start to have two ships)?¹

4.1.2 Tibbles the cat

Tibbles the Cat is sitting on the mat, the only cat sitting there. Suppose Tibbles has 1000 hairs, and let's call them $H_1, H_2, H_3, \dots, H_{1000}$. Let C be the biggest continuous mass of feline tissue on the mat. Furthermore, let C_n be all of C except the relevant hair H_n ; thus, for every hair there is the correspondent mass of feline tissue that does not include that hair. Given that the loss of an hair cannot make a cat disappear, nor can it generate a cat, then every C_n must already be a cat. Hence, contrary to our initial insight, we should say that there are exactly 1001 cats on the mat: Tibbles, $C_1, C_2, C_3, \dots, C_{1000}$. How can there be in the same place so many spatially overlapping objects?²

4.1.3 The lump of clay and the statue

We have a lump of clay, and we make a dog-shaped statue out of it. Successively, we dismantle the statue, and we no longer have a dog-shaped statue but again just a lump of clay. It seems that the lump and the statue are two different objects, given that they have different existence conditions (the lump exists both before and after the statue's existence), different criteria for composition (the statue can survive the replacement of some of its matter, if this is properly shaped,³ while the lump cannot), different criteria for persistence (the lump persists if we re-shape it in different forms, such as a horse-shaped statue, while the dog-shaped statue does not). Nevertheless, there is a period of time in which the lump and the statue have the same shape and are composed by the very same simples: indeed, it looks like they are identical. The questions that arise are: how can two distinct objects be in

¹The bibliography on this puzzle (reported by Plutarch and elaborated by Hobbes) is immense. For a discussion connected to the present debate, see [Sider 2001].

²An early version of the paradox is to be found in [Geach 1980].

³This is not possible if we hold a form of mereological essentialism (the thesis that every object is composed by exactly certain mereological parts that cannot change), but this thesis is usually regarded as too extreme and brings along a lot of other difficulties. We are not considering it here.

the same place at the same time? Is there a time at which we begin to have a statue in addition to the lump of clay?⁴

4.1.4 The disruption machine

Suppose we face the Disruption Machine, that is a particular room with the capacity to disrupt the relevant identity factors of everyone who enters in it. We can adjust the example by changing the factors that we consider fundamental for a person's identity: we can think of psychological, physical or "historical" aspects, or whatever else. Suppose that the Disruption Machine is able to alter each of them. The room is empty, then a man enters the room, call him "Alpha"; successively, a man leaves the room, call him "Omega". The question then is: is Omega the same person as Alpha? When does Omega begins to exist?⁵

4.1.5 The brain transplant

We have two men, call them Brown and Robinson. Suppose that, by a surgery operation, Brown's brain is transplanted into Robinson's body. We shall call the "resultant" man Brownson. Following one interpretation,⁶ we shall say that it is indeterminate whether Brown is identical to Brownson. This gives rise to the following questions: how many men are present in the story? When does (eventually) Brown ceases to exist? When does (eventually) Brownson begins to exist?

4.2 Vague Existence Paradoxes?

All these paradoxes drive us to reflect on the notions of composition, identity and persistence: these are the three aspects in which the phenomena of vagueness and indeterminacy appear in the five paradoxes. Thus, we can try to make sense of the several questions posed by clarifying our point of view concerning those metaphysical notions. Those notions, as we have seen in the other Chapters, are related to our main concern, the problem of vague existence. Despite that, none of the previous

⁴See as an introduction [Thomson 1998] ; [Lowe 2003].

⁵Even if this puzzle has implications similar to that of the brain transplant, it is often treated as an independent case. See for example [Parfit 1984]; [Van Inwagen 1988].

⁶See [Noonan 2008], where Noonan re-elaborates the puzzle, which was presented for the first time by [Shoemaker 1963]. As for the paradox of Tibbles the cat, the bibliography shows that the case of the brain transplant is suitable for different formulations in order to highlight different problems.

five paradoxes is suitable for an exemplification of vague existence, and there are two main reasons for this impossibility.

The first is that the dimension of time, even when it is called into question, does not play a crucial role in those paradoxes, while it has to be strictly involved in a representation of the vagueness of existence of an object. The "events" that generates the paradox in each of the previous five puzzles take place through time, but this dimension seems to play only a marginal role in the puzzles.

The second is that in those paradoxes the indeterminacy in existence and identity emerges always among one and more objects, while in a genuine case of vague existence of an entity it is vague whether we have one object or no object. Even when it is indeterminate, or vague, whether we have one or two objects, two or three objects (and so on and so forth) we do have a problem of indeterminate or vague existence: but the issue is usually characterized in terms of indeterminate or vague identity. Let's see these two reasons in details for each of the five paradoxes.

4.2.1 Two conditions lacking

In the paradox of the Ship of Theseus we have a problem of diachronic identity, and the passage of time is indeed crucial for the efficacy of the story. The puzzle would lose part of its force if we would imagine that the replacement of the planks of the first ship and the building of the second ship, by means of some incredible machinery, would take place instantaneously. In such a case, I suppose that we would have a strong insight that the second ship would be the ship of Theseus, even if there would still be room for a debate. Thus it is important, for the full accomplishment of the paradox, to hold that the planks are replaced one by one, not all together instantaneously.

Nevertheless, this fact shows that the essential aspect of the argument does not concern the passage of time: the soritical series, indeed, is about the process of the replacement of the planks. This process does take place in time, but this is not the most important feature of the paradox. If we go back to the questions posed after the analysis of the paradox we see that, with the exception of the first fundamental question, they all involve the dimension of time: in fact, they can be asked by means of the formula "When does...". Despite that, such formula does not mean "At what time..." a given change takes place; rather, it stays for "After how many planks..." that change takes place. The dimension of time does not play a crucial role in such a characterization of the paradox. Hence, this case cannot exemplify the problem of vague existence, in which the passage of time has to be involved among the essential features of the issue.

The second aspect that has to be underlined is that the vagueness regarding

which is the ship of Theseus interests two objects.⁷ Throughout the whole story we have at least one ship and at most two ships. A certain kind of three-dimensionalist and every four-dimensionalist could say that the number of objects at stake is in reality much bigger than two (see Chapter 2 on vague existence and persistence). Nevertheless, these metaphysical perspectives, with their radical ontology, would have to face exactly the same questions that we have outlined above: the nature of the paradox, so to say, would remain the same. That is why we can stick to the original characterization and say that there are minimum one ship and maximum two ships. Thus, the possible indeterminacy during some periods of time (namely, while the planks of the first ship are being replaced and while the second ship is being built) is between having one object or two objects. Hence, this case cannot exemplify the problem of vague existence, in which the possible vagueness should be between having one object or no object.

In the paradox of Tibbles the cat, the problem regards chiefly the conditions for the constitution and identity of an object, and the paradox has become central also in the discussion of the so-called "problem of the many".⁸ In the original version, the dimension of time is excluded by the possible sources of problems: in fact, the issue is about whether it is possible for different objects to occupy the same region of space *at the same time*. Hence, this case cannot exemplify the problem of vague existence, in which the passage of time has to be involved among the essential features of the issue.

The second aspect concerns the number of objects at stake in this paradox, which is often quoted as "the paradox of the 1001 cats". Thus, again, we see that the possible indeterminacy is between having one object (the smallest possible number of objects in the story) or more objects, in this case at most one thousand and one. Hence, this case cannot exemplify the problem of vague existence, in which the possible indeterminacy should be between having one object or no object.

In the paradox of the lump of clay and the statue we are concerned again with problems of constitution and identity. Indeed, we find a question analogous to that asked in the case of Tibbles: how can two distinct objects be in the same place at the same time? In this case, however, we find also questions regarding the persistence conditions of objects at stake. This consideration seems to indicate that the dimension of time is more involved in the paradox, and indeed it is: in fact, we can say that the lump exists both before the statue has begun and after it has ceased to exist. We can also ask when does the statue begins to exist, and this looks promising in order to exemplify a case of vague existence. Nevertheless, in the case of the lump and the statue, the question about the criteria for persistence of the objects is invoked in order to show that we should be thinking of two distinct

⁷The paradox can also be pushed in the direction of the problem of counting indeterminacy; see for instance [Pinillos 2003].

⁸See [Lewis 1993]; [Weatherson 2003].

objects (the lump and the statue, that have in fact different persistence conditions); consequently, we would have the main problem of how two objects could be, during some periods of time, in the same place at the same time. Thus, the main focus of the paradox is on this kind of issues, and not on the possible vagueness of existence of an object that we can face with the passage of time, as it should be in a genuine exemplification of a case of vague existence.

Moreover, as in the case of the ship of Theseus, even in this puzzle the number of objects at stake is minimum one and maximum two (with the same consideration we have made above about some theories of persistence). The passage from having no object to having one object is not involved in the paradox, which is about the passage from having one object to having (eventually) two objects. Hence, also this case cannot exemplify the problem of vague existence.

In the puzzle of the disruption machine, we see that we can make considerations analogous to those of the previous cases. In this paradox the dimension of time is involved in some measure, insofar as we consider the times before and after the disruption; nonetheless, the passage of time does not play any significant role in the argument, as it should be in a paradox regarding vagueness concerning the existence of an object.

Reflecting on the second aspect, we see that the number of objects presented in the story is minimum one (Alpha, before disruption) and maximum two (Alpha and Beta, in case the latter is thought to be distinct from the former). The indeterminacy is again between having one object or two objects; thus, even this paradox is not suitable for representing a case of vague existence.

Finally, regarding the paradox of the brain transplant the main problem that emerges is the indeterminacy in identity between Brown and Brownson. The point is that it is indeterminate, not vague, whether Brown is Brownson.⁹ The dimension of time is involved as in the case of the disruption machine, insofar as we have to consider the times before and after the transplant; however, the passage of time does not play any significant role in the argument, as it should be in a genuine exemplification of the problem of vague existence.

For what concerns the second aspect we are considering, we can see that in this paradox we have at least two object at the beginning of the story (Brown and Brownson), and at least one object at the end of the story (Brownson), after the transplant. That is why this paradox is not apt to represent a case of vague existence.

⁹See Chapter 3 on vague existence and identity.

4.3 A proper example of vague existence

It seems that none of the previous five paradoxes, that are some of the most frequently used in the literature on vagueness and indeterminacy, is apt for exemplifying the case of vague existence. An object comes into existence, then exists, and finally goes out of existence, but we find difficulties in thinking about the temporal boundaries of these "activities": that is why during some periods of time it appears to be vague whether the object already exists or still exists. The question is whether it makes sense to think about a couple of instants delimiting the duration of the existence of the object from a temporal point of view.

The challenge is to understand which are the possible sources of this vagueness (that seems to be of a peculiar kind) and make sense of the questions that it poses. Thus, first of all, we need to underline what it takes for an example to be a case of vague existence. In order to exemplify this problem, we need an example with at least the following fundamental characteristics:

- 1) The example must give rise to some sort of sorites-style argument. We need a case that can represent the vagueness concerning the temporal boundaries of existence, i.e. the vagueness regarding the processes of coming into and going out of existence.
- 2) If the difficulties that we find in the case of vague existence necessarily concern in a some measure the temporal boundaries of existence, then the change from non-existence to existence, and viceversa, has to be "provoked" by the passage of time. That is, the temporal dimension has to be included among the essential features of the problem, it cannot be excluded by means of some strategy concerning the relations of composition, persistence and identity. In other words, so to say, it cannot be mainly an affair of *matter* (how many hairs, how many planks...), nor mainly an affaire of *identity* (who is who...): it has to be also an affaire of time.
- 3) The change has to be from having no object to having one object and viceversa. Thus, in the example we need to have at least no object and at most one object. The shift in number has to be between 0 and 1, so to say. When it looks vague whether an object exists or not, the indeterminacy is between the existence of 0 object or 1 object.

My proposal is to take the previous three points as a working hypothesis for a characterization of the phenomenon of vague existence. So, let's consider again the example of Matthew, a monkey who lived for about fifty years during the eighteenth century.¹⁰ We have called *P* the period of time during which Matthew definitely

¹⁰See Chapter 2 on vague existence and persistence.

existed, *B.P.* the period of time before the coming into existence of Matthew, and *A.P.* the period of time after his going out of existence. The problem is that we find difficulties in thinking about the temporal locations of the changes from *B.P.* to *P*, i.e. when Matthew began to exist, and from *P* to *A.P.*, i.e. when Matthew ceased to exist. In fact, the individuation of the temporal boundaries of Matthew's existence appears to be subject to the problem of vagueness.

Thus, we can build soritical series that would never end, in principle. This is, on one side, the nature of the paradox of Matthew: we are driven to accept seemingly absurd conclusions¹¹ from successive applications of a classically valid rule of inference (*modus ponens*) to couples of premises that, step by step, appears to be definitely true. Once we take the first step, we get caught in a process that should have no end, making it difficult to reason about an eventual cut-off in the series: such is the nature of every soritical reasoning. However, what concerns us more directly here is that the case of Matthew the monkey forces us to question whether we can look for a *single starting instant* for the existence of Matthew. The same goes for what concerns an eventual *single ending instant* for the existence of Matthew: in fact, we can build a soritical series in analogy with the previous one, by adding one nanosecond at a time starting from a given time *u*, at which supposedly Matthew went out of existence.

Moreover, the uncertainty that we face in questioning whether there are those instants is caused by the apparent vagueness regarding the temporal boundaries of Matthew's existence. This appears to take place through time, and thus the passage of time seems to play a fundamental role in the process; a role that should be maintained in the characterization of a proper example of vague existence.

Finally, around the times of the coming into and going out of existence of Matthew, it is vague whether we have one object or no object.

Thus, the case of Matthew the monkey presents all the three necessary features that we have listed above for an exemplification of the phenomenon of vague existence. This example, contrary to the other five previously analyzed, is apt for a proper reflection on the problem of vague existence. Now, the question is whether those conditions are also sufficient for characterizing the problem.

¹¹Such as, for example: Matthew came into existence at some time in 460 b.C. (such date, as noted earlier, should be expressed in the following way: "*t - x*", where *x* stays for the relevant amount of nanoseconds).

Chapter 5

The problem of vague existence

5.1 Recap

The main goal of the present work is to investigate the problem of vague existence. We started from what looks like a puzzling discrepancy between the importance that the problem seems to have and the relatively sparse consideration that it has received, from a philosophical standpoint. Perhaps, it could be claimed, the problem of vague existence does not deserve our philosophical attention: perhaps, indeed, it is something like a fake philosophical problem that we can easily get rid of. Thus, the first question to answer is whether it is really important to take into examination such a problem. There are two different considerations that, in my opinion, support a positive answer to this question.

First of all, we have underlined that the alleged absurdity of the notion of vague existence plays a fundamental role in some influential arguments regarding other metaphysical debates, such as those on composition, persistence and identity. As we have seen, from some philosophical perspectives the entailment by a theory of occurrences of vague existence is taken to be a sufficient condition for the *reductio ad absurdum* of the same theory. Hence, it is legitimate to ask whether the notion of vague existence is really so absurd and can be used as a strategic weapon in different metaphysical disputes.

The second consideration that supports the claim that vague existence deserves more attention is that it is a phenomenon that seems to be apparently very pervasive: we find difficulties in holding that there are a precise starting instant and a precise ending instant for the existence of many objects. We can think about this phenomenon in terms of "temporal boundaries" for the existence of some objects. In particular, let's take into examination material objects, assuming that these are the things that occupy some spatiotemporal region; we could even push the previous idea forward and claim that it looks like there are no precise temporal boundaries for the existence of *any* material object. For example, let's consider the following

questions: when did I begin to exist? When did the chair I am sitting on begin to exist? When did the building I am in begin to exist? And so on and so forth for other material objects. As soon as we try to formulate an answer, we find ourselves in troubles. The same goes for a question as: when will those objects cease to exist?

The second consideration lets emerge another issue, that concerns the reason why we find particularly problematic to understand how an object's existence could have precise temporal boundaries. The reason is that the idea that an object starts and ends to exist at a precise couple of instants immediately seems to give rise to the problem of vagueness. Let's suppose that I began to exist exactly at time t , back in 1983, after a given quantity of matter Q (including molecules, cells and so on...) came together in a certain way W . Then, how could we hold that it is determinately false that I began to exist one nanosecond before t , that is (say) before the last micro-portion of matter of Q came together in way W ? All these elements (what we have called " Q ", " W ", "coming together") lack an adequate definition, but what interest us for the moment is the following idea: it seems very plausible to say that it could be true that the conditions for the beginning of my existence occurred also one nanosecond earlier than t . But then, obviously, if we accept this new claim about the beginning of my existence, we get caught in a soritical series seemingly never ending; and the same goes for the end of my existence.

Now let's say that the building I am in will cease to exist at time t_1 , for example after a given quantity of matter Q_1 (in which we have bricks, tiles, cement...) will be dismantled in a certain way W_1 . Then, how could we hold that it is determinately false that this building will cease to exist one nanosecond before t_1 , that is (say) before the removal of the last micro-portion of matter from Q_1 in way W_1 ? Again, provided the same considerations outlined above, it seems plausible to say that it could be true that the building will cease to exist one nanosecond earlier than t . But then again, if we accept this new claim about the ending of the existence of this building, we get caught in a soritical series seemingly never ending; and the same goes for the beginning of the existence of this building. We now have two new issues to examine: firstly, we have to see how the different theories of vagueness have dealt with such phenomena. Secondly, we have to see whether the cases of myself and the building are to be considered of the same kind.

5.2 Two strategies

As we have seen in the *Introduction* and in Chapter 1, there is a rather complex way of thinking about the phenomena of vague existence: van Inwagen's metaphysics for material objects. This strategy, that allegedly makes sense of the phenomena of vague existence, includes different theories that, in turn, deal with different meta-

physical debates: namely, those on composition, persistence and identity. As we have seen, these notions are linked together in a philosophical framework where the main assumption seems to be the following: composition entails existence. From van Inwagen's perspective, there are cases of vague existence, because the relation of composition is itself subject to the problem of vagueness. Thus, let's assume that van Inwagen's strategy is plausible: then from this point of view we would have, among others, the philosophical benefit of avoiding the adoption of extreme thesis on composition and persistence (such as universalism and some sort of four-dimensionalism), to the cost of the admission of occurrences of metaphysical vague existence.

The latter is not strictly a "cost" for van Inwagen; rather, it is a welcomed consequence of his metaphysics and something that could plausibly conform to our common sense intuitions about this topic. The problem with van Inwagen's perspective, as we have seen, is that it entails other very counterintuitive thesis. Primarily, the thesis that only living beings and simples exist, while every other entity would be in reality a set of simples arranged in a certain way; this is why van Inwagen would claim that my existence, but not that of what we see as a building, can be subject to vagueness. Moreover, even assuming that this strategy is plausible, there are nonetheless other problems with its arguments, as we have seen in Chapter 1. Thus, the question is whether we can think about vague existence even if we refuse to adopt van Inwagen's metaphysics for material objects.

In the same philosophical framework, where the main conviction is that composition entails existence, we have found a radical alternative to the previous strategy. This alternative consists in denying that it can be really vague when an object begins or ceases to exist; the main source of the phenomenon of vagueness would be conceptual. The strategy that takes vagueness to be primarily conceptual goes together with some semantic treatment of the phenomena, and is usually (but not mandatorily) paired with radically revisionary theories: e.g., universalism and some sort of four-dimensionalism. The basic idea that all those theories share is the following: wherever vagueness emerges, in any case, it is always a form of conceptual indeterminacy. Let's call this perspective the "conceptual strategy".

From this point of view, it cannot be indeterminate whether an object is composed by some parts, nor whether it persists through a certain time, nor whether it is identical with another object or itself; in the same way, it cannot be indeterminate whether an object exists or not, at any time. If sometimes it can look like this is the case, as in the examples of myself and the building during certain periods of time, the reasons are to be found in the relevant concepts and/or in the rules that govern the semantics of our language. Thus, let's assume that the conceptual strategy is plausible: then from this perspective we would have, among others, the metaphysical benefit of avoiding occurrences of vague existence, to the cost of the adoption of rather counterintuitive perspectives on composition and persistence (something

that is not seen as a cost, from this standpoint).

We have nonetheless a further question, as we have noted above: we have to see whether the conceptual strategy can deal with the phenomena of the vague existences of myself and the building in the same way. Those who defend such strategy claim that it can: the rules that govern the use of my proper name (or of the term "human being", for instance) as well as those that govern the use of the term "building", would be just not specified enough in order to avoid occurrences of borderline cases of application. This is the source of our difficulties in applying the relevant terms in certain circumstances and of our difficulties in singling out the exact composite objects, that are the sums of a certain number of spatial and temporal parts, to which apply the relevant terms. And that would be the reason why it looks like we are not able to define the exact temporal durations of these two material objects' existence.

I am persuaded by this linguistic treatment of the phenomenon of vague existence, or at least I find the basic idea plausible, but only in cases such as that of the building. That is, I can follow the basic idea of a conceptual vagueness only in respect to the existences of *artifacts*. I include in the set of artifacts all those objects that in some measure have been built, made or developed by means of some human activity. Buildings, ships, statues and the like are all artifacts, and I guess it is plausible to hold that the apparent vagueness regarding the temporal boundaries of the existence of such objects can depend on a deficiency of the semantics of the relevant terms. After all, for example, in no definition of the extension of the word "building" we will find an indication regarding the exact quantity of matter that we need to begin to have a building (and how this matter should be put together). And this can be a plausible reason why in some situation we are not sure as to whether we can apply the term "building" to a certain aggregate of matter. I am not persuaded that the same strategy is plausible even in cases such as that of the apparent vagueness concerning the temporal boundaries of my existence, i.e. the existence of a living being, for reasons I will explain in the next paragraphs.

5.3 Objects of investigation

Now let's try to define properly the set of material objects at stake here, that is the set of *living beings* (human beings, animals, plants). First of all, let's state that this distinction between artifacts and living beings is by no means intended to be exhaustive; perhaps, there are material objects that do not belong to any of these two categories. A river, for example, could be included in some ontology as an existing object, but it would not be an artifact nor a living being; a bird's nest, as well, could be considered as an existing object without being included in the set of

artifacts nor in the set of living beings. Anyway, this ontological classification is not our present concern. We need the distinction between artifacts and living beings in order to explore whether the phenomena of vague existence that they give rise to are all of the same kind.

As a working hypothesis, let's assume that an instant is a temporal item with no duration, as a point is a spatial item with no extension. I include in the set of living beings all those objects that are such that constitutively they could not exist for a single instant. Such objects could not exist instantaneously because of some intrinsic features of their nature. Primarily, they necessarily move, at least in some measure: every living being, including plants, at least grows/develops and we can consider this as a form of movement in our definition. The fact that an object necessarily moves entails that it necessarily exists at more than one instant of time because, in order to move, an object must occupy different locations at different times. Thus, let us define a living being such as an object that could not exist for a single instant, for the reason explained above.

Among the set of material objects, there are both natural entities (such as stones or rocks) and non-natural entities (such as many artifacts) that do not necessarily move. This is why from a metaphysical point of view it is legitimate to think about a rock, a chair, a statue, or a building existing instantaneously: those object would display all of their intrinsic features even existing at a single instant, and there is nothing contradictory in this idea. Hence, we will exclude such objects from the set of those that we will consider in our analysis of vague existence. On the contrary, it would not be legitimate to postulate the instantaneous existence of a living being: that thing existing for a single instant would be, so to say, no more than an image of a living being. No object existing at only one instant could exemplify the features that make a living being to be a living being.

A plausible issue arising from this definition of our ambit of inquiry could come from the consideration of four-dimensionalism and stage theory. After all, we have been saying, also in Chapter 2, that a temporal part or a stage of any object (conceiving it in the standard way, i.e. " M at t "), including living beings, is something existing instantaneously. Moreover, we have that a temporal part *is* the object at the relevant time. But then, this would be just a way to say that material objects, including living beings, could indeed exist for a single instant.

I think that this is not the case. I think that any perdurantist believing in the existence of living beings would not concede that there could exist temporal parts of a given living being absolutely detached from any other relevant spatiotemporal part of the same object or other objects. There could not exist something such as, for instance, a dog existing only at a single instant t_1 in February 2011. In other words, it would not be consistent, even from a four-dimensional or stage theory perspective, to hold that a living being could come into existence and go out of existence in just one instant. That entity would be something like a picture appearing and

disappearing at the same instant; but a picture of a living being is not a living being. Perdurantists and stage theorists can talk of temporal parts or stages of living beings only on condition that any living being is composed by at least more than one temporal part. The same condition does not hold for the instantaneous existence of, say, a chair. As we have noted, there is nothing metaphysically contradictory in conceiving a machinery that could make a chair exist at only one instant: in that instant we would have a "real" chair, not an image of a chair.

There is a further issue, concerning this definition of our objects of investigation, that needs to be taken into consideration. This definition could be thought to be question begging, or at least *ad hoc* for the purposes of the analysis of the phenomena of vague existence in the case of living beings. In fact, claiming that living beings necessarily exist at more than one time, we would be settling the matter for the possibility of an indeterminacy regarding the temporal boundaries of their existences. There is no vicious circularity in that. The fact that we are concerned with objects whose existence necessarily has some temporal duration does not bring about the idea that necessarily this duration must be subject to the problem of vagueness. An object could necessarily exist at more than one instant and have nonetheless sharp temporal boundaries. Indeed, this is our guiding question: does it make any sense to think that the existence of those material objects that necessarily exist at more than one time is subject to the problem of vagueness?

Before taking into examination this question, there is another issue regarding our definition of the kind of objects that we will consider. It could be thought that there exist objects whose nature is indeterminate, at least in some measure, in respect to the characterization of living beings as objects that constitutively could not exist for a single instant because of their intrinsic features. For example, consider a virus,¹ and call it "*v*": *v* is surely a natural entity and there is nothing artificial in its existence. On the other side, even from a strictly biological point of view, it seems debatable whether *v* could be included in the set of living beings. So: is *v* an object whose existence could be subject to the problem of vagueness in the way we are analyzing? This is debatable. Moreover, suppose that it is metaphysically indeterminate whether viruses belong to the set of living beings: this would entail that this set lacks a precise membership. The question is whether this fact could in turn entail a problem for our characterization of the object of the present investigation. I do not think that it can. Perhaps, there are objects such that there is no fact of the matter as to whether we have to include them in our analysis of metaphysical vague existence or not. Anyway, that would not exclude the fact that there are other objects such that it is definitely the case that they have certain features, the features required in order to be the objects of the present investigation: i.e., living beings in the characterization provided above.

¹As suggested also in [Van Inwagen 1990] and [Hawley 2002].

Now let's resume our guiding question: does it make any sense to think that the existence of those material objects that necessarily exist at more than one instant is subject to the problem of vagueness? So, the issue is whether we should hold that the existence of every material object (including living beings) must have precise temporal boundaries. Or, to put it in a different way, the issue is whether we should be happy with the same kind of linguistic treatment that I find plausible in the case of artifacts, even for what concerns the temporal boundaries of the existence of living beings. Thus, the main question to answer will be the following: does the notion of vague existence make any sense, at least in some case, or is it truly always absurd as it has been so often thought to be?

5.4 Predicates and paradoxes

In the *Introduction* of the present work, we have already underlined an important difference between, on one side, the typical examples of vague predicates such as "heap", "bald", "tall" and, on the other side, the predicate "exists", that seems nonetheless subject to the problem of vagueness. The difference between those predicates amounts to the fact that we know what is varying throughout the soritical series concerning the typical cases of vagueness: namely, in the previous examples, we have a variation of the number of grains, the number of hairs and the number of millimeters (or another adequate spatial unity of measurement). It looks like we do know which parameter we have to examine in such cases. In other words, we know how to reason about heapness, baldness and tallness: i.e., in terms of grains, hairs and millimeters respectively. On the contrary, in the case of the phenomenon of vague existence, it is hard to think about a variable that could be the subject of the relevant soritical series. It seems that we do not have a single unity of measurement for existence. The hypothesis that it could be a temporal item, in the attempt to build the soritical series on a line representing the passage of time, turned out to be mistaken.² The issue is whether it makes sense to think about a possible variable for the apparent soriticality of existence, as we do for heapness, baldness and tallness and other typical cases that are subject to the problem of vagueness. Thus, the question is: does it make sense to single out *one* element whose variation could determine when an object exists or not, as for example the number of hairs determines whether a man is bald or not (together, in both cases, with the semantical features of the relevant predicates)?

In the standard philosophical framework, where the problem of vague existence is discussed, something of this kind indeed takes place. As we have seen, the main assumption in such framework is that composition entails existence. Thus, if we

²See the *Preface*.

argue for some restriction on the relation of composition (defending some criterion for composition), and this restriction can be subject to the problem of vagueness, then we get vagueness for what concerns composition and hence vagueness for what concerns existence. This is for example van Inwagen's position. On the contrary, if we argue that the relation of composition is unrestricted, then we have that this relation is never subject to the problem of vagueness and thus we can adopt universalism and have no vagueness for what concerns existence. This is for example Lewis's position. So, even if we cannot say that, in this framework, composition is the single unity of measurement of existence, we can say that it is thought to be the parameter that determines whether an object exists or not: apart from the case of the existence of simples or mereological atoms, an object exists if and only if it is composed by some parts, and the debates regards the criteria for composition.

Throughout the course of the present work, we have examined the reasons why the consideration of the problem of vague existence only in terms of this standard framework is not satisfactory. We have examined some aspects of the problem that seem to indicate that the notion of vague existence could not only make sense, but it can also be a particular kind of vagueness. Some of these aspects were already explicit in the *Introduction*. We have seen that composition is not enough as a parameter determining whether an object exists or not, because it looks like the dimension of time plays a fundamental role in the problem of vague existence (we will come back soon on this role). Another aspect that seems to be peculiar of a case of vague existence, in respect to other phenomena of indeterminacy and vagueness, came out in Chapter 4 on the paradoxes: in a case of vague existence the indeterminacy is between the existence of one object and the existence of no object, while in the other cases we have examined it is always between one and more than one object. And this is one of the main reasons why none of the typical paradoxes that we find in the literature on vagueness is apt to exemplify a case of vague existence.

Before taking into examination the role of time, let's sum up the characteristics, that we have found out so far, of the phenomena of vague existence that we want to examine:

- I) Given that we assumed that vagueness is a particular form of indeterminacy, whose primary feature is soriticality, we have that the cases of vague existence at stake here must give rise to some sort of soritical series.
- II) The objects whose existence seems to be subject to the problem of vagueness in a peculiar way are those that we have labeled with the expression *living beings*.
- III) Contrary to what takes place in the typical examples of vagueness, in the case of vague existence it looks like we lack a definite parameter or a determining variable that would be the single subject of the relevant soritical series.

- IV) Time seems to be fundamentally involved in the phenomenon of vague existence. We find difficulties in thinking that the existence of a living being has precise temporal boundaries.
- V) If it is vague *when* an object comes into or goes out of existence then, during the relevant periods of time, it is vague whether we have one object or no object. We can call this the "0-1 and 1-0" feature of the problem of vague existence.

5.5 The role of time

Throughout the course of the present work, we have often underlined that the dimension of time seems to play an important role in the phenomenon of the vague existence of living beings; despite that, such role is often only superficially acknowledged in the arguments concerning vague existence. Briefly, the fact is that it looks like there are no precise temporal boundaries for the existence of a living being. An object of this kind comes into existence, then exists and finally goes out of existence, but it is hard to reason about the times at which it begins and ceases to exist. Hence, it is hard to reason about what we have characterized as the passages from 0 to 1 and from 1 to 0: that is, during some periods of time it seems to be vague whether we have one object or no object. Let's see whether this idea makes sense.

Consider a typical example of something that is subject to the problem of vagueness: take baldness and the relevant predicate "bald". Consider John, a man who is definitely not bald: John has 100.000 hairs on his head at time t . Suppose that, one by one, John starts losing his hairs in a process that takes place through time: at each time t_n John loses one hair. This process will lead John to have not a single hair on his head, at time $t_{100.000}$. Thus, at $t_{100.000}$, John has 0 hairs and is definitely bald. The paradoxical feature of such case is that the individuation in the process of a sharp cut-off, distinguishing the times when John is bald from those when he is not, is subject to the problem of vagueness. That is, we can connect t to $t_{100.000}$ in a soritical series, linking a determinate case of non-baldness to a determinate case of baldness: when do we start to apply the predicate "bald" to John? This is a typical formulation of a case of vagueness.

The paradox of the bald man (as every typical paradox of vagueness), in a sense, can be reformulated as a case of vague existence. Consider again the example of John and the process from t to $t_{100.000}$. The question could then be: when does a bald man come into existence? Or, when does a case of baldness come into existence? In such a reformulation, it could seem that we would have all of those characteristics that we have previously enumerated for having a problem of vague existence: soriticality, a living being as a subject, an important role played by time and the passage from the existence of 0 bald man to the existence of 1 bald man.

The question is whether we can take this to be a real case of vague existence, with the consequence that vague existence would then be the same kind of phenomenon that we face in the typical cases of vagueness.

5.5.1 Synchronic reductions

I do not think that we can, primarily because time just seems to play an important role in this case, while indeed it does not. In fact, we can transform the previous example of the bald man in a way in which the paradoxical features of the problem of vagueness remain, without the dimension of time playing any role. This transformation consists in a synchronic reduction of what was presented originally as a diachronic case.

Instead of considering only John, at different times, let's think about 100.001 men: suppose that each of them has a different number of hairs on the head, starting from $J_{100.000}$, who has 100.000 hairs, and finishing with J_0 , who has not a single hair on his head. Suppose we line them up in an ordered series of decreasing number of hairs, from $J_{100.000}$ to J_0 , and consider them altogether at the same time: in this way we would have a soritical series concerning baldness and the predicate "bald". This form of the example of the bald man would maintain all the paradoxical features that we usually have in a case of vagueness. The question would be: from which J_n should we start to apply the predicate "bald"? And the answer would be subject to the problem of vagueness, because we have troubles with the individuation of a sharp cut-off in the series, distinguishing the set of bald men from the set of non-bald men. Thus, we would have borderline cases of application of the predicate, whose extension seems to lack sharp boundaries.

What we would lack is any significant role for the dimension of time. Indeed, it would not make sense anymore to ask at what time does a bald man or a case of baldness come into or go out of existence. This hypothesis of a synchronic reduction of the paradox is completely plausible. Moreover, it is totally innocent from a philosophical point of view: it does not compromise any of the fundamental feature of the typical examples of vagueness. I claim that this kind of synchronic reduction of an eventually diachronic case of vagueness holds for every typical case of vagueness, not only for the paradox of the bald man. If we think about predicates such as "heap", "tall", "rich" and so on, we can see that a synchronic reduction is again plausible and innocent; the same goes for paradoxes such as that of the ship of Theseus. Perhaps, the same goes also for a particular class of vague predicates, the observational ones: if we think about "red", it looks like this kind of reformulation still holds. In such cases, I welcome a fully linguistic account of the problem of vagueness, as for the apparent vagueness concerning the temporal boundaries of the existence of artifacts.

Now, let's see whether this synchronic reduction works even in the case of vague existence that we are trying to examine in the present work. Consider a given period of time P and a living being o , with the usual features that we have already met in previous discussions.³ Suppose that P lasts for exactly 100.000 seconds (as always, we can adjust the example using other numbers and/or other unities of measurement); we name the passage of each second, from the beginning until the end of P , in the following way: $t_1, t_2, t_3, \dots, t_{100.000}$, lining them up in this way in an ordered series. This series has a soritical nature insofar as the individuation of the two sharp cut-offs delimiting the beginning and the end of o 's existence is subject to the problem of vagueness.

During certain periods of time in P it looks like there is no fact of the matter as to whether o already or still exists; during such periods of time it seems to be vague whether we can apply the predicate "exists" to something, because it is vague whether there exists one object or no object. In this diachronic form, this example seems to be a case of vague existence and has indeed all the features that we have outlined above: soriticality, a living being as a subject, an important role played by time and the passages from the existence of 0 object to the existence of 1 object and viceversa. The question is whether we can operate a synchronic reduction of this case, putting it back in the class of the typical cases of vagueness.

In order to reformulate this latter case in a synchronic form, we should multiply the number of the subjects that are present in the soritical series, considering them altogether at the same time, as we did in the bald man case; but this is simply not possible in the case of o coming into and going out of existence through P , for the following reasons. Suppose for ease of description that the living being we are considering is a hamster, as in the examples of van Inwagen and Hawley. In a synchronic form of such case, we should have several distinct hamsters, each taken at one instant, at different stages of their existence, and line them up in an ordered series; we should proceed from the "younger" to the "older", so to speak. We would thus have a given number n of entities, ordered following a progression based on different stages of their development. Let's suppose that we would have difficulties in applying the predicate "exists" to some of the alleged "hamsters" in the earlier or later stages of development, because of the soritical nature of the series. Then, we could plausibly lean on a linguistic perspective even on this case of vagueness. We could indeed say that the rules that govern our use of the term "hamster" are not specified enough in order to single out what begins (or ends) to count as one existing hamster during some periods of time. Thus, this would be again a typical case of vagueness, such as "bald" and "heap": the problem of vague existence would

³See for instance Chapter 3 on vague existence and identity. Suppose for ease of description that P is a continuous portion of time: in the early part of P , o definitely does not exist, then it comes into existence, then determinately exists, then goes out of existence and, in the final part of P , the object definitely does not exist. Moreover, o is the only object ever existing in P .

not be peculiar.

This hypothesis is rather questionable. It is not obvious that we could line up *different objects* in a progression following several stages of the same development. That is, we should have many hamsters at different stages of their existence, lined up in a series that should represent the existence of *one* living being: and this is problematic. So, this is a fundamental issue for this kind of synchronic reduction. Anyway, even admitting that we could put together such a series, we can see that this alleged reformulation would compromise some of the fundamental features of the case in its originally diachronic form. First and foremost, we would not be concerned with the vague existence of one object, but we would have in fact many objects. Briefly, we cannot consider different hamsters, because we want to deal with the temporal boundaries of the existence of one and the same hamster. A series with many different subjects is a series with many different existences involved; a series with many existences involved cannot stay for a series representing the course of one existence. This is why I do not think that the synchronic reduction would work in this case.

Another way in which we could try to operate a synchronic reduction of the case of *l* in *P* is the following. Suppose that, from the beginning of *P* (when *o* definitely has not come into existence yet) throughout all the period of time until its end (when *o* definitely has already gone out of existence), we take a picture at the passage of each second pointing to the place where *o* develops. Let's avoid for the sake of simplicity all the complications concerning the spatial location and the way in which we could take these pictures, and assume that we have a machinery that enables us to do that. We would thus have 100.000 pictures at the end of the process. Suppose that we line them up following their chronological order: the first pictures will be empty, then around the middle of the series we would have pictures of *o* definitely existing, and the last pictures will be empty again (assuming for simplicity that the process of the biological decomposition of *o* is completely finished by the end of *P*). Finally, let's consider all these pictures together, at the same time. It seems that we would have a series representing the vagueness concerning the temporal boundaries of the existence of *o*, with all the due features outlined above: soriticality, a living being as a subject, an important role played by time and the passages from the existence of 0 object to the existence of 1 object and viceversa. Moreover, we would have them in a synchronic form; this could mean again that the problem of vague existence is analogous to the other typical examples of vagueness and that, also in this case, we could plausibly lean on a linguistic perspective in order to account for the phenomenon.

Even this latter hypothesis is questionable. The main problem with this reduction is that it just seems that we have a living being as a subject. The pictures of *o* at different times of his existence are in fact only images of *o*: they are not living beings, nor they could be taken to be temporal parts of a living being (for

reasons explained above, see Paragraph 5.3 on the objects of investigation). Their metaphysical status is not that required for the present analysis of the problem of vague existence: hence, this is not the kind of problem with which we are concerned now. Even the alleged relation among the pictures in the soritical series cannot stay for the relation among the different stages of development of o : on one side we have an artificial series of metaphysically unrelated elements (the pictures), while on the other side we have a continuous development of one subject. Thus, the "pictures case" is not a plausible and above all innocent reformulation of the case of o in P .

These are the reasons why I hold that it is not possible to operate any synchronic reduction of a case of vague existence, as it is legitimate to do in the typical cases of vagueness. My conclusion is that the nature of the problem of vague existence in the case of living beings is necessarily diachronic. The dimension of time plays an unavoidable role: this is a peculiarity of such case of vagueness.

There is a further remark that we can display considering the role of time in respect to the problem of vague existence. The dimension of time is necessarily involved in this case, independently from the nature of such dimension. There are rich debates, both from a physical and metaphysical standpoint, in which the problematic notion of time is discussed.⁴ The interesting thing to note is that we do not need to specify anything concerning the nature of time. Whichever micro-structure or direction we think it has, or whichever topology we decide to adopt, or whichever temporal items we decide to include in our ontology, and so on and so forth: in any case the dimension of time still plays its fundamental role in relation to the phenomena of vague existence we are examining.

5.6 Vague existence: some necessary conditions and a possible account

There is a basic sense in which we can maintain that every phenomenon of vagueness emerges as soon as we start to use a language.⁵ The problem presents its features in a linguistic form, as every other philosophical problem. Moreover, we have to deal with this problem in a necessarily linguistic structure. Nonetheless, this does not mean that we can completely reduce every phenomenon of vagueness to a linguistic matter. In the case of vague existence, it looks like we cannot, if not by means of radical interventions at a metaphysical and/or ontological level. In this paragraph, I will try to sum up (at least some of) the necessary conditions for having a case of vague existence, and shape an account of the problem, starting from the different

⁴Some of these debates were briefly outlined in the *Preface*.

⁵On this topic, see [Russell 1923], reprinted in [Keefe 1997].

elements that we have examined so far. The attempt is to use the instruments of the framework we have analyzed, without introducing new notions or notions taken from other philosophical spheres. The aim of this attempt, obviously, is not to solve the problem of vague existence. Rather, we will see whether there is a way in which we can sensibly reason about the issue, without having to endorse revisionary perspectives on a metaphysical and/or ontological level.

On one side, in a linguistic account for the phenomena of vague existence such as the Lewis-Sider strategy, we have universalism about composition and some kind of four-dimensionalism or stage theory for what concerns persistence. This standpoint, paired with a semantical indecision theory of vagueness, can make sense of every phenomena of vagueness, including those of vague existence, for every kind of objects. On the other side, in a metaphysical account for the phenomena of vague existence such as that of van Inwagen, paired with the considerations about its "modest brand" provided by Hawley, we have an ontology where the only existing things are organisms and simples. Also this standpoint, with adequate adjustments at an ontological and semantical levels, can make sense of the phenomena of vague existence, and for the same kind of objects with which we are concerned here: living beings. The question is whether we can reason about the problem in the same framework where we find these two strategies, without endorsing one of them.

Now we will try to highlight which are the necessary conditions for having a case of vague existence. First of all, the dimension of time seems to play a crucial role. Indeed, in many cases concerning allegedly vague objects, or alleged case of vague existence, the dimension of time seems to be involved: for instance, we have examined the examples of the hamster in [Van Inwagen 1990] and [Hawley 2002], or the proposal of [Tye 1990], or the example of Brown and Brownson in [Noonan 2008]. Nevertheless, we have seen why in such cases time is only loosely involved and just appears to be part of the problem. On the contrary, in the phenomena of vague existence the dimension of time is the key factor that gives rise to the soriticality of the event. In many cases, the importance of the temporal dimension can be reduced to a mere appearance, by means of a synchronic reduction of the relevant sorites paradox: this is the case for what concerns the most part of the objects (together with their relevant predicates and terms) that are subject to the problem of vague existence. In other cases, this synchronic reduction is not available: namely, in the case of the vague existence of living beings.

These objects cannot come into and go out of existence at one single instant, because of some of their intrinsic features: their existence cannot be instantaneous in particular because these objects necessarily move. A possible way to think about this kind of objects is what we have listed as the fourth option available for the three-dimensionalist.⁶ We can hold that during some periods of time, around what

⁶See Paragraph 2.2.1. The same four options, as we have said, are available also for the four-dimensionalist, even if the last three are less popular than the first one: see Paragraph 2.2.3.

we call the "beginning" and the "ending" of a given living being's existence, there is no fact of the matter determining whether an entity is an existing object or not. The problem would be that what we have called the passages from 0 to 1 and from 1 to 0 necessarily take place through time. If we do not want to account for this problem by radically multiplying or reducing the number of the objects existing in such circumstance (option 1 and 2), nor we want to claim that the existence of a living being has precise temporal boundaries but we cannot know them (option 3), we can maintain that the existence of a living being (something that, when definitely existing, counts as one object) has not precise temporal boundaries.

So, these are five necessary conditions for having a case of metaphysical vague existence: we need a sorites, a living being as a subject, the passages from the existence of no object to the existence of one object (and viceversa), the fact that these passages necessarily take place through time and the fact that seemingly we lack a single variable for the relevant sorites.

Indeed, time cannot be the only variable in a case of vague existence, as we have said since the *Preface*, despite the fact that it is one of the sources of the problem and the element that conveys the apparent soriticality of the situation. Even in many traditional example of vagueness it looks like there is not single variable. In the case of the heap of sand, for instance, not only the number of grains matters, but also their disposition: if we line up 1000 grains of sand, one next to the other following a straight line, probably we would not be inclined to apply to that thing the predicate "heap", while if we put them together in another way we would. In the present work I have followed for simplicity the tendency to reduce the case of the heap to an issue of number of grains, even if things are slightly more complicated. In the case of existence, things are extremely more complicated. Throughout the passage of time, for what concerns the existence of a living being, there are obviously many elements varying: from a metaphysical standpoint, we can reason about them in terms of composition and claim that there are some criteria for composition for what concerns the kind of objects we have labeled "living beings". These criteria are subject to restrictions and, as such, they can give rise to situations in which it is not determinate whether they occur or not. What I want to suggest here is that the processes for the composition (and the decomposition) of living beings necessarily take place through time; thus, it is too reductive to narrow the debate on the problem of vague existence, in the case of living beings, to a matter of criteria for composition. In order to reason about the problem, it seems necessary to pair the variable of the criteria for composition to the variable of the temporal dimension of the existence of such objects. These two variables considered together seem to convey the idea that, during certain periods of time, it can be metaphysically indeterminate whether the conditions for the existence of one object occur: an object that, if (already/still) existing, would be a living being. This indeterminacy assumes the form of vagueness, insofar as the conditions for the existence of an object of this

kind necessarily vary through time, and this aspect is what gives rise to the apparent soriticality of the event, as in the example of Matthew the monkey.⁷

5.6.1 Vague existence: further remarks

The aim of the present work was to analyze whether the notion of vague existence makes sense, in a metaphysical framework where it is typically ruled out or accepted by means of some revisionary interventions at the metaphysical and ontological level. I have underlined five conditions that I think are necessary in order to have a case of metaphysical vague existence and a possible account for such kind of case. Whether this attempt is successful or not, there are several other questions that I have not addressed in the present work: if the perspective here outlined is plausible, then such questions could be the subject of further investigation. Here I will highlight some of these issues.

A first debatable point is that distinguishing the kind of vagueness affecting the existence of living beings from the kind of vagueness regarding other things, I hold that there are different sources of the phenomenon, depending on which case we consider. Even limiting our worries to the temporal boundaries of the existence of material objects, I have claimed that I am happy with a conceptual account of the problem for what concerns the set of artifacts (and probably even for many other material objects that are neither artifacts nor living beings). I believe that chairs and buildings exist, I do not want to follow [Van Inwagen 1990] or [Merricks 2001] in holding that they do not exist. I believe that in some circumstances it seems indeterminate whether an entity is a chair or not, or is a building or not. I think that this indeterminacy depends on a semantical indecision regarding the words "chair" and "building": I find plausible to hold that the rules that govern our use of such term are not specified enough in order to define the extension of the terms. I am not persuaded by this account in the case of the vagueness regarding the temporal boundaries of the existence of living beings. This view entails a form of "pluralism" for what concerns the possible sources of vagueness, and consequently for the accounts of the phenomena in different cases. I understand that this pluralism can be seen as a weak point, but I do not see this eventual weakness as an objection to this perspective.

A second question is whether there is a notion that we can use in order to pair the variables of the criteria for composition with the variable of time (and consequently with some perspective about persistence). Perhaps, a useful notion could be that of "states of affairs", but I will not commit here to such idea.⁸

A third issue is whether the five necessary conditions that we have underlined

⁷See Chapter 2.

⁸As an introduction to the topic, see for instance [Armstrong 1993] and [Hawley 2001].

are also sufficient for having a case of vague existence.

A fourth problem regards which kind of consequences (if there are any) the individuation of these conditions can have on the debates where the notion of vague existence is employed, often in *reductio ad absurdum* arguments. Furthermore, it would be interesting to see whether the problem of vague existence, in the form defended in the present chapter, can have an impact on debates such as those on persistence, identity and the problem of counting. This could depend also on the distinction between "existence-at" on one side and "quantification" or "existence *simpliciter*" on the other:⁹ hence, even the relation between such distinctions and vague existence could be the subject of further investigation.

⁹A distinction defended among others by [Tye 2000] and [Sider 2003].

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